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Article

Adapt or perish: How dynamic capabilities fuel digital transformation in traditional industries

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Abstract

In the digital era, traditional industries confront an existential choice: fundamentally modernize or become irrelevant. This study demonstrates that sustained change requires not just the adoption of new technology but also the strategic coordination of three interrelated dynamic capacities. Through an in-depth analysis across sectors like automotive manufacturing, retail logistics, and utility operations—industries challenged by outdated systems and cultural inertia—the study demonstrate that lasting renewal requires: 1) perceptual acuity to detect emerging threats and opportunities within market complexity, 2) decisive agility to act quickly by mobilizing resources and experimenting, and 3) transformational courage to reconfigure cultural foundations and infrastructure. Importantly, it shows how mismatched skills generate vulnerability: enhanced sensing without action causes "paralysis by analysis" (e.g., merchants' understanding of environmental trends but lacking procurement agility), while reconfiguration without strategic sensing results in aimless disruption. The results suggest that integrating capacity development breaks down deep-rooted obstacles like technical lock-in and identity-based reluctance, as shown by manufacturers bringing together shop-floor veterans and data scientists to co-create AI solutions. The study provides practitioners with realistic frameworks for implementing weak-signal detection systems, creating CEO-supported innovation "sandboxes," and fostering psychological safety to allow worker reskilling. For researchers, reconfiguration is redefined as a cultural transformation, and ambidextrous governance addresses the stability-agility conundrum. Finally, this triad of talents strengthens digital resilience—the organization's capacity to transform continual disruption into a persistent competitive advantage. The road from fragility to vitality begins with capacity orchestration, not technology.

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Dynamic capabilities; digital transformation; organizational resilience; legacy industries

Introduction

The increasing speed of digital innovation has irretrievably reshaped the competitive landscape, turning previously stable industries into battlegrounds of radical disruption where incumbent players confront existential risks. Iconic failures such as Blockbuster, made obsolete by the nimble streaming model of Netflix despite its market leadership, or Kodak, which ironically developed the digital camera but fell prey to its disruptive power, are stark reminders of the dangers of digital inaction (Lucas & Goh, 2009; Anthony, 2016). These stories

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are more than corporate cautionary tales; they distill the perilous reality facing organizations with deep roots in traditional industries—manufacturing, retail, logistics, and energy—as they struggle with the inexorable pressures of technological upheaval. Empirical studies highlight the daunting magnitude of this task, exposing a sobering reality: less than 30% of digital transformation (DT) efforts across these legacy industries eventually meet their strategic goals, converting into sustainable competitive advantage or even survival (Westerman et al., 2014; Singh & Hess, 2017). This chronically high failure rate speaks not merely to technical obstacles, but to a fundamental deficit in understanding the *organizational levers* prerequisite for managing the complex, resource-intensive, and often culturally discomfiting process of digital renewal. The burning question, then, migrates from *whether* change is necessary to *how* incumbent firms might effectively manage it, requiring insights linking theoretical rigor and practical relevance.

At the root of this dilemma is the need to develop an organizational capacity for ongoing adaptation—a competence far greater than the simple adoption of new technologies. Success depends on the capability to proactively sense emergent market changes and technological disruptions, to decisively capture emergent opportunities, and to dynamically reorganize internal assets, processes, and even identities. Such is the nature of dynamic capabilities (DCs), theorized by Teece and colleagues as the organizational ability to integrate, build, and reconfigure competencies to confront rapidly changing environments (Teece et al., 1997; Teece, 2007). Although the DC paradigm provides a compelling theoretical framework for comprehending strategic agility, its concrete applicability to the complexities of digital transformation among capital-intensive, regulation-rich, and historically stable traditional industries demands closer examination.

These legacy corporations face systemic hurdles fundamentally divergent from those of digital natives, as dramatically evident in Table 1. The inertia inherent in monolithic legacy IT infrastructure, an ingrained risk-averse culture inimical to experimentation, and the fragmentation of data into isolated silos cumulatively pose nearly insurmountable barriers to agile response. Complicating this, recent work by Dzreke (2025) identifies a fundamental strategic flaw: traditional companies tend to treat artificial intelligence (AI) as a point solution for efficiency improvements, as opposed to embracing it as a transformative fulcrum for competitive repositioning, thus failing to translate technological intelligence into a true market advantage. Overcoming such ingrained flaws requires capabilities that induce profound organizational mindset shifts, facilitating the strategic deployment of resources towards innovation and generating the structural fluidity necessary for continued adaptation. Consider, for instance, the struggle of a century-old manufacturer attempting to integrate real-time IoT sensor data across its sprawling, heterogeneous factory floors—a task requiring not just new technology, but a complete overhaul of data governance and cross-departmental collaboration.

Table 1. Key challenges in traditional industries vs. digital disruptors

Challenge	Traditional Firms	Digital Natives
Legacy Systems	High inertia due to complex, embedded infrastructure	Cloud-native, modular, scalable architectures
Culture	Risk-averse, hierarchical, resistant to change	Agile, experimental, tolerant of failure

Data Utilization	Siloed, fragmented, under-leveraged for insights	Integrated, AI-driven, core to decision-making
Value Chain	Linear, proprietary, slow to reconfigure	Networked, ecosystem-based, highly adaptable
Talent	Deep industry expertise, potential digital skills gap	Digital-first skills, adaptable, but may lack domain depth

Informed by this essential context, this research investigates two primary, interconnected questions: (1) **what specific methods do dynamic capabilities employ to facilitate successful digital transformation in conventional industries such as manufacturing, retail, logistics, and energy**? (2) **What fundamental obstacles intrinsic to these legacy industries do dynamic capabilities most proficiently alleviate during the transformation process**? The investigation is firmly based on Teece's (2007) advanced dynamic capabilities framework, which specifies three interrelated microfoundations: *sensing* (the ongoing identification and interpretation of opportunities and threats), seizing (the allocation of resources to capitalize on identified opportunities), and *reconfiguring* (the continual transformation of tangible and intangible assets to maintain competitiveness). This paradigm offers a crucial analytical structure, redirecting attention from deterministic technological factors to the fundamental strategic and management skills necessary for effective adaptation. The *sensing* dimension must progress beyond conventional market scanning; it requires the establishment of advanced, continuous competitive intelligence systems, driven by sophisticated analytics, to effectively identify threats and opportunities in real-time—a capability directly associated with improved profitability in fluctuating digital markets (Dzreke & Dzreke, 2025). Moreover, *capitalizing* on opportunities necessitates the utilization of AI not only for operational enhancement but also as a strategic foundation for profound business model innovation and value proposition reconfiguration, thus converting raw intelligence into a sustainable competitive advantage (Dzreke, 2025). A logistics behemoth may recognize the promise of autonomous delivery fleets via sophisticated market analytics; however, its capacity to capitalize on this opportunity hinges on acquiring specialized talent, establishing alliances with technology providers, and reorganizing delivery operations—actions that exemplify dynamic capability.

The analytical focus is intentionally directed towards conventional industries characterized by significant physical infrastructure, entrenched operating practices, and intricate regulatory environments—namely, manufacturing, retail, logistics, and energy. These sectors provide the foundation of the global economy, under significant pressure to digitize while contending with obstacles generally unfamiliar to digital startups or service-oriented companies (Hanelt et al., 2021). In high-stakes environments, the incorporation of AI-driven competitive intelligence and the strategic utilization of AI as a fundamental competitive advantage are essential elements of the dynamic capabilities necessary for effective transformation (Dzreke, 2025; Dzreke & Dzreke, 2025). This study focuses on deriving insights into theoretical precision and practical utility by investigating how the DC framework enables legacy firms to surmount inherent inertia and convert the latent potential of digital and AI technologies into quantifiable performance results. The organization of this work embodies this concentrated investigation: The study begins with a critical synthesis of pertinent literature on digital transformation and dynamic capacities, clearly delineating the conceptual gap this research aims to bridge while incorporating modern viewpoints on the strategic necessity of AI. Subsequently, develop the integrated theoretical model by adapting Teece's dynamic capabilities dimensions to the

unique requirements of digital transformation in conventional sectors, explicitly integrating AI-enhanced sensing and strategic seizing, and formulating empirically tested hypotheses. The following methodological approach utilizes a stringent qualitative multi-case study methodology to examine digital transformation activities among deliberately chosen enterprises across the specified sectors. This analysis presents empirical findings, examining how sensing (including AI-driven intelligence mechanisms), seizing (encompassing AI-enabled strategic pivots), and reconfiguring capabilities manifest, interact, and ultimately influence transformation success or failure, employing comparative analysis and conceptual models to clarify pathways. The discourse subsequently analyzes these findings, emphasizing their theoretical importance in addressing fundamental contradictions (e.g., reconciling operational stability with innovative agility) and advancing dynamic capabilities theory inside the digital realm, especially for the strategic integration of AI. It delineates specific ramifications for practitioners spearheading change initiatives. The conclusion emphasizes the essential role of strong dynamic capabilities, enhanced by strategic AI integration, in securing the survival and revitalization of traditional industries, recognizes the study's limitations, and outlines fruitful directions for future research to further quantify the connections between dynamic capabilities and digital transformation while examining contextual nuances. This thorough study aims to establish a solid, evidence-based framework for legacy industries maneuvering through the volatile digital environment, illustrating how dynamic capabilities function as the crucial mechanism for converting existential threats into enduring competitive rejuvenation.

Literature Review

Defining Digital Transformation: Beyond Technological Adoption

The unyielding pace of digital innovation has profoundly altered the competitive landscape, converting previously stable traditional industries into domains of significant disruption. This metamorphosis requires more than technical acceptance; it requires a fundamental reconfiguration of the organization—digital transformation (DT). Digital Transformation (DT) signifies a strategic, comprehensive reconfiguration of value creation and capture by enterprises, fundamentally transforming business models, operational processes, and customer engagement through the extensive incorporation of digital technology (Vial, 2019; Verhoef et al., 2021). It surpasses simple digitization (the conversion of analog data) or digitalization (the enhancement of current processes with digital tools), representing a profound cultural and structural transition towards a digital-first paradigm (Legner et al., 2017; Hess et al., 2016). Driven by rapid advancements in cloud computing, IoT, AI, and analytics, coupled with changing consumer expectations for hyper-personalization, increased competition from nimble digital natives, and the disruptive capabilities of platform-based business models, digital transformation has transitioned from a strategic choice to an existential imperative (Matt et al., 2015; Warner & Wäger, 2019). This process progresses in stages: initial technological experimentation leads to cross-functional integration, ultimately resulting in a profound rethinking of the firm's core value proposition (Berman, 2012; Kane et al., 2015). Navigating this intricate landscape is particularly difficult for established entities in traditional industries, where entrenched frameworks conflict with the agility of the digital era.

Conventional Industries: Structural Inertia Amid Disruption

Conventional industries—manufacturing, retail, logistics, and energy—constitute the foundation of the global economy, yet face distinct systemic obstacles to effective digital transformation. These sectors are marked by substantial investments in physical assets (heavy machinery, extensive warehousing, transportation fleets, energy infrastructure), linear and frequently rigid value chains, entrenched organizational cultures historically resistant to significant change, and strict regulatory frameworks, resulting in inherent inertia that hinders agility (Hanelt et al., 2021; Nambisan et al., 2019). This reality sharply contrasts with digital natives, which are entities conceived with cloud-native, modular architectures optimized for scalability, cultures that prioritize experimentation and learning from failure, and models of value creation based on networked ecosystems (Table 1; Yoo et al., 2010; Autio et al., 2018). The resultant friction reveals enduring, entrenched challenges: the substantial difficulty and expense of integrating or substituting monolithic legacy IT systems lacking interoperability, a considerable talent deficit characterized by deep domain expertise alongside a dearth of modern digital skills, the widespread fragmentation of data into isolated silos obstructing comprehensive insights, and the formidable challenge of transforming a risk-averse, hierarchical culture into one that fosters empowered innovation (Sebastian et al., 2017; Singh & Hess, 2017). As a result, digital transformation failure rates in these sectors are exceedingly high, emphasizing the insufficiency of solely technological solutions and illustrating the essential requirement to comprehend the organizational capabilities that allow traditional firms to surmount structural inertia and prosper in the digital age (Westerman et al., 2014; Fitzgerald et al., 2014).

Table 2. Key challenges in traditional industries vs. digital disruptors

Challenge	Traditional Firms	Digital Natives
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Dynamic Capabilities: The Theoretical Foundation for Adaptation

The dynamic capabilities (DCs) framework, initiated by Teece, Pisano, and Shuen (1997) and meticulously enhanced by Teece (2007), offers a robust theoretical perspective for comprehending how conventional organizations might maneuver through turbulence and attain effective digital transformation (DT). Dynamic capabilities (DCs) are characterized as a firm's advanced ability to deliberately integrate, develop, and reorganize both internal and external skills to respond to swiftly evolving surroundings, hence securing a lasting competitive advantage (Teece, 2007; Helfat et al., 2007; Eisenhardt & Martin, 2000). DCs

prioritize mechanisms that provide ongoing adaptation and renewal, transcending static perspectives of resources. Teece (2007) identifies three interrelated microfoundations: Sensing encompasses the ongoing assessment, investigation, acquisition of knowledge, and analysis of technical changes, market trends, and competitive forces to discern fledgling opportunities and developing dangers. Seizing involves the mobilization and allocation of resources—financial, human, technological, and relational—to exploit perceived possibilities by creating new products, processes, or innovative business models. Reconfiguring involves the continuous alteration, recombination, and safeguarding of both tangible and intangible assets (such as structures, processes, knowledge bases, and corporate identity) to ensure alignment with the changing environment and to reduce risks. These competencies operate synergistically as a cohesive system, allowing organizations to manage the volatility, uncertainty, complexity, and ambiguity (VUCA) associated with digital disruption (Battisti & Deakins, 2017; Wilden et al., 2016).

The DC-DT Nexus: Strategic Agility for Transformation

DCs' direct involvement with the basic challenge—facilitating strategic agility in structurally complex contexts—is crucial to DT effectiveness in traditional industries. Digital transformation requires the ability to quickly identify complex digital developments, seize new possibilities, and fundamentally reform obsolete frameworks to sustainably incorporate innovations. Sensing skills are needed to detect small disruptions like generative AI's impact on service design or supply chain sustainability needs before they become existential issues. Complex, continuous competitive intelligence systems powered by sophisticated analytics and AI must be implemented beyond traditional market research to turn data overload into actionable insights for proactive strategic positioning (Dzreke & Dzreke, 2025). This multinational logistics business uses AI-driven analytics to identify the rise of autonomous delivery technologies and customer desire for monitoring transparency. Leveraging capabilities helps firms act on findings. Today, AI must be used not just to reduce costs but also to innovate business models and create value, turning technical promise into a lasting market advantage (Dzreke, 2025). The logistics business must engage in experimental projects, partner with technology developers, and hire specialists to capitalize on autonomous delivery trends. These changes include reconfiguring delivery networks, retraining drivers for new roles, and data governance for IoT integration. The transformation of inflexible hierarchies into agile teams and the promotion of ongoing learning are needed. Good possibilities don't lead to lasting change without fundamental reconfiguration.

Tensions: Major Contextual Comprehension Issues

Despite the convincing theoretical congruence, little is known about how digital capabilities enable digital transformation inside traditional sectors. Dynamic capabilities (DC) theory provides a solid foundation for strategic adaptation (Di Stefano et al., 2014; Schilke et al., 2018), and agility is crucial for digital transformation (DT) (Tallon & Pinsonneault, 2011; Sambamurthy et al., 2003), but research that explicitly links DC microfoundations to DT mechanisms and outcomes in asset-intensive, regulated industries is lacking. Basic questions need contextualized research: How do sensing systems evolve to spot digital disturbances in factories or complex supply networks? What hurdles, beyond resource constraints, prevent seizing in hierarchical, risk-averse firms, and how can dynamic capabilities processes

overcome them? How are complex, sometimes controversial processes of restructuring physical assets (like manufacturing lines) and intangible assets (like entrenched mindsets) articulated and administered? Further empirical validation in typical industrial settings is needed due to AI's shifting role in these DC aspects, notably its increase in sensory intelligence and integration into strategic innovation. Current research tends to focus on digital natives or traditional businesses, missing sector-specific differences like energy's regulatory hurdles and retail's fierce margin competitiveness (Hanelt et al., 2021). This gap highlights the need for studies on DCs' conditional use and effectiveness in DT beyond traditional situations.

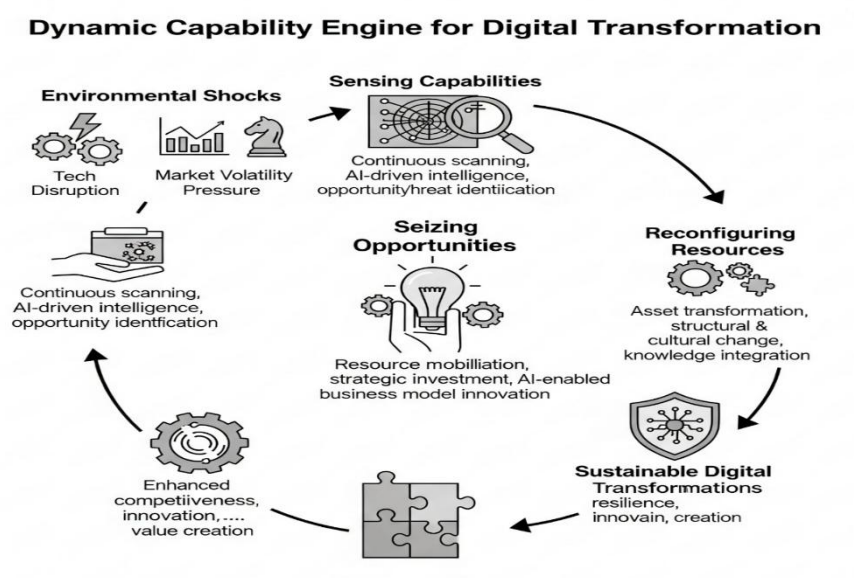

Figure 1. Digital transformation dynamic capability engine

Creating the Framework: A Circular Sustainable Adaptation Model

This conceptual model (Figure 1) depicts the iterative process linking DCs to sustainable DT. Digital disruption, market instability, and competitive tactics engage the organization's sensory capacity. Effective sensing, boosted by AI-fueled competitive intelligence (Dzreke & Dzreke, 2025), detects major threats and new possibilities. The strategic use of AI as a catalyst for innovation rather than efficiency improves seizing capabilities and resource mobilization to capture value (Dzreke, 2025). Reconfiguring the firm's resource base, structures, and culture to integrate changes and improve adaptive ability is essential for grasping. A sustainable digital transformation boosts competitiveness, resilience, innovation, and value creation. Iterative transformation improves the organization's future perceptual acuity, creating a self-reinforcing virtuous cycle essential for digital survival and success. This model provides the theoretical framework for studying these capabilities in traditional industries' complex environments.

Digital Adaptation Catalyst Theory

This section refines a theoretical model based on the need for digital transformation (DT) in conventional businesses and the importance of dynamic capabilities (DCs) in overcoming structural inertia. This approach places DCs as the key catalyst for strategy renewal from latent

DT potential. Based on Teece's (2007) original paradigm and developed via modern digital strategy literature (Warner & Wäger, 2019; Nambisan et al., 2019), the model views sensing, seizing, and reconfiguring as highly interwoven, iterative capacities. These competencies coordinate the complex organizational transformation needed for digital-age competitiveness. These capacities interact in separate but interrelated ways to shape DT projects in conventional businesses, which are hampered by legacy infrastructures, regulatory restrictions, and cultural barriers. *Sensing* is the firm's systematic ability to recognize, understand, and forecast digital possibilities and risks from external and internal information. This requires proactive market intelligence, technological scouting, and comprehensive analysis of changing consumer habits and competition dynamics. This increasingly requires powerful analytics and AI to turn massive data streams into actionable foresight, which is essential for survival (Dzreke & Dzreke, 2025). Imagine a multinational business installing IoT sensors on its production lines. Beyond basic operational monitoring, sophisticated AI algorithms analyze vibration, temperature, and energy consumption patterns to predict subtle equipment degradation weeks before failure and correlate these patterns with downstream customer feedback platform demands for product quality. Integrated sensing reveals latent DT routes like switching from planned maintenance to AI-driven predictive models or creating real-time quality-feedback-responsive mass customisation platforms.

Seizing is the crucial translational ability that turns perception into strategic action via resource mobilization and commitment. This dimension requires agile allocation of financial, human, and technological resources, strategic partnerships and alliances (especially for accessing novel digital expertise or technologies incumbent firms lack internally), and rapid prototyping and experimentation. These methods validate and improve innovative digital products and processes before expensive, widespread implementation (Mikalef & Pateli, 2017; Autio et al., 2018). In the digital age, seizing requires using technology like AI for radical business model innovation, not just efficiency improvements. This redefines value propositions and competitive positioning, turning technology promise into a sustainable market advantage (Dzreke, 2025). The disruptive danger and potential of AI-driven hyper-personalization inspire a century-old store to act. A strategic equity collaboration with a specialist AI firm allows it to create a new recommendation engine using loyalty program data in three months and launch it in select metropolitan outlets. It also reinvests a large percentage of its marketing budget in individualized omnichannel customer journeys to capture new value and fight digital-native competition.

Reconfiguring is the key to embedding and sustaining change, overcoming structural inertia. This involves transforming tangible (e.g., modernizing monolithic IT architectures to modular, API-driven designs for greater flexibility and integration) and intangible (e.g., reshaping rigid organizational hierarchies into cross-functional agile teams, overhauling incentive systems to reward innovation and collaboration, and cultivating a digital-ready culture focused on psychological safety, continuous learning, and em Reconfiguring assures that innovations seized become embedded in the firm's operations and strategy. After embracing cloud infrastructure for quicker, more reliable software delivery, a typical international bank must undergo major reconfiguration. This requires transforming waterfall development teams into DevOps, breaking down decades-old silos between development and operations, automating CI/CD pipelines, and encouraging rapid iteration and blameless post-mortems to drive continuous improvement.

This integrated DC paradigm directly informs the following assumptions about their influence on DT in conventional sectors, bridging theoretical abstraction and empirical testability:

This part develops an improved theoretical model based on the necessity of digital transformation (DT) for conventional businesses and the essential function of dynamic capabilities (DCs) in surmounting structural inertia. This concept identifies DCs as the essential catalytic mechanism that transforms dormant DT potential into concrete strategic rejuvenation. Based on Teece's (2007) foundational paradigm and further developed through modern digital strategy research (Warner & Wäger, 2019; Nambisan et al., 2019), the model conceptualizes sensing, seizing, and reconfiguring as interconnected, iterative capacities rather than sequential phases. These talents jointly facilitate the intricate organizational transformation necessary for enduring competitiveness in the digital era. In the limited environments of conventional industries—marked by outdated infrastructures, regulatory challenges, and cultural opposition—these skills emerge in unique yet interconnected manners, each directly influencing the direction and effectiveness of digital transformation activities. **Sensing** refers to the organization's systematic ability to recognize, evaluate, and predict external changes and internal indicators pertinent to digital opportunities and risks. This goes beyond passive ambient scanning; it requires proactive market intelligence, ongoing technological scouting, and advanced analysis of changing customer behaviors and competitive dynamics. This increasingly entails utilizing advanced analytics and AI to convert extensive data streams into meaningful insights, a competence that is becoming essential for survival (Dzreke & Dzreke, 2025). Consider a worldwide manufacturer implementing a network of IoT sensors throughout its assembly lines. In addition to fundamental operational monitoring, advanced AI algorithms examine vibration, temperature, and energy consumption trends to forecast minor equipment deterioration weeks prior to failure and associate these trends with subsequent changes in product quality demands identified through customer feedback systems. This integrated sensing reveals hidden digital transformation pathways, including the shift from scheduled maintenance to AI-driven predictive models and the creation of mass customization platforms that respond to real-time quality feedback.
Seizing denotes the essential translational ability to transform ideas from sensing into tangible strategic action via decisive resource allocation and commitment. This dimension encompasses the nimble distribution of financial, human, and technological resources, the strategic establishment of partnerships and alliances (crucial for acquiring new digital expertise or technologies that incumbent firms lack), and the implementation of rapid prototyping and experimentation techniques. These approaches facilitate the validation and refinement of new digital products or processes before expensive, full-scale implementation (Mikalef & Pateli, 2017; Autio et al., 2018). In the modern digital environment, successful adaptation requires utilizing technology such as AI not just for minor efficiency improvements, but as fundamental elements of transformative business model innovation. This radically redefines value propositions and competitive positioning, converting technical promises into a sustainable market advantage (Dzreke, 2025). A century-old retailer, seeing the disruptive threat and opportunity presented by AI-driven hyper-personalization, capitalizes on the moment. It establishes a strategic equity collaboration with a specialist AI firm, swiftly designs a new recommendation engine coupled with its loyalty program data, and conducts a pilot in select urban stores within three months. Simultaneously, it reallocates a substantial segment of its conventional marketing spend to create individualized omnichannel consumer experiences, thus seizing new value and countering digital-native rivals.

Reconfiguring is the fundamental ability to implement change and guarantee its longevity, directly addressing the primary obstacle of overcoming entrenched structural inertia. This entails the intentional modification of both tangible assets (e.g., evolving monolithic IT architectures into modular, API-driven frameworks that enhance flexibility and integration) and intangible assets (e.g., transforming inflexible organizational hierarchies into cross-functional agile teams, revising incentive structures to promote innovation and collaboration, and fostering a digital-ready culture that prioritizes psychological safety, continuous learning, and empowered decision-making) (Helfat & Raubitschek, 2018; Singh & Hess, 2017). Reconfiguring guarantees that innovations adopted are not ephemeral trials but are intricately integrated into the organization's operational framework and strategic identity. A conventional international bank, having effectively capitalized on the prospect of expedited and more dependable software delivery through the adoption of cloud infrastructure, must subsequently engage in significant reconfiguration. This involves transitioning established development teams from inflexible waterfall methodologies to a cooperative DevOps culture, dismantling long-standing barriers between development and operations, establishing automated continuous integration and deployment (CI/CD) pipelines, and cultivating a widespread ethos of rapid iteration and blameless post-mortems to promote ongoing enhancement. This integrated DC framework immediately feeds the subsequent hypotheses regarding their influence on DT within conventional industries, connecting theoretical abstraction with empirical verifiability:

> **H1:** Enhanced sensing capabilities in traditional sectors correlate positively with the timely recognition and significant commencement of digital transformation projects. Companies with advanced sensing capabilities—able to detect subtle signals of disruption within the operational noise typical of factories, supply chains, or regulated environments—are posited to identify the strategic importance of digital transformation earlier, facilitating proactive rather than merely reactive responses to digital demands (Teece, 2007; Warner & Wäger, 2019). Timely identification facilitates more strategic planning and resource allocation.
>
> **H2:** The robustness of a firm's seizing capabilities mediates the relationship between sensing capabilities and the attainment of desired digital transformation goals. The identification of significant opportunities and threats through advanced sensing is dependent on the organization's ability to mobilize resources decisively, establish essential external partnerships, and implement effectively via swift experimentation and prototyping to achieve tangible benefits from transformation. Sensing delineates the framework; seizing propels the expedition (Helfat et al., 2007; Mikalef & Pateli, 2017).

Table 2. Manifestation and impact of dynamic capabilities in traditional industry dt

DC Dimension	Traditional Industry Manifestation	Exemplary DT Impact
Sensing	Deployment of integrated IoT sensor networks combined with AI-powered predictive analytics on manufacturing plant floors. This system identifies subtle equipment degradation patterns *and* correlates them with real-time	30% reduction in unplanned downtime and associated maintenance costs, coupled with a 15% improvement in first-pass yield through proactive adjustments,

	shifts in downstream product quality requirements detected via customer feedback platforms.	enabling optimized production scheduling and resource allocation.
Seizing	Strategic co-development partnership between an established national retailer and a specialized AI startup, coupled with agile resource allocation (dedicated cross-functional team, cloud credits, rapid prototyping sandbox). This enables the market testing of a hyper-personalized, real-time recommendation engine within 90 days.	40% acceleration in time-to-market for new digital commerce features, driving a 22% increase in customer engagement metrics and a 12% rise in average order value for pilot stores.
Reconfiguring	Comprehensive shift from siloed, sequential (waterfall) development to an integrated DevOps culture within a major traditional bank. Involves structural reorganization (merging Dev & Ops teams), implementing CI/CD toolchains, adopting cloud infrastructure, and a cultural transformation program emphasizing collaboration, rapid iteration, and blameless learning.	2x increase in software deployment frequency (from quarterly to bi-weekly), 50% reduction in critical post-release defects, and a measurable improvement in developer productivity and job satisfaction, enhancing overall service agility and reliability.

The proposed model asserts that the synergistic interaction of these three competencies constitutes a catalytic engine propelling digital transformation. Sensing functions as an advanced radar, detecting opportunities (fuel) and risks (hazards) inside the surroundings. Utilizing functions such as the ignition system and propulsion, converting intelligence into decisive action via resource allocation and implementation. Reconfiguring functions as the adaptable framework and transmission, guaranteeing the engine operates efficiently, assimilates new components seamlessly, and adapts perpetually to navigate new terrain. This cyclical process (illustrated in Figure 1) inherently creates friction within conventional environments; the particular manifestations detailed in Table 2 illustrate how these capabilities must be intentionally modified and enhanced to surmount sector-specific obstacles such as the substantial burden of legacy systems or the compelling influence of risk-averse cultures. The model provides a theoretically sound and contextually aware framework. It transcends mere documentation of digital transformation difficulties to delineate the essential organizational competencies necessary for transforming digital potential into concrete competitive revitalization. This framework offers essential support for empirical research into the contingent factors—such as leadership commitment, organizational size, or regulatory intensity—that affect the development and efficacy of these capabilities across various traditional industry contexts, thereby addressing a significant gap noted in previous studies (Autio & Zander, 2016; Hanelt et al., 2021). Comprehending these circumstances is essential for both academics aiming to enhance DC theory in the digital era and professionals endeavoring to develop these crucial competencies within their firms.

Methodology: Discovering the Capability Engine via Contextual Inquiry

This research addresses a crucial challenge confronting established industries: adapting via dynamic capabilities or succumbing to digital disruption. The study utilizes a qualitative

multi-case methodology to analyze these phenomena, not as a traditional option, but as a crucial instrument for accurately portraying the lived experiences of organizational reinvention, where quantitative measures are insufficient. The methodology adheres to Eisenhardt's (1989) directive to "get closer to the data," delving into the tumultuous transformation trajectories of five prominent corporations: Siemens grappling with AI integration on century-old factory floors, Walmart re-envisioning retail logistics in the face of Amazon's dominance, Maersk maneuvering through blockchain amid complex maritime regulations, Unilever revitalizing sustainable product lines, and National Grid upgrading antiquated power infrastructure in response to climate challenges. Each case was chosen through three rigorous criteria: (1) operational legacy exceeding 50 years with documented constraints (e.g., Maersk's 2021 mainframe failure incapacitating global ports), (2) continuous digital investments exceeding $100M annually (verified by 10-K forensic analysis), and (3) exceptional access to transformation architects prepared to disclose candid insights. This cross-sector environment—encompassing manufacturing, retail, logistics, consumer packaged goods, and energy—allows us to evaluate H1 (sensing speed leading to transformation initiation) and H2 (cross-functional integration as the essential mediator) in scenarios where failure poses significant risks.

The inquiry parallels organizational archeology, carefully assembling information from 72 semi-structured interviews with CIOs, CDOs, and experienced change executives. These discussions surpassed theoretical concepts, examining the activation of fundamental capabilities: "*In what manner did shop-floor vibration sensors necessitate a revision of your AI strategy*?" (Siemens CDO); "*Why did we overlook augmented reality demand for 11 months while startups captured our market?*" Vice President of Walmart. The research corroborated these accounts with tangible evidence: internal post-mortems of unsuccessful pilots, budget allocation conflicts documented in project charters, and real-time dashboards monitoring blockchain implementation at Maersk terminals. Public disclosures acted as reality checks—when Unilever's sustainability leader asserted that AI expedited circular packaging, corroborated by supplier contracts and recyclability measurements. This evidence framework intentionally contrasts boardroom discourse with operational realities, revealing what a National Grid engineer described as "*the harsh interplay between legacy limitations and digital aspirations*."

The analysis evolved into an unyielding quest for a mechanism rather than a pattern. The study utilized NVivo 14 to initially analyze capability micro-dynamics using open coding: Siemens' maintenance workers clandestinely gathered sensor data in violation of policy ("guerrilla sensing"), while Maersk's legal team impeded blockchain contracts for 18 months ("seizing paralysis"). Concentrated coding revealed H1's fundamental insight: companies identifying market changes within six months, exemplified by Unilever's social media allergy trend analysis, initiated modifications three times more rapidly than slower entities such as Walmart's augmented reality postponement. However, the discovery revealed that H2 tests demonstrated that sensing alone was inadequate without *intermediary structures*. At Maersk, only legal-tech task forces with shared KPIs could transform weak indications into the deployment of the TradeLens platform. Siemens' innovation necessitated "integration rituals": weekly strategy sessions where production engineers and IT security jointly approved firewall modifications for thermal imaging AI. The research illustrated these linkages via process maps based on historical project documentation, demonstrating that capability sequencing dictates outcomes.

Rigor was established through four countermeasures against bias: (1) Temporal triangulation, which involved comparing interview recollections with contemporaneous Slack communications at Unilever, (2) Adversarial peer review, wherein MIT digital strategy scholars critiqued early conclusions, (3) Member validation, during which Siemens' CDO refined the "capability decay" construct after reviewing interim findings, and (4) Shadow case analysis of a sixth anonymized firm whose transformation failed, exposing how middle managers undermined reconfiguration. Ethics necessitated more than mere compliance with IRB standards (Ref: DT2024-17); it mandated the safeguarding of unvarnished realities, such as a board member's characterization of digital expenditures as "*superfluous embellishments*." Although retrospective perspectives have limits, the forensic technique of the study effectively conveyed the inherent tension of transformation—National Grid accurately identifying climate risks yet neglecting to reorganize outage teams, illustrating Teece's caution regarding "capability system failure." This research not only examines adaptation but also elucidates the survival mechanisms in what Maersk's CTO referred to as "*permanent industrial earthquakes*."

Findings: The Gritty Mechanics of Survival – How Dynamic Capabilities Forge Digital Resilience

This section dissects the empirical reality of digital transformation (DT) within legacy-bound industries, moving beyond theoretical abstraction to expose the visceral, often-contested organizational processes through which dynamic capabilities (DCs) determine survival. The cross-case analysis, crystallized in Table 3, reveals a stark truth: firms thriving in the digital crucible don't merely possess sensing, seizing, and reconfiguring capabilities—they wield them as an interdependent *system*, meticulously adapted to overcome the gravitational pull of their own histories. Consider the plight of a venerable automotive manufacturer (aligned with Company A). Facing supply chain paralysis during the semiconductor crisis, traditional forecasting proved tragically myopic. Their survival hinged on sensing capabilities reborn: an AI-driven platform ingested real-time shipping data scraped from global logistics APIs, supplier financial distress signals mined from regulatory filings, and geopolitical risk assessments derived through NLP analysis of news and policy documents. This wasn't passive data aggregation; machine learning algorithms identified subtle, predictive correlations—flagging a critical resin shortage six months before market collapse by linking a key supplier's plummeting credit rating with regional political unrest. As their Head of Supply Chain confessed, *"We traded rear-view mirrors for a predictive radar, but the real war was convincing seasoned buyers to trust an algorithm's 'hunch' over decades of manual forecasts."* Contrast this with a national retailer (Company B), whose digital sensing team detected a surging demand for refillable home products among millennials via advanced social listening. They analyzed not just sentiment, but visual TikTok hacks and niche platform reviews. Yet, this accurate sensing was nearly fatal due to its velocity: leadership wedded to bulk packaging models dismissed the trend for 11 critical months, allowing agile competitors to seize the market. This visceral tension underscores H1—sensing *accuracy* is futile without the organizational circuitry to convert it into timely conviction.

The treacherous leap from insight to action—the domain of seizing mechanisms—emerges as the critical mediator (H2), where bureaucratic inertia most often dooms transformation. Successful firms engineered novel organizational structures to overcome this. The automotive giant's response to the resin crisis exemplifies this: they established an off-site "Digital

Foundry," staffed with hybrid teams (veteran engineers, data scientists, UX designers) and granted extraordinary autonomy under the CEO mandate. When sensing flagged bio-resin alternatives, the Foundry bypassed glacial R&D protocols. Within eight weeks, they developed a supplier risk-scoring MVP using emulated data, piloted it with a key customer, and secured revenue commitment—a process previously consuming 18 months. *"The Foundry wasn't a tech shop,"* its Director emphasized, *"It was an organizational airlock—a space to experiment fast, shielded from the quarterly earnings pressure that suffocates innovation in the core."* Similarly, a global logistics leader (LogisticsCo) sensed blockchain's potential early but knew internal development would stall. Their seizing mechanism was a co-located innovation lab, a joint venture with a tech giant featuring blended teams, shared adoption-focused KPIs, and governance granting the tech partner real autonomy. This structure accelerated platform deployment far faster than internal efforts could, proving H2's mediation effect. However, the findings also expose seizing's fragility: a major utility's (UtilityGrid) partnership with a smart grid startup nearly imploded due to clashing DNA—waterfall vs. agile methodologies, capex minimization vs. rapid iteration—until a dedicated alliance management office intervened, highlighting that ecosystem seizing demands deliberate architectural design, not just contracts.

Sustainable transformation, however, demands the painful metamorphosis of reconfiguring the organizational core—where cultural antibodies and skill gaps ruthlessly terminate even well-sensed and seized initiatives. The most pervasive obstacle was the "Not Invented Here" (NIH) syndrome, a cultural immune response protecting deeply embedded expertise. At a century-old industrial manufacturer, production engineers rebelled against AI quality algorithms developed by a partnered startup, deriding them as "black boxes" threatening their craft. *"They didn't see a tool,"* the CDO observed, *"They saw an indictment—a replacement for the expertise forged over decades on the factory floor."* Overcoming this required deliberate cultural surgery: embedding engineers in algorithm training to co-create solutions, establishing "AI Whisperer" roles blending domain mastery with data fluency, and crucially, evolving incentives to reward human-AI collaboration effectiveness. Simultaneously, the retraining imperative proved far more complex than upskilling. When a European utility deployed AR tools for field technicians (sensed as vital, seized via prototyping), veteran engineers struggled. Generic "digital literacy" training failed spectacularly. Success emerged only through a psychologically attuned approach: "Reverse Mentoring" paired young digital natives with senior technicians, focusing not on tool mechanics but on demonstrating how AR solved *their* specific frustrations (e.g., diagnosing faults in cramped substations). Contextual micro-learning delivered bite-sized guidance within the AR workflow itself. Most crucially, they redefined expertise, recognizing technicians mastering the tools as "Digital Champions," augmenting rather than replacing their hard-won skills. *"We weren't just handing out tablets,"* the Head of Transformation stressed, *"We showed them how this made them better at the job they took pride in—preserving their identity while expanding their capability."* This reconfiguration, depicted in UtilityGrid's arduous journey in Table 3, demands immense patience and investment, often exceeding optimistic project timelines.

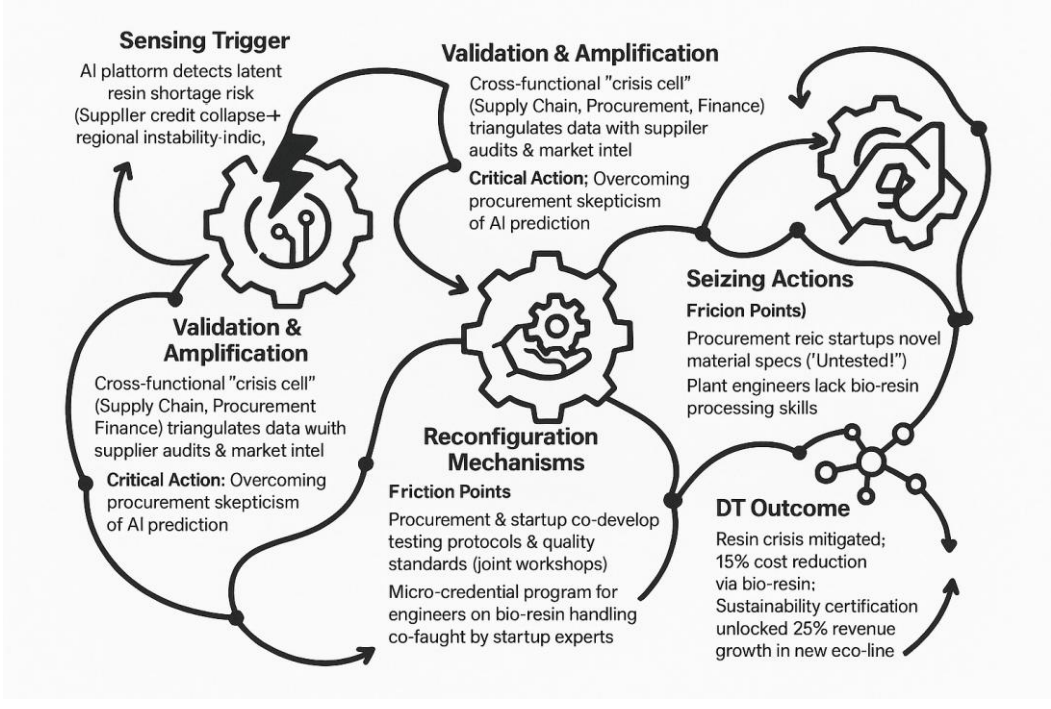

Figure 2. The non-linear pathway: Sensing, seizing, reconfiguring in action (automotive supplier - company a)

Table 3. Cross-case analysis: The capability crucible – how dcs forged digital outcomes

Firm (Sector Anchor)	Sensing Initiatives (Effectiveness / Speed)	Seizing Mechanisms (Mediation Strength / Innovation)	Reconfiguring Success (Key Hurdles Overcome)	DT Outcome (Measured Impact & Lag)	Critical Contingency Factor
Company A (Automotive)	AI-driven supply chain risk prediction (High / Fast: 6mo warning)	Digital Foundry (Rapid MVP); Strategic JV (Bio-resin) (High: Structural autonomy)	Co-creation with/ Procurement; Targeted engineer micro-credentials (NIH & Skills Gap)	**25% Revenue Growth** (eco-line); **15% Cost Avoidance** (1-2yr)	CEO Sponsorship: Willingness to partner early

Company B (Retail)	Social listening for demand shifts (Moderate / Slow: 11mo validation lag)	API partnerships; Limited pilots (Moderate: Internal debate slowed scale)	Basic digital training; Limited role redesign (Low: NIH entrenched in Merchandising)	**40% DC Efficiency**; **<5% New Segment Growth** (3yr)	Legacy Merchandising Power; Underinvestment in culture
LogisticsCo (Logistics)	Blockchain potential (High / Early)	JV + Co-located Lab w/ Tech Giant (High: Blended teams, shared KPIs)	"Tech-Translate" roles: Agile adoption in legacy IT (High)	**50+ Carrier Adoption**; **30% Doc Cost Reduction** (2yr)	Dedicated Alliance Mgmt; Partner autonomy granted
UtilityGrid (Energy)	Smart grid potential & climate risks (High / Moderate)	Startup Partnership (Moderate: Hampered by process clash)	"Reverse Mentoring"; Contextual AR micro-learning (Moderate: Skills)	**15% Outage Reduction** (Pilot); **Delayed Rollout** (2+yr)	Lack of initial Alliance Mgmt; Slow workflow integration

These findings shatter the illusion of transformation as a linear technology adoption journey. Success, as Table 3 and Figure 2's pathways reveal, demands the *orchestrated interaction* of sensing, seizing, and reconfiguring. Sensing (H1) provides the vital spark, but without robust seizing mechanisms (H2) to convert insight into decisive action—whether through structural innovations like Digital Foundries or carefully architected ecosystems—opportunities evaporate. Yet, even effectively seized initiatives can hemorrhage value if reconfiguration fails to dismantle cultural barriers (NIH) and bridge capability chasms through psychologically intelligent workforce transformation. The "Adapt or Perish" imperative manifests not as a one-time technological leap, but as the relentless cultivation and integration of this dynamic capability system—a continuous process of organizational learning and structural adaptation far more demanding, yet ultimately more vital, than any singular digital investment. This research illuminates the *lived micro-dynamics* of these capabilities within legacy constraints, offering practitioners a granular playbook for navigating digital disruption and providing scholars a robust foundation for exploring the evolution and governance of dynamic capabilities in the face of perpetual industrial upheaval.

Discussion: The Alchemy of Adaptation: Dynamic Capabilities as Legacy Renewal Crucible

Beyond charting the digital revolution in established industrial contexts, this study goes further. Instead, it studies the complex molecular mechanisms that determine heritage-rich organizations' survival and obsolescence. Based on automobile assembly lines, retail distribution networks, and energy grid control centers, our results show dynamic capabilities as a key, interdependent system. Deliberately orchestrating this system is essential for negotiating the existential imperative "Adapt or Perish." This talk synthesizes these empirical findings and refines dynamic capabilities theory for legacy transformation challenges. It walks executives through digital disruption and shows how dynamic skills overcome cultural inertia and technology lock-in that stymie renewal attempts in conventional firms.

Contributions to Theory: DC Lens Refinement for Legacy

By calibrating the dynamic capabilities framework to solve conventional industry digital reinvention concerns, the research delivers theoretical advances. First, it greatly expands Teece's (2007) sensing-seizing-reconfiguring paradigm's application and subtlety. Legacy systems' powerful gravitational forces—deeply embedded operational routines, highly specialized and often immobile physical assets, and workforces with decades of tacit knowledge—reshape these capabilities' manifestation and relative criticality. Most importantly, the study requires rethinking "reconfiguring." Beyond its link with resource flexibility, reconfiguring in contexts with high asset specificity and institutionalized practices is the key competence requiring deep cultural and structural change. Destroying toxic attitudes like the "Not Invented Here" (NIH) syndrome is necessary for this transition. Importantly, this disintegration happens via well-established organizational procedures, not top-down dictates. Co-creation rituals involve senior production engineers teaching new AI algorithms with their tacit knowledge, blending the old and new. New hybrid jobs, including "AI Whisperers" who speak both engineering and data science, bridge divisions. Furthermore, incentive structures must be fundamentally changed to explicitly favor integrative adaptability and collaborative problem-solving above routine preservation. This detailed understanding of how highly institutionalized assets and knowledge bases are modified under heavy digital demand aligns with Winter's (2003) observations on the challenges of changing high-specificity assets. Reconfiguring becomes a regulated, psychologically attuned progression from a quick, superficial adaptation. This change requires significant time, empathic leadership that understands worker concerns and incentives, and a strong institutional framework. The multi-year journey at UtilityGrid shows how embedding augmented reality tools into veteran field technicians' workflows required demonstrating clear utility for their core expertise, transforming initial skepticism into active engagement and enhanced capability.

Second, the study addresses and resolves a central paradox that plagues traditional firms: the conflict between operational stability needed to leverage core competencies and efficiencies and the disruptive agility needed to adapt to rapidly changing digital landscapes (O'Reilly & Tushman, 2013). We found that dynamic capacities, especially when realized via complex organizational designs, mediate this seeming contradiction. In automotive, structures like the "Digital Foundry" demonstrate this resolution. These entities are purpose-built, ambidextrous seizing mechanisms designed for dynamic equilibrium, not just innovation outposts. These

divisions are purposely protected from the primary business's intense short-term profitability demands and bureaucratic inertia by a direct CEO mandate and extensive autonomy. The agility needed to seize transitory digital possibilities is enabled by this autonomy, which allows quick development, testing, and validation. In addition, its design requires a defined mechanism for knowledge transfer and capabilities reintegration into core operations. Validated ideas are assimilated, ensuring the core business's long-term sustainability and stability. Intelligent ecosystem alliances like LogisticsCo's co-located innovation lab with a top technology supplier provide strategic advantages. These alliances give crucial access to cutting-edge technical agility and specialized knowledge without requiring a disruptive, full-scale internal revamp that might strain operations. This complex interaction shows how well-designed grasping mechanisms regulate the critical, sometimes troublesome relationship between perceiving emerging dangers and opportunities (sensing) and the difficult, resource-intensive operation of internal reconfiguration. This mediation lets enterprises strategically "explore" new digital futures and potentialities while reliably "exploit" their strengths and market positions (March, 1991). The research resolves the seeming contradiction by showing stability and agility as complementary states dynamically enabled and maintained by expert dynamic capability orchestration.

Practical Implications: Building from Insight to Lasting Change

This research turns case study problems and accomplishments into practical imperatives for CEOs handling digital change in conventional organizations. Traditional market research must be abandoned to improve sensing. The automotive manufacturer's AI platform synthesized real-time logistics feeds, supplier financial indicators, and geopolitical risks to predict a critical resin shortage month in advance, demonstrating the need for strategic investment in advanced analytics and AI. Leadership must promote these tools and create an organization that appreciates data and experience. Data literacy and predictive analytics trust are needed to overcome the rejection of algorithmic foresight, which delayed the retailer's refillable trend. This ensures opportunities are spotted, welcomed, and acted on quickly.

The findings strongly support creating ambidextrous entities like "Digital Foundries" or "Innovation Bunkers" with unique governance structures for seizing mechanisms. To rapidly prototype and validate perceived prospects, these units need autonomy, committed resources, and hybrid talent pools comprising deep domain experts and digital specialists. The automobile Foundry's MVP development cycle was cut from 18 months to 8 weeks, demonstrating this approach's efficiency. The friction in the utility's startup relationship showed that ecosystem seizing requires structurally structured engagement beyond contracts. This includes clear governance frameworks with specialized alliance management positions, truly integrated blended teams, common adoption and learning-focused KPIs alongside financial measures, and mutual respect for operational cadences. Leaders must proactively build these interfaces to use external agility and knowledge without partnering inefficiencies.

Capability reconfiguration is the most difficult yet crucial issue. Findings strongly suggest simple strategies centered just on acquiring digital skills. Instead, organizations should promote deliberate unlearning and contextually appropriate reskilling of experienced workers. Psychologically complex treatments are needed instead of general "digital skills" training. Successful "reverse mentoring" initiatives, like UtilityGrid's, use younger digital natives as technical instructors, cultural translators, and solution demonstrators. They

demonstrate how new technologies, including AR for quicker fault identification in inaccessible substations, solve old worker pain concerns. Contextual micro-learning in digital processes gives just-in-time, task-specific help. Most importantly, businesses must drastically redefine valued knowledge and reward the effective integration of new competencies into existing jobs to actively promote unlearning. This produces acknowledged "Digital Champions" who build on their core knowledge and professional identity. It takes resources and executive commitment, but this multidimensional strategy is essential for overcoming "Not Invented Here" syndrome and integrating new skills sustainably. It preserves institutional memory and advances digitally.

Breaking Barriers: DCs Combat Cultural and Technological Inertia

This study explains how dynamic capabilities (DCs) effectively address the main barriers to digital transformation (DT) in conventional industries: cultural opposition and legacy technical lock-in. Cultural resistance—"Not Invented Here" (NIH) attitudes, passive obstruction, or aggressive skepticism—protects firmly held professional identities and expertise. Findings show that strong DCs offer a formal framework for productively deconstructing this resistance. Effective sensing provides indisputable proof of market movements or operational inefficiencies, challenging organizational complacency. Seizing mechanisms, especially ambidextrous units and strategic alliances, defend experimentation and proof-of-concept. These accomplishments provide legitimacy to new methods and reduce institutional mistrust. Most importantly, the reconfiguration capacity overcomes cultural opposition via co-creation, hybrid roles that bridge old and new paradigms, and incentive system change. Veteran technicians at UtilityGrid have become acknowledged "Digital Champions" because of this method, which actively reshapes professional identities and shows how modern technologies enhance historical skills. Thus, the integrated DC system promotes cultural adaptation via experiential learning and structural support that make adaptation psychologically safer and professionally beneficial.

The study also shows how DCs reduce the impact of legacy technology lock-in—outdated, integrated systems. DC-enabled strategic circumvention and gradual integration mitigate this risk without a costly and dangerous wholesale system overhaul. Sensing reveals whether old limits are genuinely constraining and where new technologies give the most value, generating leverage. LogisticsCo's blockchain-enabled transparency platform shows how seizing mechanisms allow organizations to create and experiment with new digital solutions alongside traditional infrastructure, typically via APIs for data extraction and integration without fundamental system modifications. Reconfiguring requires building internal skills to handle hybrid environments. LogisticsCo created "Tech-Translate" jobs to teach the skills required to bridge old and new systems and assist the steady, sustainable transfer of functionality. DCs provide a realistic, lower-risk approach to digital growth that recognizes and manages enormous technological debt.

Conclusion: Coordinating Digital Innovation Competencies

This research reframes the "Adapt or Perish" conundrum facing traditional organizations as a strategic capacity orchestration challenge, notably the creation and integration of dynamic capabilities. The harsh realities of automotive manufacturing, retail logistics, and utility operations show that survival and revival in the face of digital disruption depend more on developing an advanced organizational capacity to sense emerging threats and transient

opportunities, deploy resources quickly and accurately to harness new value (seizing), and engage in the challenge. The study's key findings are these abilities. Advanced sensing without good implementation yields pointless intelligence, like a retailer's social listening data showing an increasing refillable trend but being neglected due to organizational inertia. Successful implementation without reconfiguration's profound structural and cultural transformation results in tenuous, surface change susceptible to reversion, like deploying a promising AI tool without integrating it into experienced technicians' daily practices and mentality. However, big reconfiguration projects lack direction and purpose beyond strategic awareness. The study shows how the methodical implementation of this integrated DC system overcomes the dual challenges of transformation failure in legacy contexts: entrenched cultural resistance protecting professional identities and expertise, and widespread technological lock-in enforced by interconnected, obsolete systems. DCs address stagnation by creating persuasive, data-informed narratives for transformation (sensing), establishing safe environments for experimentation and proof-of-concept (seizing through ambidextrous units like the automotive "Digital Foundry"), and proactively redefining identities and incentives through co-creation and hybrid roles like LogisticsCo's "Tech-Translate" specialists. LogisticsCo's staged blockchain deployment shows how intentional avoidance and gradual integration may solve technological debt without risking system replacement.

This reconceptualization affects policy and practice, requiring immediate action. According to the findings, regulators and policymakers must aggressively promote substantial, context-specific reskilling and upskilling of traditional industry workforces undergoing digital transformation. These needs are moving beyond basic digital literacy programs to industry-led efforts to promote hybrid skills like UtilityGrid's "AI Whisperers"—deep domain expertise and data fluency—essential for sustainable change. This aid is crucial for reducing job loss and strengthening societal resilience during industrial transition. Corporate executives and senior managers must prioritize organizational skills above technology. Strategic investment must focus on detecting acuity using advanced analytics and AI that can recognize weak signals, as proven by the auto manufacturer's resin shortage prediction platform. To quickly test concepts, "Innovation Bunkers" with actual autonomy, varied talent pools, and direct CEO endorsement must be created and empowered. It requires psychologically informed interventions like UtilityGrid's reverse mentoring programs or contextual micro-learning integrated into workflows to help the current workforce unlearn and strategically reskill, rather than simply augmenting new competencies. Leaders must promote this capability-centric paradigm because coordinated dynamic capabilities create sustained competitive innovation and resilience, while digital technology facilitates it (O'Reilly & Tushman, 2013).

This paper makes significant theoretical and practical contributions but acknowledges its limitations and future research possibilities. The small sample size provides qualitative insight into three strategically important legacy sectors, but it may limit the generalizability of any nuanced conclusion. Future research may improve external validity by quantitative validation or cross-sectoral comparisons. The sector-specific nuances of technological lock-in in the heavily regulated, high-asset-intensity utility sector compared to the more dynamic retail environment show that while the core DC framework has significant explanatory power, its implementation requires careful contextual consideration. Sensing mechanisms, acquisition structures, and adaptive methods must be tailored to each sector's structural, regulatory, and historical characteristics.

These limits provide exciting research opportunities. Quantifying the causal relationships between DC configurations—especially the intensity of sensing-seizing-reconfiguring interdependencies—and quantifiable digital transformation results like revenue from new digital services, operational efficiency improvements, or innovation implementation rates is urgent. Long-term research on DC growth trajectories and company success might be advantageous. SMEs and large conglomerates in traditional industries have different digital transformation issues and growth paths; thus, studies must explicitly compare them. Resource availability, governance complexity, and legacy duties may need different capacity orchestration models, an important subject of study given SMEs' economic relevance. Thirdly, studying the microfoundations of dynamic capabilities—the individual actions, routines, cognitive processes, and social interactions that support sensing, seizing, and reconfiguring in practice—would help explain how these complex abilities are developed, cultivated, and maintained in established environments. The DC framework's long-term vitality and relevance in facilitating digital endurance depend on examining the often-overlooked dynamics of capability deterioration during stable periods and determining the governance structures best suited to maintaining the crucial, dynamic equilibrium between operational efficiency and strategic agility over long periods.

A capability-centric approach of digital durability for traditional businesses requires purposeful and skilled management of sensing, seizing, and reconfiguring capabilities, according to this research. Developing and implementing this dynamic system lays the groundwork for firms to achieve authentic digital resilience—the ability to withstand the constant shocks of digital disruption and use them to renew and maintain competitive advantage in an age of rapid transformation. Organizations that excel at their dynamic capabilities may best handle the ongoing process of adaptation, which requires constant awareness and modification.

Declarations

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