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Managing Digital Business Resilience through Strategic Agility, Workforce Adaptability, and Data-Driven Decision Infrastructure

Fatima El Idrissi^{1*}, Samira Bennani¹

Abstract

Digital disruption has become a persistent condition of contemporary business rather than an exceptional event. Firms face cybersecurity risks, platform shifts, supply-chain volatility, workforce reconfiguration, data overload, and rapid changes in customer behaviour. These pressures require resilience capabilities that are explicitly suited to digital environments. Existing resilience research has clarified how organizations anticipate, absorb, recover from, and adapt to disruption. However, digital business resilience requires more than general robustness or crisis response. It depends on the capacity to use digital systems, strategic flexibility, and human adaptability as mutually reinforcing sources of continuity and renewal. This article develops an original Digital Business Resilience Framework. The framework integrates three pillars: strategic agility, workforce adaptability, and data-driven decision infrastructure. It argues that resilience emerges when these pillars interact as a coherent system rather than operating as separate managerial initiatives. The central contribution is to reposition digital business resilience as a triadic capability. Strategic agility enables rapid direction-setting, workforce adaptability enables human execution under uncertainty, and data-driven decision infrastructure enables timely sensemaking and coordinated action. Together, these elements help firms anticipate disruption, withstand shocks, recover operationally, and reconfigure for future competitiveness.

Keywords Digital transformation, Strategic agility, Digital business resilience, Workforce adaptability, Data-driven decision infrastructure, Resilience framework

*Correspondence:

Fatima El Idrissi
fatima.idrissi@gmail.com

¹ Department of Digital Entrepreneurship, Faculty of Economics and Management, Mohammed V University, Rabat, Morocco

Introduction

Digital disruption has altered the meaning of business resilience because firms now confront turbulence through interconnected technological, organizational, and human systems. Resilience is no longer limited to recovery after a discrete crisis but includes the continuous capacity to function, adapt, and renew under conditions of uncertainty. Linnenluecke's review shows that resilience research has become central to management scholarship, yet the digital conditions under which resilience is built require sharper conceptual specification [1]. In digital contexts, resilience depends on whether firms can interpret weak signals, adjust strategy, mobilize employees, and use information systems before disruption escalates into organizational breakdown.

The problem is that the main components of digital business resilience are often treated in separate literatures. Strategic management research emphasizes dynamic capabilities, strategic renewal, and agility, while information systems research examines digital transformation, analytics, and IT-enabled responsiveness [2, 3]. Human resource and

organizational behaviour research, meanwhile, highlights employee resilience, adaptive performance, and workforce development as foundations of continuity during change [4]. These perspectives are valuable, but they do not yet provide an integrated framework explaining how strategy, people, and data infrastructure jointly produce digital resilience.

Digital transformation research has also warned that technology adoption alone does not create business value or organizational adaptability. Nambisan, Lyytinen, Majchrzak, and Song argue that digital innovation changes the conditions of organizing and strategy, while Vial shows that digital transformation reshapes value creation, structures, and responses to environmental change [2, 5]. However, firms may invest in platforms, analytics, or automation without building the strategic and workforce conditions required to use those tools effectively. This creates a gap between digital capability possession and digital resilience performance.

This article addresses that gap by proposing a Digital Business Resilience Framework that integrates strategic agility, workforce adaptability, and data-driven decision infrastructure. The framework treats resilience as a system-level capability rather than a single function, asset, or technology. It builds on dynamic capabilities theory, organizational resilience research, and analytics capability research to explain how firms sense disruption, respond quickly, recover operationally, and reconfigure for future conditions [6-8]. The aim is to offer a conceptual and managerial tool for understanding how digital firms can thrive amid repeated turbulence rather than merely survive individual shocks.

Digital Business Resilience Logic

Digital business resilience refers to the organizational capacity to anticipate, absorb, respond to, recover from, and reconfigure after disruption through the coordinated use of digital capabilities, strategic choices, and workforce adaptation. General organizational resilience research highlights anticipation, coping, and adaptation, but digital business resilience adds the need to operate through information systems, data flows, digital platforms, and digitally mediated work [9]. Duchek's capability-based view is especially useful because it frames resilience as a process that unfolds before, during, and after disruption rather than as a static organizational trait [9]. In digital business contexts, this process depends on whether firms can convert technological resources into timely strategic and human action.

The logic of digital resilience begins with sensing, because organizations must detect early signals of market, operational, technological, and workforce disruption. Business intelligence, analytics, and digital platforms can increase visibility, but visibility does not automatically become action unless managers interpret data and align it with strategic priorities [8, 10]. Organizational resilience therefore requires both information-processing capacity and decision-making capability. The resilient firm is not simply the firm with more data; it is the firm that can transform data into coordinated adaptation.

Digital business resilience also requires response and recovery capabilities. Response involves the rapid reallocation of attention, resources, and routines, while recovery involves restoring essential functions without returning blindly to pre-disruption assumptions [11]. Conz and Magnani emphasize that firm resilience is dynamic, meaning that recovery and renewal are linked rather than separate stages [11]. In digital settings, this means that firms should use disruption as a trigger for reconfiguration, not merely as an operational interruption to be neutralized.

The core logic proposed here is that digital business resilience emerges from the interdependence of strategic agility, workforce adaptability, and data-driven decision infrastructure. Strategic agility gives direction to adaptation, workforce adaptability gives the organization behavioural capacity to enact change, and data infrastructure gives managers and employees the informational foundation for timely action [12, 13]. **Table 1** summarises the key components of digital business resilience logic. These components show that resilience is not a linear sequence but a reinforcing cycle of sensing, deciding, acting, learning, and reconfiguring.

Table 1. Digital Business Resilience Logic: Core Components and Underlying Principles

Core component	Underlying principle	Role in digital business resilience
Digital sensing	Firms must detect weak signals, disruptions, and opportunities through data, platforms, and environmental scanning.	Enables earlier recognition of turbulence before it becomes a full organizational crisis.
Strategic response	Firms must translate disruption signals into rapid strategic choices and resource shifts.	Prevents paralysis by linking information to direction-setting and coordinated action.
Operational recovery	Firms must restore critical processes while maintaining service, continuity, and stakeholder confidence.	Reduces disruption damage and preserves organizational functioning under stress.
Adaptive reconfiguration	Firms must redesign routines, capabilities, and business models when disruption reveals structural weaknesses.	Turns disruption into renewal rather than simple restoration.
Integrated learning	Firms must capture lessons from disruption and embed them into future strategy, workforce practices, and data systems.	Strengthens resilience over time through cumulative adaptation.

Strategic Agility

Strategic agility is the firm's capacity to make timely strategic shifts in response to changing technological, competitive, and market conditions. It is closely linked to dynamic capabilities because it involves sensing opportunities and threats, seizing new options, and transforming organizational resources [6, 7]. Teece's work on business models and dynamic capabilities shows that firms need more than operational efficiency when environments shift; they need the ability to renew how value is created and captured [6]. In digital disruption, strategic agility allows leaders to avoid rigid planning cycles that become obsolete before implementation is complete.

The strategic agility pillar is especially important because digital business resilience depends on the speed and coherence of managerial response. IT-enabled dynamic capabilities can support competitive performance when firms align technological resources with strategic renewal processes [3]. Yeow, Soh, and Hansen similarly show that alignment with new digital strategy requires dynamic capability development rather than one-time technology implementation [14]. Strategic agility therefore acts as the directional mechanism that determines whether digital tools and workforce capabilities are mobilized toward meaningful adaptation.

Strategic agility includes flexible planning, agile governance, rapid resource redeployment, experimentation, and strategic foresight. Ravichandran links IT competence, innovation capacity, and organizational agility, suggesting that technology contributes to resilience when it supports broader organizational responsiveness [12]. Tallon, Queiroz, Coltman, and Sharma further show that organizational agility research has increasingly treated IT as an enabling condition for speed, flexibility, and coordinated adaptation [13]. In the proposed framework, strategic agility is not improvisation; it is disciplined flexibility supported by governance mechanisms that allow firms to change direction without losing coherence.

Strategic agility also requires leadership attention to business model renewal, ecosystem shifts, and competitive disruption. Helfat and Raubitschek argue that digital platform-based ecosystems require dynamic and integrative capabilities, which means firms must coordinate across technologies, partners, and value propositions [15]. Warner and Wäger describe digital transformation as an ongoing process of strategic renewal, reinforcing the idea that agility is continuous rather than episodic [16]. **Table 2** outlines the dimensions and enablers of strategic agility for digital resilience. These dimensions clarify how agility becomes a resilience capability rather than a generic managerial aspiration.

Table 2. Strategic Agility Dimensions and Enablers for Digital Business Resilience

Strategic agility dimension	Key enablers	Contribution to digital business resilience
Environmental sensing	Strategic foresight, market intelligence, technology scanning, competitor monitoring.	Helps firms identify digital threats and opportunities before they destabilize the business.
Strategic flexibility	Scenario planning, modular strategy, flexible investment portfolios, adaptable business models.	Allows firms to pivot without abandoning long-term strategic intent.
Rapid resource reallocation	Agile budgeting, cross-functional prioritization, dynamic capability deployment, executive decision rights.	Enables quick movement of capital, talent, and technology toward emerging resilience needs.
Agile governance	Short decision cycles, empowered teams, escalation pathways, iterative review routines.	Reduces bureaucratic delay and improves coordination during disruption.
Strategic renewal	Business model experimentation, ecosystem adaptation, digital opportunity exploitation, post-disruption learning.	Converts disruption into innovation, repositioning, and long-term competitiveness.

Workforce Adaptability

Workforce adaptability is the human pillar of digital business resilience because disruption is ultimately absorbed and enacted through people’s changing roles, skills, interpretations, and behaviours. Employee resilience research shows that individuals and teams need psychological resources, learning capacity, and support systems to remain effective under stress [4]. Kuntz, Malinen, and Näswall position employee resilience as developable rather than fixed, which is important for firms facing repeated digital turbulence [4]. In this framework, workforce adaptability refers to the capacity of employees to learn, adjust, collaborate, and perform as technologies, workflows, and strategic priorities change.

Digital disruption often changes not only what employees do but also how they understand the organization’s future. Workforce adaptability therefore requires digital skills, learning agility, adaptive performance, and confidence in new work systems. Trenerry, Chng, Wang, Suhaila, Lim, Lu, and Oh show that workplace preparation for digital transformation depends on multilevel factors, including individual readiness, team support, leadership, and organizational structures [17]. These insights suggest that resilience cannot be delegated to technology departments alone, because employees across the firm must be able to translate disruption into changed practice.

Human resource practices play a central role in building workforce adaptability. Learning-oriented organizations can strengthen employee resilience and engagement when they create conditions for continuous development, participation, and psychological support [18]. Tonkin, Näswall, Malinen, and Kuntz further show that employee wellbeing is connected to resilience-building, indicating that adaptability should not be confused with unlimited pressure or constant availability [19]. **Table 3** identifies the workforce adaptability factors critical for digital resilience. These factors clarify how skills, mindset, and organizational support combine to make the workforce a resilience asset.

Table 3. Workforce Adaptability Factors: Skills, Mindset, and Organizational Support Mechanisms

Workforce adaptability factor	Core meaning	Organizational support mechanism	Resilience contribution

Digital skill readiness	Employees possess the technical and process knowledge needed to work with changing digital tools.	Continuous training, role-specific upskilling, peer learning, and digital coaching.	Reduces disruption caused by new systems and accelerates adoption.
Learning agility	Employees can update assumptions, acquire new knowledge, and apply learning in unfamiliar situations.	Experimentation routines, feedback systems, reflective learning, and safe-to-learn environments.	Enables rapid behavioural adjustment during technological and market change.
Psychological resilience	Employees maintain functioning, motivation, and confidence under uncertainty and pressure.	Wellbeing support, workload management, trust-building, and resilient leadership practices.	Prevents fatigue, withdrawal, and resistance during disruption.
Adaptive performance	Employees modify tasks, workflows, and collaboration patterns when conditions change.	Flexible role design, team autonomy, agile work routines, and performance systems that value adaptation.	Allows the organization to keep operating while changing.
Collective adaptability	Teams coordinate across functions and share knowledge during volatile conditions.	Cross-functional projects, communities of practice, shared platforms, and collaborative governance.	Converts individual adaptability into organization-wide resilience.

Workforce adaptability also requires leadership and culture that prevent resilience from becoming an individual burden. Studies of employee resilience suggest that organizational context shapes whether employees respond to uncertainty with proactive adaptation or defensive resistance [20]. Ahmad, Islam, Sohal, Wolfram Cox, and Ahmad connect servant leadership, resilience, and proactive personality, showing that leadership behaviour affects whether employees feel supported enough to act constructively under pressure [20]. For digital business resilience, the managerial task is to create an environment in which employees can change with the organization rather than simply endure change imposed by it.

Data-Driven Decision Infrastructure

Data-driven decision infrastructure is the technological and informational pillar of digital business resilience. It includes analytics platforms, business intelligence systems, real-time monitoring, predictive models, dashboards, decision-support routines, and the governance processes that determine how information is used. Sivarajah, Kamal, Irani, and Weerakkody show that big data creates both analytical opportunities and managerial challenges, especially when firms struggle with complexity, quality, interpretation, and actionable use [10]. In resilience terms, data infrastructure matters because it reduces uncertainty only when it is connected to timely and meaningful decisions.

Big data analytics can strengthen resilience by improving visibility across operations, customers, markets, and supply networks. Wamba, Gunasekaran, Akter, Ren, Dubey, and Childe demonstrate that analytics can influence firm performance through dynamic capabilities, which links data use directly to strategic adaptation [21]. Mikalef, Boura, Lekakos, and Krogstie similarly show that big data analytics capabilities contribute to firm performance when technical resources are combined with organizational and managerial capabilities [22]. These findings support the view that data infrastructure is not merely an IT asset but a capability system that enables sensing, prioritization, and coordinated response.

However, data alone is insufficient for digital business resilience because firms can possess advanced analytics while still responding slowly or incoherently. Grover, Chiang, Liang, and Zhang argue that strategic business value from big data

analytics depends on the organizational processes through which data is converted into decisions and action [8]. This means that resilient firms must embed analytics into governance routines, escalation processes, and cross-functional decision forums. Data-driven decision infrastructure therefore functions as a bridge between environmental turbulence and managerial response.

The infrastructure also needs to be adaptive, because digital disruption changes what must be measured and how quickly information must circulate. Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, and Haenlein emphasize that digital transformation affects multiple business domains, including customer experience, operations, and business models [23]. A resilience-oriented data infrastructure should therefore track not only financial or operational performance but also employee readiness, customer behaviour, digital risk, ecosystem dependencies, and emerging market signals. Its purpose is not to produce more reports but to create a shared decision environment in which strategy and workforce action can be adjusted quickly.

Proposed Digital Business Resilience Framework

The proposed Digital Business Resilience Framework integrates strategic agility, workforce adaptability, and data-driven decision infrastructure into a single system. It builds on resilience research that defines resilience as a dynamic organizational capability and on digital transformation research that emphasizes the interaction between technology, structure, and strategy [9, 23]. The framework begins from the premise that no single pillar is sufficient. Strategic agility without workforce adaptability produces plans that people cannot enact, workforce adaptability without data infrastructure produces effort without visibility, and data infrastructure without strategic agility produces information without direction.

The framework operates through three reinforcing feedback loops. First, data-driven decision infrastructure informs strategic agility by providing evidence about disruption signals, performance shifts, customer needs, and operational vulnerabilities [8]. Second, strategic agility empowers workforce adaptability by clarifying priorities, reallocating resources, and legitimizing experimentation during uncertainty [16]. Third, workforce adaptability improves data infrastructure by generating high-quality operational knowledge, using analytics in practice, and feeding frontline insights back into decision systems [17]. These feedback loops convert resilience from a defensive capability into an adaptive system for renewal.

The framework also advances a set of conceptual propositions. First, firms are more digitally resilient when strategic agility, workforce adaptability, and data-driven decision infrastructure are mutually aligned rather than developed independently. Second, data infrastructure strengthens resilience only when embedded in strategic and human decision processes, consistent with research linking analytics capabilities to dynamic capabilities and firm performance [21, 22]. Third, workforce adaptability mediates the conversion of strategic intent and analytical insight into practical action. **Table 4** presents the proposed Digital Business Resilience Framework integrating the three pillars.

Table 4. Digital Business Resilience Framework: Integration of Strategic Agility, Workforce Adaptability, and Data-Driven Decision Infrastructure

Framework pillar	Primary resilience function	Key mechanisms	Interaction with other pillars	Expected resilience outcome
Strategic agility	Provides direction and speed in turbulent conditions.	Strategic sensing, flexible planning, resource reallocation, agile governance, business model renewal.	Uses data insights to guide decisions and gives the workforce clear priorities for adaptation.	Faster response, better strategic fit, and improved capacity to exploit disruption.

Workforce adaptability	Provides human capacity to enact change.	Digital skills, learning agility, psychological resilience, adaptive performance, cross-functional collaboration.	Converts agile strategy and data insights into changed routines, behaviours, and service delivery.	Higher employee readiness, reduced resistance, and stronger continuity during change.
Data-driven decision infrastructure	Provides informational visibility and decision support.	Analytics platforms, real-time monitoring, predictive modelling, decision dashboards, data governance.	Supplies evidence for strategy and enables employees to coordinate action based on shared information.	Earlier sensing, more accurate prioritization, and better coordinated recovery.
Integrative governance	Aligns the three pillars as a resilience system.	Cross-functional resilience teams, shared metrics, iterative review cycles, leadership sponsorship.	Prevents siloed investments and maintains coherence across strategy, people, and technology.	System-level resilience rather than isolated functional responsiveness.
Learning and reconfiguration	Converts disruption experience into future capability.	Post-disruption reviews, capability redesign, feedback loops, experimentation, knowledge capture.	Updates strategy, workforce practices, and data systems after each disruption cycle.	Cumulative resilience, renewal, and long-term adaptive advantage.

The framework’s central claim is that digital business resilience is a triadic capability that must be intentionally designed and governed. This differs from approaches that treat resilience as redundancy, agility as speed, adaptability as employee flexibility, or data infrastructure as technical capacity alone. Hillmann and Guenther argue that organizational resilience is valuable for management research because it connects survival, adaptation, and long-term viability [24]. Extending this logic, the proposed framework positions digital resilience as a managed integration of strategic, human, and technological capabilities.

Figure 1 presents the integrated Digital Business Resilience Framework, showing how strategic agility, workforce adaptability, and data-driven decision infrastructure interact through reinforcing feedback loops to produce sensing, response, recovery, and reconfiguration capacity.

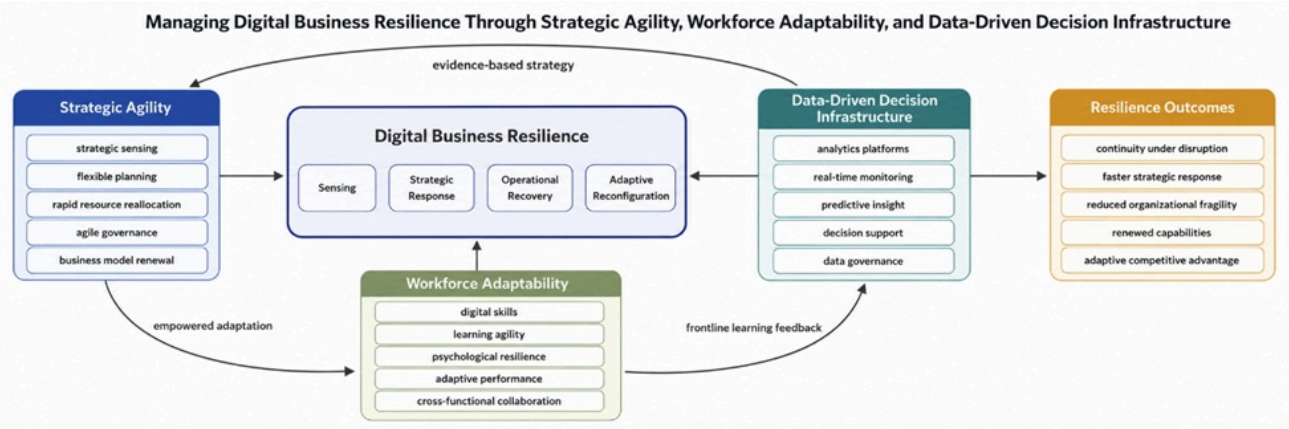


Figure 1. Integrated Digital Business Resilience Framework Linking Strategic Agility, Workforce Adaptability, and Data-Driven Decision Infrastructure

Implementation Strategy

Implementation should begin with a maturity assessment across the three pillars. Managers need to examine whether the firm can sense disruption, shift strategy, support employee adaptation, and use analytics in real decision processes. Clauß, Abebe, Tangpong, and Hock show that strategic agility is connected to business model innovation and performance, which suggests that assessment should include both current responsiveness and the ability to redesign value creation [25]. A diagnostic approach can reveal whether the organization is overinvesting in one pillar while neglecting the others.

The second step is to develop an integrated resilience roadmap. This roadmap should combine strategic priorities, workforce development initiatives, and data infrastructure investments rather than assigning them to separate departments. Troise, Corvello, Ghobadian, and O'Regan show that agility is especially important for navigating volatile, uncertain, complex, and ambiguous environments in the digital transformation era [26]. For managers, this means that resilience initiatives should be iterative, cross-functional, and linked to real disruption scenarios instead of being treated as abstract preparedness exercises.

The third step is to use cross-functional resilience teams and iterative pilots. These teams should include strategic decision-makers, HR leaders, digital technology specialists, analytics experts, and operational employees who understand frontline disruption patterns. Ragmoun's study of IT capabilities, strategic flexibility, organizational resilience, and big data analytics capabilities reinforces the importance of connecting technological capabilities with strategic and organizational flexibility [27]. Piloting allows the firm to test resilience routines in controlled settings, learn from failures, and scale practices that improve coordination across the three pillars.

Figure 2 illustrates the staged implementation pathway through which managers can diagnose resilience maturity, align the three framework pillars, pilot cross-functional practices, and institutionalise continuous learning.

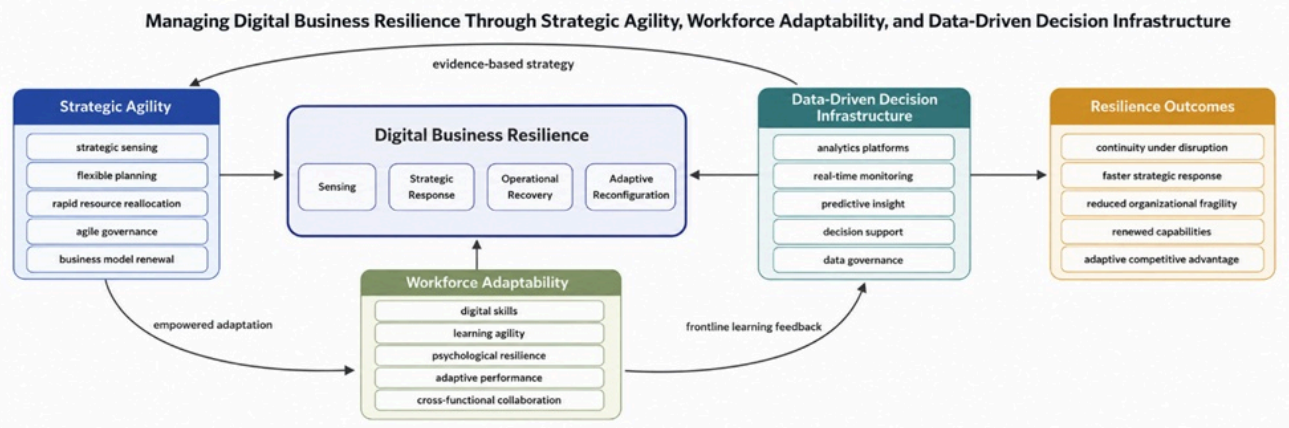


Figure 2. Implementation Pathway for Building Digital Business Resilience across Strategic, Workforce, and Data Capabilities

Managerial Implications

For managers, the framework provides a diagnostic tool for asking whether the firm's resilience capacity is balanced or fragmented. A firm may have strong analytics but weak strategic agility, or a highly adaptive workforce without reliable data infrastructure. Kumar, Sindhwani, Behl, Kaur, and Pereira identify several enablers of digital resilience for small and medium enterprises, reinforcing the view that resilience depends on multiple organizational conditions rather than isolated technology adoption [28]. Managers should therefore evaluate resilience as an integrated capability portfolio.

The framework also helps clarify investment priorities. Leaders should avoid treating digital resilience as a cybersecurity issue, a digital transformation issue, or a workforce issue alone. Awad and Martín-Rojas show that digital transformation can influence organizational resilience through learning and innovation, which means that investments should strengthen the firm's capacity to learn from disruption and renew its practices [29]. This requires balancing short-term response capacity with long-term workforce development and data capability building.

Finally, the framework implies that governance structures must connect strategy, people, and data at the point of decision. Digital innovation and transformation often change institutional arrangements, organizational roles, and coordination mechanisms, as Hinings, Gegenhuber, and Greenwood argue [30]. Managers therefore need governance routines that make resilience visible, measurable, and actionable across functions. The practical challenge is not only to install better systems or train employees but to design an organization in which strategy, workforce capability, and decision infrastructure reinforce one another continuously.

Conclusion

This article has argued that digital business resilience is not a property of technology alone. It emerges from the integration of strategic agility, workforce adaptability, and data-driven decision infrastructure. Firms become resilient when they can sense disruption, make timely strategic choices, support employees through adaptation, and use data to coordinate action.

The proposed Digital Business Resilience Framework contributes a conceptual model for understanding resilience as a triadic capability. It shows how strategic agility gives direction, workforce adaptability enables execution, and data-driven decision infrastructure provides informational visibility. The framework also explains why these pillars must be connected through feedback loops, governance routines, and continuous learning.

Future research can empirically test the framework across industries, firm sizes, and disruption contexts. Managers can use it as a diagnostic and design tool for assessing resilience gaps and aligning investments. The central message is that digital business resilience must be managed as an integrated strategic, human, and technological system.

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