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How dynamic capabilities enable digital resilience: insights from an organizational transformation case

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Abstract

This study investigates how dynamic capabilities enable digital resilience in organizations facing sudden, disruptive change. While existing literature has examined technological factors (such as system modularity) and organizational factors (such as decision-making autonomy) separately, studies linking technological structures with organizational resilience remain scarce. We address this gap with a case study of an insurance brokerage firm during the Covid-19 pandemic, examining how it adapted its information systems (IS) and work practices in response to disruption. Using a participatory action research approach, we trace the firm's process of sensing legacy system limitations, seizing tactical solutions, and transforming its digital configurations. We develop a framework mapping organizational activities across two dimensions: the level of guidance provided by information systems and the degree of autonomy in task execution. Our findings contribute to the literature on digital resilience by showing that resilience emerges from the interdependence between technological structures and organizational practices. We operationalize the dynamic capabilities framework by linking strategic capacities to system configurations and adaptation processes and we offer a diagnostic tool for assessing and improving digital resilience in organizations.

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1. Introduction

Contemporary organizations face volatile, uncertain, complex, and ambiguous environments [1,2]. While digital technologies offer new capabilities, they also introduce rigidity and vulnerability. A key organizational challenge is not just adopting digital technologies but also configuring information systems to sustain resilience, the capacity to absorb shocks, adapt to change, and continue operating effectively [3]. The Covid-19 pandemic provided a severe stress test for organizations worldwide, exposing weaknesses in technological infrastructures and organizational processes. Many found that their existing IS configurations limited their ability to support remote work, adapt processes quickly, and maintain business continuity. In this context, enabling digital resilience, the ability to dynamically reconfigure systems, processes, and work practices, has become crucial and understanding how organizations build and deploy capabilities that support digital resilience is an important question for scholars and practitioners.

Prior studies have explored resilience and related concepts, such as agility and flexibility, from various angles. Scholars have examined how organizations develop IT agility to respond to rapidly changing environments [3,9,10], how dynamic capabilities shape adaptability [4,13,15], and how legacy systems constrain or enable transformation [14]. Research has emphasized technological factors, like the modularity and interoperability of information systems [3,7], as well as organizational factors, such as decision-making autonomy, flexible processes [6,8], and resource orchestration [20]. However, different streams of literature often highlight separate dimensions, with some focusing on technological enablers while others concentrate on organizational routines and learning. Integrative studies that connect the technological structure of information systems with organizational capabilities necessary for resilience are still limited.

This paper addresses this gap by posing the following research question: *How do dynamic capabilities enable digital resilience in organizations?* To address the question, we conducted an in-depth qualitative case study of a large insurance brokerage firm that experienced significant operational disruption during the Covid-19 pandemic. In the study, we adopted a dynamic capabilities framework [4] and, by examining how the organization sensed technological constraints, seized adaptation opportunities, and transformed its digital infrastructures, we gained insights into the socio-technical nature of digital resilience. In our analysis, we develop a framework based on two dimensions - the level of guidance provided by information systems and the level of autonomy in task execution - to map and interpret the resilience of different organizational arrangements.

Through our study we contribute three key insights to the literature on dynamic capabilities and digital resilience. First, we show how digital resilience emerges from the interdependence between information systems and organizational practices, rather than being a property of technology or people alone. Second, we operationalize dynamic capabilities by linking them to specific IS configurations and adaptation processes, showing how abstract strategic capacities manifest in organizational contexts. Third, we develop a practical diagnostic framework that helps organizations assess and enhance the resilience of their information systems.

2. Literature review

The concepts of resilience, agility, and dynamic capabilities have attracted increasing scholarly attention as organizations face environments characterized by frequent disruptions and technological change. This section reviews the main contributions in these areas, highlighting different perspectives on how organizations build the ability to respond effectively to unexpected challenges through technology and organizational capabilities.

Organizational resilience refers to the capacity of an organization to absorb shocks, adapt, and continue operating under adverse conditions. In the digital era, resilience increasingly depends on the interaction between organizational routines and information systems [5,6]. Some studies emphasize the technological dimension of resilience, focusing on how flexible, modular, and interoperable IS architectures can support rapid reconfiguration and recovery [3,7]. Others underline the importance of human and organizational factors, such as decentralized decision-making, learning mechanisms, and cultural adaptability [8]. Recent research has highlighted that digital resilience emerges not only from technical robustness but also from the capacity to rapidly reconfigure systems, data flows, and stakeholder coordination in response to disruption [20,21].

Agility is defined as the ability to sense changes in the environment and respond quickly and effectively. Research on IT agility, in particular, has focused on how digital infrastructures enable organizations to adapt their products, services, and processes [9,10]. Agility requires technological flexibility (e.g., scalable systems, adaptive architectures) and organizational flexibility (e.g., dynamic routines, cross-functional collaboration). Studies have shown that agile organizations can more effectively exploit digital opportunities and manage risks [3,11]. However, agility is not only a technological feature; it depends on alignment between IS capabilities and organizational structures.

The dynamic capabilities framework offers a theoretical lens to integrate these perspectives. Dynamic capabilities are the abilities of an organization to sense opportunities and threats, seize opportunities, and transform the organization's resources and structures to maintain competitiveness [4]. In the digital context, dynamic capabilities involve the ability to adapt IS architectures, redesign processes, and reconfigure organizational competencies. Dynamic capabilities emphasize that resilience is the ability to evolve and thrive through disruption events.

Despite extensive research, gaps remain. IT agility studies often emphasize technological flexibility while overlooking human and organizational dimensions. In technical domains, digital resilience is often associated with measurable indicators such as system uptime, recovery time, or continuity of service [3,11]. While these indicators are useful for assessing infrastructure robustness, they may not fully capture the socio-technical dynamics involved in process-level adaptation. Despite the powerful conceptual framework dynamic capabilities often remain abstract, with limited empirical studies connecting them to concrete IS configurations.

Recent work has addressed these gaps by exploring how digital infrastructures and organizational capabilities co-evolve [14]. This research highlights that digital resilience depends on both the design of technological systems and the development of dynamic capabilities at the organizational level. However, empirical studies that trace these interactions in real organizational settings, especially during periods of major disruption are still limited.

3. Methodology of the study

This study uses a qualitative, single-case design [19] combined with a participatory action research (PAR) approach [18], as one of the authors was involved as consultant in the project. This methodology was chosen for its suitability in exploring complex, evolving dynamics in a real-world setting, with the participatory component providing deep access to internal processes and perspectives.

The PAR approach was appropriate given the study's focus on dynamic capabilities, which are temporal, situated, and evolving. Understanding how these capabilities unfold in practice required close engagement with the organization as it experienced disruption, improvised responses, and reconfigured its structures. The participatory approach enabled real-time observation of change processes and helped surface informal practices and interpretations that might remain hidden in more detached research designs. This approach aligns with prior calls to investigate IS adaptation and organizational resilience as socio-technical and situated phenomena [1,6,14].

The aim is not statistical generalization but analytical generalization [19], generating theoretically informed insights. Our research design enabled the development of transferable frameworks. While grounded in a single case, the observed mechanisms may resonate with other organizations facing similar digital disruptions.

The organization studied is AlphaBroker, a leading insurance broker that offers consulting and brokering services primarily to corporate clients. Before the Covid-19 pandemic, the company operated through centralized processes managed by PAM (Portfolio Administration Management), a heavily customized legacy system, with most employees working from physical offices. The pandemic triggered an urgent need to shift to remote work, which exposed limitations in both technological infrastructure and organizational routines. This context provided a natural experiment for studying digital resilience and transformation.

The unit of analysis in the case was organizational processes and work configurations. Rather than measuring system performance indicators directly, the study focused on process-level resilience: how different work configurations adapted under stress, including the interplay of task autonomy and IS support.

Data collection took place over eight months between 2021 and 2022. We used a multi-source strategy to ensure triangulation and analytical depth. Primary data included semi-structured group interviews and workshop-style sessions focused on key organizational domains (e.g., sales, client management, IT infrastructure). These involved participants from various functional areas, including HR, operations, IT, finance, and commercial units. The President of the company was interviewed at the beginning and end of the research process to capture strategic-level

perspectives. Table 1 provides an overview of the interviews conducted, highlighting thematic focus and participant composition. The collection and analysis of secondary sources, including internal project documents, meeting notes, official reports, and financial data, allowed us to trace the evolution of the transformation process over time and to cross-validate insights emerging from interviews. While the technical architecture was not the primary focus of the study, we collected and analyzed information on key infrastructure components (e.g., legacy application dependencies, remote access protocols, and security layers) to understand how they constrained or enabled organizational responses. This technical context informed our assessment of digital resilience as an emergent property of work-system configurations. During data collection, all participants were informed of the purpose of the study and gave verbal consent for participation and note-taking. Identifying information was removed from transcripts and project materials to ensure anonymity. Formal ethical approval was not required for this study, as it was conducted in the context of a consultancy-based project with informed participant involvement and no collection of sensitive personal data

Table 1. List of meetings and topics discussed.

Date	Topic / Process area	Participants	Focus area
Oct 2021	Project framing, operational level	Head of HR, Chief Broking Officer (CBO)	Key issues in HR and Processes
Nov 2021	Branch operations analysis	Operations Manager, HR Operations, CBO, Head of HR	Operations
Nov 2021	Project framing, strategic level	President, Heas of HR, CBO	Key issues at strategic level
Nov 2021	IT infrastructure analysis	HR Operations, IT & Operations manager, Head of HR	IT
Dec 2021	Application landscape analysis	HR Operations, CBO, Head of HR	IT
Jan 2022	Digital services branch analysis	HR Operations, Digital services branch Operations manager, Head of HR, Digital services branch General Manager	Digital services / Client
Feb 2022	Sales process and intervention prioritization	HR Operations, CBO, Client director, Client assistant, Head of HR	Sales / Strategy
March 2022	Client mgt. and infrastructure	Client director, Client assistant	Operations / IT
March 2022	Payment processing analysis	Admin. Officer, Tech. Accounting Specialist	Finance / Back office
April 2022	Infrastructure deep dive	IT & Operations manager, Head of HR	IT
April 2022	Applications deep dive	IT & Operations manager, Head of HR	IT
May 2022	Findings validation and reflection	President, Head of HR, CBO	Evaluation and feedback

We adopt the dynamic capabilities framework, which examines how organizations sense, seize, and transform structures and routines to remain competitive [4]. This lens informed both our data collection strategy (e.g., identifying moments of sensing, seizing, transforming) and our analytical process.

Data analysis followed a systematic, inductive approach inspired by the Gioia methodology [17]. First, we engaged in open coding of interview transcripts, meeting notes, and documents, identifying emerging concepts related to resilience, IS challenges, work practices, and adaptation strategies. In the second phase, we aggregated these first-order concepts into second-order themes, guided by the dynamic capabilities' framework. We identified patterns of sensing (recognition of rigidity and challenges), seizing (implementation of tactical solutions during the crisis), and transforming (longer-term strategic initiatives for IS and organizational evolution). This method allowed us to balance inductive richness with theoretical rigor.

Given the participatory nature of the research, we were attentive to maintaining objectivity and minimizing biases. We adopted several strategies to strengthen the credibility and trustworthiness of the findings. First, we systematically triangulated data from different sources (interviews, documents, observations) to validate emerging insights. Second, we maintained detailed field notes and analytic memos to document how interpretations evolved over time. Third, we regularly engaged in critical reflection sessions within the research team, challenging assumptions and interpretations. Finally, while one of the authors actively participated in the project, the second author served as an independent

researcher. This allowed for external validation of the emerging findings and ensured a more objective analytical perspective throughout the research process.

4. Findings

This section presents the study's findings through the lens of dynamic capabilities, focusing on how AlphaBroker implemented sensing, seizing, and transforming actions in response to the Covid-19 disruption. The analysis emphasizes how information systems and organizational practices interacted to enable or constrain adaptive responses, and how these interactions evolved over time.

4.1. Overview of the case study in pre-covid situation

Before the Covid-19 pandemic, AlphaBroker operated as a traditional, office-based organization with a centralized and customized information system. Its core operations were managed through a legacy policy management application (PAM) adapted over the years to fit company's processes. Alongside PAM, the organization utilized a portfolio of over 30 applications, including CRM systems, business intelligence tools, data integration platforms, and internal document repositories. However, many of these systems were not integrated, and several were maintained independently by different offices. While PAM centralized core data and guided structured workflows, it was not designed for remote work or cross-location collaboration. Remote access to systems required a Virtual Private Network (VPN), and most employees worked on desktop computers within office networks.

This architecture created a hybrid environment that combined rigid, system-guided processes with fragmented, manually coordinated practices. The organization had limited capacity to adapt work modes or quickly reconfigure processes. Nevertheless, because the digital tools appeared to function well in the existing in-office setting, few questioned their resilience until Covid-19 pushed a sudden reorganization.

4.2. Sensing: recognizing digital rigidity and organizational limits

The Covid-19 pandemic disrupted AlphaBroker's operating model, triggering a process of organizational sensing. With mandatory lockdowns in place, the company had to shift to remote work almost instantly. Employees and managers began to recognize latent technological and procedural limitations. A key challenge was the centralized, monolithic architecture of the PAM software, which was originally designed for on-premise access and tightly coupled to fixed workflows. The system lacked modularity, had limited support for mobile or asynchronous use, and could not be adapted quickly without vendor intervention. VPN-based access to this environment proved unreliable under increased load, revealing architectural bottlenecks in bandwidth, security handshakes, and session persistence.

The technical constraints limited the organization's ability to reassign tasks that required low autonomy and strong software support, revealing the weaknesses of a rigid IS backbone during forced remote work. In contrast, tasks with high autonomy and loosely coupled tools adapted more readily. Employees involved in client support or field operations utilized email, templates, and personal initiative to ensure service continuity. These differing experiences highlighted a structural misalignment between IS architecture and actual work practices. Employees began to question the effectiveness and adaptability of the systems in place. This phase of sensing underscored how embedded routines and rigid architectures limited the organization's responsiveness and created systemic fragilities.

4.3. Seizing: emergency adaptations and tactical responses

As limitations emerged, AlphaBroker implemented short-term responses to maintain continuity. The IT department acted swiftly to extend VPN licenses, redistribute laptops, and expand the use of remote access tools. These centrally coordinated responses were essential to re-establish basic connectivity. However, many adaptive solutions emerged from the ground up. Employees created ad hoc digital workflows, used personal devices for coordination, and established informal communication routines. For example, shared folders were used to replace paper-based document exchanges, and digital signatures were introduced on an experimental basis.

These improvised solutions demonstrated the organization's seizing capability: the ability to mobilize available resources under constraint to address immediate threats. They also revealed the latent flexibility of staff who, despite lacking formal tools, managed to deliver core services. However, the reliance on informal practices also exposed risks, including inconsistent data management and gaps in process traceability. The seizing phase thus highlighted both the resourcefulness of individuals and the institutional weaknesses in supporting coordinated, remote work at scale.

4.4. Transforming: strategic reconfiguration of systems and practices

After the initial crisis response, AlphaBroker initiated a more deliberate transformation process aimed at improving digital resilience. The company invested in upgrading hardware, enhancing VPN capacity, and expanding mobile telephony. A centralized document management system was introduced, enabling digital archiving and remote approval processes. These infrastructure changes supported more consistent and traceable workflows. In parallel, organizational practices evolved. Managers were encouraged to adopt hybrid work models and to define performance goals suited to distributed teams. Training sessions were held to improve digital literacy and align work routines with the new tools. The company began reassessing its broader IS architecture considering the replacement of PAM with a more modular, cloud-based system capable of supporting integrated workflows across locations.

This phase reflects the development of higher-order dynamic capabilities: the capacity to move beyond emergency response and reconfigure technological and organizational foundations. While progress varied across departments, the organization began transitioning from reactive adaptation to proactive system redesign.

4.5. Analytical framework: mapping socio-technical resilience

To make sense of the patterns observed during the disruption, we developed two complementary analytical tools. The first is a 2x2 matrix (Table 2) that maps organizational activities based on (1) the level of guidance embedded in the information systems and (2) the degree of autonomy in task execution. This framework helps explain why some processes were more resilient than others under stress.

Table 2. Mapping Organizational processes by IS guidance and task autonomy.

IS Guidance	Task Autonomy	Example Processes	Observations
High	Low	PAM-based contract management	Highly structured, difficult to adapt, disrupted by remote work limitations
High	High	CRM routines in a locally adopted software solution, with executive oversight	Mixed performance, adaptable where staff had initiative, but limited integration
Low	Low	Payment reconciliation via Office software, document archiving	Manual, slow, resilient in emergencies but inefficient
Low	High	Customer interaction, field office client support	Flexible, adapted well to remote work, but lacked control and traceability

This mapping highlights that resilience is not a general property of the organization but emerges from the interaction between systems and users. Activities governed by rigid IS and limited autonomy were the least adaptable while tasks performed with loosely coupled tools by autonomous actors adapted quickly. The model helps explain why certain functions, such as remote sales or basic advisory services, transitioned online smoothly, while others, like contract finalization or claims workflow, faced significant disruption. It also indicates where transformation efforts should focus: reconfiguring high-guidance, low-autonomy systems like PAM and supporting autonomous roles with more integrated digital tools.

The second tool (Table 3) links the phases of dynamic capabilities to concrete organizational actions and IS implications. This framework connects abstract theoretical constructs to observable practices.

Table 3. Dynamic capabilities, organizational responses, and IS role.

Capability Phase	Organizational Actions	Information System Role
Sensing	Recognition of PAM and VPN limitations under remote work	Exposure of rigidity, fragility in core systems
Sizing	Tactical IT interventions, bottom-up process improvisation	Remote access expansion, informal workflows
Transforming	Strategic upgrades, hybrid models, new IS planning	Investment in resilience-enabling technologies

These frameworks illustrate how digital resilience developed over time. They show that resilience is not an innate feature of systems or organizations, but an emergent property of their alignment and evolution under pressure. This highlights the value of viewing digital resilience as a dynamic, situated, and evolving capability.

5. Discussion

This study was guided by the question: *How do dynamic capabilities enable digital resilience in organizations?* Through our qualitative case study of AlphaBroker during the Covid-19 pandemic, we explored how information systems and organizational practices interact to shape digital resilience. Using a dynamic capabilities lens, we traced how the company sensed technological rigidities, seized short-term solutions, and transformed its digital infrastructure to enhance resilience. Our analysis offers three significant contributions to both theory and practice.

First, our study reveals that resilience emerges from the interdependence between information systems and organizational practices rather than being a fixed property of either technology or people. The resilience of organizational activities depends on their configuration along two dimensions summarized in the analytical matrix (Table 2) developed in the study: the degree of task autonomy and the level of guidance embedded in the IS. This relational perspective refines existing literature on agility and flexibility, which often treats IS flexibility as a stand-alone variable [3,7,9]. Our findings align with recent research showing that resilience is built through the dynamic interaction of digital infrastructures and institutional work practices, rather than as a fixed technological attribute [20,21]. At AlphaBroker, activities embedded in the legacy system with rigid logic and tightly coupled tasks became difficult to adapt when remote work was imposed. In contrast, processes such as customer advisory services, where employees used lighter tools and exercised greater discretion, demonstrated higher adaptability. This insight shows that resilience must be evaluated as a socio-technical configuration where the interplay between digital and human flexibility determines the organization's capacity to reconfigure under pressure [1,14].

Second, this study operationalizes the dynamic capabilities framework, which prior research has often conceptualized as an abstract, high-level strategic process [4,13]. Our findings show how these capabilities are enacted through both strategic adaptation and technical reconfiguration, such as specific adjustments to access protocols, system modularity, and integration capabilities. The analytical framework presented in Table 3 provides a template for further studies seeking to bridge the gap between strategy and technology [13,15]. In the case of AlphaBroker, for example, sensing was evident when the pandemic exposed the limitations of the legacy IS infrastructure; seizing involved immediate tactical responses, such as deploying remote access tools and improvising workflows; and transforming was initiated through strategic investments in mobile devices, cloud access, and a new digital document management system. These actions emerged not only from top management strategy but also from the distributed improvisation of staff at different levels of the organization. This observation supports the view that digital transformation is an unfolding capability expressed through iterative adjustments to technology, roles, and routines.

Third, we offer a practical diagnostic tool to guide resilience-oriented transformation by helping managers identify misalignments between systems and work autonomy. By highlighting the misalignments between technology and practice, the framework helps organizations prioritize transformation efforts where they are most needed. Unlike maturity models or readiness assessments that evaluate organizations against fixed benchmarks [11,16], our framework encourages reflection on the internal coherence of socio-technical configurations. This perspective is particularly useful for organizations undergoing rapid, unplanned transitions, as it focuses attention on the interplay between system structure and work autonomy [1,14].

This study has several limitations that should be acknowledged. First, it is based on a single case in the insurance brokerage sector, which limits the generalizability of the findings. The aim of this research was not statistical generalization but analytical insight and the conceptual frameworks developed are intended as transferable tools to

support theoretical generalization. However, future research could apply and refine these frameworks in comparative studies across industries and organizational contexts to assess their broader applicability. Second, the participatory nature of the research raises concerns about potential researcher bias. To mitigate this, we employed data triangulation, critical reflection, and cross-validation of findings through multiple data sources. Nonetheless, future studies could benefit from independent data collection and multi-case designs to further validate and extend the analytical tools proposed here. Third, the study focuses on a twelve-month period of acute disruption. While this scope allowed us to trace dynamic capabilities emergence, it does not capture long-term outcomes such as sustained performance, adoption patterns, or system scalability. Longitudinal research is needed to examine whether adaptive configurations persist, evolve, or degrade over time and under what conditions they remain effective.

Future research could also integrate qualitative insights with quantitative indicators, such as recovery time, service delays, or user response time, to provide a more comprehensive view of digital resilience across organizational levels. It may also explore the impact of recent technologies, such as AI and Generative on digital resilience.

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