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Strategic Management Under Digital Uncertainty: Navigating Rapid Technological Change in Contemporary Industries

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Abstract

Digital uncertainty, defined by the rapid, non-linear evolution of technologies and disruption of industry boundaries, fundamentally challenges the assumptions underpinning traditional strategic management. This managerial perspective article examines how firms must reconceptualize strategy amid technological volatility, ambiguity, and shifting competitive landscapes. We argue that conventional planning models—rooted in prediction, long-term stability, and linear execution—become liabilities in digitally turbulent environments. Instead, effective strategic management in the face of digital uncertainty requires a dynamic architecture centered on sensing, interpretation, adaptive decision-making, and organizational reconfiguration. We analyze the strategic challenges posed by digital disruption, including the tension between commitment and flexibility, the erosion of industry boundaries, and the cognitive limits of managerial foresight. Building on contemporary research, we propose a strategic management framework that integrates continuous environmental sensing, real-time resource reallocation, and learning feedback loops.

Keywords Dynamic capabilities, Strategic management, Technological volatility, Digital uncertainty, Adaptive strategy, Strategic flexibility

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Introduction

The strategic management landscape has been fundamentally altered by the accelerating pace and unpredictable trajectory of digital technologies. What was once considered a stable backdrop for competitive strategy—industry structure, technological life cycles, and predictable patterns of innovation—has given way to persistent uncertainty [1], in which digital platforms, artificial intelligence, and ubiquitous connectivity reconfigure markets in months rather than years [2, 3]. For managers, the challenge is no longer merely about adapting to discrete technological shifts [4]; it is about navigating a state of digital uncertainty [5]—a condition in which the sources, direction, and consequences of technological change are inherently ambiguous and often emergent [6].

Traditional strategic management, with its roots in industrial organization and resource-based views, has long emphasized analytical rigor, long-range planning, and sustainable competitive advantage built on defensible positions [7, 8]. However, under conditions of rapid technological change, such approaches risk fostering rigidity and strategic paralysis [9, 10]. Digital technologies erode traditional entry barriers [11], compress decision cycles [12], and create ecosystems where value migrates unpredictably across traditional industry boundaries. In this environment, strategic success depends less on the precision of a five-year plan [13] and more on an organization's capacity to sense weak signals, interpret ambiguous information, and reconfigure resources in near real-time [14, 15].

This article provides a managerial and strategic perspective on how organizations can navigate digital uncertainty. We synthesize insights from recent peer-reviewed research to answer three core questions: (1) How does digital uncertainty challenge conventional strategic management assumptions? (2) What strategic capabilities and architectures enable firms to adapt under conditions of technological volatility? (3) How can leaders balance the need for strategic coherence with the imperative for flexibility?

The relevance of these questions is underscored by the proliferation of digital disruption across industries—from manufacturing and finance to healthcare and professional services [16-18]. Incumbent firms face the dual threat of new entrants leveraging digital business models [19] and the internal difficulty of transforming legacy structures [20, 21]. Meanwhile, even digital-native firms encounter uncertainty as platforms, algorithms, and user behaviors co-evolve in unpredictable ways [22-24]. Consequently, the ability to manage strategy in the face of digital uncertainty has become a core determinant of survival and competitive renewal [7, 10].

Strategic Challenge of Digital Uncertainty

The failure of conventional strategic planning

Traditional strategic management has been built on a foundation of prediction: market analysis, competitor mapping, and forecasting based on historical data and stable industry structures [7, 8]. These approaches presume that the future can be anticipated with sufficient accuracy to justify long-term resource commitments and that competitive advantage arises from the careful execution of a pre-determined plan [9, 19]. However, digital uncertainty fundamentally undermines these assumptions. Technological change in the digital era is often non-linear, emergent, and subject to network effects and feedback loops that defy linear extrapolation [1, 6, 12].

Table 1 contrasts the strategic logic of conventional planning with the adaptive logic required in the face of digital uncertainty.

Table 1. Strategic logic shift from conventional planning to adaptive management under digital uncertainty

Strategic dimension	Conventional strategic management logic	Adaptive strategic management under digital uncertainty	ma im
View of the environment	Industry structure is assumed to be relatively stable and analyzable	Competitive conditions are treated as fluid, cross-boundary, and recursively changing	Man unc p ra ex
Dominant planning logic	Prediction, forecasting, and long-range commitment	Iteration, optionality, and continuous reprioritization	S pr sho for r
Basis of advantage	Defensible position and efficient execution	Rapid sensing, flexible redeployment, and renewal capacity	A c be stra
Time orientation	Multi-year planning cycles and periodic review	Continuous scanning with compressed decision cycles	cad acco t c
Treatment of uncertainty	Risk is to be reduced through analysis	Ambiguity to be interpreted through scenarios and experimentation	Man di ur fro in inf
Resource allocation logic	Annual budgets and high-commitment investment decisions	Staged investment, real options, and modular allocation	a p reve l
Organizational design assumption	Stable roles, formal hierarchy, and fixed reporting lines	Modular structures, cross-functional teams, and fluid coordination	S resp b c s e

Leadership role	Planner, controller, and allocator of predetermined priorities	Architect of adaptive routines, guardrails, and learning mechanisms	Learning as a resource presence
Decision authority	Concentrated at the top for consistency and control	Distributed toward information-rich teams, with portfolio oversight at the center	Resource allocation decisions
Performance logic	Variance from plan indicates underperformance	Deviation may signal environmental change or strategic learning	System separation into individual actions
Learning model	Post hoc review after major cycles	Embedded feedback and rapid strategic updating	Learning as an internal strategic activity
Strategic coherence	Achieved through adherence to the plan	Achieved through stable intent plus flexible pathways	Control, stability, and direction

When technologies evolve at exponential rates and new digital entrants can rapidly scale through platforms and ecosystems, the half-life of strategic plans shortens dramatically [2, 3, 10]. Research has shown that firms that rely heavily on formal planning processes under conditions of high environmental dynamism tend to experience slower adaptation and greater vulnerability to disruption [4, 5, 14]. The very tools designed to reduce uncertainty—detailed business cases, long-term budgets, stage-gate innovation processes—can become sources of rigidity, locking firms into outdated commitments. At the same time, competitors experiment and pivot [17, 20, 24].

Erosion of industry boundaries and competitive architecture

Digital uncertainty also manifests in the blurring of industry boundaries. Digital platforms enable firms to span multiple sectors simultaneously, creating ecosystems where

complementors, rivals, and partners interact in fluid configurations [8, 11, 12]. For example, a company traditionally competing in automotive manufacturing may find itself competing with technology firms in mobility services, data analytics, and software platforms [1, 16, 21]. Such boundary erosion renders conventional industry analysis—a cornerstone of strategic planning—increasingly unreliable as a guide for resource allocation [18, 22, 23].

This fluidity is compounded by the fact that digital technologies themselves co-evolve with business models, user practices, and institutional arrangements, generating ambiguity about which capabilities will become valuable and which will be rendered obsolete [3, 13, 15]. Managers face the challenge of making strategic decisions in environments where the relevant competitive set, key success factors, and even the industry definition are continually redefined [5, 6, 19].

Tensions between commitment and flexibility

One of the most profound challenges posed by digital uncertainty is the tension between strategic commitment and organizational flexibility. On one hand, an effective strategy requires some degree of focus, resource allocation, and continuity to develop deep capabilities and capture value [7, 8, 25]. On the other hand, excessive commitment to a particular technology, business model, or market positioning can become a liability when digital conditions shift unexpectedly [2, 9, 10].

This tension is particularly acute for incumbents with established assets, routines, and performance metrics that reinforce the status quo [4, 17, 20]. Research on digital transformation highlights the difficulty of simultaneously exploiting existing competencies while exploring new digital opportunities—a challenge often framed as the “ambidexterity” dilemma [16, 26, 27]. In the face of digital uncertainty, the costs of getting commitment wrong are amplified: investments in digital platforms or AI capabilities may be swiftly devalued by technological shifts. At the same time, hesitation can lead to being outpaced by more agile competitors [14, 23, 28].

Managerial cognition under ambiguity

Beyond organizational factors, digital uncertainty imposes significant cognitive burdens on strategic decision-makers. The human tendency to seek clarity and control can lead

managers to over-rely on familiar heuristics, to anchor on past successes, or to demand analytical certainty before acting [9, 13, 15]. In highly uncertain digital contexts, such cognitive biases can result in delayed responses, incrementalism, or outright denial of the scale of change [1, 5, 10].

Moreover, digital uncertainty often involves “unknown unknowns”—situations in which the nature of the threat or opportunity is not recognized until late in its emergence [9, 15, 24]. Leaders must therefore cultivate not only analytical capabilities but also interpretive capacities that allow them to reframe ambiguous signals into actionable strategic insights [3, 11, 25]. This requires moving beyond traditional strategic analysis toward more experimental, learning-oriented approaches that embrace iteration and accept the inevitability of some failures [2, 4, 12].

Managing Strategic Adaptation in Technologically Volatile Environments

To navigate digital uncertainty, firms must replace static planning with a dynamic strategic architecture that enables continuous adaptation. Drawing on the dynamic capabilities literature and recent research on digital strategy, we propose a framework built on five interconnected components: (1) environmental sensing and digital signal detection, (2) uncertainty interpretation and scenario framing, (3) adaptive decision-making and resource reallocation, (4) organizational reconfiguration, and (5) learning and renewal feedback loops. These components form a coherent system that allows firms to maintain strategic direction while remaining responsive to emergent technological shifts.

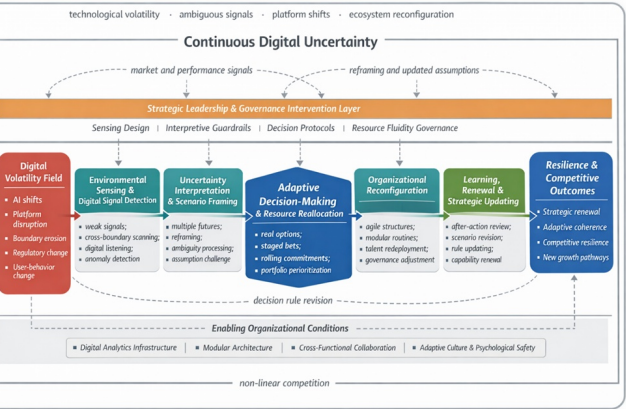


Figure 1. Strategic management architecture under digital uncertainty. The figure conceptualizes strategy in digitally turbulent environments as a recursive system rather than a linear planning sequence. Environmental volatility enters through distributed sensing and interpretive framing, feeds an adaptive decision and resource allocation core, triggers organizational reconfiguration, and generates resilience-related outcomes whose signals recursively update earlier stages. Leadership and governance operate as intervention layers shaping sensing, interpretation, decision protocols, and resource fluidity, while enabling infrastructures and adaptive culture to support the entire cycle.

Environmental sensing and digital signal detection

The first component of the architecture involves systematically detecting digital signals that may indicate emerging threats or opportunities. In contrast to traditional competitor monitoring, sensing under digital uncertainty requires organizations to expand their perceptual field beyond industry boundaries, tracking technological developments, platform dynamics, shifts in user behavior, and regulatory changes across multiple domains [1, 13, 23]. This sensing must be distributed across the organization, leveraging both data analytics and human judgment to identify weak signals that might otherwise go unnoticed [14, 15, 28].

Firms such as those studied in digital transformation research deploy “digital listening” capabilities—using AI, social media analytics, and open innovation platforms to capture early indicators of technological shifts [2, 10, 22]. However, sensing alone is insufficient; the architecture emphasizes that signals must be processed through interpretive lenses that avoid confirmation bias and encourage exploration of diverse possibilities [3, 11, 24].

Uncertainty interpretation and scenario framing

Once signals are detected, organizations need interpretive mechanisms to make sense of ambiguous information. In the face of digital uncertainty, the goal is not to predict a single future but to develop a range of plausible scenarios that capture potential technological trajectories [4, 19, 25]. Scenario framing helps managers avoid the trap of treating uncertainty as a temporary deviation from a predictable

path; instead, it embeds the assumption of ongoing volatility into strategic discourse [9, 20, 21].

Research highlights that firms that are effective at navigating digital uncertainty often use structured techniques—such as multiple scenario planning, red teaming, and premortems—to challenge dominant assumptions and expose hidden vulnerabilities [5, 6, 12]. Importantly, these interpretive exercises must be connected to decision-making; they should yield not merely documents but actionable insights on where to place flexible bets and which indicators to monitor for strategic pivots [16–18].

Adaptive decision-making and resource reallocation

A critical shift required under digital uncertainty is moving from large, irreversible commitments to a portfolio of smaller, modular resource allocations that can be scaled up, redirected, or abandoned as conditions evolve [2, 7, 26]. This approach aligns with real options logic, where investments are structured to preserve upside potential while limiting downside exposure [8, 19, 27]. In practice, this may involve funding multiple digital initiatives in parallel, using staged investments, and establishing clear metrics for continuation or termination [14, 15, 23].

Adaptive decision-making also requires changes in governance: authority for resource reallocation must be pushed to lower levels where information is richer. At the same time, senior leaders focus on managing the overall portfolio and maintaining strategic coherence [1, 10, 13]. Digital technologies themselves can facilitate this by providing real-time dashboards and analytics that make resource flows more transparent and reallocation faster [3, 22, 28].

Learning and renewal feedback loops

The final component closes the loop: outcomes from strategic actions—whether successes or failures—must be systematically captured and fed back into the sensing and interpretation processes. Without such feedback, organizations risk repeating mistakes or failing to recognize when successful strategies have become obsolete [1, 2, 10]. Learning under digital uncertainty requires deliberate mechanisms for post-hoc analysis, knowledge codification, and updating of mental models [8, 13, 19].

Importantly, learning must be rapid and iterative. Digital environments generate data at scale, but data alone does not produce learning. Firms must invest in sense-making capabilities that translate operational and market data into strategic insights, and they must embed those insights into updated scenarios, decision rules, and resource allocations [3, 18, 22, 23].

Practical Guidance for Managers

For managers seeking to implement this architecture, several practical actions emerge from the literature. First, cultivate a distributed sensing capability by empowering frontline employees, establishing external networks, and leveraging digital analytics to monitor a broad array of signals [1, 13, 15]. Second, institutionalize interpretive practices that challenge prevailing assumptions—for instance, by regularly convening diverse teams to reframe competitive threats and opportunities [19, 22, 23]. Third, redesign resource allocation processes to enable rapid reallocation: use rolling budgets, stage-gate funding with clear decision criteria, and digital tools that provide visibility into resource utilization [2, 3, 10]. Fourth, adopt agile organizational designs that enable rapid reconfiguration, such as cross-functional squads, internal talent marketplaces, and modular IT architectures [4, 6, 12, 16]. Fifth, create feedback loops by embedding post-mortems, after-action reviews, and learning dashboards into the rhythm of strategy execution [5, 14, 25]. **Table 2** specifies the managerial design levers through which the proposed architecture can be operationalized and monitored in practice.

Table 2. Managerial design levers for building strategic adaptation capacity under digital uncertainty

Architectural component	Primary strategic tension addressed	Managerial design lever	Illustrative practice
Environmental sensing and digital signal detection	Breadth of scanning vs signal overload	Distributed sensing architecture	digital listening systems; frontier scanning teams; par and custo

			intelligent network anomaly dashboard
Uncertainty interpretation and scenario framing	Analytical discipline vs premature closure	Structured interpretive forums	multi-scenario workshop pre-mortem red teaming assumptions audits
Adaptive decision-making and resource reallocation	Commitment vs reversibility	Modular capital allocation logic	staged investment rolling budgets option-based funding portfolio kill/scale rules
Organizational reconfiguration	Stability vs responsiveness	Structural modularity and fluid coordination	cross-functional squads internal platform talent marketplace temporal strategic taskforce
Learning and renewal feedback loops	Action speed vs reflective learning	Embedded strategic learning routines	after-action reviews experimentation retrospective strategic learning dashboard knowledge repository
Leadership and governance layer	Empowerment vs strategic drift	Guardrail-based governance	strategic intent statement escalation thresholds portfolio review councils adaptive

			governance charter
Enabling digital infrastructure	Information richness vs fragmentation	Shared data and visibility backbone	real-time dashboard API-based integration digital twin views of operation shared planning platform
Adaptive culture and talent system	Psychological safety vs accountability	Learning-oriented people systems	intelligent failure recognition ambiguity training rotation assignment hybrid digital business capabilities development

Finally, a leadership mindset is paramount. In the face of digital uncertainty, managers must embrace a paradox: they must provide strategic direction while simultaneously accepting that the path to that direction will be emergent and iterative [8, 9, 20]. This requires humility to admit when initial assumptions are wrong, courage to reallocate resources from legacy businesses to new opportunities, and patience to allow experiments to yield insights before scaling or terminating them [7, 11, 24].

Strategic Leadership in Digitally Turbulent Environments

The evolving role of top management

The shift from static planning to adaptive strategic management fundamentally alters the role of top management. In the face of digital uncertainty, the traditional model of the CEO and executive team as chief architects of a fixed strategic plan becomes untenable [1, 5, 9]. Instead, leaders must assume multiple, often paradoxical roles: setting directional guardrails while empowering decentralized experimentation; maintaining

financial discipline while funding exploratory initiatives with uncertain returns; and articulating a compelling vision while acknowledging that the means of achieving it will evolve [4, 19, 20].

Research on strategic leadership in digital contexts highlights the importance of what might be termed meta-cognitive capabilities—the ability to reflect on and adjust the organization's own strategic routines and assumptions [2, 13, 25]. Leaders who succeed in navigating digital uncertainty are those who can step back from the content of strategy to question the processes by which strategy is made, ensuring that sensing, interpretation, decision-making, and reconfiguration mechanisms remain fit for purpose as conditions change [7, 10, 11].

Cognitive agility and strategic paradox

A distinctive leadership challenge in the face of digital uncertainty lies in managing cognitive biases that are amplified in volatile environments. The human preference for certainty can lead leaders to demand analytical proof before acting, delaying responses until competitive windows have closed [6, 15, 16]. Conversely, the excitement of new digital possibilities can lead to overcommitment to unproven technologies without adequate attention to execution risks [12, 14, 23].

Effective leaders in the face of digital uncertainty cultivate cognitive agility: the capacity to hold multiple, conflicting perspectives simultaneously and to shift between analytical and intuitive modes as circumstances demand [3, 8, 22]. This involves embracing strategic paradoxes—such as the need to exploit existing capabilities and explore new ones simultaneously, or to maintain strategic focus while remaining open to serendipitous opportunities [9, 17, 24]. Leaders who openly articulate these paradoxes and embed them in organizational routines help their teams navigate the tensions inherent in digital adaptation [5, 19, 26].

Distributed leadership and empowerment

Under conditions of rapid technological change, no single leader or central planning unit can possess all the information needed to make timely strategic decisions [1, 13, 20]. Digital uncertainty thus necessitates a shift toward distributed leadership, where decision-making authority is pushed to the front lines—to product teams, regional units,

and functional specialists who are closest to emerging signals [2, 4, 25].

However, distributed leadership without coordination can lead to fragmentation and strategic drift. The architecture proposed in **Figure 1** addresses this by combining distributed sensing and decision-making with centralized mechanisms for interpretation, resource allocation governance, and learning integration [10, 11, 14]. Leaders at the top focus on designing these mechanisms, ensuring that local decisions align with overall strategic intent while preserving the autonomy needed for rapid response [7, 16, 21].

Organizational Capabilities for Navigating Digital Uncertainty

Dynamic capabilities revisited

The concept of dynamic capabilities—an organization's capacity to sense, seize, and transform—provides a foundational lens for understanding strategic adaptation in the face of digital uncertainty [7, 8, 27]. Recent research has extended this framework to address the specificities of digital environments, emphasizing that sensing must extend beyond traditional market intelligence to encompass technological developments, platform dynamics, and ecosystem co-evolution [1-3, 15].

Seizing under digital uncertainty requires not only the ability to make timely investment decisions but also the capacity to experiment rapidly and to pivot based on early learnings [6, 13, 19]. This involves developing experimental infrastructures—such as sandboxes, pilot programs, and incubators—that allow new digital initiatives to be tested in market-like conditions before scaling [5, 9, 25]. The challenge lies in integrating learnings from experiments back into the mainstream organization without allowing failure aversion to stifle exploration [4, 20, 24].

Transforming under digital uncertainty demands that organizations continuously renew their resource bases, structures, and routines. This is particularly difficult for incumbents with deeply embedded legacy systems and cultural norms [11, 12, 17]. Research on digital transformation highlights the importance of ambidextrous architectures—organizational designs that separate exploratory units from exploitative core operations while

maintaining mechanisms for knowledge transfer [10, 16, 18, 23].

Digital sensing capabilities

Given the velocity of digital change, sensing capabilities must be augmented by digital tools. Advanced analytics, artificial intelligence, and machine learning can process vast amounts of structured and unstructured data to identify emerging patterns and anomalies that human analysts might miss [14, 22, 28]. However, technology alone is insufficient. Effective digital sensing combines algorithmic detection with human interpretation, ensuring that signals are contextualized and evaluated for strategic relevance [1, 3, 13, 15].

Organizations that excel in digital sensing often deploy what might be termed distributed intelligence networks—structures that connect technological monitoring with frontline employees, customers, partners, and even competitors to create a rich, multifaceted picture of emerging digital trends [5, 19, 23]. These networks are supported by digital platforms that enable rapid sharing of insights across organizational boundaries, reducing the latency between signal detection and strategic response [9, 11].

Strategic flexibility through modularity

A recurring theme in the literature on strategic management under digital uncertainty is the importance of modularity—designing organizational structures, processes, and technologies as loosely coupled components that can be reconfigured independently [2, 4, 20]. Modularity enables organizations to isolate the impact of change, allowing some parts of the business to adapt rapidly while others maintain stability [7, 16, 26].

In practice, modularity manifests in various forms: modular product architectures that allow components to be upgraded or replaced without redesigning entire systems; modular organizational structures that enable teams to form, disband, and re-form around new priorities; and modular resource allocation mechanisms that decouple funding for strategic initiatives from the annual budgeting cycle [6, 13, 14, 21]. The digital technologies that create uncertainty also enable modularity—cloud computing, APIs, and microservices architectures allow organizations to build and reconfigure digital capabilities with unprecedented speed [1, 5, 17, 24].

Governance and Performance Management Under Uncertainty

Rethinking strategic control

Traditional strategic control mechanisms—such as annual budgets, fixed milestones, and variance analysis—assume a relatively stable environment in which deviations from plan indicate performance problems rather than shifts in external conditions [9, 19, 24]. Under digital uncertainty, such mechanisms can become dysfunctional, penalizing the very flexibility and responsiveness that adaptation requires [4, 11, 20].

Alternative governance models emphasize rolling forecasts, continuous planning, and dynamic resource allocation. Rather than locking in resource commitments for a full fiscal year, firms can adopt quarterly or even monthly reallocation processes that adjust funding in response to emerging opportunities and threats [2, 3, 13]. This approach requires a robust data infrastructure to provide real-time visibility into performance and market conditions, as well as governance processes that enable rapid reprioritization without bureaucratic delays [1, 15, 16, 23].

Performance metrics for adaptation

A related challenge lies in designing performance metrics that reflect strategic adaptation rather than simply execution against a fixed plan. Under digital uncertainty, traditional financial metrics—while necessary—are insufficient, as they capture past performance rather than future readiness [14, 22, 26]. Firms must supplement financial metrics with leading indicators of strategic health, such as the pace of experimentation, the diversity of digital initiatives in the pipeline, the speed of resource reallocation, and the organization's capacity to attract and retain digital talent [5, 7, 12, 17].

Critically, performance management systems must differentiate between the evaluation of execution (where predictability and efficiency are valued) and the evaluation of exploration (where learning and adaptability are paramount) [4, 6, 10, 19]. Applying execution-focused metrics to exploratory initiatives can discourage risk-taking and prematurely terminate promising experiments. Instead, exploratory initiatives should be assessed against learning milestones, such as validating or invalidating key

assumptions, developing new capabilities, or acquiring market insights [9, 11, 24, 25].

Organizational Culture and Change Management

Cultivating a culture of adaptability

The structural and process changes required for strategic management in the face of digital uncertainty must be underpinned by cultural transformation. A culture of adaptability is characterized by psychological safety, intellectual humility, and a shared belief that change is not a threat but an opportunity [6, 10, 13, 19]. In such cultures, employees at all levels feel empowered to surface concerns, propose experiments, and challenge established ways of working without fear of retribution [1-3, 25].

Cultivating adaptability requires deliberate interventions. Leaders must model the behaviors they seek—openly acknowledging uncertainty, admitting mistakes, and adjusting course based on new information [4, 5, 9, 15]. Reward systems must celebrate intelligent failures (well-designed experiments that yielded valuable learning) alongside successes, rather than punishing outcomes that deviate from the plan [11, 16, 20, 24]. And hiring and promotion criteria should prioritize learning agility, curiosity, and comfort with ambiguity alongside technical expertise [12, 14, 22, 23].

Overcoming resistance to digital adaptation

Despite the strategic necessity of adaptation, organizational resistance remains a formidable barrier. Incumbents face particular challenges, as digital initiatives often threaten established power structures, resource allocations, and identities built around legacy business models [2, 7, 13, 17]. Research on digital transformation emphasizes the importance of change leadership—the ability to articulate a compelling rationale for adaptation, build coalitions of support, and manage the political dynamics that accompany resource reallocation [1, 8, 19, 20].

Successful transformations often combine top-down commitment from senior leadership with bottom-up energy from champions across the organization [4, 9, 11, 26]. Leaders can create safe spaces for digital experimentation that protect nascent initiatives from the full

weight of mainstream performance expectations, allowing them to develop and demonstrate value before being integrated into the core [3, 15, 16, 22]. Over time, as digital initiatives gain traction and visibility, they can serve as catalysts for broader cultural and structural change [5, 14, 21, 23].

Talent and capability development

Navigating digital uncertainty requires talent with distinctive capabilities: the ability to work at the intersection of technology and business, the capacity to analyze data while exercising strategic judgment, and the skill to collaborate across functional and organizational boundaries [2, 7, 13, 25]. The scarcity of such talent is a persistent constraint, and organizations must adopt strategic approaches to talent development.

Beyond recruiting external digital talent, organizations must invest in reskilling and upskilling existing employees, leveraging digital learning platforms and experiential development programs [1, 6, 11, 19]. Moreover, talent deployment must become more fluid. Instead of fixed roles and static teams, organizations can create internal talent marketplaces that match individuals to projects based on skills and interests, enabling rapid assembly and disassembly of teams around emerging priorities [4, 5, 9, 10]. This fluidity requires human resource systems that support internal mobility, project-based work, and continuous learning [16, 20, 22, 24].

Strategic Renewal in Digitally Turbulent Environments

The imperative of continuous renewal

In stable environments, strategic renewal occurs episodically—a period of stability followed by a punctuated transformation. In the face of digital uncertainty, such episodic approaches are inadequate because the pace of technological change does not allow for long periods of stability [1, 13, 14, 17]. Instead, strategic renewal must become a continuous process, embedded in the organization's ongoing operations rather than reserved for occasional transformation initiatives [2-4, 8].

Managing strategic transitions

While continuous renewal is the ideal, digital uncertainty inevitably generates moments of significant strategic

transition—when a particular technology, business model, or competitive dynamic reaches a tipping point that demands more fundamental change [13, 15, 19, 20]. Managing such transitions requires careful attention to the trade-offs between preserving existing value and creating new value.

Research on strategic transitions suggests that firms benefit from dual strategies: maintaining the existing business while building new digital capabilities, with explicit plans for how resources and attention will shift over time [1, 11, 14, 23]. Transition management also requires temporal separation—creating distinct organizational units and governance processes for the new digital business to protect it from the inertial forces of the legacy organization [3–4, 10]. Over time, as the digital business scales and the legacy business declines, the organization must manage the integration or divestment of legacy assets. This process demands both operational discipline and strategic foresight [6, 16, 22, 24].

Learning from failure and success

In the digital age, both failures and successes offer critical learning opportunities. However, organizations often fail to systematically capture these learnings, allowing valuable insights to dissipate as teams disband and attention shifts to new priorities [5, 9, 13, 17]. Institutionalizing learning requires structured retrospectives—post-project reviews that examine not only outcomes but also the assumptions, decision processes, and environmental conditions that shaped those outcomes [1, 11, 19, 25].

Equally important is the capacity to scale learning across the organization. Mechanisms such as communities of practice, internal knowledge platforms, and rotational assignments can facilitate the transfer of insights from exploratory units to mainstream operations [2, 4, 7, 8]. Leaders play a critical role in modeling a learning orientation, explicitly valuing the extraction of lessons from both successes and failures and ensuring that those lessons inform future strategy [15, 16, 20, 22].

Conclusion

In conclusion, strategic management under digital uncertainty is not about finding better ways to predict the future but about building organizations that can learn, adapt, and renew themselves continuously as the future unfolds, requiring a fundamental shift from static planning to a dynamic architecture of continuous adaptation in which strategy becomes an ongoing process of sensing environmental signals, interpreting implications, making adaptive decisions, reconfiguring resources, and embedding learning back into the strategic system. This reconceptualization demands that managers develop interpretive capabilities to navigate deep ambiguity rather than mere incomplete information, augment traditional dynamic capabilities with digital sensing infrastructures, modular designs, and experimental governance mechanisms to balance exploitation and exploration, and embrace a leadership mindset that empowers distributed decision-making while cultivating cultures of adaptability that normalize experimentation and learning from failure. The architecture presented in this article—replacing the linear logic of planning with the iterative logic of learning—provides a framework for this journey, one that replaces the illusion of control with the reality of resilience and static plans with dynamic capabilities for navigating an ever-changing digital landscape.

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