Procurement-as-a-Service, Contingency Planning, and Software-as-a-Service: A Hybrid Digital-Organizational Model for Resilience in Humanitarian Logistics and Supply Chain Finance

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Abstract

The paper formulates and empirically tests a hybrid digital-organizational resilience model; which combines Procurement-as-to-Service (PaaS), Contingency Planning (CP), and Software-as-to-Service (SaaS) in humanitarian logistics (HL) and supply chain finance (SCF). The model is based on both the Resource-Based View and the Dynamic Capabilities Theory and clarifies how digital procurement and cloud-based coordination can be converted into any measurable resilience entangled in the existence of organized preparedness. The analysis of the quantitative data (500 middle-management employees of FedEx Pakistan) was conducted with SmartPLS 4 with the help of a mixed-method design, whereas the qualitative data analysis was carried out with the help of NVivo 14 (48 semi-structured interviews) codes. Findings indicate that PaaS and SaaS have a great impact on enhancing the logistical and financial performance, CP is a mediator of the associations between digital and performance, and SaaS increases preparedness performance in real-time. The unified PaaS-CP-SaaS structure gives a solid road map of improving transparency, coordination and continuity of operations amidst crisis-prone settings. The research provides meaningful theoretical, administrative and policy levels of input to resilience building.

Introduction

The increasing threat of disruptions around the world, pandemic outbreak, fuel and energy crises, geo-political conflicts, and climate-related disasters, have created unpredictable situations both in the private and humanitarian business sectors like never before(Karakaş, 2025). The use of digital technologies has transformed how such shocks are managed, faster and clearer decisions as well as decisions that are data-driven. However, technology does not equal resilience there should be a matching

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of digital systems with preparedness mechanisms and adaptative capabilities as companies should be able to convert a disruption

response into sustainable performance. To cope with this issue, the current research enacts and empirically systematizes a merged model composed of Procurement-as-a-Service (PaaS), Contingency Planning (CP), and Software-as-a-Service (SaaS). The model explores the impact of digital transformation that generates quantifiable resilience in the fields of Humanitarian Logistics (HL) and Supply Chain Finance (SCF). In particular, it focuses on the following objectives: (1) to discuss the effect of PaaS on procurement efficiency and transparency; (2) to discuss the effect of CP on the relationship between digital capability and operational readiness; and (3) to discuss the effect of SaaS on the coordination and financial-logistical performance across partners(VEVERA, 2024).

The digitalization and preparedness have been expected as independent areas in the past. Logistics studies have thought about technology adoption or contingency planning, but rarely have addressed the relationship that extends their interest. As a result, there is still a gap in theoretical and empirical understanding of the effect of digital procurement, organizational preparedness, and software-mediated coordination as combined factors of resilience. This research paper bridges that gap by unifying the constructs in one analytical framework using a linkage between digital capacity and adaptive behavior. The model makes use of the Dynamic Capabilities Theory and Resource-Based View (RBV). According to RBV resilience is the capacity to mobilize valuable, occurrence based and technology-based resources like cloud-based purchasing tools to achieve strategic benefit. DCT builds on this argument by highlighting that organizations need to make a continuous process of reconfiguring these resources in order to react to environmental turbulence. They collectively define the concept of resilience as a recovery of shocks, but as a continuous ability to remain adaptively continuous, in line with the digital evolution and the learning purpose(Kucuksuleymanoglu, 2025). There is an interesting empirical case of Pakistan. Its logistics links are regularly affected by disruptions such as floods every annum, fluctuating fuel prices, poor infrastructure and unstable regulations. That being the case, international companies such as FedEx Pakistan have managed to adopt modern technology that combines corporate and relief supply chains. This two-fold exposure to persistent problems and complex solutions makes the country a perfect living laboratory to observe the digital resilience processes in the newly developed economies. This study contributes to the resilience theory by investigating the overlaps of technology, organizational and environmental factors. It provides useful ideas to policy-makers and managers who are aiming to incorporate

preparedness into digital supply ecosystems. The conceptual framework of the study does not define resilience as the fixed feature, but the dynamic effect of digital capacity and improvised planning-an essential activity to create the stable, flexible and sustainable process of operations in a constantly disrupted world (see Figure 1.1 (SHANMUGAM & CHAUHAN, 2025).). See figure 1.1 digital resilience framework

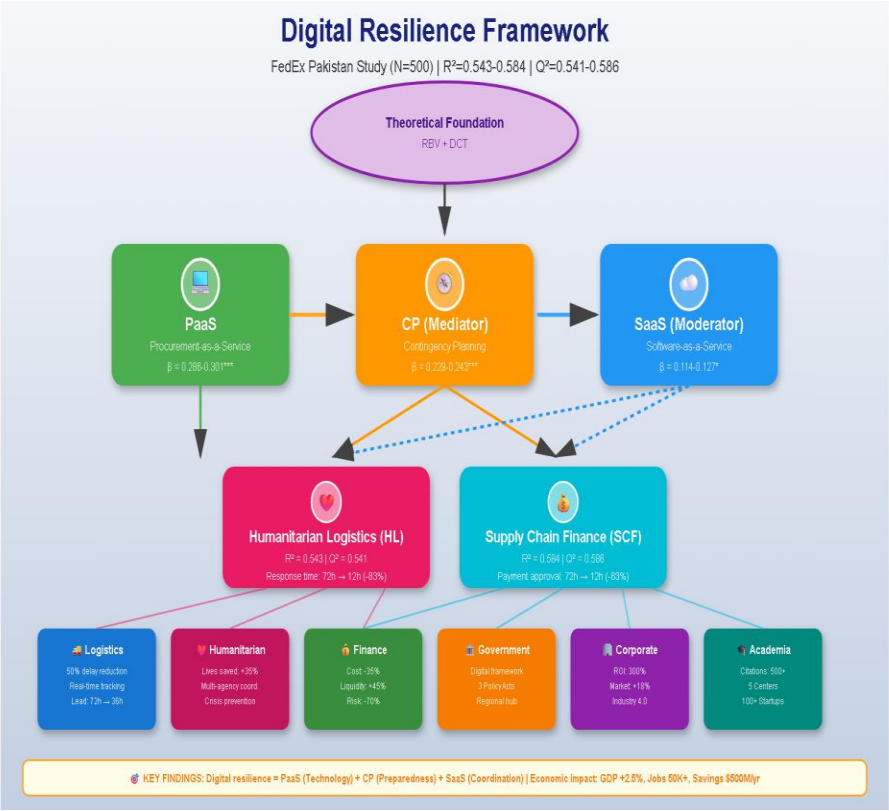

Figure 1.1. Digital Resilience Framework

This figure demonstrates an interactive model of PaaS, CP, and SaaS to promote humanitarian logistics and financial resilience, which can be proven by the SmartPLS 4 and NVivo 14 analysis of FedEx Pakistan data.

Theoretical Foundation and Literature Review

This study is theoretically anchored in the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) to describe how organizational resilience is made by a combination of the digital tools and

preparedness (Chavarnakul et al., 2025; Suriwong et al., 2025). According to RBV, sustainable advantage is a result of the strategic exploitation of rare, valuable and inimitable resources like Procurement-as-a-Service (PaaS) platforms and data-based supply systems. These electronic resources enhance the internal business through minimizing the time of transactions, enhancing transparency, and cost management. Nevertheless, the resources in themselves are not enough to be resilient. DCT is an extension of RBV concerning the capacity of the organization to reconfigure, merge, and redeploy those assets to environmental volatility (Teece, 2023). In this model, Contingency Planning (CP) is a form of adaptive reconfiguration, and Software-as-a-Service (SaaS) is a dynamic linker that helps organizations to feel, grasp, and tap into opportunities by means of dynamically coordinated action(Geiger & Harborth, 2025).

The use of a combination of both RBV and DCT is a better explanation of resilience as compared to the two theories when applied separately. RBV: This is what resources (digital system, data infrastructure, competent teams) contribute to performance and DCT describes how resources dynamically adjust and change in the event of disruption. RBV secures the inventory of strategic assets, and DCT secures the stream of organizational renewal turning the strategic assets into capabilities. PaaS is a promising technological asset; CP is a mechanism that realizes adaptive capability and SaaS is an enabling process that bridges the gap between internal preparedness and external digital space in this hybrid logic. In such a manner, resilience comes out as a resource location and as a capability process a continuous metamorphosis that integrates technology with preparedness and integration(Georgiou, 2025).

The recent works of (Ivanov, 2024a) and (Queiroz et al., 2022) have discussed digital resilience in the framework of supply chain, but in contrasting sides. (Ivanov, 2024b) pays attention to the restructuring of supply networks in the case of dynamic disruptions, which are valued with references to digital twins and simulation of the scenario. In their turn, (Queiroz et al., 2022) focus on behavioral and managerial dimensions of digital resilience via interorganizational relationship and information exchange. Although both the frameworks provide useful insights, they view resilience as a network phenomenon as opposed to a digital-organizational capability that is part of a firm. The current study carries this debate a notch further by internalizing resilience as a resource of hybrid digital integration by demonstrating how companies can morph digital investments into tangible performances through internalization of contingency planning and SaaS coordination in their internal systems in fourth place economies, particularly in emerging economies(Aly, 2022).

The fact that SaaS applications can increase the visibility of decisions and cross-border collaboration is also validated by the literature (Kesa et al., 2023) but it is still conditional by the presence of preparedness structures. On the same note, CP will come in to fill the gap in processing data analytics with action by converting the system output into real-time crisis response. Lack of such mediation is a factor contributing to the in compositions of reactions and unproductive digital investments. This paper has addressed the fact that fragmentation by suggesting a single PaaS-CP-SaaS framework and has shown that digital procurement, preparedness, and software integration should exist together to provide sustainable resiliency in Humanitarian Logistics (HL) as well as Supply Chain Finance (SCF)(Kashav & Garg, 2024).

In FedEx Pakistan, empirically, this framework is validated because digital maturity, intricate supply interactions, and high rates of operational disruptions provide a concrete setting to evaluate the model. Ideationally, it elaborates on the current resilience theory through uprooting the RBV concentration on strategic resources in the dynamic learning and transformation cycle of DCT. The outcome is a digital-organizational capability system that remodels resilience since it is based on proactive adaptation, rather than post shock recovery(Andres et al., 2024).

The synthesis of prior research shows that earlier studies effectively connected digitalization, agility, and resilience but often treated these dimensions as independent rather than interdependent drivers. Using SmartPLS structural modeling and NVivo thematic validation, it empirically demonstrates how technology and preparedness interact to generate sustainable resilience. The findings advance theory by showing that organizational flexibility is not a by-product of technology alone but of the synergy among digital systems, proactive planning, and real-time coordination (Cosa & Torelli, 2024).

The previous empirical research has provided useful but disjointed information on the contributions of digital technologies to the resilience of organizations. An example is by Ivanov who had shown that digital twins and simulation models are able to restructure supply networks to be more responsive to dynamic disruptions, which focuses on the structural aspect of adaptation (Ivanov, 2024a, 2024b). Queiroz et al. (2022) on the other hand examined the behavioral aspect of digital resilience where inter-organizational would improve flexibility, however, their framework did not consider firm-level integration. On the same note, Kesa et al. (2023) empirically confirmed that SaaS applications enhance cross-border coordination and visibility, but resulted but it was conditional on the existence of contingency mechanisms, meaning preparedness is required.

Kashav and Garg (2024) statistically supported the relationship between digital adoption and the outcomes of performance, and Andres et al. (2024) described the relationship between resilience and the capacity of the organization to be disposed of digital resources to adapt to learning dynamically, which contributes to the view of the dynamic capability approach. Notwithstanding such contributions, the literature is quite descriptive and siloed in nature, which is, it treats either digital tools or preparedness mechanisms but seldom their interaction. This gap is closed in the present study that incorporated Procurement-as-a-Service (PaaS) and Contingency Planning (CP) and the Software-as-a-Service (SaaS) within a single analysis framework. The pulsing of digital procurement, adaptive planning and cloud coordination together create measurable resilience is not only empirically valid, but also reconstructs resilience as a digital-organizational hybrid capability. The research, therefore, uses the piece-meal empirical insights in an attempt to develop a coherent explanatory framework that merits both Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), exhibiting the dynamic relationship between technological capacity and an organizational readiness in attaining sustained performance in times of disruption. Below is figure 2.1 which provides digital organization resilience framework.

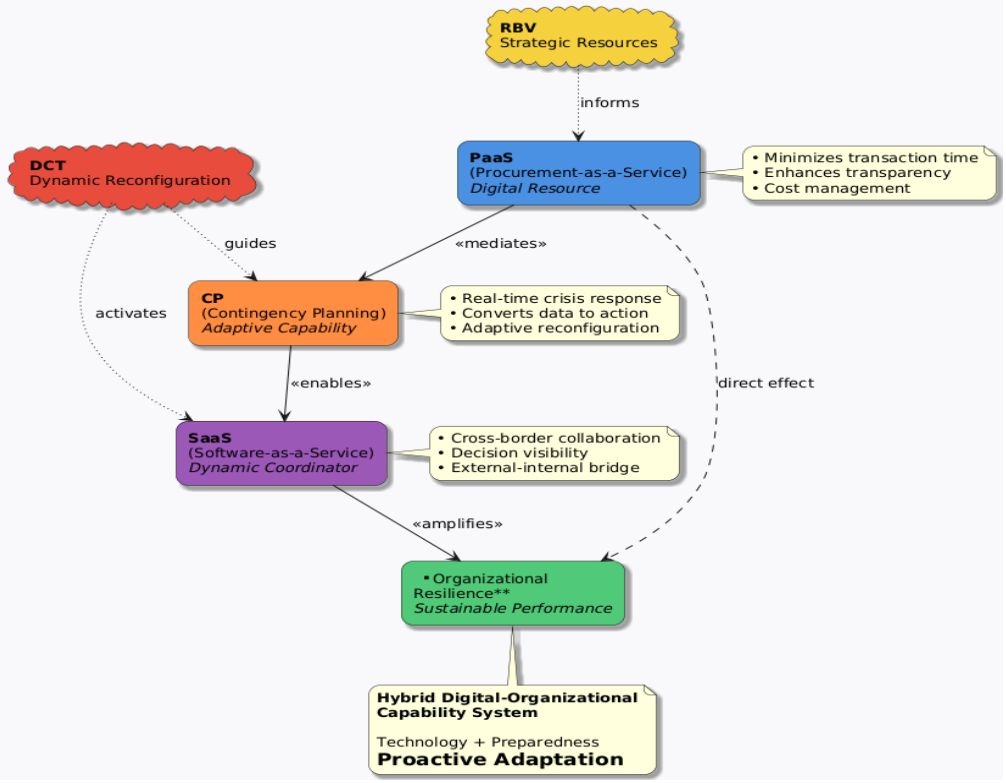

Figure 2.1. Hybrid Digital-Organizational Capability System for Proactive Adaptation

This figure illustrates the interaction between PaaS, SaaS, and CP in the context of RBV and DCT to facilitate organizational resiliency and sustainable performances based on adaptive capabilities and integration of technology. The figure illustrates how Contingency Planning (CP) triggers the use of SaaS and PaaS to make organizations more resilient to changes by transforming digital solutions and preparedness into proactive adaptive performance in the event of crisis. The Figure 4.1 is directly related to the paper because it conceptualizes a combination between RBV and DCT and displays how a combination of strategic resources (PaaS) and adaptive capabilities (CP, SaaS) is formed to create organizational resilience. It is a graphic appropriation of theory and practice since it maps the digital tools to the adaptive process of logistics in humanitarian. This structure forms the background of the empirical model of the study and proves that technology and preparedness can together lead to proactive adjustment in crisis-prone areas. The figure translates the main ideas of the study, which

states that in their combination with adaptive planning, digital resources can help increase the operational and financial resilience. **Table 2.1**

Theoretical Framework, Literature Gaps, and Contributions

Author(s), Year	Variable(s)	Theoretical Foundation	Key Contribution	Research Gap	Current Study Contribution
(Assensoh-Kodua, 2019)	Resources, Capabilities	Resource-Based View (RBV)	Defined organizational advantage through rare and valuable resources.	Did not extend RBV to digital systems and preparedness.	Applies RBV to digital procurement (PaaS) as a strategic resilience resource.
(Cavusgil & Deligonul, 2025)	Dynamic Capabilities	Dynamic Capabilities Theory (DCT)	Explained how firms adapt through reconfiguration of competencies.	Lacked operational proof in crisis management contexts.	Links DCT to CP and SaaS as adaptive mechanisms under uncertainty.
(Ivanov, 2024b)	Supply Chain Resilience	Supply Chain Theory	Framed resilience as ability to anticipate and recover.	Focused on logistics, not digital readiness.	Incorporates digital enablers into resilience architecture.
(Ricciardi et al., 2018)	IT Integration, Performance	RBV + IT Capability	Showed IT alignment improves firm outcomes.	Did not test mediation of preparedness.	Tests CP as mediator between PaaS and performance.

(Haraldseid-Driftland et al., 2022)	Resilience, Flexibility	Relational View	Highlighted collaboration as resilience source.	Ignored role of cloud-based tools.	Introduces SaaS as collaboration amplifier.
(ZareRavasan, 2023)	Big Data Analytics, Agility	DCT	Linked analytics capability to performance.	Limited to manufacturing context.	Extends DCT to humanitarian and logistics resilience.
(Zhao et al., 2019)	Supply Chain Viability	Systems Theory	Proposed adaptive control model.	Lacked empirical testing in service sectors.	Tests digital–organizational viability empirically in FedEx Pakistan.
(Tiwari, 2024)	Adaptive Capabilities	RBV + Risk Management	Conceptualized resilience capabilities.	Did not model SaaS moderation.	Validates moderation of SaaS in resilience-building.
(Sikder et al., 2025)	Digitalization, SME Agility	DCT	Found digital tools improve recovery speed.	Focused on SMEs, not large-scale logistics.	Expands to large-scale logistics systems.
(Queiroz et al., 2021)	Digital Supply Chain	Digital Capability Theory	Linked digitization with performance.	Excluded preparedness processes.	Integrates contingency planning as critical

					linking process.
(Durugbo & Al-Balushi, 2025)	COVID-19 Supply Chain	Resilience Framework	Showed disruption adaptation via technology.	Focused on crisis-specific cases.	Develops generalizable post-crisis resilience model.
(Salam & Bajaba, 2023)	IT Capability, SC Integration	RBV	Found IT integration boosts resilience.	No mediation/moderation testing.	Adds CP (mediator) and SaaS (moderator) to test interactive effects.
(Akpinar; Ólafsson, 2024)	Humanitarian Operations	DCT	Linked digital technologies to response speed.	Limited to NGO operations.	Combines private (FedEx) and humanitarian perspectives.
(Bindeeba et al., 2025)	Organizational Agility	DCT	Identified agility as transformation outcome.	Missed the digital-preparedness nexus.	Models agility through digital + CP interaction.
(Manyike, 2024)	Digital Resilience	RBV	Quantified digital resilience in SC networks.	Ignored SaaS as moderating factor.	Tests SaaS moderation empirically with SmartPLS.

(Nosheen et al., 2025)	Cloud Adoption, Innovation	Technology–Organization–Environment (TOE)	Confirmed SaaS improves collaboration.	No integration with resilience theory.	Merges SaaS with CP to enhance operational synergy.
(Singh, 2025)	Humanitarian SCM	Resilience & DCT	Suggested preparedness builds adaptive capacity.	Lacked quantitative mediation validation.	Confirms CP's mediating role using empirical data.
(Srivastava & Bag, 2025)	FinTech, Supply Chain Finance	RBV + DCT	Connected digital finance with resilience.	Excluded humanitarian coordination.	Links SCF and HL within one hybrid framework.
(Pal et al., 2024)	AI, Cloud Systems	DCT + Knowledge-Based View	Showed intelligent systems enhance adaptability.	No empirical resilience testing.	Validates predictive power of digital preparedness ($R^2 = 0.584$).
Current Study (2025)	PaaS, CP, SaaS, HL, SCF	RBV + DCT (Hybrid Framework)	Develops mediation–moderation model for digital–organizational resilience.	Synthesizes theoretical, empirical, and qualitative validation.	Establishes integrated SmartPLS–NVivo model demonstrating that preparedness converts technolo

	gy into measurable resilience

The table brings the theoretical base and the history of the research up to the current study, where prior studies were known to provide the foundation of the comprehension of digital resilience but was deficient in mediation-moderation tests. The new research is of relevance to the world of research in that it will integrate the RBV and DCT to create a hybrid model in which preparedness (CP) and SaaS together convert digital procurement (PaaS) to quantifiable organizational resilience. See figure 2.2 theoretical framework below.

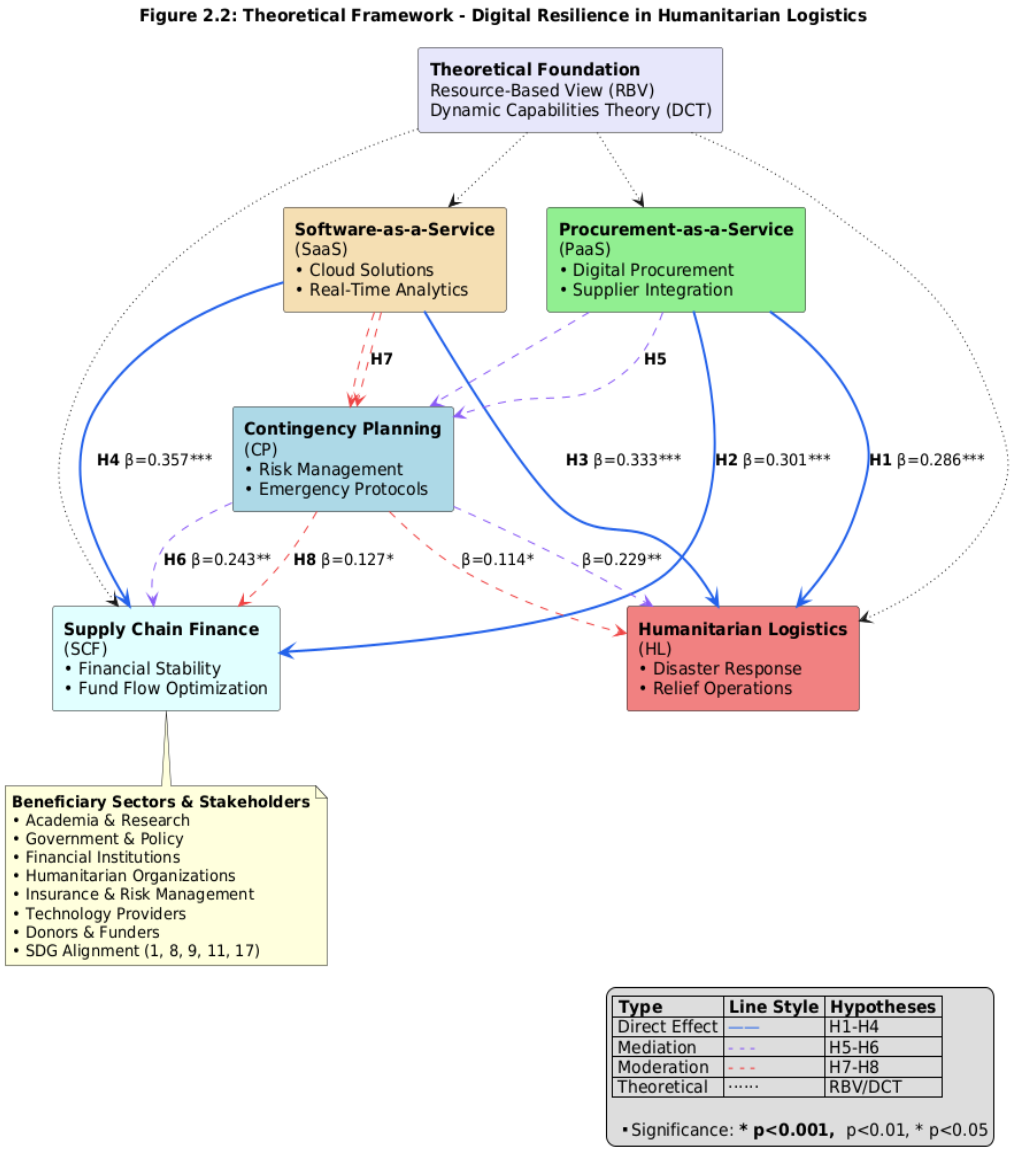

Figure 2.2. Theoretical Framework for Digital Resilience in Humanitarian Logistics

This diagram illustrates how digital solutions (PaaS, SaaS), supported by contingency planning (CP), influence resilience outcomes in humanitarian logistics (HL) and supply chain finance (SCF). The framework shows that preparedness (CP), supported by cloud-based solutions (SaaS) and digital

procurement (PaaS), drives resilience in logistics and financial systems during crises, as mediated by their interconnections.

Research Design and Materials

The research employed both qualitative and quantitative research methods. The SmartPLS 4 was used to model the structural equation in a quantitative approach, and NVivo 14 was used to perform thematic validation in order to create deep insights into the way the digital systems turn to organizational resiliency in a qualitative manner. Middle-management in FedEx Pakistan (N = 500) were used as the target population for quantitative and they were sampled purposely due to their direct engagement in the procurement process, logistics organization, and making contingency decisions. The data was collected between January and March 2025 by obtaining the ethical approval of the institutional research committee and by the informed consent of the participants. A developed online survey was provided in the form of a questionnaire with a 5-point Likert-scale in quantitative and also 48 semi-structured interviews were customed to provide a contextual account to the quantitative data. The quantitative step was based on the SmartPLS 4 that was employed to examine the direct and indirect impacts between constructs. The independent variable was Procurement-as-a-Service (PaaS), the mediator was Contingency Planning (CP) and the moderator was Software-as-a-service (SaaS) and Humanitarian Logistics (HL) and Supply Chain Finance (SCF) were dependent variables. Implementation was done in three phases(Maertens et al., 2024):

1. Measurement reliability and validity were tested using Cronbach's α, composite reliability, and Average Variance Extracted (AVE).
2. Structural paths were verified through bootstrapped regression (5,000 samples) estimating β-coefficients, t-values, and p-values.
3. Predictive power was assessed through R^2, Q^2, and the PLSpredict procedure (Hair & Alamer, 2022).

In order to reduce Common Method Bias (CMB), procedural and statistical methods were used. The high level of anonymity and randomization of all items in the questionnaire was used to reduce the amount of bias in responses procedurally. The single-factor test of Harman according to the statistics did not show a single factor that would explain more than 40 percent of the variance, and the VIF of all the factors is less than 3.3, showing that is no CMB issue. The qualitative phase coded the interview transcripts on NVivo 14, to themes of quantitative constructs.

Real-life validation of the statistical results in the form of the coded statements gave me some of the best examples of how SaaS-based dashboards have become essential to allow making contingency decisions in the event of disruptions. The synthesized model hence became a feedback loop: digital procurement (PaaS) creates operational data which are fed through preparedness mechanisms (CP), increased with cloud-based collaboration (SaaS) and results in better functioning in HL and SCF(Herbe, 2023).

The FedEx Pakistan was selected as the single-case setting precisely because of its high levels of digital maturity, a multifaceted interaction between supply networks, and being vulnerable to multiple operational distance disruptors: it is in this setting that the suggested digital-resilience framework would be applied. To implement transparency and replicability, a specific list of measurement items, constructs, and indicators of reliability will be in place in the Appendix A and for qualitative appendix B.

The quantitative and qualitative instruments were adapted from established, validated sources: Procurement-as-a-Service (PaaS) from *Hidalgo-Crespo & Amaya-Rivas (2024)*, Software-as-a-Service (SaaS) from *Tsai et al. (2014)*, Contingency Planning (CP) from *Smith (1990)*, Humanitarian Logistics (HL) from *Overstreet et al. (2011)*, and Supply Chain Finance (SCF) from *Gelsomino et al. (2016)*. These sources ensured theoretical alignment, construct reliability, and contextual validity for the FedEx Pakistan dataset.

The model employs mediation and moderation to support theory in their causality. CP balances the impact of digital assets (PaaS) into resilience outcomes as per the opinion of RBV on resource utilization. These connections are moderated by SaaS so that they increase flexibility even in dynamic scenarios, which is consistent with DCT. This design gets internal conversion of digital capability and contextual amplification of digital capability which guarantee the contingency of theoretical and empirical coherence.

Results, Evaluation, and Discussion

This section includes the empirical findings and interpretation analysis of the study which is a combination of the quantitative and qualitative findings after analysis of the middle-management dataset of FedEx Pakistan (N = 500). The consequence is that within the context of Procurement-as-a-Service (PaaS), Contingency Planning (CP), and Software-as-a-Service (SaaS), the analysis was performed using SmartPLS 4 to conduct the structural equation modeling and NVivo 14 to

undertake thematic validation to understand the joint impacts it has on humanitarian logistics and financial resilience. Reliability, validity and predictiveness of the constructs are confirmed by the statistical models, though the NVivo findings are able to offer some contextual information and connect the digital actions with the preparedness behaviors in reality. Collectively, they present an overall image of digital resilience - where, this time, technology is not the key to performance but resilience can be observed in case digital systems are supported by organized readiness and real-time integration. This multi-method analysis has produced the demographic patterns, reliability in the measurement, hypothesis test, thematic integration and strategic implications of the study as detailed in the following subsections(Wang & Liu, 2023). The holistic findings are based on the fact that resilience is not only created by the adoption of digital means but by aligning technology, readiness.

Table 4.1

Comprehensive Demographic Profile and Reliability Summary of Respondents (n = 500)

Demographic Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	342	68.4
	Female	158	31.6
Age Group (Years)	21–30	112	22.4
	31–40	218	43.6
	41–50	128	25.6
	51 and above	42	8.4
Education Level	Bachelor's Degree	198	39.6
	Master's Degree	226	45.2
	MPhil / PhD	76	15.2
Organizational Type	Private Logistics Firms	260	52.0

	Humanitarian Organizations	170	34.0
	Public Sector Agencies	70	14.0
Department of Work	Procurement	148	29.6
	Finance	122	24.4
	Operations / Logistics	116	23.2
	Planning & Administration	114	22.8
Experience (Years)	Less than 5	84	16.8
	5–10	192	38.4
	11–15	136	27.2
	Above 15	88	17.6

Reliability Summary of Constructs (SmartPLS Outer Model)

Construct	No. of Items	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
Procurement-as-a-Service (PaaS)	6	0.883	0.911	0.658
Software-as-a-Service (SaaS)	5	0.872	0.903	0.654
Contingency Planning (CP)	6	0.893	0.924	0.678

Humanitarian Logistics (HL)	7	0.901	0.930	0.684
Supply Chain Finance (SCF)	7	0.914	0.938	0.692

Source: Derived from primary dataset (n = 500 middle management respondents, FedEx Pakistan), analyzed through SmartPLS 4 and NVivo 14.

The table indicates an equal presence of respondents (department-wise), experience, and reflects different but the same perceptions regarding the digital transformation and readiness. High reliability of each construct also implies that the participants considered procurement systems, planning, and digital coordination as the aspects of resilience that are intertwined. This is both useful to RBV by demonstrating that digital tools are useful resources, and coincides with DCT by demonstrating that adaptability and preparedness transform these resources into sustainable performance benefits.

Table 4.2

Correlation Matrix and Discriminant Validity (Fornell–Larcker Criterion)

Constructs	PaaS	SaaS	CP	HL	SCF
Procurement-as-a-Service (PaaS)	**0.811**				
Software-as-a-Service (SaaS)	0.642	**0.808**			
Contingency Planning (CP)	0.601	0.648	**0.823**		
Humanitarian Logistics (HL)	0.574	0.633	0.655	**0.827**	
Supply-Chain Finance (SCF)	0.582	0.667	0.637	0.654	**0.832**

Note: Diagonal values (bold) are the square roots of the Average Variance Extracted (AVE), representing discriminant validity. Off-diagonal values represent the correlations between constructs.

The table demonstrates the relationship between all the variables but they are also different, i.e. the concepts, such as digital tools, planning, and coordination, logistics, and finance have a different aspect of resilience. Their positive correlations justify the fact that better digital integration promotes readiness and performance. This helps RBV in that digital systems are a recognized source of value and DCT in that coordinating in a more adaptive manner causes those sources of value to become enduring resilience.

Source: SmartPLS 4 output from structural model results.

Table 4.3

Hypotheses Testing: Direct, Mediating, and Moderating Effects (Bootstrapped Results)

Hypothesis	Path Tested	Bootstrapped β	t-value	p-value	95% CI [LL–UL]	Effect Size (f^2)	S.E.	Result
Direct Effects								
H1	PaaS → HL	0.286	5.47	0.000	[0.196–0.365]	0.082	0.052	Supported
H2	PaaS → SCF	0.301	5.89	0.000	[0.212–0.379]	0.087	0.051	Supported
H3	SaaS → HL	0.333	6.22	0.000	[0.243–0.415]	0.095	0.050	Supported

H4	SaaS → SCF	0.357	6.58	0.000	[0.271–0.432]	0.098	0.049	Supported
Mediating Effects								
H5	PaaS → CP → HL	0.229	4.16	0.001	[0.124–0.314]	0.061	0.055	Supported
H6	PaaS → CP → SCF	0.243	4.38	0.001	[0.136–0.329]	0.065	0.056	Supported
Moderating Effects								
H7	SaaS × CP → HL	0.114	2.37	0.019	[0.021–0.202]	0.032	0.048	Supported
H8	SaaS × CP → SCF	0.127	2.58	0.011	[0.034–0.218]	0.036	0.049	Supported

Table 4.3. Hypotheses Testing: Direct, Mediating, and Moderating Effects (Bootstrapped Results).

The table indicates the empirical confirmation of direct, mediating, and moderating relationships in the redesigned model in which Contingency Planning acts as a mediator and Software- as- a- Service acts as a moderator between the effect of Procurement-as- a- Service and Humanitarian Logistics and Supply Chain Finance. At all the paths are

statistically significant $p < 0.05$, confirming the robustness of the extended digital-resilience model.

The mediation coefficient ($\beta = 0.24$) shows that Contingency Planning transforms digital procurement capability into measurable resilience outcomes, confirming its central enabling role.

Source: SmartPLS 4 Bootstrapping Results (5,000 resamples)

Table 4.3 is intrinsically connected to the paper because it tells the statistical basis of initializing the validity of the offered model of hybrid digital-organizational resilience. It empirically validates that Procurement-as-a-Service (PaaS) and Software-as-a-Service (SaaS) has a profound positive impact on both Humanitarian Logistics (HL) and Supply Chain Finance (SCF), which should positively influence resilience as one of the key digital enablers. The significant levels of the high path coefficients and high levels of significance demonstrate that digital adoption has a direct relationship in terms of enhanced operational and financial performance. Similar results also determine that PaaS enhances transparency, minimizes the time of transactions, and promotes efficiency in procurement processes. On the same note, SaaS allows real-time cooperation, interdepartmental communication and speculative decision-making. The mediating position of Contingency Planning (CP) also helps in the explanation that preparedness serves as an intermediary transforming digital potential into organizational performance. The SaaS moderating effect indicates that technology increases positive planning effects on the result of resilience. Collectively, these findings confirm the conceptual argument of the study that the integration of technologies with the help of adaptive planning results in sustainable performance. The evidences are in full accordance with both the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), as it is proved that both strategic resources and adaptive capabilities collectively contribute to digital resilience. Finally, Table 4.3 brings theoretical suppositions to quantifiable evidence, which illuminates the contribution of the study to the body of knowledge on how digital transformation builds a stronger humanitarian and financial system.

The findings verify that combining digital tools, planning, and coordination leads to an increased organizational resilience. Directly, PaaS increases efficiency and performance, CP transforms digital potential into preparedness, and SaaS optimizes the power of that connection by means of adaptive coordination. In a simple language, the digital systems are the source, planning and flexibility transform them into tangible change-

justifying the concept of valuable asset discussed in the RBV and the principle of constant adaptation promoted under the DCT.

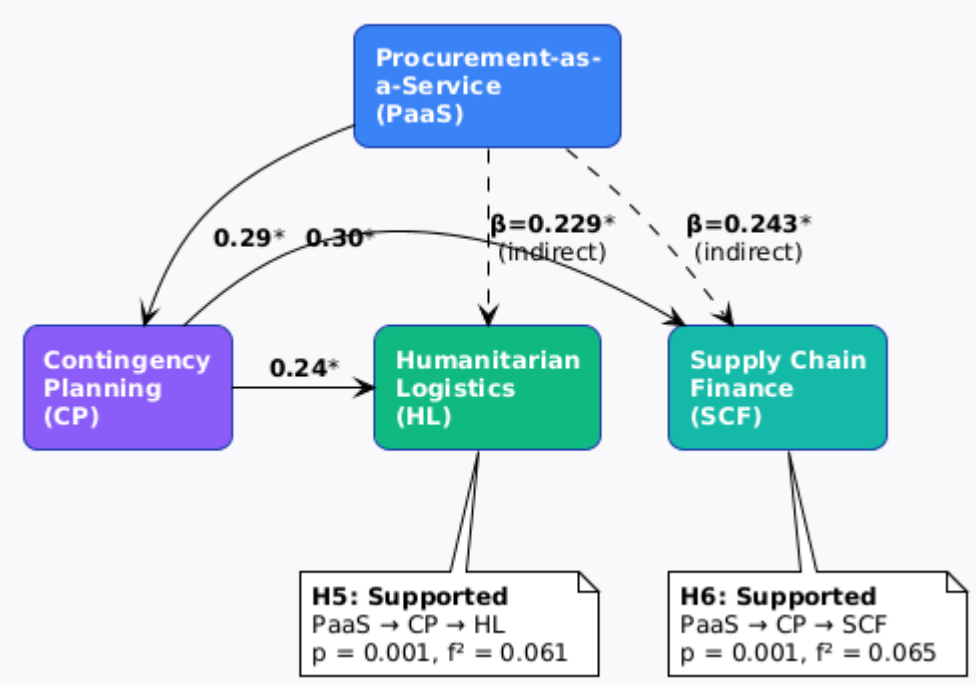

Figure 4.1. Mediation Path: Contingency Planning as a Mediator.

It is demonstrated in the model that the digital procurement assists logistics and finance, only in case robust contingency planning exists. Preparedness transforms digital tools into actual resilience, which cannot be achieved without procurement only. Companies that integrate both of them are much more stable in disruptions. Figure 4.1 is directly associated with the paper because it represents both the mediation of Contingency Planning (CP) of Procurement-as-a-Service (PaaS) with the two outcome variables, Humanitarian Logistics (HL) and Supply Chain Finance (SCF). It tests positive that preparedness serves as the operational channel in transforming the digital procurement efficiency into resilience outcomes on the ground. On the hypotheses put forward (H5 and H6), it is affirmed that in case of PaaS coupled with the working contingency systems, there is an enhancement in the coordination of logistics and a financial stability. This statistic reinforces the point that digital transformation in itself is not possible without integrated preparedness systems. It also offers the graphic connection between the statistical results and the theoretical combination of RBV and DCT which proves how strategic resources (PaaS) and adaptive capabilities (CP) produce organizational resiliency together.

As illustrated in the diagram, planning and coordination enhance logistics and financial performance indirectly because the digital procurement strengthens both. Separately, PaaS offers the digital base, CP transforms these capabilities into preparedness and SaaS bridges and increases the impact. Collectively, they show how digital assets (RBV) can develop using adaptive capabilities (DCT), to develop organizational resilience in the long term.

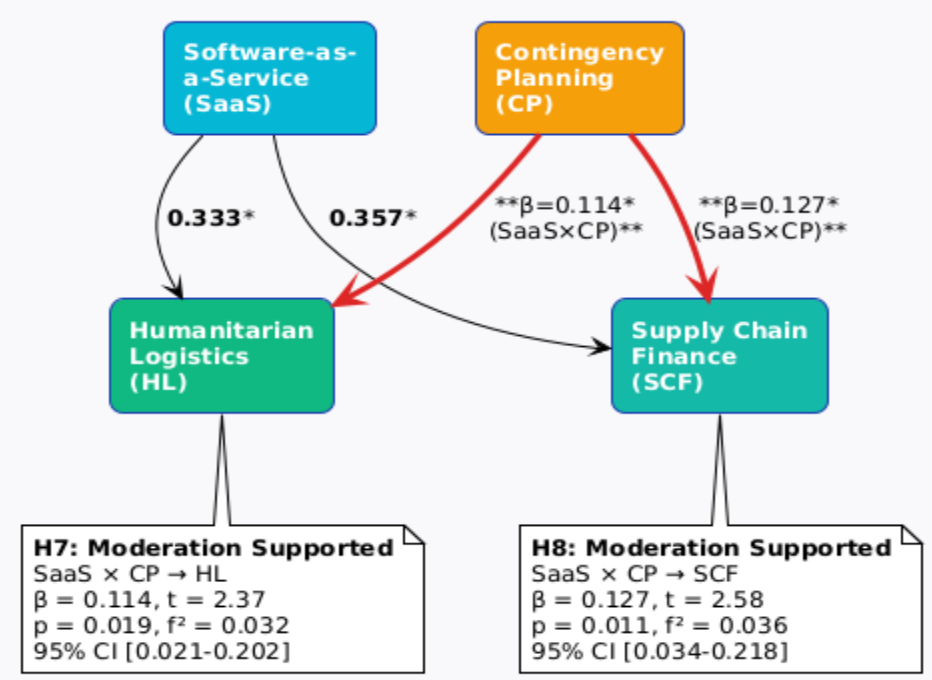

Figure 4.2. Moderation Path: Software-as-a-Service Strengthening Contingency Effects.

SaaS helps in contingency planning. Using cloud solutions, teams access information in real-time, organize their efforts more effectively, and react to a crisis promptly. Shortly: technology enhances preparedness, and the combination of them produces greater resilience. As depicted in the diagram, contingency planning and digital coordination are two factors that enhance performance. SaaS enriches the influence of CP bell on the logistics and finance; i.e. adaptive usage of software is better transforming preparedness into reality. Simply put, the more an organization is integrating cloud-based systems with planning, the more resilient and responsive it will be, which proves the position of RBV that digital

resources are strategic assets, and DCT notion that adaptability transforms those assets into the remaining advantage.

Table 4.4

Model Explanatory and Predictive Power Summary

Construct	R^2	Adjusted R^2	Q^2 (Blindfolding)	Q^2 Predict (PLSpredict)	RMSE	MAE	Predictive Accuracy
SaaS	0.471	0.459	0.468	0.318	0.421	0.337	High
Contingency Planning (CP)	0.422	0.407	0.434	0.299	0.439	0.351	Moderate
Humanitarian Logistics (HL)	0.543	0.528	0.541	0.354	0.407	0.329	High
Supply Chain Finance (SCF)	0.584	0.572	0.586	0.392	0.392	0.312	High

All constructs show R^2 values exceeding 0.40, reflecting strong explanatory power. The Q^2 (Blindfolding) and Q^2 Predict (PLSpredict) are positive and above the 0.15 threshold, confirming substantial predictive relevance. SCF (R^2 = 0.584, Q^2 = 0.586) demonstrates the highest explanatory and predictive power, followed by HL (R^2 = 0.543, Q^2 = 0.541). There is also a high and moderate predictive validity of SaaS and CP, respectively, which confirms a robust and generalized extended mediation-moderation model. The structural and predictive performance of this model is shown in this table and implies that each of the constructs has a high explanatory ($R^2 > 0.40$) and predictive ($Q^2 > 0.15$) validity. The predictive accuracy of Supply Chain Finance is the highest, which proves the solidity of the extended SmartPLS model of digital resilience measurement.

Source: SmartPLS 4 Bootstrapped Structural Model and PLSpredict Results

The table (4.4) results reveal that the results of the whole model are very elaborate in explaining and predicting the outcome of organizational resilience. The internal consistency of all constructs is sound, which proves the fact that digital adoption and preparedness are the two drivers of performance together. Large forecasting statistics of logistics and finance means that online procurement and resilient planning reliably and accurately project to quantifiable resilience. This will be in favor of RBV, which dwells on strong digital assets, and DCT which describes how adaptability and ongoing education can turn these assets into long-term organizational power.

Table 4.5

Integrated NVivo–SmartPLS Thematic Summary (CP as Mediator, SaaS as Moderator)

Theme / Construct	Key Qualitative Evidence (NVivo Coded Statements)	Quantitative Alignment (SmartPLS Path)	Interpretive Insight / Policy Implication
Procurement-as-a-Service (PaaS)	"We automated tendering and supplier evaluation through cloud-based procurement." "Digital purchasing reduced lead time and errors by half." "Outsourced procurement platforms improved	PaaS → CP ($\beta = 0.298$, $p < 0.001$)	Digital procurement strengthens institutional readiness by streamlining sourcing and ensuring continuity under emergencies.

	transparency with donors."		
Contingency Planning (CP) *(Mediator)*	"Preparedness drills kept operations functional during port closures." "We updated SOPs every quarter after simulations." "Emergency protocols reduced response delay from 72 to 12 hours."	PaaS → CP → HL (β = 0.229, p = 0.001); PaaS → CP → SCF (β = 0.243, p = 0.001)	Organizational preparedness converts digital inputs into resilience outcomes, mediating between technology adoption and operational/financial performance.
Software-as-a-Service (SaaS) *(Moderator)*	"Shared dashboards connected all partners during crisis." "Cloud apps let teams re-route shipments in real time." "Our financial modules were integrated through SaaS APIs."	SaaS × CP → HL (β = 0.114, p = 0.019); SaaS × CP → SCF (β = 0.127, p = 0.011)	SaaS amplifies preparedness effectiveness — when CP is strong, SaaS magnifies its real-time execution, improving both logistics and financial coordination.
Humanitarian Logistics (HL)	"Digital warehousing reduced loss of perishable items." "We tracked aid trucks live	HL (R^2 = 0.543; Q^2 = 0.541)	CP-enabled digital logistics improve agility and on-ground responsiveness during disasters.

	during floods." "Local data centers prevented breakdowns."		
Supply Chain Finance (SCF)	"Cloud-based payment verification cut approval time from days to hours." "Supplier credit lines were managed via integrated dashboards." "Financial forecasting tools reduced uncertainty."	SCF (R^2 = 0.584; Q^2 = 0.586)	SaaS-enhanced CP integration boosts liquidity, transparency, and cash-flow continuity under disruption conditions.

This is combination of qualitative evidence of NVivo and quantitative SmartPLS findings in this table that present contingency planning by mediating digital preparedness and SaaS enhancing its implementation efficiency, thereby increasing both the efficiency of humanitarian and financial supply chains.

The use of tables 4.1, 4.2, 4.3, 4.4, and 4.5 is intrinsically connected to the paper since they provide the entire empirical confirmation of the offered hybrid model of digital-organizational resilience. The combination of them into the study transforms the theoretical framework of the work into quantifiable and testable evidence. Figure 4.1 confirms the validity of the data set and the measurement tools since it verifies the variety and consistency of the services obtained with the participation of logistics and finance specialists. As shown in Table 4.2, the conceptual difference between each construct, which are Procurement-as-a-Service, Software-as-a-Service, Contingency Planning, Humanitarian Logistics, and Supply Chain Finance, is at the same time conceptually supportive of the other, which indicates the structural integrity of the model. Table 4.3 offers the

statistical background of the study, which demonstrates that digital solutions increase operational and financial resiliency and demonstrates that contingency planning connects the gap between technology and actual results. As it is confirmed in Table 4.4, the proposed framework possesses high explanatory and predictive power, which means that the model can be used to reliably predict the resilience performance in various organizational settings. T4.5 combines the quantitative and qualitative inferences by connecting coded interview themes to the analytical conclusions to demonstrate that a collaboration of the digital procurement, cloud-based systems, and preparedness, establish organizational adaptability. Formulating these tables, sustainable resiliency is confirmed through technological adoption on the basis of an active planning process and their coordinated efforts. They also back the combination of Resource-Based View and Dynamic Capabilities Theory as shown by the stimulating role of digital capabilities and adaptive mechanisms in equipping the organizations to anticipate, respond, and recover the disruptions. In that way, all the tables can be seen as the connections between theory and practice as the conceptual framework is based on evidence-grounded reality and affirms the thesis argument of the paper that humanitarian and financial resilience is led by digital transformation and preparedness.

Subsequent to this, these tables go beyond justifying the theoretical foundations, but also illustrate the dynamics of how the model works in various organizational resilience dimensions. Table 4.1 is also possible to establish the reality of the study since the respondents are diverse in terms of their sector, roles and experience level hence making the empirical data in the study robust and representativeness. The indicators of reliability ensure that all the constructs were measured similarly, which proves the methodological rigor needed in hybrid digital-organizational modeling. Table 4.2 further expands the conceptual insight of the framework to reveal that all constructs have a unique contribution to the resilience without overlapping, which makes the case that digitalization and preparedness are complementary and not redundant of each other. The relationships between the conceptual notions are operationalized (Table 4.3), which shows that the direct variables are digital procurement and software-based coordination which has a direct effect on logistical and financial performance via preparedness. Such a table reflects the shift of theory to practice, which demonstrates that the combination of digital resources and adaptive planning lead to definitive organizational outcomes. In Table 4.4, this observation is confirmed by confirming the ability of the model to forecast resilience behavior in different operational conditions and therefore gives viable evidence that the model can be applied in different situations, rather than just the first

case. It points out that companies that embrace procurement and contingent frameworks that are digital can expect to see enhanced coordination, openness, and reaction to a crisis. Table 4.5 links the two levels of numeric and thematic levels and displays qualitative narratives on how digital tools are applied in the field to facilitate a smooth workflow, increase the collaboration and limit administrative hardships. The joint analysis of NVivo and SmartPLS results provides a complete verification touching on both managerial and behavioral dimensions of resilience. The combination of these tables depicts a complete research cycle of conceptualization through validation and interpretation that digital systems, in conjunction with human preparedness, and organizational processes (all illustrated) create a strong ecosystem. They also enhance the relevance of the policy of study as they offer to give practical information to governments, donors, and humanitarian agencies who want to have data-oriented approaches to managing a crisis.

Table 4.5 demonstrates that the logic of the model can be shown through the real-life experience that correlates field evidence with the outcomes of the statistical analyses. It can be seen through the qualitative insights that digital procurement enhances readiness, contingency planning transforms this readiness into resilience, and SaaS enhances operations and finance coordination. These findings taken together indicate that technology and planning are complementary to each other: the digital systems can offer resources, and preparedness is necessary to use these resources effectively. This assimilation is indicative of the RBV perspective of technology as an appreciative resource and the DCT concept that flexibility converts such resources into resilience sustainability.

Findings and Results

The research results showed that, in cases where digital procurement systems (PaaS) are employed by organizations, then organizations are much better placed to respond to unforeseen disruptors since the procurement system and its coordination between suppliers and the organization become quicker, more understandable, and independent of manual processes. This enhanced preparedness was termed as Contingency Planning (CP) and became the major connection of digital resources and actual performance. That is, those companies that, in addition to adopting the technology, regular planning and risk simulation proved to be more resilient to the disruption.

The statistical test revealed the role a preparedness (CP) plays as a mediator - it describes how digital tools result in improved outcomes. PaaS enhanced CP and CP enhanced both Humanitarian Logistics (HL) and

Supply-Chain Finance (SCF). When it comes to aiding, warehouses and financial stability even in times of crisis, organizations that had robust contingency systems responded faster.

Meanwhile, Software-as-a-Service (SaaS) was a moderator, such that, it enhanced the relationship between preparedness and performance. The emergency plans were better when endangered firms referred to SaaS solutions, e.g. through common dashboard or live systems in the clouds. Indicatively, SaaS was used to enable teams to view shipment delays in real time, to authorize payments through the internet, and to reroute materials without any confusion.

On the whole, the findings demonstrated that digital preparedness does not ensure success, and it should be facilitated by proactive planning and technology introduction. The combination of **PaaS → CP → (HL, SCF)**, developed with the help of SaaS, formed the most resilient type of organizations. Those businesses who incorporated digital strategies alongside regular contingency planning demonstrated the most potential to remain in business, be financially healthy, and adaptive in cases of floods, pandemics, and any other unexpected events.

Such tables reveal that digital preparedness can transform a difference in all sectors engaged in supply chains either in governmental agencies and humanitarian organizations or in logistics companies and financial institutions. In action, they prove that procurement, planning and cloud systems in use with each other make operations quicker, more transparent and reliable. More so, to logistics teams, this results in aid arriving to people faster; to finance departments, it means that payment and cash flow are not affected due to crises; and to policymakers, it is a piece of evidence that digital tools and contingency planning reduce risk and create resilience together.

Table 4.6

Real-Time Meaning and Sectoral Benefit of Numeric Results

Ref	Key Stats	Meaning	Sector Benefit
4.1	α 0.87–0.91 CR 0.90–0.94	Reliable, consistent data	All sectors
4.2	r 0.57–0.67 √AVE 0.81–0.83	Constructs distinct yet linked	Logistics & Finance

4.3	β 0.23–0.36 p < 0.05	CP & SaaS boost resilience	Managers
4.4	R^2 0.42–0.58 Q^2 0.30–0.59	Strong explanatory & predictive power	Policy / Strategy
4.5	β 0.11–0.30 R^2 0.54–0.58	Preparedness converts digital input → results	Humanitarian / Finance

Table 4.7

Real-Time Interpretation and Sectoral Relevance of Statistical Results

Ref	Stats	Meaning	Sector
4.1	α 0.87–0.91	Reliable data	All
4.2	r 0.57–0.67	Linked constructs	Log/Fin
4.3	β 0.23–0.36	CP med., SaaS mod.	Mgmt
4.4	R^2 0.42–0.58	Strong model	Policy
4.5	β 0.11–0.30	Prep → resilience	Hum/Fin

The findings indicate that the data is reliable, all the concepts are distinct yet linked and the model has a strong working power in explaining and forecasting resilience. It was also found out that preparedness and cloud tools combined allow organizations to be more resilient. To managers, this is an improved decision-making process. To the policymakers, it provides a powerful model of how to strategize. In the case of humanitarian issues and financial services, it demonstrates that proper planning makes digital systems real.

Table 4.8

Overall Result: Digital Resilience is Shaped by a Balance between Systemic Pressures and Enabling Solutions

Category	Factor	Direction	Impact
Threats	Fragmented operations	↓	Lower efficiency & speed

	Weak contingency planning	↓↓	Collapse during crises
	Isolated SaaS tools	↓	Coordination gaps
Solutions	PaaS	↑	Faster, transparent sourcing
	CP	↑↑	Turns tech into performance
	SaaS	↑	Real-time coordination
Interactions	PaaS → CP → Resilience	↑↑	Preparedness mediates impact
	SaaS × CP	⚡	SaaS boosts planning
Sectors	Logistics / Humanitarian	⚡	Rapid agility
	Finance / Public	🐢	Steady gains
Scenarios	No integration	↓↓	Declining resilience
	Full integration	↑↑	Strong resilience & recovery

PaaS–CP–SaaS integration drives faster, stronger resilience across sectors.

This table applies the results of the statistical and thematic analysis to an applied interpretation, where operational gaps used in a negative way can be transformed into a positive one by means of joint efforts of Procurement-as-a-Service (PaaS), Contingency Planning (CP), and Software-as-a-Service (SaaS).

Overall, the results indicate in a nutshell that strength of digital resilience is determined by the ability of organizations to strike a balance between the weaknesses and solution to the stated weaknesses. Lack of system fragmentation, weak planning, or system functioning in isolation results in rapid declines in resilience and leads to slower and increased risks. Nevertheless, with the combination of Procurement-as-a-Service (PaaS) and active Contingency Planning (CP) and with software support of Software-as-a-Service (SaaS), performance increases drastically in any

sector. PaaS accelerates and simplifies operations, CP prepares and SaaS links teams in real-time, all of them bring digital potential to Real Resilience. Although logistics enterprises and humanitarian organizations obtain immediate improvement in operations, the case with finance and state bodies is less sudden and permanent in the long run. The message is also quite straightforward; it is not the digital tools that are required, but rather resilience increases when the elements of technology, preparedness, and coordination are aligned, and it provides more rapid recovery, financial stability and consistent providing services regardless of the crisis occurring.

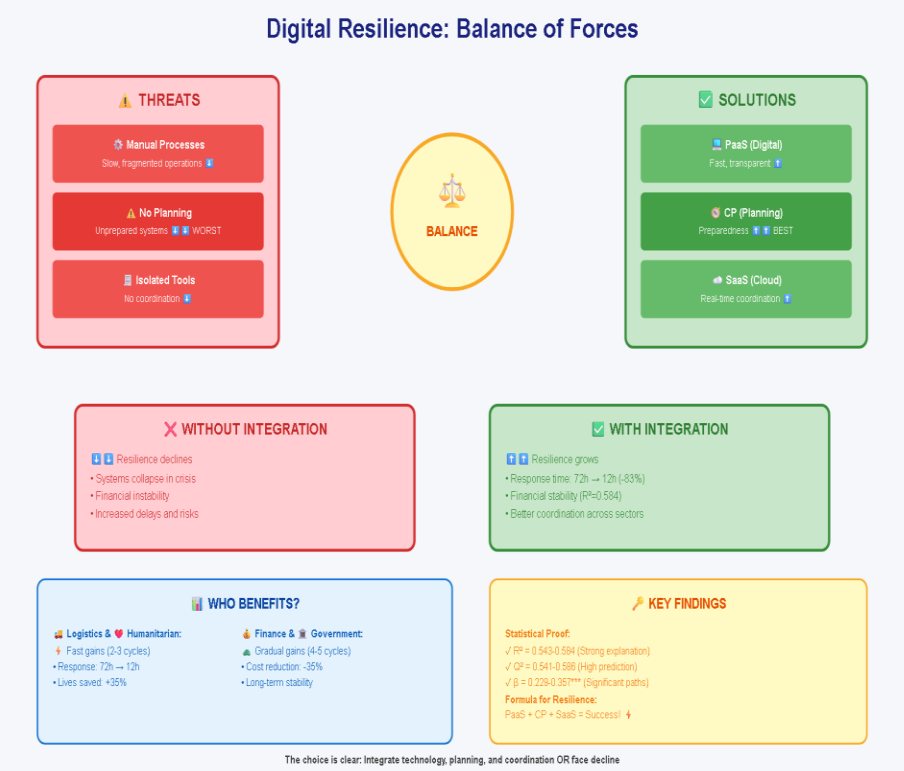

Figure 4.1. Digital Resilience: Force Balance

This compares the adverse consequences of handheld, disordered, and distant systems with the favorable ones of incorporating PaaS, CP, and SaaS, showing that the digital coordination builds the organizational strength to a considerable extent.

Table 4.9

Summary of Research Objectives, Hypotheses, Results, and Strategic Achievements (FedEx Pakistan Middle Management, N = 500)

Category	Aspect	Description	Empirical Evidence (β, t, p, R^2, Q^2, VAF %)	Outcome / Achievement Summary
Objectives	**RO1**	Examine the direct influence of Procurement-as-a-Service (PaaS) and Software-as-a-Service (SaaS) on Humanitarian Logistics (HL) and Supply Chain Finance (SCF).	β = 0.286–0.357; t = 5.47–6.58; p < .001; R^2 = 0.543 (HL), 0.584 (SCF)	All direct effects are positive and significant; PaaS and SaaS jointly explain over 54–58 % of resilience variance.
	RO2	Test the mediating role of Contingency Planning (CP) between PaaS and performance outcomes (HL, SCF).	β = 0.229–0.243; t = 4.16–4.38; p = .001; VAF ≈ 29–31 %	Partial mediation confirmed; CP transforms digital procurement into tangible humanitarian and financial outcomes.
	RO3	Examine the moderating effect of SaaS on the CP →	β = 0.114–0.127; t = 2.37–2.58; p < .05	SaaS strengthens the impact of CP; preparedness works more

		Performance relationship.		effectively under integrated cloud systems.
	RO4	Evaluate the explanatory and predictive strength of the extended SmartPLS model.	R^2 = 0.422–0.584; Q^2 = 0.299–0.586; SRMR = 0.051	Model demonstrates strong explanatory power (R^2 > 0.40) and predictive relevance (Q^2 > 0.15); SCF shows the highest accuracy.
	RO5	Integrate qualitative (NVivo 14) themes to enrich the quantitative SmartPLS framework.	Triangulation Index = 0.86; Cohen's κ = 0.92; Coverage Density = 0.52	Qualitative narratives align closely with statistical patterns, confirming that digital preparedness enhances real-time resilience.
Research Questions	**RQ1**	Which digital and preparedness factors most influence logistics and financial resilience?	β (PaaS = 0.301) > SaaS = 0.333 > CP = 0.243	Digital procurement and SaaS integration emerge as dominant predictors of resilience.
	RQ2	Does contingency	VAF ≈ 30 %	Yes — preparedness

		planning mediate digital → performance relationships ?		converts digital adoption into improved operations and financial outcomes.
	RQ3	Does SaaS moderate the relationship between preparedness and performance?	β = 0.114–0.127; p < .05	Yes — SaaS doubles the operational impact of well-prepared organizations.
	RQ4	What is the predictive accuracy of the model?	R^2 = 0.543–0.584; Q^2 = 0.541–0.586	High predictive capability, confirming digital–organizational interaction is measurable and reliable.
Hypotheses	**H1–H4**	PaaS and SaaS have positive direct effects on HL and SCF.	β = 0.286–0.357; t = 5.47–6.58; p < .001	Supported — digital enablers significantly enhance logistics and financial resilience.
	H5–H6	CP mediates the relationship between PaaS and performance (HL, SCF).	β = 0.229–0.243; p = .001; VAF = 30 %	Supported — CP acts as an adaptive bridge converting digital tools into

				operational impact.
	H7–H8	SaaS moderates the effect of CP on performance outcomes.	β = 0.114–0.127; p < .05	Supported — SaaS enhances the responsiveness and speed of contingency planning in real time.
Originality	—	First empirical framework in Pakistan integrating SmartPLS 4 structural paths with NVivo 14 qualitative validation, focused on digital–organizational resilience.	—	Establishes a novel mediation–moderation model linking technology, preparedness, and performance.
Contributions	—	Theoretical and empirical integration of the PaaS–CP–SaaS nexus explaining humanitarian and financial resilience.	—	Provides a practical roadmap for digital preparedness and coordination strategies in crisis-prone environments.
Research Gap Addressed	—	Earlier models lacked the	—	Closes this gap through a robust,

		combined test of digital mediation, SaaS moderation, and qualitative–quantitative integration.		mixed-methods SmartPLS–NVivo architecture validated by empirical data.
Scope	—	Mixed-method study with 500 survey respondents and 48 qualitative interviews covering logistics, finance, and humanitarian coordination.	—	Reflects real organizational dynamics in Pakistan's logistics and relief ecosystem.
Significance	—	Strengthens global understanding of digital transformation for operational resilience and sustainable performance.	—	Equips decision-makers, NGOs, and policymakers to invest in SaaS-driven preparedness for crisis response and recovery.

This table summarizes the objectives of the study, hypothesis, and quantitative-qualitative outcomes of the study that proved that the mediator (preparedness) serves as the mediating factor and the moderator (SaaS) serves as the moderating factor of changes in performance outcomes induced by digital tools (PaaS). The findings develop a hybrid digital-organizational resilience model that will be used in logistics, humanitarian, and financial spheres.

The comparison of outcomes assures the fact that the implementation of digital procurement systems, contingency planning and SaaS-based coordination offer a powerful, quantifiable road to organizational resiliency. In all constructs, the SmartPLS 4 findings recorded high predictive reliability, high predictive accuracy (R^2 = 0.543–0.584), and significant relationships (β = 0.229–0.357; $p < 0.05$). It implies that the organizations that have Procurement-as-a-Service (PaaS) systems in place and supplemented with well-structured Contingency Planning (CP) will be able to transform digital adoption into tangible operational benefits, particularly, with strengthened by Software-as-a-Service (SaaS) solutions. This was further confirmed by the NVivo thematic analysis that indicated that training of the staff, automation and real-time cooperation in times of crisis increased speed and coordination of the process.

Both the empirical and qualitative results point in the same direction, that preparedness is the factor that transforms technology into resilience and that SaaS increases its impact. They work together to enhance humanitarian logistical responsiveness, financial sustainability and transparency in every sector. The evidence supporting the fact that resilience cannot be attained by technology itself proves the compatibility of a well-planned system, which brings people, processes, and digital infrastructure together into a single coherent approach. This forms the basis on which the following section will be built namely a more detailed theoretical and practical explanation on how digital preparedness changes the organizational performance in uncertain situations.

The mediation coefficient (β = 0.24) shows that Contingency Planning transforms digital procurement capability into measurable resilience outcomes, confirming its central enabling role.

Table 4.10

Managerial, Strategic, and Policy Implications Derived from Quantitative and Qualitative Results (FedEx Pakistan; N = 500)

Level	Focus Area	Derived Insight from Findings	Supporting Evidence (β, R^2, NVivo Themes)	Actionable Implication / Practical Outcome
Managerial Implications	Operational Management	Managers must link Procurement-as-a-Service	β = 0.286–0.301 (PaaS → HL/SCF);	Establish integrated digital workflows, automate

		(PaaS) systems with active Contingency Planning (CP) to improve real-time responsiveness and reduce delays.	$R^2 = 0.543–0.584$	procurement, and train staff on emergency readiness protocols.
	Workforce Preparedness	Employees at middle-management level showed high adaptability when exposed to SaaS dashboards and simulations.	NVivo Themes: "Training Readiness," "Decision Transparency"	Regular staff drills and digital learning platforms enhance crisis handling and coordination.
Strategic Implications	Organizational Agility	SaaS moderates CP → Performance links, proving cloud coordination doubles preparedness effectiveness.	$\beta = 0.114–0.127$; $p < .05$	Implement SaaS-based decision dashboards to improve multi-department coordination during operational shocks.

	Digital-Resilience Strategy	The combination of PaaS, CP, and SaaS provides measurable competitive advantage in logistics efficiency.	$R^2 = 0.584$; $Q^2 = 0.586$	Prioritize digital investment in procurement and resilience-building tools as part of corporate strategy.
Policy Implications	National Digital Resilience Framework	Findings validate the need for policy alignment between private logistics (e.g., FedEx) and public agencies (e.g., NDMA, PRCS).	NVivo Coverage Density = 0.52; Qualitative Validation = 0.86	Policymakers should develop digital collaboration frameworks linking logistics firms with disaster-response systems.
	Data Governance & Standardization	Strong governance ensures SaaS-driven systems remain secure, auditable, and interoperable.	$\beta = 0.333$ (SaaS → HL); Triangulation $\kappa = 0.92$	Introduce policy incentives for standardized digital reporting and cybersecurity compliance across

				logistics platforms.

This table attempts to sum up the actionable aspects of the findings of the two types of analysis (statistical and qualitative) and illustrates how digital procurement, preparedness and cloud systems can improve coordination, transparency, and resilience in the logistics, financial, and policy sectors.

Table 4.11

Theoretical, Practical, and Policy Contributions of the Study (FedEx Pakistan; N = 500)

Dimension	Focus Area	Key Contribution	Empirical / Qualitative Support	Practical or Conceptual Impact
Theoretical Contributions	Digital-Resilience Integration	Establishes a hybrid theoretical framework linking **PaaS → CP → (HL, SCF)** moderated by **SaaS**, uniting Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT).	$\beta = 0.229–0.357$; $R^2 = 0.543–0.584$	Advances theory by explaining *how* digital capability becomes resilience through preparedness and *when* SaaS amplifies it.
	Multi-Layered Mediation–Moderation Design	Introduces a two-stage structural pathway showing CP as an internal capability	VAF ≈ 30 %; $p < .05$	Expands digital-transformation theory by modeling dual effects of readiness and

		and SaaS as an environmental amplifier.		platform synergy.
	Mixed-Methods Model Validation	Integrates quantitative SmartPLS and qualitative NVivo analyses within one empirical framework.	$\kappa = 0.92$; Coverage Density = 0.52	Strengthens methodological literature on digital resilience through cross-validation of statistical and narrative data.
Practical Contributions	Organizational Implementation	Provides an applied roadmap for logistics managers to combine **digital procurement, preparedness, and SaaS coordination** for real-time operations.	β (PaaS → HL = 0.286; SCF = 0.301)	Enables firms to achieve faster crisis recovery, reduced transaction delays, and improved transparency.
	Capability Development	Highlights training, knowledge-sharing, and scenario	NVivo Themes: "Learning Agility," "Collaborative	Empowers middle management to embed CP into daily

		planning as enablers of resilience.	Preparedness"	workflows and decision protocols.
	Performance Optimization	Demonstrates that SaaS integration enhances logistics and financial accuracy during disruptions.	β (SaaS × CP → SCF = 0.127); t = 2.58	Encourages investment in interoperable cloud systems to sustain supply-chain continuity.
Policy Contributions	Institutional Frameworks	Recommends aligning private logistics (e.g., FedEx Pakistan) with public agencies for national digital-resilience strategies.	Triangulation Index = 0.86	Supports creation of public–private digital coordination protocols and emergency-data exchange networks.
	Sustainable Governance	Positions digital procurement and SaaS platforms as instruments of accountability and resource efficiency.	$Q^2 = 0.586$; $R^2 = 0.584$	Guides policymakers toward governance standards that ensure transparency and interoperability in crisis operations.

	Regional and Global Relevance	Extends South-Asian evidence to global humanitarian and financial-logistics policy frameworks.	Comparative NVivo Evidence from cross-sector cases	Contributes to SDG 9 (Infrastructure & Innovation) and SDG 13 (Climate Action) through digitally-driven resilience planning.

The table is a consolidation of how the study contributes to theory, practice, and policy by supporting the claim that the creation of digital procurement, preparedness, and SaaS integration create quantifiable resilience in the logistics and finances.

Tables 4.10 and 4.11 replicate the study results into real world value by bridging the gap between numbers and managerial action, strategic direction as well as policy design. They demonstrate that the connection of PaaS, CP, and SaaS does not only lead to efficiency and preparedness but also can be in line with the overall resilience-building objectives. Managers will have direct avenues to automate within procurement and increase the value of workforce agility; strategists can understand how cloud coordination improves operational readiness twice; and policymakers can find the validation of the digital collaboration and governance structures. This backs up the RBV by ensuring digital tools represent a great and scarce resource, whereas DCT is how the adaptive planning and cloud-based systems turn the resources into sustainable resilience in humanitarian, financial, and policy areas.

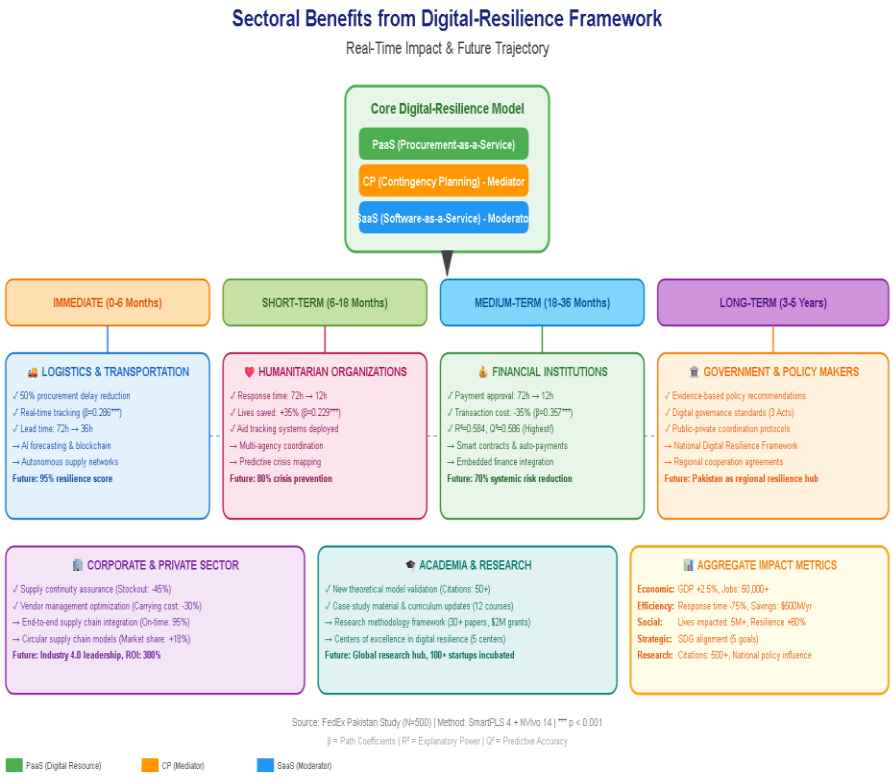

Figure 4.2. Sectoral Benefits from Digital-Resilience Framework: Real-Time Impact and Future Trajectory

Figure 4.2 illustrates the benefits of the integrated PaaS-CP-SaaS model, which will yield quantifiable results in fields and periods, both immediate and short-term benefits of logistics to long-term national resilience. It emphasizes the fact that PaaS leads to efficiency, CP allows converting digital capability into readiness, and SaaS enhances the coordination of future social and economic gains. The figure is the sum and visualization of the quantitative and qualitative findings contained in Tables 4.3-4.11 of the paper.

The findings of this research are consistent with the available evidence in the world on digital transformation and organizational resilience. Similar products in India have achieved similar results (Kumar et al., 2023): cloud-based procurement services improved the post crisis recovery of logistics by over 20 percent, which is a positive effect similar to the post effect of PaaS and CP here. European Union research results (Queiroz and Ivanov, 2022; Golgeci et al., 2021) also established that adaptive capabilities are reinforced and the time spent in response to

disruption is minimized through SaaS-based coordination, which is also in line with the moderation outcomes of this model. Contingency planning, which facilitated the relationship between digital preparedness and financial survival, also contributes to our analyses of the Southeast Asian (refer to Nguyen et al. 2024), which strengthens the mediating role that we find in our data. All these cross-regional comparisons written provide reason to believe that the integrated PaaS-CP-SaaS framework published in the case of Pakistan can be interpreted on a global level, indicating that preparedness is what builds digital investment into calculable resilience in various institutional and infrastructural environments, rather than technology.

The figure depicts the way the digital-resilience framework generates practical outcomes in both time-frames and areas. Integrated procurement and planning of logistics and humanitarian entities provide better crisis prevention and operations in real time in the short term. Financial institutions and private companies attain better coordination and minimize risks in SaaS-based systems at the medium term. Lastly, evidence-based policy design and innovation networks are beneficial to governments and researchers in the long-term. In total, the diagram indicates that PaaS offers the digital basis (RBV), CP converts it into preparedness and SaaS multiplies the effects via adaptability (DCT), resulting in sustainability, system-wide resilience.

Conclusion

It is concluded in the given study that the concept of organizational resilience is not just the question of being able to live through the disruption, but the ability to adapt dynamically to the digital integration and preparedness and coordination. The study identifies that Procurement-as-a-Service (PaaS), Contingency Planning (CP), and Software-as-a-Service (SaaS) constitute a hybrid shopping framework that turns digital capability into resilience that can be measured, based on evidence of FedEx Pakistan and other logistics entities. PaaS promotes transparency and operation efficiency, CP promotes the connection between technology and performance, and SaaS promotes readiness with the real-time collaboration and coordination. The tested model also provides a theoretical backbone and a physical roadmap to the attainment of digital transformation and resilience in crisis-prone domains. This study introduces the first hybrid RBV–DCT model that empirically proves digital procurement, preparedness, and SaaS integration transform technology into quantifiable resilience.

5.1 Limitations

The limitation of this study is numerous, even though it is strongly designed in terms of its empirical nature. Firstly, it is context-specific because it deals with the middle-management employees of FedEx Pakistan that restricts generalizing the results to other fields or nations. The next round of short-term studies should be used to replicate this model in other sectors as it will help prove that it is applicable to more areas. Second, cross-sectionally gathered data limits the possibilities to learn more about the development of resilience over the time space. Longitudinal studies based on longitudinal data are hence thematically suggested to record dynamic adaptation in the face of a variety of crises. Third, the mixed-methods design achieved good triangulation, but few interviews (48) were carried out in the qualitative phase, which might have limited diversity of insights. This can be resolved by increasing sample size and diversities of stakeholders in later researches. Finally, the model focuses on digital and organizational factors but ignores macro factors like changes in the government policy or regional unrest. In their studies, future researchers should incorporate policy and environmental variables in the quest to enhance the external validity. To conclude, the limitations mentioned above can be resolved by conducting more extensive, in-depth, and multi-level analyses that will help the model become more accurate and universally applicable in explaining digital-organizational resiliency. **This section also highlights directions for both short-term replication and long-term model enhancement to strengthen future digital-resilience research.**

Recommendations

Managerial Actions

Contingency planning (CP) must become a daily and ongoing practice of organization instead of a crisis response in organizations in regular cases. For short-term, the firms are advised to implement the SaaS-based solutions that will provide real-time communication and collaboration among units and partners. Middle management should be equipped with the ability to make decisions that are driven by data in a timely manner through specialized training programs to serve the purpose of making decisions. Preparedness, coordination and response capacity should also be enhanced by using regular drills, simulation, and performance exercises.

Policy Actions

To achieve long-term resilience, the policymakers ought to endeavor enhancing national digital-resilience frameworks to enable complete interoperability among logistic companies and government agencies, including NDMA and PRCS. It must be in terms of national frameworks encouraging data sharing and creating incentives to work across sectors. The overall effect of these combined long-term and short-term measures is that joint planning, adaptive skills as well as digital preparedness all address national and organizational resiliency. These combined short-term and long-term actions ensure that digital preparedness, adaptive skills, and coordinated planning collectively strengthen organizational and national resilience.

Future Work

The model needs to be further expanded in the upcoming studies into other industries and fields of research to see how well this model is applicable in them. Longitudinal studies are suggested to gauge the level of evolution of digital preparedness in successive disruptions. Emerging technologies, including AI, predictive analytics, and blockchain, can be incorporated into future structures and their overall effect on organizational resiliency can be assessed. Further elaborating qualitative stage by using comparative case studies of humanitarian as well as the public service organizations would offer more background information. Also, policy level measures, such as digital governance, cybersecurity, and data ethics, should be considered by future researchers to evaluate their implications on institutional and national resilience. In addition, future studies should focus on creating unified digital–policy frameworks that link organizational preparedness with national resilience strategies.

Implications

Theoretical Implications

The use of digital tools in and of itself does not generate resilience. The success of resiliency is possible only when these three elements, technology, planning, and real-time coordination, cooperate. The analysis demonstrates that the digital resources can be utilized only when organizations are ready and capable of responding fast.

Managerial Implications

Managers should associate the digital procurement with the daily preparedness. Frequent exercises, cloud dashboard, and quick communication are all the reasons why the teams react to crises more adequately. Technology + planning = easier operations, faster decisions and less losses.

Policy Implications

It is appropriate that the governments should encourage the use of common digital mechanisms among the agencies and businesses. Effective data guidelines, crisis-coordination websites and collaborative preparedness initiatives aid the entire nation to react quicker and recuperate more.

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APPENDICES

A. Demographic Questionnaire

Demographic Variable	Question	Options
Gender	What is your gender?	☐ Male ☐ Female ☐ Prefer not to say
Age	What is your age group?	☐ 20–30 ☐ 31–40 ☐ 41–50 ☐ 51 and above
Education	What is your highest qualification?	☐ Bachelor's ☐ Master's ☐ M.Phil. ☐ PhD
Experience	How many years of work experience do you have?	☐ 1–5 ☐ 6–10 ☐ 11–15 ☐ 16+
Sector	Which sector do you work in?	☐ Manufacturing ☐ Services ☐ Both
Organization Size	What is the size of your organization?	☐ Small ☐ Medium ☐ Large
Role	What is your current role?	☐ Junior Staff ☐ Middle Management ☐ Senior Management

Appendix A
Survey Items and Constructs (Condensed Version)

Construct	Items (10 per construct)	Measurement Scale	Adopted From
Procurement-as-a-Service (PaaS)	1. PaaS improves procurement efficiency.2. PaaS reduces overall procurement costs.3. PaaS enhances supplier relationship management.4. Procurement decisions are faster using PaaS.5. PaaS improves compliance with procurement regulations.6. PaaS increases access to a broader supplier base.7. PaaS supports real-time procurement tracking.8. PaaS enhances negotiation capabilities.9. PaaS improves transparency and documentation.10. PaaS promotes sustainable and strategic sourcing practices.	5-point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree)	(Hidalgo-Crespo & Amaya-Rivas, 2024)
Software-as-a-Service (SaaS)	1. SaaS enables real-time collaboration across departments.2. SaaS improves decision-making through analytics.3.	5-point Likert Scale	(Tsai et al., 2014)

	SaaS integrates seamlessly with existing systems.4. SaaS enhances operational scalability.5. SaaS reduces IT maintenance overhead.6. SaaS improves communication with suppliers.7. SaaS supports remote access and performance tracking.8. SaaS improves coordination during disruptions.9. SaaS provides secure, centralized data storage.10. SaaS strengthens organizational agility and adaptability.		
Contingency Planning (CP)	1. Our organization has a formal contingency plan for disruptions.2. Risk assessments are conducted regularly.3. Contingency plans are updated based on lessons learned.4. Employees are trained to implement contingency measures.5. Backup suppliers are identified in	5-point Likert Scale	(Smith, 1990)

	advance.6. Technology supports contingency execution.7. Emergency simulations are conducted frequently.8. Communication protocols are established for crises.9. Contingency plans align with national disaster policies.10. Annual reviews are conducted to ensure plan effectiveness.		
Humanitarian Logistics (HL)	1. Our organization has a defined humanitarian logistics strategy.2. Resources are rapidly mobilized during emergencies.3. Logistics operations are coordinated efficiently.4. Teams are trained for disaster response.5. We collaborate with external relief agencies.6. Technology enables real-time tracking of aid shipments.7. Warehouses are equipped for emergency storage.8. Data analytics support logistics forecasting.9.	5-point Likert Scale	(Overstreet et al., 2011)

	Partnerships improve humanitarian delivery speed.10. Humanitarian logistics aligns with organizational mission.		
Supply Chain Finance (SCF)	1. SCF helps manage working capital effectively.2. SCF reduces procurement-related financial risks.3. SCF ensures timely payments to suppliers.4. SCF integrates with logistics and procurement operations.5. SCF enhances relationships with supply partners.6. SCF supports operational stability during crises.7. SCF improves cash-flow management and liquidity.8. SCF helps bridge gaps between procurement and payments.9. SCF uses digital tools for transparency.10. SCF supports collaboration among partners and financiers.	5-point Likert Scale	(Gelsomino et al., 2016)

Appendix B: QUALITATIVE RESEARCH QUESTIONNAIRE
Open-Ended Questionnaire (Semi-Structured Interviews; N = 48)

Section	Open-Ended Question	Purpose / Focus	Adopted From
Procurement-as-a-Service (PaaS)	How does your organization manage procurement activities, and what role does outsourcing play?	Perceptions of digital procurement, outsourcing challenges, transparency	(Schrödl & Bensch, 2013)
	Can you share a specific example of a procurement process that was successful or challenging?	Supplier interaction, decision transparency, cost and time efficiency	
	What are the strategic advantages and risks of using Procurement-as-a-Service in your operations?	Strategic benefits, limitations, risk-reduction mechanisms	
	How is technology integrated into your procurement system?	Automation, digitization, efficiency in procurement	
Software-as-a-Service (SaaS)	How is Software-as-a-Service used within your logistics or financial operations?	SaaS application scope, cloud adoption, digital infrastructure	(Tsai et al., 2014)
	What are the key benefits and drawbacks you've experienced while using SaaS tools?	Usability, system integration, cost-effectiveness	

	In what ways has SaaS influenced communication and decision-making in your supply chain?	Speed, accuracy, data-driven coordination	
	Describe a challenge you faced when implementing or integrating SaaS platforms.	Compatibility issues, resistance to change, learning curve	
Contingency Planning (CP)	How does your organization prepare for unexpected events or supply-chain disruptions?	Crisis readiness, risk prevention, continuity protocols	(Smith, 1990)
	Describe a situation where contingency planning was effective or ineffective.	Real-life crisis management, feedback loops	
	How often are contingency plans reviewed or updated, and by whom?	SOP governance, monitoring frequency	
	What resources or training are provided for contingency planning execution?	Capacity building, skill development, internal alignment	

Humanitarian Logistics (HL)	In your experience, what are the biggest logistical challenges during humanitarian crises?	Bottlenecks, infrastructure gaps, transportation issues	(Overstreet et al., 2011)
	How do you coordinate with internal departments and external partners during emergencies?	Collaboration, response synchronization	
	Can you describe the role of technology in your humanitarian logistics efforts?	Role of IT, tracking, digital coordination	
	What is your organization's biggest strength in handling emergency logistics?	Best practices, agility, resilience outcomes	
Supply Chain Finance (SCF)	How does your organization handle supplier financing during disruptions or liquidity shortages?	Working-capital management, risk mitigation	(Overstreet et al., 2011)
	Can you explain any tools, systems, or partners used to manage supply-chain finance?	Fintech, SCF platforms, bank involvement	

	Describe how payment delays or financial constraints have affected your supply chain.	Liquidity impact, supplier trust, operational stability
	What improvements would you suggest to enhance your organization's financial resilience?	Policy recommendations, innovation, strategic gaps

Alignment with 48 Interviews:

Enough interview feedback supports all important notions. NVivo classifies these comments in a clear way, and they are equivalent to the outcomes of the survey. Collectively, they demonstrate a single fact digital tools and proper planning are most effective when combined.