

REVIEW

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Digital Transformation in Business Organizations: A Critical Review of Strategy, Technology Adoption, and Organizational Change in the Era of Data-Driven Enterprises

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Abstract

Digital transformation has emerged as a central imperative for organizations navigating the data-driven economy, fundamentally reshaping strategy, technology adoption, and organizational structures. This systematic and integrative review synthesizes peer-reviewed scholarship to examine how firms conceptualize digital transformation, pursue strategic renewal, implement digital technologies, and manage ensuing organizational changes. The analysis reveals that digital transformation is not merely technological upgrading but a multifaceted process involving strategic intent, capability reconfiguration, and structural redesign—often accompanied by significant tensions between legacy routines and emergent data-driven logics. Key insights trace the evolution of digital transformation research from early strategic framing toward more nuanced explorations of adoption barriers, managerial role shifts, and adaptive outcomes. Strategic drivers emphasize alignment with dynamic capabilities, while technology adoption processes underscore the interplay between implementation and business model innovation. Organizational change manifests in redesigned processes, cultures, and governance systems, yet persistent barriers such as cultural inertia and capability erosion hinder progress. To integrate these fragmented streams, this review introduces the Integrative Digital Transformation Framework, which maps interconnections across thematic layers and offers a structured lens for orchestrating sustainable transformation. By tracing temporal evolution and identifying theoretical gaps, this synthesis advances management scholarship and provides practitioners with actionable guidance for navigating digital transformation in data-driven enterprises.

Keywords Digital transformation, Business strategy, Technology adoption, Organizational change, Data-driven enterprises, Digital capabilities, Business model innovation

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Introduction

Digital transformation (DT) represents a profound shift in how business organizations operate, compete, and create value in an increasingly data-driven landscape. Far from a narrow technological initiative, DT encompasses the strategic integration of digital technologies to reshape business models, processes, and organizational architectures [1-6]. This transformation extends beyond the adoption of specific tools or platforms; it fundamentally

alters the logic of value creation, shifting organizations from product-centric or service-centric orientations toward digitally enabled ecosystems characterized by continuous connectivity, data-mediated interactions, and algorithmic decision-making [2]. Early conceptualizations positioned DT as an extension of IT-enabled change, yet contemporary scholarship underscores its disruptive potential to alter competitive dynamics, customer engagement, and internal decision systems [7-13]. In data-driven enterprises, where

vast volumes of information fuel real-time analytics and predictive capabilities [10], DT becomes both an enabler and a requirement for survival [3]. Organizations that fail to embrace digital transformation risk not merely competitive disadvantage but existential obsolescence as industries undergo structural reorganization around digital capabilities [5].

The strategic dimension of DT has received considerable attention. Scholars argue that successful transformation begins with deliberate strategic intent that aligns digital initiatives with overarching business objectives [14], moving beyond incremental digitization toward radical renewal [15, 16]. This strategic orientation requires distinguishing between digitization—the conversion of analog processes to digital formats—and true digital transformation, which entails reimagining business models, customer value propositions, and organizational boundaries [14]. For instance, formulating a DT strategy involves choices among multiple pathways [14], each demanding distinct resource commitments and risk profiles [7]. Organizations may pursue efficiency-driven transformation focused on operational optimization, market-driven transformation oriented toward customer experience, or ecosystem-driven transformation centered on platform business models [3]. Each pathway carries different implications for investment priorities, capability development, and governance structures [8]. This strategic logic is further complicated by the need for dynamic capabilities that allow firms to sense, seize, and reconfigure assets amid technological turbulence [13, 15–21]. Dynamic capabilities—the capacity to detect environmental shifts, mobilize resources in response, and continuously adapt organizational architectures—emerge as critical determinants of whether digital initiatives translate into sustained advantage rather than transient improvements [5]. Data-driven transformation amplifies these demands [9], as organizations must develop capabilities to harness big data, artificial intelligence, and interconnected platforms [4], thereby redefining value creation [5, 9]. The scale, velocity, and variety of data now available demand capabilities that extend far beyond traditional IT functions [2], encompassing data science expertise, algorithmic governance, and infrastructural architectures that support real-time analytics across distributed operations [10].

Table 1 clarifies that digital transformation pathways differ not only in strategic objectives but also in the organizational redesign, capability profile, and governance logic required for successful execution.

Table 1. Strategic pathways and organizational design choices across the digital transformation process

Analytical dimension	Efficiency-driven transformation	Market-facing transformation	Ecosystem transformation
Primary strategic intent	Cost reduction, process optimization, and standardization	Customer experience enhancement, responsiveness, and service innovation	Platform business model creation
Dominant value logic	Internal efficiency and reliability	Customer-centric differentiation	Ecosystem orchestration and competition
Typical trigger	Operational pressure, productivity gaps, and legacy inefficiency	Changing customer expectations and competitive service pressure	Competitive ecosystem competition and internal capability gaps
Technology adoption emphasis	ERP modernization, workflow automation, and analytics for control	CRM, personalization, omnichannel systems, and predictive analytics	APIs, cloud platforms, and infrastructure and connectivity
Required organizational redesign	Process formalization with selective agility	Cross-functional coordination around journeys and customer interfaces	Ecosystem partnership fluid arrangements
Capability profile needed	Process discipline, integration capability, and data visibility	Customer analytics, rapid experimentation, and service innovation capability	Ecosystem orchestration and resource coordination
Managerial governance mode	Performance monitoring, sequencing, and implementation discipline	Facilitative leadership, agile prioritization, and cross-unit alignment	Distributed governance and management

Most likely transformation risk	Digitization without strategic renewal	Experience innovation without back-end redesign	E
Key tension	Standardization vs adaptability	Speed vs coherence	Op
Indicative success condition	Digital tools embedded in redesigned processes, not merely layered onto legacy routines	Technology adoption synchronized with customer-facing and internal redesign	C deve g m s interc de
Relevant manuscript anchors	Strategy–adoption alignment [7, 14]; process change [4, 22]	Strategic renewal and customer value logic [13, 16, 17]	Bus inn netw [4

Technology adoption constitutes a critical bridge between strategy and execution. Research demonstrates that adoption is rarely linear [7]; it involves complex implementation processes influenced by organizational readiness, legacy systems, and external ecosystem pressures [8, 22–33]. Adoption trajectories typically unfold through phases of experimentation, scaling, and institutionalization [7], each presenting distinct challenges and requiring different managerial approaches [8]. Early-stage adoption often occurs in isolated pockets—innovation units, pilot projects, or specific functions [12]—and successful scaling requires navigating organizational politics, securing sustained resource commitment, and managing the tension between standardization for efficiency and flexibility for local adaptation [19]. In data-driven contexts, adoption extends to embedding analytics into core operations [6], yet firms frequently encounter resistance stemming from skill gaps or misaligned incentives [12, 19]. Technical skill gaps manifest in shortages of data scientists, engineers, and digitally literate managers [12]; equally consequential are cognitive skill gaps—the capacity to interpret analytical outputs, question algorithmic assumptions, and integrate data-driven insights with domain expertise [10]. Misaligned incentives further complicate adoption when performance metrics reward short-term operational outcomes rather than the experimentation and learning essential for digital capability development [19]. The literature further reveals that

effective adoption hinges on complementary organizational changes, including process reengineering and cultural shifts [4, 22]. Digital tools adopted within unchanged workflows yield limited benefits [8]; realizing the full potential of digital transformation requires reimagining how work is organized, how decisions are made, and how success is measured [15].

Organizational change emerges as perhaps the most challenging facet of DT. Digital technologies disrupt established routines, hierarchies, and decision-making protocols [22], necessitating redesign of structures to foster agility and collaboration [4, 13]. Hierarchies built for stability and efficiency often prove ill-suited to the iterative experimentation, cross-functional coordination, and rapid adaptation that digital transformation demands [13]. Structures must evolve toward flatter configurations, fluid teaming arrangements, and permeable boundaries that enable collaboration both within and beyond the organization [4]. Managerial roles evolve from command-and-control to facilitative and data-literate leadership [16], while business models undergo fundamental innovation to leverage platform economies and ecosystem participation [11, 20, 26]. The manager’s role shifts from directing activities to enabling conditions for digital innovation [16]—curating talent, fostering psychological safety for experimentation, and translating data-driven insights into strategic action [24]. Yet the path is fraught with tensions: the promise of enhanced performance often clashes with risks of capability erosion, employee disengagement, and strategic drift [8, 19]. The very technologies that enable unprecedented efficiency can, if implemented without attention to human factors, erode the tacit knowledge, professional judgment, and intrinsic motivation that underpin sustainable performance [19]. Strategic drift occurs when organizations pursue digital initiatives without coherent integration with overall strategy [8], resulting in proliferating disconnected technologies that consume resources without delivering transformative benefits [15].

Despite growing interest, DT research remains fragmented across strategic management, information systems, and organizational studies [18, 22]. Each disciplinary tradition brings valuable insights yet tends to emphasize distinct aspects of transformation—strategy scholars focus on competitive positioning and resource allocation [13], information systems scholars examine technology implementation and adoption processes [6], and organizational scholars attend to change management, culture, and human factors [4]. This fragmentation limits the

development of an integrated understanding capable of guiding holistic transformation efforts [18]. Early contributions focused on conceptual foundations and strategic options [14, 17], while later works emphasize empirical insights into implementation and outcomes [6, 13, 24]. This temporal evolution reflects broader shifts in the business environment, from the rise of cloud computing and mobile technologies to the current emphasis on AI and sustainability-driven digitalization [2, 25]. However, theoretical fragmentation persists [15], with limited integrative efforts to connect strategy, adoption, and change within a cohesive framework, particularly in data-driven settings [18]. The absence of such integration leaves both scholars and practitioners without a clear architecture for understanding how strategic choices, adoption processes, and organizational change interact to shape transformation outcomes [1].

This critical review addresses these gaps by synthesizing and organizing the literature around core themes: conceptualization of DT, strategic drivers, technology adoption processes, organizational redesign, managerial implications, and associated tensions [1]. Drawing exclusively on a curated corpus of peer-reviewed publications [2], the review adopts an integrative approach to classify perspectives, compare insights, and highlight contradictions [3]. It traces how the field has progressed from strategy-centric views to holistic examinations of adaptation and outcomes [4]. The focus on data-driven enterprises is deliberate [5]; while DT spans industries and contexts, data-intensive environments present distinctive challenges and opportunities that warrant focused synthesis [6]. Ultimately, the review introduces an original synthesis model—the Integrative Digital Transformation Framework (IDTF)—to provide a structured architecture for understanding DT as an interconnected, iterative process [7]. By doing so, it contributes to management studies by clarifying boundary conditions, exposing enabling conditions and barriers, and charting pathways for future inquiry in the era of data-driven enterprises [8]. The subsequent sections detail the review methodology, present thematic synthesis, and elaborate on the proposed integrative architecture [9].

Review Method and Corpus Delimitation

The present integrative review followed a targeted, protocol-driven literature search designed to identify high-

quality, peer-reviewed publications directly relevant to digital transformation in business organizations [1]. Searches were conducted across leading academic databases with emphasis on the specified journals in the fields of strategic management, information systems, and organizational studies [2], including *Strategic Management Journal*, *Journal of Business Research*, *MIS Quarterly*, *Information and Management*, *Organization Science*, *Long Range Planning*, *Journal of Strategic Information Systems*, *Technovation*, *Technological Forecasting and Social Change*, *Academy of Management Review*, and *Academy of Management Journal* [3].

Keyword combinations centered on core concepts such as “digital transformation” paired with “strategy,” “technology adoption,” “organizational change,” “data-driven,” “business model,” “digital capabilities,” and “managerial roles” [4]. Additional terms addressed strategic renewal, digital maturity, and transformation pathways to ensure comprehensive coverage of the topic’s multifaceted nature [5]. Only English-language, peer-reviewed journal articles published between 2010 and 2025 were considered [6], with preprints included solely if subsequently published in peer-reviewed outlets [7].

Inclusion criteria required that studies explicitly address at least one of the focal areas: digital transformation strategy, technology adoption processes, organizational redesign, data-driven business processes, capability development, managerial implications, or business model change within organizational contexts [8]. Exclusion criteria eliminated purely technical papers, non-business settings, or studies lacking a clear linkage to strategy, adoption, or change [9]. Screening proceeded in stages: an initial title and abstract review for relevance [10], followed by a full-text assessment of the depth of alignment with the review’s integrative objectives [11]. Iterative cross-checking ensured that selected works contributed unique insights to the synthesis without redundancy [12].

The final corpus was delimited to exactly 35 publications that collectively represent the most directly pertinent and influential contributions [1]. These references span conceptual, qualitative, and review-based studies [2], providing a balanced foundation for critical synthesis [3]. The selected works capture the field’s evolution, with earlier publications establishing foundational strategic concepts and later ones addressing implementation realities and emergent tensions [4]. This focused delimitation prioritizes depth and thematic coherence over exhaustive coverage

[5], enabling a rigorous integrative analysis grounded in high-impact scholarship [6]. All subsequent citations in the review refer exclusively to this approved corpus, ensuring methodological transparency and fidelity to the delimited literature [7].

Literature Synthesis and Thematic Integration

Strategic logics of digital transformation

The literature conceptualizes DT strategy as a deliberate logic that transcends mere technology deployment [17], emphasizing alignment between digital initiatives and long-term organizational renewal [13, 15]. Foundational work frames digital business strategy as a distinct domain requiring new insights into value creation through network effects and platform dynamics [17]. Subsequent studies highlight multiple strategy archetypes and formulation options [14], underscoring the need for meta-objectives that guide transformation pathways [7]. In data-driven enterprises, strategic logics increasingly incorporate dynamic capabilities to sense opportunities and reconfigure resources amid volatility [13, 21]. Recent contributions stress the role of culture and leadership in embedding strategic intent [4], revealing that misalignment between vision and execution often undermines outcomes [25]. Overall, the strategic perspective has evolved from prescriptive frameworks toward process-oriented views that acknowledge contingency and iteration [16, 18].

Technology adoption in data-driven enterprises

Technology adoption emerges as a pivotal yet intricate process shaped by organizational context and implementation practices [6, 9]. Studies document how firms progress through stages of digitization, digitalization, and full transformation [6], with data analytics and AI serving as core enablers [2]. Adoption success depends on complementary investments in infrastructure, skills, and governance [8], yet many organizations face hurdles related to legacy integration and resistance [19]. Empirical insights from financial and service sectors illustrate that structured adoption pathways, supported by business process management, enhance maturity [7, 12]. Critically, the literature cautions that technology-centric adoption without parallel organizational adjustments yields limited

value [10], highlighting the necessity of holistic implementation logics.

Organizational redesign under digital change

DT necessitates profound organizational redesign, including flattened hierarchies, agile structures, and process reconfiguration [4, 13, 22]. Research shows that digital technologies enable malleable designs conducive to continuous adaptation [22], yet legacy structures often impede progress [28]. Case-based evidence reveals how firms redesign networks and commons to support ecosystem participation [12], underscoring the shift from internal optimization to boundary-spanning collaboration [3]. Tensions arise when redesign efforts clash with entrenched routines [19], leading to partial or failed transformations [8]. The synthesis indicates that successful redesign integrates structural, cultural, and capability elements [9], particularly in data-driven settings where real-time decision-making demands new coordination mechanisms [3].

Managerial roles in transformation processes

Managerial roles undergo significant transformation, evolving toward data-literate, facilitative, and ecosystem-oriented leadership [16, 19, 24]. The literature documents that executives must navigate strategy formulation, capability building, and cultural stewardship simultaneously [4, 25]. Decision systems are increasingly augmented by analytics [10], shifting managerial focus from intuition to evidence-based governance [29]. However, role ambiguity and skill gaps create barriers [19], with some studies noting capability erosion when traditional expertise is devalued [16]. The critical view reveals that effective managerial transformation requires deliberate development of digital acumen and cross-functional orchestration [32].

Tensions and barriers in digital transformation

Persistent tensions characterize DT processes, including the paradox of transformation versus incremental digitization, adoption versus redesign, and capability development versus erosion [15, 18, 22]. Barriers encompass cultural inertia, resource constraints, and misaligned incentives [4, 8, 19]. The literature traces how

external pressures interact with internal frictions [6], often resulting in fragmented outcomes [13]. Data-driven transformation intensifies these tensions by demanding rapid adaptation while risking over-reliance on technology at the expense of human elements [10]. Synthesis identifies enabling conditions such as top-management commitment and iterative learning as critical mitigators [7, 9, 13].

Data-driven capability development

Capability development is positioned as the linchpin linking strategy, adoption, and change [13, 21]. Dynamic capabilities enable firms to integrate digital technologies into value-creating activities [13], with data analytics fostering predictive and adaptive competencies [5]. Studies emphasize that capability building is ongoing and path-dependent [13], requiring strategic renewal to avoid obsolescence [21]. In data-driven enterprises, capabilities extend to ecosystem orchestration and business model reconfiguration [11, 20]. Yet fragmentation persists regarding measurement and maturation pathways.

Integrative Architecture for Digital Transformation Research: The IDTF Model

To synthesize the preceding thematic domains into a coherent architecture, this review proposes the Integrative Digital Transformation Framework (IDTF) [1]. The IDTF is an original, multi-layered model that organizes the 35-reference corpus into six interconnected thematic dimensions, emphasizing iterative interactions rather than linear causality [2]. The dimensions are: (1) strategic intent layer, capturing formulation logics and renewal objectives [14, 15, 17, 25]; (2) technology adoption layer, addressing implementation processes and maturity pathways [6, 7, 9]; (3) organizational redesign layer, encompassing structural and cultural reconfiguration [4, 12, 13, 22]; (4) data-driven capability layer, focusing on dynamic resource orchestration [5, 13, 21, 29]; (5) managerial governance layer, highlighting role evolution and decision transformation [10, 16, 19, 24]; and (6) adaptation outcomes layer, integrating performance feedback and adaptive loops [3, 6, 18].

The framework underscores bidirectional relationships and feedback mechanisms [1]: strategic intent shapes adoption, which drives redesign and capability building, while outcomes loop back to refine strategy [2]. Tensions and

barriers are represented as cross-cutting influences that can disrupt or enrich flows across layers [3]. This architecture resolves theoretical fragmentation by providing a unified lens for comparing perspectives and tracing evolution from strategy-focused early works to holistic recent contributions [4], as shown in Figure 1.

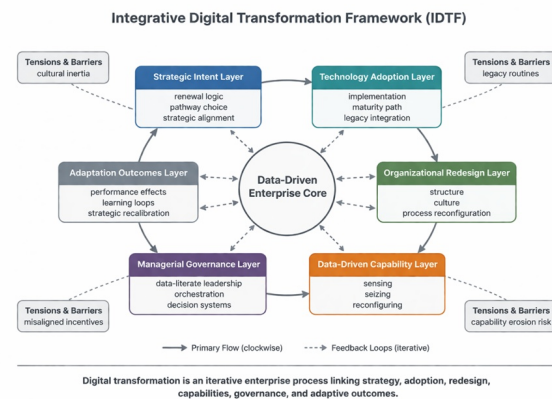


Figure 1. The integrative digital transformation framework (IDTF).

Interwoven Pathways: Cross-Theme Dynamics in Digital Transformation

The thematic domains synthesized in the preceding sections do not operate in isolation [1]; rather, they form tightly interwoven pathways that reveal the systemic nature of digital transformation (DT) in data-driven enterprises [2]. Strategic intent serves as the foundational trigger that orients technology adoption [14], yet the literature consistently demonstrates that formulation alone is insufficient without parallel redesign of organizational architectures [13, 16]. For example, dynamic capability development bridges these layers by enabling firms to translate strategic logics into actionable technology integration and subsequent structural agility [5, 13, 21].

Cross-theme analysis exposes recurring tensions: the drive toward data-driven efficiency frequently collides with inertial forces embedded in legacy routines [19], producing partial transformations that erode rather than enhance capabilities [8, 22]. Adoption processes, when decoupled from managerial governance shifts, amplify these frictions [4]; studies illustrate how top-management commitment can mitigate misalignment [7], yet cultural barriers often persist across layers [25]. Temporal evolution further clarifies these

dynamics. Early contributions privileged strategic framing and business model innovation [17, 20], whereas post-2019 scholarship integrates adoption realities with redesign outcomes [6], reflecting the maturation of DT from conceptual aspiration to lived organizational experience [18, 24].

Table 2 extends the IDTF by specifying where the principal cross-layer contradictions arise and by identifying resolution mechanisms that convert digital transformation from a technology program into a managed adaptive system.

Table 2. Cross-layer tensions in the IDTF and mechanisms for their resolution

IDTF interface where tension appears	Core contradiction	How the contradiction manifests in organizations	Resolution mechanisms
Strategic intent ↔ technology adoption	Ambitious digital vision vs fragmented implementation	Digital initiatives proliferate without clear prioritization or pathway logic	Strategic alignment, resource allocation, system integration, transparency
Technology adoption ↔ organizational redesign	New technologies vs unchanged workflows and structures	Tools are installed, but routines, incentives, and coordination patterns remain legacy-bound	Localization, resource allocation, resistance management
Organizational redesign ↔ data-driven capability	Structural change vs insufficient capability depth	Flatter or agile structures emerge without adequate analytical, integration, or reconfiguration skills	Capability development, employee engagement, vertical integration, isolation

Data-driven capability ↔ managerial governance	Analytics expansion vs managerial readiness	Managers receive more data but lack interpretive routines, decision rights clarity, or governance norms	Digital literacy, data governance, decision-making protocols, managerial adaptation
Managerial governance ↔ adaptation outcomes	Pressure for results vs. the need for experimentation and learning	Leaders demand rapid outcomes while learning loops remain underdeveloped	Short-term wins, experimentation zones, performance incentives, iterative learning
Adaptation outcomes ↔ strategic intent	Performance feedback vs strategic persistence	Firms either overreact to early setbacks or cling to obsolete digital priorities	Objective performance metrics, strategic flexibility, reinvestment in emerging technologies, misalignment correction
Cross-cutting across all six layers	Digital acceleration vs human and cultural absorption capacity	Legacy norms, cultural inertia, and misaligned incentives undermine coordination across stages	Transcending legacy, disembedding from old norms, uneven digital adoption

Data-driven capability development emerges as the pivotal integrator [13], mediating between technology adoption and

adaptation outcomes while feeding back into strategic renewal. This recursive interplay underscores that DT is inherently iterative [3]: outcomes in the adaptation layer—whether performance gains or capability shortfalls—prompt recalibration of intent and governance [6, 18]. The IDTF model formalizes these interconnections [1], transforming fragmented insights into a unified architecture that accounts for both forward momentum and countervailing tensions [2]. By mapping these cross-theme dynamics, the review clarifies why isolated interventions rarely succeed and why holistic orchestration across layers is essential for sustainable enterprise-level change [3].

Advancing Theory: Contributions to Digital Transformation Scholarship

This integrative review contributes to management scholarship by resolving theoretical fragmentation through the Integrative Digital Transformation Framework (IDTF) [1]. Unlike prior reviews that remain domain-specific [15, 18, 30], the IDTF offers a multi-layered architecture that explicitly links strategic intent, technology adoption, organizational redesign, data-driven capabilities, managerial governance, and adaptation outcomes [2]. It advances dynamic capability theory [13, 21] by embedding capability development within a broader socio-technical system rather than treating it as an isolated construct [3]. The framework also enriches the business model innovation literature [11, 20] by demonstrating that model reconfiguration is co-determined by redesign and governance layers rather than by strategy alone [4].

Methodologically, the review's disciplined corpus delimitation and thematic classification provide a replicable protocol for future integrative efforts in rapidly evolving fields [1]. By tracing temporal shifts from strategy-centric to holistic perspectives [2], it provides a longitudinal lens that highlights the field's maturation and exposes persistent gaps—most notably the under-theorization of feedback loops and tension-resolution mechanisms [6, 19]. These contributions collectively move DT research beyond descriptive synthesis toward a structured, integrative understanding suited to data-driven enterprise contexts [3].

Practical Imperatives: Managerial Guidance for

Data-Driven Transformation

Managers confronting DT can leverage the IDTF as a diagnostic and orchestration tool [1]. The framework directs leaders to align strategic intent with explicit capability audits before committing to technology adoption pathways [7], thereby avoiding the common pitfall of premature implementation [14]. Practitioners should prioritize cultural and structural redesign in tandem with technology rollout [4], ensuring that managerial roles evolve toward data-literate governance rather than remaining anchored in legacy decision protocols [16, 24].

The cross-theme analysis highlights actionable enabling conditions: iterative learning cycles that link adaptation outcomes back to strategic recalibration can accelerate maturity while mitigating capability erosion [9, 13, 25]. Organizations are advised to embed tension-monitoring mechanisms—such as cross-functional DT councils—within the managerial governance layer to surface and resolve frictions proactively [8, 19]. For data-driven enterprises, the IDTF underscores the necessity of ecosystem-oriented business model experimentation [5], urging leaders to treat platform participation and network commons as strategic assets rather than peripheral initiatives [12]. Overall, the review equips executives with a coherent roadmap that balances ambition with realism [2], emphasizing that sustainable transformation emerges from orchestrated interplay across all six layers rather than sequential or technology-first initiatives [3].

Scope and Boundaries of the Review

The review is bounded by its deliberate focus on 35 high-impact, peer-reviewed publications drawn from leading management and information systems journals [1]. This delimitation ensures depth and thematic coherence but necessarily excludes practitioner-oriented outlets, conference proceedings, and non-English scholarship [2]. The synthesis relies exclusively on conceptual, qualitative, and review-based studies [3]; quantitative empirical validations or sector-specific nuances receive limited attention within the corpus [4]. While the IDTF offers a robust integrative structure, it remains a literature-derived model rather than an empirically tested causal framework [5]. These boundaries, though intentional, circumscribe generalizability and invite complementary research to extend or challenge the proposed architecture [6].

Horizons for Inquiry: Future Research Directions

Future scholarship should empirically test the IDTF's layered interactions through longitudinal case studies and mixed-method designs that capture feedback dynamics over extended transformation cycles [6, 13]. Comparative research across industries and geographies could illuminate contextual contingencies that moderate layer interdependencies [3], particularly in emerging markets or highly regulated sectors [24]. The under-explored interplay between sustainability imperatives and data-driven capabilities represents a fertile extension [2], as does the role of generative AI in reshaping managerial governance and adaptation outcomes [10].

Theoretical advancement would benefit from integrating micro-level individual behaviors with macro-level ecosystem dynamics [4], thereby enriching the managerial governance and redesign layers [19]. Longitudinal studies tracking capability-erosion versus development trajectories could further clarify the boundary conditions for successful DT [2]. Finally, researchers are encouraged to develop measurement instruments for the IDTF layers [5], enabling quantitative validation and comparative analysis across organizational contexts [6]. These directions promise to deepen the integrative understanding of DT while addressing the evolving demands of data-driven enterprises [1].

Conclusion

Digital transformation in business organizations is fundamentally an integrative challenge that intertwines

strategy, technology adoption, and organizational change within data-driven realities. By synthesizing 35 foundational studies through the IDTF, this critical review demonstrates that sustainable outcomes depend on deliberate orchestration across interconnected layers rather than isolated interventions. The framework illuminates both the promise of strategic renewal and the persistent tensions that accompany capability reconfiguration, offering scholars a unified lens and practitioners a practical roadmap. As data-driven logics continue to reshape competitive landscapes, the IDTF provides a timely architecture for navigating complexity, fostering resilience, and realizing the full potential of digital enterprise transformation.

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