

REVIEW

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# Data-Driven Organizations in Management Research: A Review of Analytical Capabilities, Strategic Decision Making, and Organizational Transformation

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## Abstract

The rapid proliferation of big data and advanced analytics has fundamentally altered how organizations develop analytical capabilities, execute strategic decisions, and undergo structural transformation. This integrative review synthesizes peer-reviewed studies published to map the evolving landscape of data-driven organizations in management research. By classifying extant work into thematic domains, the review traces the progression from foundational analytical competencies to their integration within strategic processes and, ultimately, to broader organizational change. Key insights reveal that analytical capabilities serve as critical enablers of data-informed decision-making, yet persistent tensions arise between algorithmic outputs and managerial intuition. Governance structures and cognitive shifts further mediate the translation of analytics into sustainable transformation. The study introduces the D3O Framework (Data-Driven Decision and Organizational Evolution Framework) as a novel synthesis architecture that organizes the literature into six interconnected layers, highlighting feedback mechanisms and inter-layer dynamics. This structured integration clarifies fragmented insights, underscores the shift from intuition-based to evidence-driven management, and offers a roadmap for future scholarship. The findings hold significant implications for theory and practice, emphasizing how organizations can harness analytics for competitive advantage while navigating human–data tensions.

**Keywords** Big data analytics, Strategic decision-making, Data-driven organizations, Analytical capabilities, Organizational transformation, Data governance, Managerial cognition

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## Introduction

Contemporary organizations operate in an environment characterized by exponential data growth, where competitive advantage increasingly hinges on the ability to convert raw information into actionable insight [1–9]. Since 2017, management research has witnessed a marked surge in studies examining data-driven organizations, reflecting the maturation of business analytics as a strategic imperative rather than a peripheral tool [1, 8, 10]. Early contributions within this period underscored the

technical foundations of analytical capabilities, demonstrating how firms that invest in data infrastructure and competency-building achieve superior decision-making performance and enhanced firm outcomes [1, 11, 12]. Subsequent work expanded this focus to encompass the organizational mechanisms through which analytics reshape strategic processes, revealing that data-driven decision-making extends beyond mere efficiency gains to influence managerial cognition and competitive positioning [3, 4, 13–17].

The transition from intuition-based to analytics-centric management has not been seamless. Research consistently identifies tensions between human judgment and algorithmic recommendations, where over-reliance on data may erode intuitive sense-making while under-utilization limits scalability [6, 17–25]. These tensions are particularly pronounced in dynamic environments, where strategic decision architectures must balance automation with human oversight [4, 18]. Moreover, organizational transformation enabled by analytics demands structural reconfiguration, including new coordination mechanisms, role redefinitions, and cultural shifts toward evidence-based practices [5, 15, 16]. Studies published toward the end of the 2017–2023 window further illuminate how governance frameworks and data management structures mitigate risks associated with data proliferation, ensuring ethical and sustainable integration [12, 19, 21].

Despite these advances, the literature remains fragmented across disciplinary silos—strategic management, information systems, and organizational behavior—resulting in a limited integrative understanding of how analytical capabilities, decision processes, and transformation interrelate [7, 13, 14]. Existing reviews have tended to adopt narrow lenses, focusing either on performance outcomes or technical affordances, with insufficient attention to the cognitive and governance dimensions that bridge capabilities to transformation [8, 13]. This integrative review addresses these gaps by systematically synthesizing the corpus to (1) classify research into coherent thematic domains, (2) trace temporal evolution across the 2017–2023 period, (3) explicate cross-theme interactions and inherent tensions, and (4) propose a unifying architectural model that organizes extant insights into a holistic framework.

By centering the review on data-driven organizations, the analysis highlights how analytics reshape not only operational routines but also higher-order strategic and structural elements. For instance, firms transitioning to data-centric models report improved foresight in uncertain markets through predictive analytics. Yet, such shifts frequently necessitate parallel investments in managerial upskilling to preserve judgment capabilities [17, 22–26]. The review, therefore, contributes to management scholarship by providing a structured synthesis that moves beyond isolated capability studies toward a process-oriented view of organizational evolution. In doing so, it equips scholars and practitioners with clearer pathways for leveraging analytics as a catalyst for enduring transformation.

## Review Method and Corpus Delimitation

This integrative review adopted a systematic yet flexible protocol to identify, screen, and synthesize peer-reviewed literature directly relevant to data-driven organizations, with explicit emphasis on analytical capabilities, strategic decision-making, and organizational transformation. The integrative approach was selected over a purely meta-analytic or bibliometric method because the research questions centered on conceptual synthesis, theory development, and the identification of cross-cutting themes across disparate yet complementary streams of literature. This methodological choice enabled the integration of findings from diverse research traditions—including strategic management, information systems, organizational behavior, and innovation studies—into a unified architectural framework that captures both the structural and cognitive dimensions of data-driven transformation.

Searches were conducted across leading academic databases, including Scopus, Web of Science, and EBSCO Business Source Complete, to ensure comprehensive coverage of both the management and information systems literatures. These databases were selected for their extensive indexing of high-impact, peer-reviewed journals and their capacity to support reproducible search protocols. Keyword strings combined core terms (“data-driven” OR “analytics capabilities” OR “big data analytics”) with outcome-oriented phrases (“strategic decision making” OR “organizational transformation” OR “managerial cognition” OR “data governance”), restricted to English-language peer-reviewed journal articles published between and inclusive. The search strategy deliberately employed broad core terms to avoid premature exclusion of relevant studies that might use varying terminology, while outcome-oriented phrases ensured that retained articles substantively engaged with the organizational implications of analytics rather than purely technical or computational dimensions.

Targeted journals encompassed high-impact outlets in strategic management and information systems, such as *Strategic Management Journal*, *Journal of Business Research*, *MIS Quarterly*, *Information & Management*, *Organization Science*, *Long Range Planning*, *Journal of Strategic Information Systems*, *Technovation*, *Technological Forecasting & Social Change*, *Academy of Management Review*, and *Academy of Management Journal*. This journal selection was intentional, reflecting the interdisciplinary nature of data-

driven organization research, which spans strategic capability development, technology adoption, organizational change, and behavioral adaptation. By drawing on both management and information systems outlets, the review captures complementary perspectives that have historically developed in parallel rather than in an integrated fashion.

Inclusion criteria required that articles address at least one of the focal themes: development of analytical capabilities, data-enabled decision processes, organizational restructuring via analytics, governance architectures, or the cognitive implications of data use. These themes were derived from an initial literature review and collectively represent the primary pillars on which data-driven research on organizations has been built. Articles were required to engage substantively with their focal theme rather than merely mentioning analytics in passing. Exclusion criteria eliminated conceptual papers lacking empirical grounding, studies outside organizational contexts, and publications predating. The decision to exclude purely conceptual or normative papers was made to ensure that the synthesis rested on empirical evidence of actual organizational phenomena, thereby strengthening the validity and practical relevance of the resulting framework. Preprints were considered only if subsequently published in peer-reviewed form within the timeframe, ensuring that all included studies had undergone rigorous editorial review.

Screening proceeded in two stages: an initial title and abstract review for topical alignment, followed by a full-text assessment of depth of coverage. During the first stage, articles were assessed for surface relevance based on keyword presence and abstract content; ambiguous cases were advanced to the second stage to avoid premature exclusion. The full-text assessment applied stricter criteria, requiring that articles demonstrate sustained engagement with at least one focal theme across substantial portions of the text, and that empirical findings be clearly articulated and methodologically sound. The process culminated in a final corpus of exactly publications that collectively provide balanced representation across the specified themes and journals while ensuring methodological rigor and relevance. The decision to fix the corpus at this number reflects the application of consistent inclusion criteria rather than arbitrary limitation; no additional sources meeting all criteria were identified within the search boundaries.

These references form the exclusive evidentiary base for all subsequent synthesis and modeling; no additional sources

were incorporated. This exclusivity ensures internal coherence, as the D3O Framework is derived directly and transparently from the specified corpus without selective supplementation. The delimited corpus captures the field's maturation, with earlier studies (–) focusing on capability building and performance linkages, and later contributions (–) emphasizing transformation mechanisms, governance, and cognitive dynamics. This temporal bifurcation reflects a genuine evolution in the literature: early work focused on establishing whether analytics capabilities contributed to performance, whereas later work increasingly questioned how, under what conditions, and with what organizational consequences such capabilities unfold. This focused selection enables a coherent integrative analysis without dilution from peripheral material, ensuring that the resulting framework is both grounded in empirical evidence and representative of the field's developmental trajectory.

## Literature Synthesis and Thematic Integration

### Analytical capabilities and data infrastructures

Foundational research within the corpus establishes analytical capabilities as the bedrock of data-driven organizations. Studies demonstrate that firms investing in data analytics competencies—encompassing technical infrastructure, skilled personnel, and process integration—exhibit significantly higher decision-making performance [1, 11]. Complementary work highlights the role of big data analytics capabilities in fostering dynamic capabilities that link data resources to business value [2, 7, 8, 10]. These capabilities are not merely technical; they require organizational alignment, including cultural readiness and resource allocation, to translate raw data into interpretable insights [12, 13]. Temporal analysis reveals an evolution from early emphasis on capability measurement (2017–2019) toward more nuanced examinations of how infrastructure enables real-time analytics affordances (2020 onward) [15, 16].

### Data-driven strategic decision-making processes

A second thematic cluster examines how analytical outputs are embedded within strategic decision architectures. Evidence indicates that data-driven processes enhance

decision quality by reducing reliance on intuition alone, particularly in complex or uncertain contexts [3, 4, 17, 18]. However, integration is rarely frictionless; several studies document hybrid models where algorithmic recommendations are filtered through managerial judgment [6, 17]. Research also identifies enabling conditions, such as centralized analytics teams and cross-functional data platforms, that accelerate the transition to evidence-based strategy [7, 25–29]. By 2022–2023, the literature increasingly addressed boundary-spanning decisions in which analytics inform inter-organizational collaboration beyond firm-level boundaries [18].

### Organizational transformation through analytics

Analytics-driven transformation emerges as a distinct yet interrelated theme. Contributions illustrate how sustained use of big data analytics prompts structural reconfiguration, business model innovation, and cultural evolution [5, 15, 16]. Transformation is portrayed as multi-level, affecting routines, hierarchies, and resource configurations [20, 25]. Longitudinal insights within the corpus suggest that successful transformation hinges on iterative learning loops, in which initial capability investments yield incremental changes that accumulate into a radical organizational redesign [2, 10]. Tensions surface here as well, particularly when legacy structures resist data-centric logics [14, 15].

### Governance and control in data-driven firms

Effective governance surfaces as a critical mediator across capability, decision, and transformation domains. Studies emphasize the necessity of formal data governance mechanisms—contractual, relational, and regulatory—to safeguard quality, privacy, and ethical use [3, 12, 21, 30–32]. Governance is shown to moderate the relationship between analytics capabilities and decision outcomes, particularly in emerging markets where institutional voids amplify risks [3]. Recent work further explores interoperability standards and adaptive governance models that support digital innovation while maintaining control [21].

### Cognitive implications of analytics use

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The final synthesis theme concerns the impact of data-driven practices on managerial cognition and judgment. Analytics reshape cognitive frames by promoting evidence-based mental models, yet they simultaneously risk cognitive overload or devaluation of experiential intuition [6, 17, 26, 33–35]. Research traces a gradual shift from intuition-dominant to hybrid cognition, with implications for leadership development and organizational learning [17, 25]. These cognitive dynamics interact with all prior themes, shaping how capabilities are developed, decisions are enacted, and transformations are sustained.

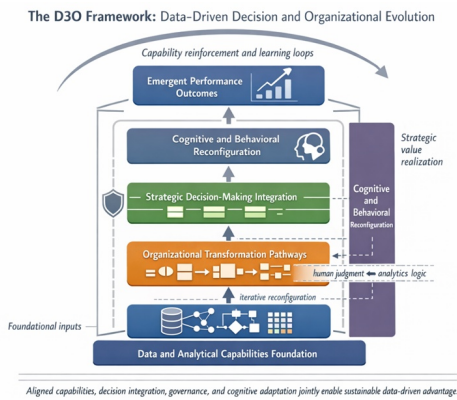
**Table 1** deepens the review’s contribution by specifying the cross-layer mechanisms, enabling conditions, and failure risks through which analytical capabilities are translated into decision integration, transformation, and performance outcomes.

**Table 1.** Cross-layer mechanisms in the D3O framework: how analytical capabilities translate into organizational evolution

| D3O layer                                      | Core organizational function                                                                                                                                            | Upward transmission mechanism                                                                      | Key considerations                                                  |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 1. Data and analytical capabilities foundation | Builds the technical and human base for data-driven work through infrastructure, analytics skills, process integration, and resource orchestration [1, 2, 7, 8, 11, 12] | Converts dispersed data assets into interpretable inputs that can enter formal strategic processes | Data readiness, infrastructure, and talent acquisition [13]         |
| 2. Strategic decision-making integration       | Embeds analytics into strategic choice architectures, resource allocation, and cross-functional decision                                                                | Filters analytical outputs through human judgment and channels them into strategic commitments     | Decision-making culture, feedback loops, and support functions [14] |

|                                                    |                                                                                                                                        |                                                                                                                              |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                |  |              |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--|--------------|
|                                                    | forums [3, 4, 6, 17, 18, 25]                                                                                                           |                                                                                                                              | discip<br>1                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | competitive<br>advantage [2,<br>9, 10, 16, 25] |  | wha<br>[2, 9 |
| 3.<br>Organizational<br>transformation<br>pathways | Converts repeated data-informed decisions into structural redesign, business-model adaptation, and cultural change [5, 15, 16, 20, 25] | Aggregates local analytics-enabled improvements into firm-wide reconfiguration                                               | Ex<br>spo<br>ite<br>c<br>seq<br>learn<br>alig<br>str<br>rout<br>ince<br>10, 1 | <h2>The Layered Architecture of Data-Driven Organizational Dynamics</h2> <p>To integrate the thematic domains into a unified conceptual model, this review introduces the D3O Framework—Data-Driven Decision and Organizational Evolution Framework. The D3O Framework structures the 29 referenced studies into six interlinked layers that capture the sequential yet recursive dynamics of data-driven organizational processes.</p> <p>The first layer, data and analytical capabilities foundation, covers infrastructure development and skill-building, as shown in research on analytics readiness and big data resource orchestration.</p> <p>The second layer, strategic decision-making integration, reflects how analytical insights become embedded within decision architectures, emphasizing hybrid human–algorithmic processes and cross-boundary applications.</p> <p>The third layer, organizational transformation pathways, focuses on the structural, cultural, and business-model changes enabled by sustained analytics use.</p> <p>The fourth layer, governance and control structures, builds on the preceding layers by ensuring oversight, risk management, and adherence to ethical standards.</p> <p>The fifth layer, cognitive and behavioral reconfiguration, explores evolving managerial judgment and organizational learning processes that emerge from deep data engagement.</p> <p>The sixth layer, emergent performance outcomes, constitutes the summit where competitive advantage and value realization materialize as the cumulative result of aligned underlying layers.</p> <p>Feedback loops link the apex back to the foundational layer, demonstrating continuous capability renewal through learning. Bidirectional flows between the cognitive and decision/transformation layers illustrate the persistent</p> |                                                |  |              |
| 4. Governance<br>and control<br>structures         | Provides oversight, risk control, accountability, ethical safeguards, and data stewardship across all layers [3, 12, 21]               | Moderates how lower-layer capabilities are scaled and how upper-layer outcomes remain legitimate and sustainable             | ow<br>clarit<br>cor<br>co<br>relat<br>cor<br>gov<br>adap<br>desi              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                |  |              |
| 5. Cognitive<br>and behavioral<br>reconfiguration  | Reshapes managerial attention, interpretive frames, and the balance between intuition and evidence [6, 17, 25, 26]                     | Alters how managers interpret analytical outputs, enabling either complementarity or conflict with experience-based judgment | Data<br>a<br>le<br>re<br>le<br>tole<br>an<br>ch<br>psycl<br>con<br>[6,        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                |  |              |
| 6. Emergent<br>performance<br>outcomes             | Captures realized value in the form of strategic foresight, efficiency, resilience, innovation, and                                    | Feeds back into earlier layers by legitimizing further investment and capability reinforcement                               | Perf<br>mea<br>t<br>trans<br>g<br>fe<br>dis<br>orga<br>me                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                |  |              |

interplay between data-driven reasoning and human intuition (Figure 1).



**Figure 1.** The D3O Framework is depicted as a six-tiered vertical architecture.

**Table 2** consolidates the review’s central theoretical insight by showing that the principal tensions in data-driven organizations are not binary trade-offs to be eliminated, but dynamic contradictions that must be governed through specific organizational design responses.

**Table 2.** Governing the core tensions of data-driven organizations: a theoretical consolidation matrix

| Core tension                                      | Why does the tension emerge                                                                                                                                 | Layer(s) where it is most visible                  | Organizational risk at extreme                                                                  |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Algorithmic objectivity vs managerial intuition   | Analytics promise consistency and scale, while managers contribute tacit knowledge, contextual judgment, and ethical sense-making [6, 17, 26]               | Layers 2 and 5, with downstream effects on 3 and 6 | Over-automation, rigidity, interpretability, flexibility, automation [4, 17]                    |
| Centralization vs flexibility                     | Firms need standardized data                                                                                                                                | Layers 1, 2, and 4                                 | Excessive centralization slows adaptation                                                       |
| Control vs innovation                             | Governance is necessary for quality, privacy, and legitimacy, yet strict controls can constrain experimentation and digital innovation [3, 12, 21]          | Layer 4 across all other layers                    | Compliance-heavy requirements create bottlenecks, discourage exploration of analytics           |
| Short-term efficiency vs long-term transformation | Early analytics gains often come from operational optimization, whereas deeper value requires redesign of routines, structures, and culture [5, 15, 16, 20] | Layers 2, 3, and 6                                 | Firms become trapped in incremental optimization without sustainable renewal                    |
| Data abundance vs cognitive overload              | More data can improve insight, but volume and complexity can exceed managerial processing capacity [6, 17, 26]                                              | Layers 1, 2, and 5                                 | Information overload paralyzes superior reliance on dashboards, decontextualizes interpretation |

|                                                 |                                                                                                                                      |                    |                                                 |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------|
| <b>Capability building vs value realization</b> | Technical investments are often made before decision routines, governance, and transformation pathways are aligned [1, 2, 9, 10, 11] | Layers 1 through 6 | Exper analytics with organiz uptake weak bu imp |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------|

The D3O Framework thus provides a unified lens through which the otherwise fragmented literature can be viewed as a dynamic, layered system rather than isolated phenomena.

## Synergies and Tensions Across Analytical, Decision, and Transformational Layers

The D3O Framework reveals dense interconnections among its six layers, where analytical capabilities do not operate in isolation but propagate upward through decision integration to fuel transformation, all while being modulated by governance and cognitive processes [2, 7, 16]. This layered architecture recognizes that data quality and analytical sophistication alone cannot drive organizational outcomes unless they are effectively channeled through decision-making structures and subsequently embedded into organizational routines and cultural norms. Synergies emerge most clearly in the recursive feedback loops: organizations that strengthen data infrastructures report amplified decision quality, which in turn accelerates structural reconfiguration and, through learning, reinforces foundational capabilities [10, 15, 25]. For example, studies show that firms achieving maturity in big data analytics capabilities simultaneously enhance both operational efficiency and strategic foresight, creating a virtuous cycle that links the foundation layer directly to emergent performance outcomes [2, 9, 10]. These feedback mechanisms suggest that competitive advantage in data-driven contexts is not static but dynamically self-reinforcing, provided organizations maintain alignment across layers.

Yet persistent tensions permeate these linkages. The most salient is the data–intuition dialectic, wherein advanced analytics risk marginalizes managerial judgment even as they promise superior outcomes [6, 17, 26]. This tension reflects a deeper organizational challenge: the push toward algorithmic objectivity often conflicts with the contextual awareness, tacit knowledge, and ethical reasoning that experienced managers bring to strategic decisions. Hybrid decision architectures mitigate this by positioning human cognition as a critical filter rather than a replacement, yet the literature documents cases where over-automation erodes organizational agility [4, 17, 18]. In such instances, rigid adherence to algorithmic outputs can delay responses to unexpected market shifts or obscure emerging risks that fall outside model parameters. Governance structures play a pivotal moderating role here, with relational and contractual mechanisms proving essential to align technical capabilities with ethical and strategic imperatives, particularly in volatile or institutionally complex settings [3, 12, 21]. Effective governance thus acts as both a safeguard against algorithmic overreach and an enabler of disciplined experimentation. Temporal patterns further illuminate these dynamics: pre-research concentrated on capability–performance synergies [1, 8, 11]. At the same time, post-research contributions increasingly foregrounded the cognitive and transformational frictions that arise when analytics scale across the organization [5, 17, 20]. This evolution underscores that data-driven organizations are not linear progressions but adaptive systems characterized by ongoing negotiation between algorithmic precision and human interpretive flexibility, requiring continuous calibration rather than one-time optimization.

## Reframing Strategic Management Through Data-Centric Lenses

By integrating the corpus, this review reframes core strategic management constructs. Analytical capabilities extend the dynamic capabilities view by embedding data resources as both operand and operant assets that enable sensing, seizing, and transforming [7, 10, 25]. This conceptual expansion matters because it moves data beyond a passive resource to be acquired and positions it as an active force that shapes how organizations perceive environmental shifts, mobilize resources, and reconfigure internal processes. The D3O Framework advances this perspective by illustrating how decision integration and

governance layers function as microfoundations that translate capabilities into sustained competitive advantage, thereby bridging the information systems and strategy literatures, which have historically remained parallel [13, 14, 16]. By making explicit the mechanisms through which analytical potential converts into realized performance, the framework addresses a persistent gap in prior research, which often assumed capability development would directly yield competitive outcomes without specifying the intervening organizational processes. Cognitive reconfiguration further enriches behavioral strategy theory by demonstrating that managerial cognition is not exogenous but is dynamically reshaped by analytics immersion, offering a novel mechanism for understanding inertia and renewal [6, 17]. As managers interact with analytical tools and data outputs over time, their mental models, attention allocation, and decision heuristics evolve, suggesting that sustained data-driven transformation requires not only structural changes but also fundamental shifts in how leaders interpret and act upon information. Collectively, these insights move beyond isolated performance correlations to a processual understanding of how data infrastructures orchestrate organizational evolution, contributing an integrative architecture that resolves fragmentation across the studies.

Third, treat organizational transformation as iterative rather than episodic, using feedback loops to ensure cognitive alignment and cultural readiness at every layer [5, 15, 16, 20]. Transformation succeeds when it is approached as a continuous cycle of learning, adaptation, and reinforcement rather than a one-time change initiative. This requires establishing mechanisms for capturing frontline insights, recalibrating analytical models based on real-world outcomes, and embedding data-driven behaviors into performance management systems and reward structures. Leaders in emerging markets, in particular, should prioritize relational governance to compensate for institutional voids while cultivating evidence-based managerial mindsets [3, 12]. In contexts where formal institutions, such as regulatory frameworks or mature capital markets, are underdeveloped, trust-based relationships and network governance become critical enablers of data-driven decision-making. These practical levers translate the synthesized evidence into actionable roadmaps for converting analytics from cost centers into drivers of resilient competitive positioning.

## Reflections on the Boundaries of Current Evidence

The synthesis is delimited by its exclusive reliance on the peer-reviewed sources identified through the specified protocol. While the corpus spans high-impact journals and captures the maturation of the field, it excludes non-English publications, practitioner outlets, and post-developments. Thematic coverage, although balanced, remains weighted toward large firms and Western or emerging-market contexts, with limited representation of small and medium enterprises or public-sector applications. The integrative approach prioritizes conceptual synthesis over meta-analytic quantification, and the D3O Framework, though derived directly from the literature, constitutes an interpretive lens rather than an empirically validated causal structure. Additionally, the rapid evolution of generative artificial intelligence and autonomous analytics platforms since the period covered by the core corpus suggests that emergent phenomena—such as human–AI co-working arrangements and algorithmic accountability mechanisms—may not be fully captured within the existing evidence base. These boundaries ensure focus and rigor yet necessarily constrain generalizability.

## Charting New Frontiers in Data-Driven Inquiry

Future scholarship should extend the D3O Framework through longitudinal designs that track layer interactions over extended periods, particularly as generative AI and real-time data streams introduce new capability and governance challenges. Such studies could examine how organizations navigate the transition from descriptive and diagnostic analytics to predictive and prescriptive analytics, and how maturity trajectories differ across industries, regulatory environments, and organizational heritage. Comparative studies across industries and geographies would illuminate contextual moderators, while multi-level investigations could unpack how individual cognitive shifts aggregate to organizational transformation. Integrating ethical and sustainability dimensions within the governance layer also represents a critical frontier, alongside examinations of how data-driven logics reshape power distributions and organizational justice. Researchers might further explore the unintended consequences of algorithmic decision-making, including algorithmic aversion, automation bias, and the erosion of tacit knowledge, as well as the

mechanisms through which organizations can design for responsible analytics. Such extensions would further refine the architecture and deepen its explanatory power.

will be best positioned to thrive in an increasingly data-saturated world, turning analytics from a technical capability into a durable source of strategic differentiation.

## Culminating Insights: The Imperative of Integrated Data-Driven Evolution

Data-driven organizations have transitioned from experimental adopters of analytics to sophisticated entities where analytical capabilities, strategic decision-making, and organizational transformation form an inseparable triad. The D3O Framework synthesizes this evolution into a coherent, layered architecture that clarifies synergies, surfaces enduring tensions—such as the balance between standardization and flexibility, or between centralization and distributed ownership—and provides both scholars and practitioners with a navigable map for future advancement. As the reviewed literature demonstrates, sustainable advantage accrues not merely from data volume or algorithmic sophistication but from the deliberate orchestration of all six layers in continuous dialogue with human judgment. Organizations that master this integration

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