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Decision Intelligence, Digital Transformation, and Supply Chain Competitiveness in Emerging Markets

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Abstract: *This study develops a conceptual framework explaining how Artificial Intelligence (AI)-driven Decision Intelligence (DI) supports organizational transformation and enhances supply chain competitiveness in emerging markets. Although organizations increasingly invest in AI technologies, analytics platforms, and digital transformation initiatives, many firms still struggle to convert technological capabilities into consistent, scalable, and strategically aligned decisions. The study argues that the main challenge is not the availability of AI tools, but rather the limited integration of AI into organizational decision workflows, governance systems, and operational processes. Accordingly, the paper positions Decision Intelligence as a decision-centric organizational capability that connects data, analytics, AI, human expertise, and governance mechanisms to improve decision-making effectiveness and supply chain performance. Using an integrative conceptual methodology, the study synthesizes literature from digital transformation, dynamic capability theory, supply chain management, AI governance, and organizational transformation. The proposed framework consists of four interconnected components: foundations (data readiness, decision inventory, and strategic KPIs), AI-driven DI capability, governance mechanisms, and transformation outcomes. The framework explains how organizations can operationalize sensing, seizing, and transforming capabilities through decision-centric systems that embed predictive analytics, prescriptive logic, human oversight, workflow orchestration, and continuous feedback loops into organizational decisions. The study further emphasizes that governance practices such as transparency, accountability, monitoring, and human oversight are essential to ensuring trustworthy and effective AI-enabled decisions. The study concludes that Decision Intelligence represents a critical missing link between digital transformation initiatives and sustainable supply chain competitiveness in emerging markets. By embedding AI into decision processes rather than treating it as isolated technological infrastructure, organizations can improve decision speed, decision quality, accountability, organizational learning, operational flexibility, resilience, and supply chain transparency. The paper contributes theoretically by extending dynamic capability theory through a decision-oriented perspective and contributes practically by offering managers a structured framework for implementing AI-enabled decision systems within complex and uncertain supply chain environments*

Keywords: Decision Intelligence, Artificial Intelligence, Digital Transformation, Supply Chain Competitiveness, Dynamic Capability Theory, Emerging Markets.

1. Introduction

Digital transformation has moved well beyond basic automation. In supply chains, it now involves the use of digital technologies to reshape value creation, organizational routines, and interfirm coordination. Yet the literature also shows that technology adoption alone is not enough: digital transformation succeeds only when it is paired with changes in structure, processes, culture, and strategic adaptation [1]. In emerging markets, the problem is even sharper because firms often face institutional voids, fragmented logistics, financing constraints, infrastructure gaps, and uneven digital maturity. These constraints matter because supply chain competitiveness is increasingly judged by speed, reliability, connectivity, transparency, flexibility, and resilience [2]. The World Bank's Logistics Performance Indicators now measure supply chains through shipment-level data on speed, connectivity, and reliability, while UNCTAD documents how MSMEs in Africa remain constrained by low digital adoption, weak value-chain integration, and major financing shortfalls. Furthermore, recent evidence from emerging economies demonstrates that digital transformation strengthens supply chain competitiveness when supported by dynamic organizational capabilities and adaptive managerial practices [1].

Within this context, organizations have invested heavily in AI, analytics, and data platforms, but the decision impact of those investments is often inconsistent. Recent research finds that AI capabilities improve decision-making performance, but their strongest direct effect is on decision speed and their benefits depend on complementary digital capabilities and business orientation [3]. Similarly, business intelligence capabilities and analytics systems have been found to improve organizational responsiveness, strategic agility, and innovation when integrated with knowledge-sharing and decision-support mechanisms [4], [5], [6]. Decision Intelligence has emerged to address precisely this gap by treating decisions—not models or dashboards—as the focal unit of design. Academic work frames Decision Intelligence as a way to match intelligence requirements with intelligence-processing capacity, while Gartner describes decision intelligence platforms as decision-centric systems that explicitly model decisions, orchestrate decision flow, and monitor decision quality while learning from outcomes [7].

The core problem, then, is not a shortage of AI tools; it is the weak embedding of AI into decision workflows, authority

structures, and governance mechanisms [8]. Business intelligence and analytics have traditionally helped organizations describe what happened and sometimes predict what may happen, but they do not automatically convert insight into repeatable, accountable action. Prior studies suggest that organizations gain stronger operational outcomes when digital systems are embedded within organizational learning processes, governance structures, and knowledge-centered cultures [9], [10], [11]. In supply chains specifically, firms increasingly rely on intelligent systems to coordinate recurring, high-impact decisions under uncertainty, making decision-centric integration critical for operational resilience and competitiveness [12].

This study therefore develops a conceptual argument that Decision Intelligence is the missing decision-centric dynamic capability linking digital transformation to supply chain competitiveness in emerging markets [13]. Building on dynamic capability view, the report treats DI as an organizational capability that helps firms sense relevant changes, seize opportunities through structured decision workflows, and transform operations through feedback, monitoring, and reconfiguration [14]. This extension is especially relevant in emerging markets, where empirical studies from developing-country contexts show that digital transformation yields stronger outcomes when firms combine technology adoption with dynamic capabilities, organizational agility, and context-sensitive governance [1], [15], [16]. Moreover, recent studies emphasize that AI-enabled organizational transformation becomes more effective when supported by strategic decision-making processes, data-driven capabilities, and adaptive leadership mechanisms [3], [17]. The aim is to propose a conceptual DI framework that explains how AI can support organizational transformation and supply chain competitiveness by being embedded in decisions rather than deployed as isolated tools. The objectives are to:

Define Decision Intelligence and distinguish it from BI, analytics, and standalone AI.

Synthesize the literature on AI-based decision support, organizational transformation, governance, and dynamic capabilities.

Develop a four-block framework linking foundations, DI capability, governance, and transformation outcomes.

Explain the framework's practical and theoretical implications for emerging-market supply chains.

The guiding research question is: How can AI-driven Decision Intelligence be conceptualized to support organizational transformation and supply chain competitiveness in emerging markets? The contribution is a simple but theory-grounded framework showing how DI improves decision speed, decision quality, accountability, and organizational learning, and how those improvements translate into supply chain outcomes such as faster delivery, greater flexibility, reduced costs, stronger transparency, and higher resilience.

2. Literature Review

Decision Intelligence is best understood as a decision-centric discipline that sits on top of data, analytics, and AI. Academic work defines it as a framework for aligning the intelligence needed for decisions with the organization's capacity to gather and process that intelligence. Gartner's market definition is more operational: DI platforms explicitly model decisions, combine data, analytics, knowledge, and AI, orchestrate decision flow at scale, and monitor governance and decision quality while learning from actions and outcomes [18]. This distinguishes DI from traditional BI, which is primarily oriented toward reports, dashboards, and historical visibility, and from AI narrowly understood as model building. In that sense, BI is mostly descriptive, analytics expands toward predictive and prescriptive reasoning, AI creates model-based inference, while DI embeds those assets into workflows, human roles, and feedback loops so that the organization can repeatedly decide and act. Recent studies also support the growing strategic role of business intelligence and analytics in enhancing organizational responsiveness, innovation, and strategic decision-making capabilities [4], [5], [6].

The AI literature also clarifies that "AI for decisions" is not one capability but several. Business analytics research typically distinguishes descriptive, predictive, and prescriptive forms of analysis. More recent work on causal decision making adds an explanatory layer that asks why an outcome happens and what interventions change it. Generative AI adds yet another layer by assisting with scenario generation, communication, summarization, and interaction, but recent reviews stress that human judgment remains crucial under uncertainty. This implies that DI systems should not rely on one model type [19]. A robust DI stack typically combines predictive models for "what is likely," causal or explanatory tools for "why," prescriptive logic or optimization for "what should be done," and generative interfaces for "how to reason, communicate, or collaborate around the decision" [20]–[22]. Recent evidence further demonstrates that AI-enabled decision-making capabilities significantly improve organizational performance when combined with complementary digital and analytical capabilities [3], [23].

At the same time, the risks of AI-centered decision support are well documented. NIST's AI RMF identifies trustworthiness characteristics that include validity and reliability, safety, security and resilience, accountability and transparency, explainability and interpretability, privacy enhancement, and fairness with harmful bias managed. OECD emphasizes that generative AI can produce hallucinations, fake and misleading content, copyrighted outputs, biased content, and privacy harms [24]. Model drift adds another governance problem because model performance can degrade

when production data or relationships change over time [20]–[22]. In short, DI is not simply about accelerating decisions; it is about making fast decisions that remain auditable, trustworthy, and fit for context. Prior studies similarly argue that cybersecurity awareness, governance structures, and responsible digital practices are essential for ensuring sustainable and trustworthy digital transformation outcomes [10], [11], [25].

Organizational transformation is also broader than technology implementation [26]. Reviews of digital transformation describe it as a process through which digital technologies trigger strategic responses that alter value creation paths while requiring structural change and the management of organizational barriers [27]. Systematic reviews further show that DT pushes firms toward more malleable organizational designs that support continuous adaptation and ecosystem participation [28]. Management research on organizational transformation likewise treats transformation as fundamental change in the way an organization operates and delivers value, including changes in structure, culture, governance, business processes, and external relationships. This is why a decision-centric lens is analytically powerful: actual choices about market positions, investments, suppliers, partners, risks, and resource allocations are the concrete points where strategy is translated into action. Empirical studies in emerging economies further confirm that digital transformation becomes more effective when organizations combine technological investments with organizational learning, leadership support, and adaptive governance mechanisms [1].

Dynamic capability theory provides the strongest theoretical bridge for this argument. Dynamic capabilities is the capacity to exploit internal and external competencies in changing environments, and later work organizes these capabilities around sensing, seizing, and transforming. Recent work extends this lens to digital transformation and supply chain management. Studies show that digital adaptability and agility strengthen supply chain resilience, that managerial micro foundations such as leadership approach, digital experts, and flexible investment processes enable sensing, seizing, and reconfiguration in supply chain digitalization, and that supply chain managers perceive digital mindset, scenario planning, and digital maturity as especially important capabilities. In emerging-economy evidence, a study of 326 Jordanian manufacturing firms found that digital transformation positively improves supply chain competitiveness and that dynamic capabilities mediate this effect, resulting in outcomes such as faster delivery, more flexibility, and lower costs [1]. Other studies also highlight that organizational agility, knowledge-oriented leadership, and learning capabilities play critical roles in enabling firms to transform digital resources into sustainable competitive advantage [6], [9]–[11].

The governance literature adds another missing piece. NIST structures AI risk management through four cross-cutting functions govern, map, measure, and manage and explicitly treats governance as a function that informs the other three. It also requires documented human oversight processes, clear roles and responsibilities, monitoring, feedback incorporation, and controls for third-party software and data, including supply-chain issues [29]. OECD's AI Principles similarly emphasize human agency, oversight, transparency, and accountability. Review work on responsible AI governance argues that the literature is still fragmented and that organizations need structural, relational, and procedural practices to operationalize trustworthy AI. A systematic review of AI-human collaboration reaches a parallel conclusion: the field is fragmented and lacks integrative frameworks explaining how AI-human dynamics shape decision outcomes [30]. The gap is therefore clear [20]–[22]. Prior work has examined AI, governance, digital transformation, and dynamic capabilities in parallel, but there are still relatively few integrative models explaining how AI becomes embedded into organizational decisions at scale especially in emerging-market supply chains. Recent studies similarly emphasize that organizational success in AI adoption depends on integrating governance, leadership support, strategic alignment, and data-driven decision mechanisms into everyday operational processes [15]–[17], [31].

3. Method

This study uses an integrative conceptual approach [32]. Rather than testing hypotheses empirically, it synthesizes prior literature to identify recurring constructs and to assemble them into a coherent framework suitable for theory building. This kind of conceptual synthesis is appropriate because the relevant literature remains dispersed across information systems, strategy, supply chain management, AI governance, and emerging-market digital transformation. The literature base prioritizes peer-reviewed journal articles and official governance or development frameworks. Representative sources include work on digital transformation, dynamic capabilities, AI-human collaboration, Decision Intelligence, responsible AI governance, and official guidance from NIST, OECD, the World Bank, and UNCTAD [33], [34]. The synthesis followed three steps [35]. First, it identified recurring constructs in the literature, especially decision lifecycle, AI capability types, human roles, governance mechanisms, and dynamic capabilities [36]. Second, it grouped those constructs into four themes: foundations, DI capability, governance, and outcomes. Third, it connected these themes into a framework that runs from inputs to decision process to performance outcomes, while mapping the process to sensing, seizing, and transforming in dynamic capability theory [37]–[39].

4.Proposed Conceptual Framework

The proposed framework treats Decision Intelligence as a higher-order organizational capability that converts digital transformation inputs into superior decisions and, through those decisions, into supply chain competitiveness. The framework extends dynamic capability theory in a specific way: instead of treating digital transformation as a broad organizational condition, it identifies the decision system itself as the key meso-level mechanism through which sensing, seizing, and transforming are operationalized [33], [34]. Sensing occurs through data readiness and predictive or causal analysis. Seizing occurs through prescriptive logic, workflow design, and decision rights. Transforming occurs through governance, monitoring, feedback, and reconfiguration of models, processes, and roles [37]–[39]. The framework proposes that organizational transformation and supply chain competitiveness begin with strong organizational foundations, including data readiness [40], [41], clear decision inventories, and strategically aligned KPIs. These foundations enable firms to build AI-driven DI capabilities that integrate predictive, causal, prescriptive, and generative AI technologies with organizational workflows, decision rules, and human authority structures [37]–[39]. Prior research similarly emphasizes that digital transformation becomes strategically valuable only when organizations integrate digital technologies with organizational capabilities, governance systems, and adaptive managerial processes [1], [31]. Furthermore, evidence suggests that AI-enabled decision systems improve organizational responsiveness and strategic effectiveness when supported by data-driven decision-making structures and organizational agility [15], [16].

The DI capability acts as the operational core of the framework by embedding AI into actual organizational decisions rather than using AI as isolated technological tools. Through structured workflows and human AI collaboration, organizations can improve decision speed, consistency, adaptability, and strategic coordination across supply chain activities. Governance functions as a continuous overlay across the DI capability [42], [43]. Mechanisms such as accountability systems, audit trails, monitoring processes, escalation rules, human oversight, and third-party risk controls ensure that AI-enabled decisions remain transparent, trustworthy, explainable, and aligned with organizational objectives. This perspective is consistent with recent studies arguing that organizational performance improvements from AI and business intelligence systems depend heavily on governance quality, leadership support, knowledge-sharing practices, and organizational learning capabilities [4], [9], [17]. In addition, research on cybersecurity awareness and digital governance highlights the importance of transparency, monitoring, and trust-building mechanisms in sustaining responsible digital transformation initiatives [10], [11], [25].

The framework also incorporates a continuous feedback loop in which transformation outcomes generate new organizational learning. Performance outcomes produce updated data, revised KPIs, redesigned processes, and retrained models, thereby strengthening future decision-making capabilities and supporting ongoing organizational adaptation and supply chain competitiveness [40], [41]. The conceptual extension to dynamic capability theory is that DI can be treated as a decision-oriented dynamic capability rather than as a mere analytics function. It makes the "how" of sensing, seizing, and transforming more explicit: digital data and AI widen sensing; decision workflows and authority structures enable seizing; monitoring, feedback, and process redesign sustain transforming [42], [43]. This also shifts attention from isolated firm resources to supply-chain networks, where digital transformation depends on inter-organizational coordination, third-party dependencies, and governance across boundaries. Recent studies similarly demonstrate that organizational learning capabilities, knowledge-oriented leadership, and collaborative governance mechanisms strengthen firms' ability to transform digital resources into long-term competitive advantages [6], [10], [11], [15], [16]. Moreover, emerging-market evidence indicates that firms achieve stronger supply chain competitiveness when digital transformation is continuously supported by adaptive dynamic capabilities and cross-functional decision integration [1].

5. Implications and Limitations

How the framework enables transformation. The first mechanism is decision speed. AI can shorten the gap between signal and action by producing forecasts, scenario evaluations, and recommended actions quickly, but the real speed gain comes when those outputs are connected to a workflow with predefined roles, thresholds, and next steps [44]. That is why recent empirical work finds AI's strongest observed effect on decision performance in speed, and why DI platforms emphasize orchestration of decision flow at scale rather than model accuracy alone. The second mechanism is decision quality and consistency. Predictive, causal, and prescriptive tools reduce variance by structuring how evidence is gathered, how alternatives are compared, and how trade-offs are evaluated. Human-AI collaboration research further suggests that better outcomes come from hybrid configurations in which AI expands information-processing capacity while humans retain contextual judgment in ambiguous situations [45]. In supply chains, this matters because recurring decisions such as inventory allocation, supplier response, mode selection, or exception management are highly interdependent and often constrained [46].

The third mechanism is accountability and trust. Governance frameworks consistently show that trustworthy AI requires transparency, documentation, clear responsibility, and human oversight processes. These features matter not just for regulatory compliance but for adoption. If users cannot trace

who approved a recommendation, what model generated it, what data informed it, and when escalation should occur, the system will struggle to scale. This is especially important in emerging markets, where institutional weaknesses can make informal workarounds attractive but can also undermine reproducibility and trust. The fourth mechanism is organizational learning. DI systems close the loop by comparing outcomes with prior recommendations and by feeding those results back into data, models, process rules, and KPIs. Gartner's definition explicitly includes learning from actions and outcomes, while NIST requires ongoing monitoring and incorporation of feedback from relevant actors. In dynamic capability terms, this is the transforming function: the organization does not merely use AI to decide; it uses post-decision evidence to reconfigure how future decisions will be made.

6.Theoretical and Practical Implications

Managers should begin with a small number of high-value decisions rather than with a broad "AI everywhere" program. A credible starting point is a single decision loop with clear KPIs, guardrails, ownership, and baseline performance, especially where decisions are constrained, repeated, and operationally important. Governance should be designed from the outset because NIST treats it as a continual, cross-cutting requirement rather than a late-stage audit function. In emerging-market contexts, firms should also expect change management and capability development to be just as important as technology selection. Evidence from Yemen shows that structured change management mediates the relationship between dynamic capabilities and digital transformation, while evidence from Vietnam and African MSMEs highlights skills, infrastructure, finance, data quality, cybersecurity, and cultural barriers as practical obstacles to scaling.

The framework positions Decision Intelligence as the bridge between AI capability and transformation outcomes. In the dynamic capability vocabulary, DI is a decision-system capability that operationalizes sensing, seizing, and transforming through the orchestration of digital signals, workflow rules, human authority, and feedback. This extends the dynamic capability view in two ways. First, it adds a decision-centric micro foundation that clarifies where digital transformation becomes organizational action. Second, it pushes the theory beyond the focal firm toward supply chain networks, where competitiveness depends on coordinated decisions across actors, technologies, and institutional conditions.

This is a conceptual framework, not an empirical test, so its causal claims still require validation. The literature itself remains fragmented across decision science, AI governance, supply chain management, and organizational change. Future research should therefore test the framework with comparative case studies, survey-based structural models, and longitudinal studies that follow DI adoption over time. The strongest open questions concern boundary conditions: which decisions are most suitable for DI, how much human oversight is optimal across decision types, and how institutional voids, government effectiveness, and ecosystem maturity moderate the translation of DI into supply chain competitiveness.

7. Conclusion

The central problem is no longer whether firms can acquire AI tools. It is whether they can convert those tools into scalable, repeatable, and trustworthy decision impact. The evidence reviewed here suggests that digital transformation improves supply chain performance most reliably when it is mediated by dynamic capabilities, organizational change, and decision-system design rather than by technology adoption alone. Decision Intelligence offers a useful way to conceptualize that missing link because it connects data, AI, people, workflows, governance, and feedback around the decisions that actually move supply chains. The framework proposed in this report contributes a simple but extensible view of that process. Foundations such as data readiness, decision inventory, and KPIs feed an AI-driven DI capability; governance overlays that capability through accountability, oversight, and monitoring; and the result is faster, better, more accountable, and more learnable decisions that strengthen supply chain competitiveness. The broad takeaway is clear: transformation happens not when AI is merely installed, but when it is embedded into decision workflows with governance and feedback loops and that insight is especially important in emerging markets, where capability building and institutional context strongly shape whether digital investments become competitive advantage..

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