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DIGITAL INNOVATIONS AND ORGANIZATIONAL RESILIENCE: THE CASE OF SMEs IN GHANA

BY

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BY

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THIS THESIS IS

SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY IN MANAGEMENT INFORMATION SYSTEMS

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DECLARATION

I hereby declare that this work is the results of my own effort carried out under supervision and has not been submitted by anyone else for any academic award in this or any University. All sources and references used have been fully acknowledged.

I bear sole responsibility for any shortcomings.

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ABSTRACT

This study examined the relationship between digital innovation practices and organizational resilience among Small and Medium-sized Enterprises (SMEs) in Ghana. It also explored the role of organizational leadership as a moderating variable on the relationship between digital innovation practices and organizational resilience. Understanding the most adopted digital innovation practices (data analytics, social media, automation and e-commerce) by SMEs in Ghana can help these firms channel their limited resources toward building resilient organizations. Nevertheless, few studies have been undertaken on the most adopted digital innovation practices among Ghanaian SMEs and their direct impact on organizational resilience. As a result, the study employed Dynamic Capabilities Theory to fill this gap.

Using a quantitative research approach and survey data from SMEs, 400 questionnaires were distributed to 200 SMEs in Greater Accra. The analysis was conducted on 309 valid responses retrieved from the SMEs using Structural Equation Modelling (SEM) and the Statistical Package for the Social Sciences (SPSS). The findings indicated that data analytics had a significant influence on capital resilience but no significant influence on learning or relationship resilience. E-commerce had a significant influence on relationship resilience but no significant effect on capital or learning resilience. Automation showed no significant influence on any of the resilience dimensions. Additionally, organizational leadership served as a moderator only between e-commerce and learning resilience but did not moderate the relationship between the other digital innovation practices and the organizational resilience variables. However, social media emerged as the most commonly adopted digital innovation practice among Ghanaian SMEs.

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This study adds to existing literature by questioning the assumed positive impact of digital innovations on organizational resilience. The findings also extend Dynamic Capabilities Theory by highlighting the limitations of digital innovations in enhancing resilience among SMEs in emerging economies. The study provides important insights for policymakers and scholars seeking to promote organizational resilience and sustainable growth in emerging economies, showing that digital innovations do not necessarily influence the organizational resilience of SMEs. Hence, policymakers and scholars can better understand where to channel resources with respect to organizational resilience.

Keywords: Digital Innovations (DI), Digital Innovation Practices, Organizational Resilience (OR), Dynamic Capabilities Theory (DCT), Small and Medium-sized Enterprises (SMEs).

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DEDICATION

I dedicate this thesis to my dear wife Mrs. Annointing Dede Tetteh.

Also, to my parents, Mr. and Mrs. Tetteh and my siblings, who have been my source of motivation and support throughout my educational ladder.

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LIST OF ACRONYMS AND ABBREVIATIONS

SME	-	Small and Medium Enterprise
DI	-	Digital Innovations
SM	-	Social Media
DT	-	Data Analytics
AU	-	Automation
E-Com	-	Electronic Commerce
OR	-	Organizational Resilience
CR	-	Capital Resilience
RR	-	Relationship Resilience
LR	-	Learning Resilience
DCT	-	Dynamic Capabilities Theory
GSS	-	Ghana Statistical Service
GDP	-	Gross Domestic Product
ICT	-	Information and Communication Technology
AI	-	Artificial Intelligence
SPSS	-	Statistical Package for Social Science
PLS-SEM	-	Partial Least Square-Structural Equation Model

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

The integration of digital innovations and technologies has become a driving force for social and economic development, creating both opportunities and challenges for organizations across various sectors (Akpan et al., 2022; Bitencourt et al., 2020). For Small and Medium Enterprises (SMEs), the strategic approach to these digital transformations holds the key to unlocking their potential benefits (Quinton et al., 2018a). Digital innovations (DI) refers to the development of or change in goods and services in the market as a result of using digital technologies (University of Wisconsin–Milwaukee, 2017a). Organizations must succeed in welcoming changes through digital technology to enhance business performance. This can include involvement and increasing experience, streamlining operations, and developing new business models, or that organization will be crushed by competing organizations that implement such strategies (Ong & Chen, 2013; Teece, 2010).

According to Yasa et al. (2019) digital innovations are able to increase the effect of digital capabilities on business performance. With respect to digital transformation, Nambisan et al. (2019), emphasize the importance of a comprehensive understanding that spans numerous cross-levels of analysis. They integrate ideas from several disciplines, recognizing the transformative influence of digital technologies on businesses and the societies as a whole. Gregory et al. (2018), added that failure to stay innovative might result in losing client or customer bases and market positions to new digital competitors.

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While the present study focuses on four specific digital innovation practices; data analytics, social media, automation, and e-commerce, these practices are not always used in isolation in real SME settings. In practice, they frequently overlap and reinforce one another. For example, automation is often embedded within e-commerce platforms, while social media data feeds directly into analytics tools (Bradač & Huđek, 2023; OECD, 2021). Although previous studies sometimes treat them separately to allow clearer empirical testing (Chan et al., 2023), the current research acknowledges these interdependencies as a boundary condition. This approach enables a more nuanced examination of their individual and combined contributions to resilience among Ghanaian SMEs, while still recognizing that SMEs in developing economies rarely implement them as standalone tools.

Due to the changes in market demands and the increasing competition existing among organizations, there is a need for organizations to stay relevant during these striving times. Organizational resilience (OR) is a term that was framed by (Meyer, 1982); it implies an organization's ability to preserve positive modification under harsh or competitive conditions (Sutcliffe, 2003). Organizational resilience allows organizations to adapt to the changes in the environments in which they operate (Akpan et al., 2022; Waribugo & Ojiabo, 2018).

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SMEs strive to stay resilient despite the internal or external challenges that they face in their operations. However, they usually face a lot of challenges due to their fewer resources and are faced with more concentrated risk than large organizations because of their lower diversification (Linnenluecke, 2017). According to Iborra et al. (2020) resilience includes terms such as response, adaptation, flexibility, and experimentation. Researchers emphasize the importance of experimentation by focusing on adaptability and flexibility through innovation and variety

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(Vlikangas & Hamel, 2003). SMEs need to take advantage of the digital innovations in this technological era due to their impact on the economies across the globe.

According to the Ghana Statistical Service (GSS), any business entity that employs between 1 and 5 is identified as a micro business, a firm that employs between 6 and 30 is a small firm, any firm that employs between 31and100 is identified as medium and a firm that employs 100 or more workers is known as large enterprise. SMEs constitute a crucial component in the economies of many countries, more importantly in areas of job creation and employment (Amoah, 2018)

Abdulkader et al. (2020) mention that, SMEs are beneficial to their areas of operation due to their ability to merge the relationships existing between various sectors and, as a result, improve the transaction of goods and services. Despite the immense contribution of SMEs to their economies, SMEs are usually confronted with a lack of authority and resources, limiting their environmental and social benefits (Shaya et al., 2023).

In this industrial age, SMEs need to embrace digital innovations in order to match up with the competition within the industry and give society their best. However, SMEs' low capacity to scan their operational environment to gain access to relevant information that can be converted into approaches that can impact their capacity to respond to changes in a difficult environment. This can on the same vine reduce their capability to analyze, integrate, create and restructure their internal organizational connections as a means of building differentiators and to survive (Núñez-Ríos et al., 2022).

According to Madi Odeh et al. (2023), transformational leadership is positively related with and significantly affects organizational resilience. When leadership is able to implement adaptive strategies, and ensure growth and continuity in the face of challenges, the organization is able to

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survive amidst various challenges. Leadership style as a contribution to organizational resilience are not found in resilience studies. Andersson et al. (2019), opined that, studies that focuses on leadership in organizational resilience as an organizational process is scanty.

Alexander (2013), opined that, OR is a complex idea and diffused in nature, this makes it difficult in understanding the numerous factors that enable resilience in an organization. This also describe reasons why resilience is seen as an "umbrella concept" (Darkow, 2019; Duchek, 2020). As a result, resilience has become an issue of concern to a lot of organizations and even the society as a whole.

In light of this, the study seeks to understand the impact of digital innovations on organizational resilience among SMEs in developing economies. Also, the study seeks to understand how organizational leadership moderates the relationship that exists between digital innovations and organizational resilience. The study will employ the Dynamic Capability Theory developed by Teece et al. (1997), to analyze how digital innovations can assist SMEs in sensing, seizing, and reconfiguring their processes to stay competitive.

1.2 Research Problem

SMEs play a very important role globally in the economy by making up about 90% of businesses and contributing over 40% to GDP in developing economies like Ghana(Abdulkader et al., 2020). SMEs often benefit the areas where they operate by making goods and services available and easy through the merger of various sectors. According to Selase et al. (2019), these SMEs make significant impacts in communities through employment, regional development and innovations, hence their resilience must be of concern to everyone. This study seeks to identify how digital innovations can help SMEs stay resilience in today's rapidly changing business environment.

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In spite of numerous studies exploring different initiatives to enhance resilience capabilities, there are still empirical and conceptual gaps existing in these studies (Floetgen et al., 2021). Iborra et al. (2020), emphasis that, the empirical gap is due to the types of companies being investigated. Large organizations have gained much attention, whilst small and medium-sized enterprises (SMEs) are often overlooked. Also, according to Saad et al. (2021), literature with respect to SMEs resilience is limited.

The selection of data analytics, social media, automation, and e-commerce as the four focal digital innovation practices is based on both their documented prevalence among Ghanaian SMEs and their prominence in the broader literature on digital transformation in developing economies. These practices represent the areas where resource-constrained SMEs typically invest their limited digital budgets (OECD, 2021; Quaye et al., 2024). Although the practices are interrelated in daily operations, they are analyzed separately in this study to allow for precise testing of their individual effects on different dimensions of organizational resilience. This analytical separation follows established precedents in SME research (Bradač Hojnik & Huđek, 2023; S. Chan et al., 2023) and enables clearer policy recommendations on where scarce resources should be directed. At the same time, the study recognizes their overlaps as a limitation and suggests integrated approaches for future work.

The global rise of and changes in technologies, spanning from mobile computing devices to artificial intelligence and social media platforms, is changing organizations' operating surroundings digitally (Brewis et al., 2023). Mbuyisa and Leonard, (2017) iterates that, digital technologies is usually considered as a solution for developing economies, allowing their SMEs to bypass the traditional phases of development. These technologies can enable the SMEs in developing economies to enhance their efficiency and competitiveness (Ahmad et al., 2015; AlBar

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& Hoque, 2019), making the SMEs resilient in today's business world. On the other hand, the limited usage of digital technologies by SMEs may affect customer base and market position (Gregory et al., 2018; Saad et al., 2021). Irrespective of the potential advantages of digital technologies, the realism is that SMEs are either unenthusiastic to engage in digital innovations or are unable to reap these advantages from these new technologies (Ramdani et al., 2022) which can have an adverse effect on their resilience.

For organizations to experience positive effects, it is important for leadership to successfully manage digital innovations (Zulu and Khosrowshahi, 2021). The performance of leaders can largely be dependent on the environment and the style of leadership. According to Erhan et al. (2022), for organizations to stay competitive or resilient, it is necessary for the leadership to have sufficient knowledge of development in the digital sphere (Promsri, 2019). They further stated that, for organizations to keep on producing, they need to adapt their current conditions to the new development in the digital world. This implies that, organizational leadership has a significant role to play in the intersection of digital innovations and the ability of SMEs to stay resilient.

The resilience of SMEs, implies their ability to stay in operation or bounce back after any challenge they face, hence the study of resilience of importance to these SMEs and also identifying the role digital leadership plays. Saad et al. (2021) proposed that further studies should concentrate on SME-focused resilience research with a survey-based approach to provide more thorough empirical data on the resilience of SMEs.

1.3 Research Purpose

This study aimed to comprehensively investigate the role of digital innovations in shaping Small and Medium Enterprises' (SMEs) ability in building resilient structures amidst these challenging

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times. The purpose is to delve into the perceptions and attitudes of SMEs toward digital innovations in building a resilient firm and also understand the moderating role of organizational leadership in this regard. By leveraging the Dynamic Capability Theory, the study seeks to understand how SMEs are able to capitalize on digital innovations to scan, seize, and reconfigure their structures towards building resilient organizations.

1.4 Research Objectives

This study aims at achieving the following research objectives:

1. To identify the key digital innovation practices adopted by SMEs in Ghana.
2. To determine the impact of digital innovations on the organizational resilience of SMEs in Ghana.
3. To evaluate the moderating outcome of organizational leadership on the relationship that exist between digital innovations and organizational resilience among SMEs in Ghana.

1.5 Research Questions

The study seeks to find answers to the following research questions:

1. What are the key digital innovation practices adopted by SMEs in Ghana?
2. What are the impacts of digital innovations on the organizational resilience of SMEs in Ghana?
3. How does organizational leadership moderate the relationship between digital innovations and organizational resilience among SMEs in Ghana?

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1.6 Significance of the Study

The study of digital innovations and organizational resilience among Small and Medium Enterprises (SMEs) in Ghana holds profound significance in both academic and practical realms. SMEs face a myriad of challenges ranging from limited resources and market competition to external economic shocks. These challenges underscore how critical it is for SMEs to adopt approaches that enhance their resilience and sustainability. The research seeks to provide valuable insights that can benefit various stakeholders. Academically, it aims at contributing to the theoretical knowledge of how digital innovations intersects with organizational resilience within the unique socio-economic context of Ghana. This contribution is crucial in enriching the broader discourse on digital innovations and resilience in SMEs, particularly in developing countries.

Practically, this study's findings can offer actionable understandings and recommendations for policymakers in Ghana. Policymakers will be able adopt these insights to formulate targeted policies and programs aimed at fostering an enabling environment for digital innovations among SMEs, thereby promoting economic growth, job creation, and sustainable development.

The study also aimed at contributing to the body of knowledge that informs development initiatives and approaches aimed at enhancing the resilience and competitiveness of SMEs in Ghana. By connecting the gap between theory and practice, the study seeks to facilitate meaningful change in how SMEs leverage digital technologies to navigate through challenging times and to take advantage of opportunities in the rapidly changing business landscape.

1.7 Organization of the Study

The thesis was separated into six chapters. The chapter one introduced the background of the study, elucidating the research problem, the research purpose, delineating the object of the research and

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the research questions, and the significance and organization of the study. Chapter two reviewed various literature by scholars. The chapter discussed digital innovations among SMEs, digital innovation practices, organizational resilience in the settings of developing economies, organizational leadership and digital innovations, organizational leadership and organizational resilience and the link between digital innovations and organizational resilience. The third chapter looked at the underlining theoretic framework of the study. The chapter focused on discussing the underpinning theory, develop the underlining hypothesis and develop a conceptual framework for the study.

Chapter four was dedicated to the delineation of research methods and the procedures employed in conducting the study. Chapter five focused on the analysis and thorough discussion of the study's findings. Finally, Chapter 6 synthesized the research by presenting or summarizing the key findings, conclusions, and offering recommendations based on the research findings.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter was dedicated to reviewing relevant literature that have been conducted in line with the subject matter of this study. The study reviewed various literature which includes; organizational resilience and the five pillars of resilience, digital innovations, digital innovation practices, hypothesis of the study, and concepts of organizational leadership, moderating effect of organizational leadership and organizational resilience with respect to other studies undertaken by various scholars.

2.1 The Ghanaian SMEs and Technology

The incorporation of technology into Ghanaian SMEs is critical for increasing competitiveness and operational efficiency. However, the use of modern technology by Ghanaian SMEs remains restricted due to a number of difficulties.

The high expense of purchasing and maintaining new technologies is the most significant impediment to their adoption. According to Asiamah et al. (2021), due to financial resource limitations, SMES struggle to cover expenditures for hardware, software, training, and technical support. Ghana's SMEs sometimes use obsolete or foreign technology, which can be costly and difficult to maintain owing to limited local experience and support.

Despite these limitations, Ghanaian SMEs are increasingly aware of the value of technology in driving company success (Quaye et al.,2024). For example, the implementation and use of e-commerce have become very significant, particularly in metropolitan regions, where enterprises are beginning to use online platforms to access larger consumers. Also, SMEs have been able to

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stay connected with their stakeholders through the adoption and use of communication platforms. This transition is motivated by the necessity to remain competitive in a digital global market.

According to Osei et al. (2016), efforts are being made to stimulate research and development (R&D) within the SME sector in order to inspire innovation towards the adoption of new technology. Ghana's government has implemented programs to help SMEs acquire contemporary and clean technology, such as the Technology Development and Transfer Fund (TDTF).

However, issues such as insufficient infrastructure, low levels of digital literacy, and restricted access to dependable internet services continue to impede widespread technology adoption among SMEs (Omowole et al.,2024). To solve these difficulties, extensive support programs are needed, including financial incentives, training, and enhanced access to digital infrastructure (Asiamah et al., 2021).

2.2 Organizational Resilience (OR)

The ability of an organization to absorb, adapt, and finally take advantage of unruly surprises that may impair their survival is known as organizational resilience (Aldianto et al., 2021; Heredia et al., 2022). Understanding resilience encompasses the capability of an organization to forecast possible threats, absorb disruptions with minimal damage, adapt swiftly to changing environments, and ultimately emerge stronger and more prepared for future challenges (Moşteanu, 2024). Scholars like McManus et al. (2008), emphasize the crucial role of agility in this process, highlighting the ability to detect environmental shifts, manage vulnerabilities proactively, and develop nimble solutions as hallmarks of truly resilient organizations.

Digital technologies represent a double-edged sword for organizational resilience. On one hand, they offer immense potential to enhance risk management, improve communication and

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information flow, and facilitate rapid adaptation to unforeseen circumstances (Belhadi et al., 2024). Data-driven supply chain management systems, for instance, can significantly increase resilience against disruptions (Hosseini et al., 2019).

However, it is crucial to take into consideration the potential pitfalls that lurk within the rapid embrace of digital transformation. Some scholars like Yoo and Roh (2021) cautioned that, the merging of the "digital" and "physical" worlds can expose companies to unforeseen uncertainties and radical changes. Dysfunctional approaches to digitalization can even lead to negative consequences, jeopardizing existing capabilities and structures. Therefore, SMEs must adopt a thoughtful and strategic approach to digitalization, prioritizing alignment with existing practices and implementing robust risk mitigation strategies.

SMEs resilience implies their ability to bounce back to a stable operational condition after an interruption, in other words, being able to bounce back from unforeseen happening, including an economic crisis (Akgün & Keskin, 2014; Tognazzo et al., 2016). Resilient SMEs are better equipped to navigate disruptions caused by climate change, economic fluctuations, and technological advancements. This allows them to innovate and build sustainable business models, which in turn contributes to creating decent jobs, promoting technological advancements, and building resilient infrastructure. This implies that, for SMEs to stand against the environment's continued pressures, they must constantly strive to attain resilience (Sanchez-García et al., 2020). Nonetheless, research that looks at organizational (OR) in SMEs is still obviously desired (Ali et al., 2020; Zhang et al., 2021).

Chen et al. (2021) recommends a valuable framework for understanding and strengthening organizational resilience, categorizing resilience into five key pillars, which include capital resilience, structural resilience, culture resilience, learning resilience and relationship resilience.

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2.2.1 Capital Resilience

According to Chen et al. (2021), Capital resilience denotes the ability of an organization to continue operations and recapitalize during and after a disaster. Capital resilience is essential in continuing the operations of an organization, investing in innovation, and capitalizing on growth possibilities, even under difficult situations. Effective financial management, which includes diversifying revenue streams Capital structure, Cash reserve, Debt service and managing liquidity, is critical to developing capital resilience (Bellemare, 2024; Chen et al., 2021).

2.2.2 Strategic Resilience

Chen et al. (2021), defines Strategic resilience as a company's capacity to retain consistency across time, recognize and eliminate negative forces, and select a suitable growth strategy. The physical and technical infrastructure of an organization must be strong and flexible in order to be structurally resilient. According to Moşteanu (2024), a robust structure can absorb shocks and recover fast from disturbances, ensuring that activities continue uninterrupted. This involves the capacity to reorganize resources, modify supply networks, and use technology to facilitate nimble reaction to change.

2.2.3 Culture Resilience

Cultural resilience refers to how company culture influences workers' entrepreneurial spirit and devotion to the firm (Chen et al., 2021). Lalani et al. (2021) opined that resilient culture generates a common sense of purpose, inspires creativity, and promotes mental health. Businesses with great cultural resilience may better navigate change because their workers are more engaged, adaptive, and driven to add on to the organization's success.

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2.2.4 Relationship Resilience

Chen et al. (2021), also defines Relational resilience as a company's reciprocal interactions with its stakeholders. Building trusting connections with stakeholders, like as customers, suppliers, and workers, is critical for overcoming crises. According to the research, resilient companies promote communication, collaboration, and the development of robust networks, all of which are necessary for mutual assistance during disturbances.

2.2.5 Learning Resilience

Chen et al. (2021), explains learning resilience as a company's capacity to handle the strains and obstacles of learning. An organization's ability to draw lessons from past events and apply those lessons to new procedures describes its learning resilience. Learning resilience is essential for ongoing progress and innovation (Orth & Schuldis, 2021). Businesses that focus on learning resilience are better positioned to foresee obstacles, adjust tactics, and sustain long-term success.

In essence, the five elements of resilience as identified by Chen et al. (2021) capital resilience, structural resilience, cultural resilience, learning resilience and relational resilience all contribute to an organization's total resilience, allowing it to survive in a complex and unpredictable environment.

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Table 2.1 Five pillars of organizational resilience

Pillars	Definition	Sub-category
Capital Resilience	Capital resilience equips companies to navigate financial pressures while anticipating and preparing for future disruptions.	Capital structure Cash reserve Debt service

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Strategic Resilience	Strategic resilience is when a company is able to consistently remain strategic over a period of time. This can help to identify and eradicate hostile influences and be clever to choose a suitable growth model.	Survival crisis Operational strategy Product features
Culture Resilience	Cultural resilience involves the molding of employees within the framework of corporate culture, enhancing a sense of enduring commitment to the business.	Employee commitment Spiritual shaping Community sense
Relationship Resilience	Relationship resilience is instrumental in fostering mutually advantageous connections among various stakeholders, including employers and employees, employees and organizations, and companies and customers. This collaborative approach is designed to fortify these relationships, empowering entities to withstand challenges and crises effectively.	Emotional connection Reciprocal relationship Customer service Relationship enhancement
Learning Resilience	Learning resilience entails the capabilities of an organization to manage the challenges encountered during the learning process and its proficiency in assimilating diverse lessons in response to a crisis.	Emotional regulation Behavioral characteristics Positive awareness Learning ability

Source: (Chen et al., 2021)

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The study adopts these pillars proposed by Chen et al. (2021) due to its scarcity in literature and focuses on capital resilience, relationship resilience and learning resilience as it underpinning organizational resilience pillars. The study adopts these three pillars because these pillars are more likely to be relevant to SMEs, and by so doing, the study can add to the body of knowledge on these resilient pillars.

2.3 Digital Innovations (DI)

The contemporary business landscape is undergoing a profound revolution with the advent of digital innovations and technologies. The integration of Information and Communication Technologies (ICT), E-Governance, and blockchain has presented both challenges and opportunities for linking citizens and smart cities, setting the stage for significant shifts in social and economic development (Castelo-Branco et al., 2019). This digital revolution is particularly crucial for Small and Medium-sized Enterprises (SMEs) in the emerging economies, which must strategically navigate the digital terrain to harness its potential benefits (Quinton et al., 2018b).

University of Wisconsin–Milwaukee (2017), explained digital innovations as the creation of or change in goods and services offered to the market that result from using digital technologies. Digital innovations, encompassing new products, processes, or business models enabled by IT, represents a cornerstone in this evolving business environment (Popkova & Sergi, 2020; Yoo & Roh, 2021). In the sphere of SMEs, conceptualization of a digital orientation becomes imperative for enhancing performance in the digital economy (Quinton et al., 2018b). However, whether digital transformations represent opportunities or challenges for SMEs depends on their strategic approach to this paradigm shift.

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The emergence of Industry 4.0 enablers, such as big data, the Internet of Things, digitalization, smart sensors, automation, new algorithms and cyber-physical systems has become a focal point for enterprises seeking to bolster their tactical and organizational competences (Bogoviz, 2020; Popkova & Sergi, 2020). This shift is underpinned by the self-tuning model, emphasizing organizational agility, adaptability, and ambidexterity (Del Giudice et al., 2021). Major tech companies like Alibaba, Google, and Amazon have embraced this model, leveraging algorithms to rapidly adjust and adapt to business changes.

In the context of digital innovations, the reconfiguration of products, services, and entire business models becomes paramount. Nambisan et al. (2019) stresses the importance of incorporating numerous cross-levels of analysis and embracing concepts from diverse disciplines to comprehend the effect of digital technologies on transmuting organizations and societies.

Again, recent technical breakthroughs in digitalization including; big data, data analytics, artificial intelligence (AI), data analytic, automation, the Internet of Things (IoT), social media, and virtual reality (VR) have paved the way for digital and platform innovations. This growing stream of innovation alters corporate and social connections through affordances, openness, and generativity (Nambisan et al., 2019).

Companies operating in today's uncertain and changing world are leveraging digital technologies to accelerate the level of change (Ghezzi & Cavallo, 2020). This transformation can involve redefining business models to create value for clients through novel products and services (Kohli & Melville, 2019). Digital innovations offer novel opportunities for organizations to generate value, create new business models, and enhance long-term success (Yoo & Roh, 2021).

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While literature exists on digital entrepreneurship, digital transformation, and digital innovations, particularly with reference to SMEs, a notable gap is identified in the exploration of digital innovation's intersection with organizational resilience.

Although much of the literature treats digital innovations as distinct tools that SMEs can adopt independently, several scholars argue for a more integrated perspective. (Nambisan et al. (2019) and Yoo and Roh (2021) note that in practice these technologies often function as interconnected affordances rather than standalone solutions. For instance, data generated through social media frequently informs analytics, while automation is rarely implemented without support from e-commerce platforms or analytics systems. The present study adopts an analytical separation of the four practices to enable targeted hypothesis testing, consistent with approaches used in recent SME research (S. Chan et al., 2023). However, it recognizes that this separation represents a simplification and that future studies may benefit from examining digital innovation as a holistic capability in resource-constrained environments such as Ghana.

2.4 Digital Innovation Practices

Digital innovation practices are crucial for modern organizations to enhance competitiveness and resilience (Kumar et al., 2023). According to Chathuranga et al. (2023), key practices include the implementation of agile methodologies, which promote flexibility and responsiveness through iterative development and cross-functional teams. Chathuranga et al. (2023), further mentions that, digital innovation methods greatly improve the resilience of Small and Medium Enterprises (SMEs) by allowing them to stay competitive and nimble in today's ever-changing business environment.

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Saleem et al. (2021) posits that digital innovations help SMEs develop strong supply chains and improve decision-making through real-time data access. The capacity to innovate digitally promotes continual development, guaranteeing that SMEs can respond to both market opportunities and difficulties (Zutshi et al., 2021). A number of digital innovation practices have been identified in literature which includes collaboration tools, e-commerce, social media, automation, data analytics, augmented reality, and 3D printing among others.

Digital collaboration tools are becoming increasingly important for improving the resilience of Small and Medium Enterprises (SMEs). Hu et al. (2020) mentions that these technologies, which include video conferencing, project management software, and cloud-based document sharing, allow teams to communicate and coordinate seamlessly regardless of location.

Unlike traditional IT infrastructure, cloud services are flexible, allowing SMEs to easily adapt to changing business situations without making large upfront expenditures (Assistant Professor, Near East University, Department of Computer Information Systems, Mersin 10, Turkey et al., 2020). This agility is critical to the durability and survival of SMEs. The transition to cloud-based technologies also facilitates remote work, allowing SMEs to continue operations even when physical access to facilities is limited.

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Empirical studies suggest that firms leveraging today's advanced analytics turn to demonstrate higher resilience due to their ability to scan the environments and respond proactively to emerging threats (Bahrami & Shokouhyar, 2022). Analytic tools aid organizations to better understand the market and predict changes that are capable of having impact on their operations.

According to Hu et al. (2023), social media enables SMEs to quickly adapt to changing market conditions by providing real-time feedback and facilitating innovation through customer

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interaction. In recent times, most SMEs have adopted the use of social media as a result of its ease of use and ability to be incorporated into business practices easily. Large number of customers stay on social media and therefore has become the meeting place of businesses and customers.

A number of studies have emphasized some benefits of e-commerce to include; the ability of e-commerce to allow SMEs to reach new markets, diversify revenue streams, and preserve company continuity amid interruptions (Chan et al., 2023; Cueto et al., 2022). E-commerce is when business operate beyond bricks and blocks, by so doing they are able to operate beyond their geographical locations.

By integrating automated technologies, SMEs may optimize their supply chains, and lessen dependency on human labor, which is especially useful during disruptions (Kumar et al., 2023). Automated technologies have the capacity to aid SMEs to easily handle repetitive works and produce perfect outcomes from productions.

Several digital innovation practices have been discussed in the literature above; however, social media, data analytics, e-commerce and automation are focused on in this study. This is because, these practices are commonly used by SMEs and are usually inter-related.

Table 2.2 Digital innovation practice and their impact on SME resilience (Chan et al., 2023)

Digital Innovation Practice	Specific Digital Innovation Practice	Impact on SMEs Resilience
Digital Communication channels	Social Media	Social media usage and other online platforms helped the SMEs to keep in touch with their customers

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Cloud computing and e-commerce platforms	Online sales channels (E-Commerce)	Online sales helped SMEs to reach a wider customer base beyond their local regions.
Data Analytics	Data Analytics	SMEs used data analytics to track the preferences of customers, keep track of the trends happening at the market and change their strategies as such
Automation Streamlining Processes	Automation	Automation allowed SMEs to utilize their resources efficiently and to respond more effectively to market changes.

Source: (Chan et al., 2023)

For SMEs, digital innovations offer a pathway to compete with larger firms despite resource constraints (Nambisan et al., 2019). Successful adoption of these practices can enhance their operational efficiency, market reach, and customer value. However, Wylde et al. (2022) mentioned that, challenges such as cybersecurity, data privacy, and the rapid pace of technological change must be managed to fully realize the benefits of digital innovations (Michael et al., 2019).

The four digital innovation practices examined in this study; data analytics, social media, automation, and e-commerce are treated as analytically distinct to allow clear examination of their individual relationships with organizational resilience. Data analytics refers to the systematic use

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of data for decision-making, social media to customer engagement and marketing platforms, e-commerce to online transaction systems, and automation to rule-based process improvements (OECD, 2021). Automation, in particular, is conceptualized here as a standalone capability focused on operational efficiency rather than merely an outcome of the other three practices, although in reality it is frequently enabled by them. While real-world deployment in Ghanaian SMEs often involves significant overlap. For example, automated inventory systems integrated with e-commerce platforms or social media insights feeding analytics (Bradač Hojnik & Huđek, 2023), this study maintains the separation for empirical clarity. The interdependencies are noted as a boundary condition and will be reflected upon in the discussion of findings and limitations.

2.5 Digital Innovations (DI) and Organizational Resilience (OR)

The intersection of digital innovations and organizational resilience has gained considerable attention in today's scholarly work (Ramdani et al., 2022; Sörvik & Tasigiorgou, 2020; Zhang et al., 2021), more importantly as organizations face the daily rising of uncertainty and disruption. Digital innovations, encompassing the adoption and integration of technologies like artificial intelligence, big data, and cloud computing, is necessary in building and enhancing organizational resilience, which is the capacity to withstand, recover, and grow from adverse conditions (He et al., 2023).

Agile methodologies are crucial to this intersection. OR practices involve iterative development, cross-functional teams, and continuous feedback, which collectively enhances organizations to respond quickly and effectively to change (Oladapo et al., 2024). According to Carvalho et al. (2021), agility not only improves operational efficiency but also includes a culture of flexibility and adaptability, which are relevant components of resilience.

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For SMEs, digital innovations can be particularly transformative. Despite facing resource constraints, Dumitriu et al. (2019) and North et al. (2019) state that SMEs can capitalize on digital tools to improve efficiency, reach new and wider markets, and interact with customers more effectively. Research highlights that SMEs adopting digital innovations are well equipped to handle disruptions (Chan et al., 2019), showing improved resilience compared to their competitors that do to capitalize on digital innovations.

However, challenges such as cybersecurity threats, data privacy issues, and the fast pace of technological advancements must be carefully managed (Braun et al., 2018). Organizations need to pay attention to these challenges to maximize the benefits of digital innovations for resilience.

2.6 Chapter Summary

This chapter reviewed existing literature on the key constructs underpinning the study: digital innovations, organizational resilience, and organizational leadership. Digital innovations were explored as a strategic tool that enables SMEs to enhance operational efficiency, customer engagement, and adaptability through technologies such as social media, automation, e-commerce and data analytics. These digital innovation practices were discussed in this chapter as well.

Organizational resilience was discussed through three pillars; capital, relationship, and learning resilience as defined by Chen et al. (2021) who highlighted five main pillars. These three capital resilience variables help Ghanaian SMEs withstand and adapt to disruptions.

Organizational leadership was also examined as a moderating factor influencing the successful implementation of digital innovation towards organizational resilience. Gaps in existing research were noted, more importantly in the context of Ghanaian SMEs making the current study relevant.

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CHAPTER THREE

RESEARCH FRAMEWORK

3.1 Chapter Overview

Chapter three seeks to probe further into the research framework adopted for this study. This study sought to use the Dynamic Capabilities Theory as its theoretical lens. The reason behind the adoption of this theory is its ability to help researchers understand their environmental changes (challenges and opportunities). Dynamic capabilities adopt a process approach by acting as a buffer between firm resources and the changing business environment.

Dynamic resources can help a firm adjust its resource mix and thereby maintain the sustainability of the firm's competitive advantage, which otherwise might be quickly eroded. So, while the Resource Base View (RBV) emphasizes resource choice or the selection of appropriate resources, dynamic capabilities emphasize resource development and renewal. This section will therefore provide an overview of the Dynamic Capabilities Theory, followed by an explanation of the construct of the theory.

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3.2 Overview of Dynamic Capabilities Theory

Teece et al. (1997) define dynamic capabilities as 'an organization's inherent prowess to seamlessly integrate, cultivate, and recalibrate both internal and external proficiencies to adeptly navigate rapidly shifting environmental landscapes. This seminal concept emerged from a crucial lacuna within the resource-based view (RBV) of the firm. The RBV has frequently faced critique for presuming the mere existence of resources, rather than delving into the intricate mechanisms

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of their development, their interwoven integration within the corporate fabric, and their eventual divestment factors conspicuously underexplored in prior scholarly discourse.

According to Wade and Hulland (2004), information system (IS) resources often embody many characteristics akin to dynamic capabilities, rendering them singularly advantageous for firms operating in volatile environments. Thus, even if IS resources don't directly confer a position of enduring superior competitive advantage, their role can be pivotal to a firm's sustained long-term competitiveness in unstable contexts, particularly if they facilitate the ongoing development, augmentation, integration, and release of other critical resources.

The theory of dynamic capabilities, originally advanced by Teece et al. (1997) essentially represents a sophisticated evolution or refinement of the resource-based view (RBV) of the firm (Barney, 1986). The RBV traditionally posits that disparities in firm performance within similar industries stem from their heterogeneous resource endowments and capabilities (Barney, 1986; Peteraf, (1993). However, the RBV is often deemed static and insufficient to fully account for competitive advantage in a mutable market environment (Priem & Butler, 2001).

Furthermore, the resource-based view predominantly scrutinizes the singular, scarce, and often intangible resources that underpin a firm's competitive advantage and growth (Barney, 1986). Yet, the very process of sustaining competitive advantage is an unending and inherently dynamic endeavor (Hung et al., 2010). Consequently, scholars have advocated for firms to cultivate specific capabilities and embrace continuous learning to remain competitive (Hammer, 2001; Jashapara, 1993; Zott, 2003), especially through a dynamic capabilities lens within nascent or evolving market conditions (Wilden et al., 2013).

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A deficiency in dynamic capabilities will invariably preclude a firm from maintaining its competitive edge, particularly in a fluctuating milieu (Gnizy et al., 2014), thereby impinging upon organizational resilience. The application of dynamic capabilities has garnered escalating scholarly attention since the foundational works on international ambidexterity (Hsu et al., 2013; Luo, 2002; Luo & Rui, 2009; Prange & Verdier, 2011). Ambidexterity itself is often elucidated as a firm's capacity to respond to environmental intricacy and its cumulative international experience in the realm of global business (Hsu et al., 2013).

Teece et al.(1997), definition of dynamic capabilities underscores a firm's facility for orchestrating, developing, and reconfiguring external and internal expertise to react to swift environmental shifts. Prior research has offered complementary definitions; for instance, Eisenhardt and Martin (2000) conceptualize dynamic capabilities as the processes through which resources are leveraged to forge new resources, thereby instigating market transformation. Such market shifts manifest through evolution, emergence, fragmentation, or even dissolution.

Beyond these perspectives, dynamic capabilities are also understood as the consequence of altering acquired, integrated, and recombined resources to generate novel strategies (Grant, 1996; Pisano, 1994). Thus, they are unequivocally a catalyst for the genesis of new wellsprings of competitive advantage (Henderson & Cockburn, 1994; Teece et al. 1997).

Previous researchers viewed dynamic capabilities as a panacea for organizational inflexibility (Schreyögg & Kliesch-Eberl, 2007) and a mechanism for optimizing knowledge utilization (Easterby-Smith & Prieto, 2008). Some scholars also agree that dynamic capabilities can explain how firms respond to change (Newey & Zahra, 2009), particularly within their environmental context. Empirical investigations have consistently demonstrated a positive correlation between dynamic capabilities and organizational performance (Hung et al., 2010). For example, Danneels

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(2002) conducted a study on five high-tech firms and found that product innovation capabilities increase the firm's competencies and performance. Moreover, Zott (2003) meticulously identified how the different dynamic capabilities of the firm can influence performance, and the study further identified that even small differences in dynamic capabilities between the firm can create significant divergence in firm performance.

From an international business perspective, Luo (2000) revealed that the strategic exploitation of dynamic capabilities can amplify a firm's expansion into international markets and concurrently bolster its performance. The initial propositions regarding dynamic capabilities suggested a direct linkage to firm performance Teece et al. (1997).

Additionally, Zollo and Winter (2002) cemented the direct relationship between firm performance and dynamic capabilities, asserting that in a shifting environment, a firm lacking such capabilities will find its superiority and very survival ephemeral. This has been supported by Teece (2007), whereby the development of dynamic capabilities is to identify the sources of a firm's competitive advantage at the enterprise level, which is determined by the firm's success or failure.

Conversely, other researchers have contested this purported direct connection between dynamic capabilities and firm performance. Eisenhardt and Martin (2000), for instance, argued that dynamic capabilities alone do not guarantee the firm's competitive advantage, but the arrangement and positioning of the firm's resources created by dynamic capabilities are more skilled than the competition. This is also supported by Zott (2003), who echoes this sentiment, asserting that it is the modification and alteration of a firm's resources through dynamic capabilities that truly influence performance, rather than dynamic capabilities operating in isolation.

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Additionally, Eisenhardt and Martin (2000), proposed that firms possessing dynamic capabilities will inherently hold an advantage over rivals lacking such capabilities, while Zott (2003) posits that firms with distinctive dynamic capabilities are apt to cultivate varied resource configurations, leading to differentiated performance levels.

It's crucial to distinguish that dynamic capabilities are not synonymous with specific functional capabilities like supply chain management, R&D, or marketing (Gnizy et al., 2014) Instead, they serve as a facilitating conduit for exploring the resources and capabilities essential for maintaining competitiveness, particularly in a volatile market environment (Wilden et al., 2013). Dynamic capabilities have also been associated with tacit organizational elements such as routines, processes, managerial cognition, and knowledge (Easterby-Smith et al., 2009), alongside adaptive, absorptive, and innovative capacities (Grant, 1996; Pisano, 1994; Wang & Ahmed, 2007). Dynamic capabilities have also been a focus area, especially in the field of strategic management (Barreto, 2010), and firm success depends not only on the resources and capabilities that the firm has, but most importantly on how the firm adjusts itself to the market they operate in (Rua et al., 2018).

It's important to underscore that dynamic capabilities are not detached from the resource-based view; rather, they represent an additional, crucial element for explicating competitive advantage, especially within a constantly shifting landscape (Ambrosini & Bowman, 2009; Barreto, 2010; Eisenhardt & Martin, 2000; Wang & Ahmed, 2007). Furthermore, in tumultuous and rapidly expanding markets, firm resources must exhibit inherent dynamism, and managers must possess the acumen to adjust strategy to the environment, thereby cultivating new proficiencies capable of meeting market exigencies (Monteiro et al., 2017).

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3.3 Dynamic Capabilities Theory

Dynamic Capabilities Theory is a management framework that emphases on a firm's ability to adapt and innovate in response to changing market conditions, technological advancements, and competitive pressures. Developed by David Teece and his colleagues, this theory builds upon the resource-based view (RBV) of the firm and emphasizes the importance of capabilities, rather than resources themselves, in sustaining competitive advantage over time.

3.3.1 Breakdown of the Key Components of Dynamic Capabilities Theory:

Dynamic capabilities is a firm's capability to integrate, build, and restructure or reconfigure its internal and external resources and capabilities to address changing environments. Unlike static capabilities, which focus on exploiting existing resources efficiently, dynamic capabilities are forward-looking and proactive, enabling firms to innovate and adapt to new challenges and opportunities.

3.3.2 Three Key Processes:

1. **Sensing**: Teece and Leih (2016) posits that dynamic capabilities involve sensing changes in the external environment at an early stage, such as shifts in customer preferences, emerging market trends, or technological disruptions. Firms must be able to gather and interpret information effectively to identify new opportunities or threats (Ranjan & Foropon, 2021).
2. **Seizing**: Once changes are detected, firms must have the ability to seize opportunities and take action swiftly (Sharfman & Dean Jr, 1997). This may involve developing new products or services, entering new markets, forming strategic alliances, or reconfiguring existing processes.

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3. **Reconfiguring**: Dynamic capabilities also encompass the ability to reconfigure existing resources and capabilities to exploit new opportunities or mitigate threats (Teece, 2007). This may involve reallocating resources, restructuring organizational processes, or developing new competencies through learning and experimentation.

Role of Managerial Processes: Dynamic Capabilities Theory emphasizes the role of managerial processes (Ferreira et al., 2020), such as strategic decision-making, organizational learning, and innovation management, in developing and deploying dynamic capabilities. Haarhaus and Liening (2020), mentioned that, effective leadership and strategic vision are essential for fostering a culture of innovation and agility within the organization.

Resource Heterogeneity and Path Dependence: Similar to the resource-based view, Dynamic Capabilities Theory recognizes the importance of resource heterogeneity and path dependence in shaping firms' competitive advantage (Keller et al., 2022; Nayak et al., 2020). However, it goes beyond static resource endowments to focus on the firm's ability to adapt and evolve its resource base over time.

Implications for Resilience: According to Dynamic Capabilities Theory, firms that possess strong dynamic capabilities are better positioned to sustain organizational resilience (Dovbischuk, 2022) in dynamic and uncertain environments. By continuously sensing, seizing, and reconfiguring, these firms can respond effectively to market disruptions, outmaneuver competitors, and capitalize on emerging opportunities.

3.4 Limitations of DCT

Dynamic capabilities theory (DCT) has been very relevant in explaining the sustainability of firms in today's changing environments (Teece et al., 1997). However, according to Salvato and Vassolo,

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(2018), the theory faces several limitations. Kurtmollaiev (2020) mentions that the conceptual ambiguity of the dynamic capability theory is of a primary concern, as the broad and vague definitions of the theory's variables; sensing, seizing, and reconfiguring lead to difficulties in operationalizing and measuring these constructs, as a result leading to inconsistency in empirical findings.

Salvato and Vassolo (2018) identified that, the theory's top-down focus on high-level strategic processes often ignores the critical roles of middle management and frontline employees in executing dynamic capabilities. Also, the DCT assumes that all firms can develop these capabilities, which may not fully be true for smaller or resource-constrained organizations, limiting its applicability.

Context-specific requirements of dynamic capabilities also challenge the theory's generalizability across various industries and environments (Hällerstrand et al., 2023; Schilke et al., 2018). The retrospective nature of many empirical studies introduces biases and makes the establishment of causal relationships between dynamic capabilities and performance outcomes complicated (Maghzi et al., 2023).

According to Ilmudeen and Qaffas (2024), DCT also underemphasizes the impact of external factors including industry dynamics, technological changes, and regulatory shifts, which can significantly affect a firm's capability to develop and capitalize on dynamic capabilities.

3.5 Conceptual Framework

A conceptual framework implies a structure that organizes and brings together the ideas and hypotheses that a researcher uses to support and illustrate the correlations between significant concepts or variables in a study (Tamene, 2016). This framework might be visual, such as a

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diagram, or articulated narratively, emphasizing the key variables or structures to be researched and the postulated links between them. The three organizational resilience pillars adapted from Chen et al. (2021) and the four digital innovation practices in the literature form the framework of the study, with organizational leadership serving as the moderating variable.

The conceptual framework presented in this study positions the four digital innovation practices as distinct drivers of organizational resilience under the lens of Dynamic Capabilities Theory. Data analytics is positioned as the sensing mechanism, social media as a seizing tool for customer relationships, e-commerce as a reconfiguring platform for market transactions, and automation as an operational efficiency capability that supports all three processes. Automation is theorized here as a standalone dynamic capability focused on rule-based process optimization rather than simply an output of the other practices, although in Ghanaian SME contexts it is frequently supported by analytics insights or e-commerce systems. While the model treats the practices separately to permit clear hypothesis testing, the study acknowledges that in daily operations these elements are interdependent and mutually reinforcing. This analytical separation is adopted for empirical precision while recognizing the integrated nature of digital capabilities as a boundary condition that will be addressed in the interpretation of results and future research directions.

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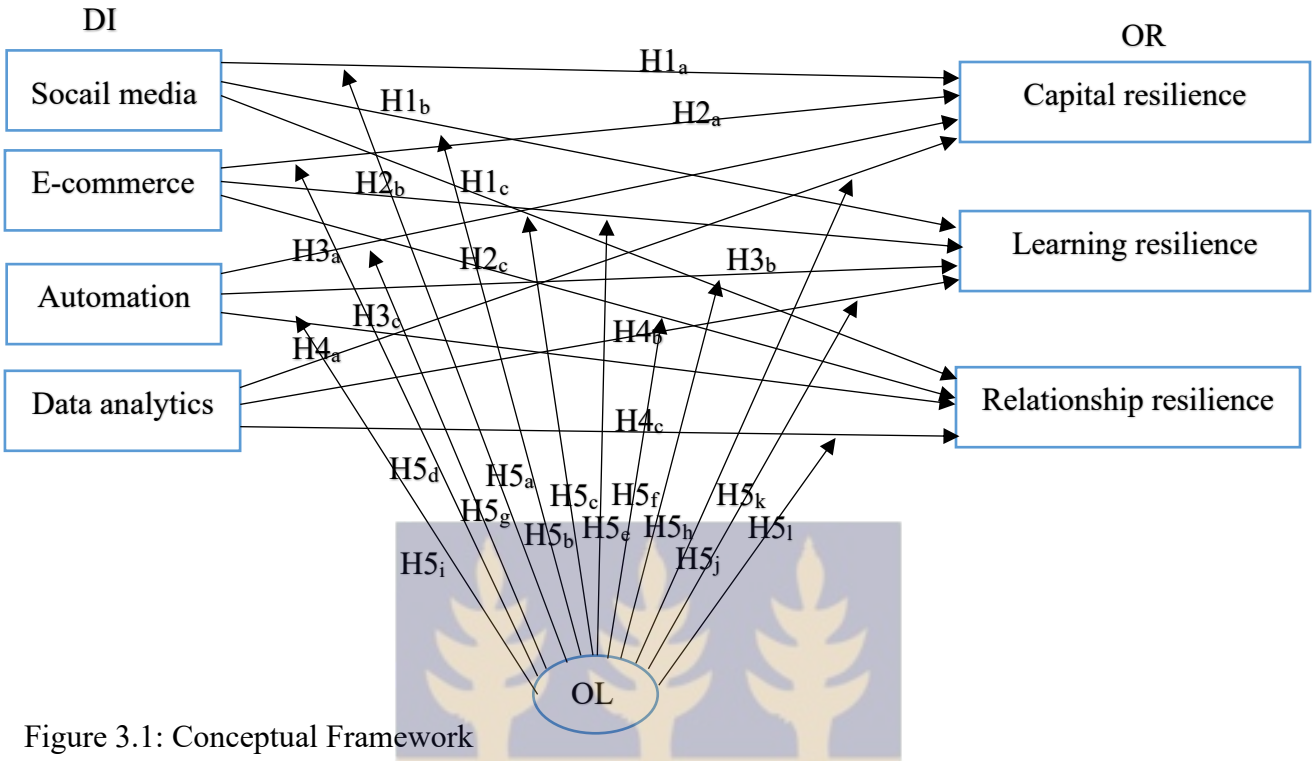

Figure 3.1: Conceptual Framework

3.6 Hypothesis Development

3.6.1 Data Analytics

Data analytics (DA) is another critical practice, enabling firms to derive actionable insights and make informed strategic decisions, ultimately leading to more personalized customer experiences (Ciriello et al., 2019). Zhang et al. (2021), identified that, the role data analytics play is also prominent in organizational resilience.

Data analytics plays a significant role in improving capital resilience by allowing for better informed financial decision-making and forecasting (Rauf et al., 2024). Teng et al. (2022), postulates that SMEs may utilize sophisticated analytics to obtain deep insights into their financial performance, helping them to better manage cash flow, cut operational expenses, and uncover new profit prospects.

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Also, Mohamed and Weber (2020), mentioned that, data analytics assists SMEs in optimizing their investment plans by studying market trends and consumer behavior to ensure that resources are deployed properly (Xie & Ren, 2022). SMEs can respond more quickly to economic developments by exploiting real-time financial data, lowering the risk of financial instability (Pu et al., 2021). Literature shows that organizations that include data analytics into their financial management strategies are better positioned to retain growth and financial stability (Abubakar et al., 2024), especially in difficult economic conditions. Based on these discussions, it is hypothesized that:

H_{1a}: Data analytics has a positive impact on the capital resilience of SMEs

Data analytics helps firms establish and sustain relationship resilience by allowing them to better manage stakeholder interactions (Gupta et al., 2019). Anshari et al. (2019) postulates that data analytics enables organizations to study consumer behavior, preferences, and feedback, resulting in more tailored and relevant interactions.

Khan et al. (2022), identified that, this customized approach not only increases customer happiness and loyalty, but it also builds trust between the company and its stakeholders. Also, according to Mageto (2021), data analytics may uncover possible hazards in supplier partnerships by monitoring performance metrics and forecasting supply chain interruptions, allowing for proactive management of these connections.

The capacity to use data to build strong, trusting relationships with customers, suppliers, and partners is critical to ensuring that firms can survive external shocks and continue to prosper (Bag et al., 2023). This leads to the hypothesis:

H_{1b}: data analytics has a positive impact on relationship resilience of SMEs

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In terms of learning resilience, data analytics speeds up the process of organizational learning and adaptation by delivering actionable insights based on past experiences and current patterns (Barlette & Baillette, 2022). Organizations can uncover patterns and trends by examining data from multiple activities and consumer interactions.

This constant feedback loop enables firms to learn fast from both triumphs and mistakes (Vittori et al., 2024), so boosting their capacity to foresee and respond to future issues. Furthermore, data analytics helps knowledge distribution throughout the firm (Ranjan & Foropon, 2021), ensuring that lessons learnt are available to all employees, enhancing collective learning and driving continuous development (Bag et al., 2020).

Studies emphasizes that firms that use data analytics in their learning processes are better positioned to innovate, adapt, and maintain long-term growth, creating learning resilient. Accordingly, it is hypothesized that:

H_{1c}: data analytics has a positive impact on learning resilience of SMEs

3.6.2 Social Media

Also, social media (SM) has turn out to be a critical tool for enhancing the resilience of Small and Medium Enterprises (SMEs). Literature highlights that SMEs leverage social media platforms to improve communication, foster customer engagement, and maintain business continuity during challenging times (Hu et al., 2023; Orengo-Serra & Sánchez-Jauregui, 2021). Moreover, it offers cost-effective marketing strategies, allowing SMEs to reach broader audiences and develop brand loyalty with minimal resources.

During economic disruptions, social media plays a critical role in empowering SMEs to sustain operations, pivot business models, and maintain customer relations (Zahoor et al., 2022). The

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agility afforded by social media platforms helps SMEs respond rapidly to external shocks, thereby enhancing their overall resilience. However, Zahoor et al. (2022) mentions that the effectiveness of social media in fostering resilience also depends on the SMEs' digital literacy and strategic approach to using these platforms. While social media offers significant benefits, Dwivedi et al. (2021) states that challenges such as managing online reputation and the need for continuous content generation can limit its impact.

Social media improves capital resilience by enabling low-cost marketing and consumer interaction tactics (Sharma & Rautela, 2022) that can considerably increase income streams. According to Sharma and Rautela (2022), SMEs may use social media platforms to reach a larger audience with less expenditure, increasing sales and decreasing the need for costly traditional advertising.

In addition, Shi et al. (2021), state that, social media analytics tools provide important insights into customer behavior and industry trends, allowing SMEs to make data-driven business choices. Businesses that understand consumer preferences and market dynamics in real time may better manage resources, improve pricing strategies, and predict demand, resulting in greater financial stability and capital resilience.

From the above literature, the hypothesis below is proposed:

H_{2a}: Social media has a positive impact on Capital resilience of SMEs

According to Rendon et al. (2021), social media is crucial in developing and sustaining relationship resilience because it allows for ongoing and transparent contact with stakeholders. SMEs may build strong, trust-based relationships with consumers, suppliers, and partners by engaging directly through platforms such as Facebook, WhatsApp and LinkedIn.

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Social media allows businesses to respond rapidly to client requests and feedback, improving customer happiness and loyalty (Sharma & Rautela, 2022). Additionally, Zahoor et al.(2022) opined that by sharing pertinent information and updates, SMEs may keep stakeholders informed and engaged even during interruptions. This continuing participation helps to strengthen connections, ensuring that SMEs can rely on their network of stakeholders for assistance during difficult times hence the hypothesis:

H_{2b}: Social media has a positive impact on the relationship resilience of SMEs

Social media promotes learning resilience by providing a platform for continual learning and information exchange (Jahng, 2021). Malesev and Cherry (2021) identified that, SMEs may utilize social media to track industry trends, competition activity, and consumer feedback, garnering useful data to inform their plans and operations. Likewise, social media allows the exchange of ideas and best practices within professional networks and communities, allowing SMEs to learn from peers and industry leaders.

Access to real-time information and collaborative learning opportunities enables firms to respond swiftly to changes, enhance their processes, and innovate continually (Bruce et al., 2023). Integrating these insights into their processes allows SMEs to improve their capability to learn and grow, guaranteeing long-term resilience and sustainability. From the discussions above, the following hypothesis is developed:

H_{2c}: Social media has a positive impact on the learning resilience of SMEs

3.6.3 Automation

According to Kaber and Endsley (1997), automation increases operational efficiency by minimizing manual mistakes, speeding up operations, and allowing for better resource

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management. Automation also enables SMEs to maintain constant quality and service standards, especially during periods of economic turbulence, by guaranteeing that vital processes continue uninterrupted.

However, the use of automation poses problems such as the requirement for significant investment in technology and training (Parker & Grote, 2022). However, for those SMEs that effectively incorporate automation, the consequence is a more robust and resilient firm that can weather external shocks and sustain long-term growth.

According to Babatunde (2024), automation improves capital resilience by increasing cost efficiency and financial management. Babatunde (2024), further mentions that, SMEs may save operating costs, eliminate mistakes, and increase productivity by automating repetitive operations and simplifying procedures. This efficiency results in improved resource allocation and bigger profit margins, which improves the company's financial stability.

Automation also provides real-time data and analytics, allowing for more precise financial planning and budgeting (Ren, 2022). This better financial monitoring enables SMEs to preserve liquidity and make more informed investment decisions, improving their capital resilience in the face of economic uncertainties. Accordingly, it is hypothesized that:

H_{3a}: Automation has a positive impact on the capital resilience of SMEs

Automation strengthens relationships by enhancing the consistency and quality of interactions with stakeholders. According to Specchia (2022), automated customer relationship management (CRM) solutions allow SMEs to manage customer data, track interactions, and customize communication at a large scale, resulting in increased customer loyalty and satisfaction.

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Automation again facilitates consistent communication with suppliers and partners through regular updates and automated procedures, lowering the risk of misinterpretation and strengthening trust (Azman et al., 2021). Automation assists SMEs in building and maintaining strong networks, which are critical during times of crisis from where emerges the hypothesis:

H_{3b}: Automation has a positive impact on the relationship resilience of SMEs

Sobczak (2022) iterates that, automation helps to build learning resilience by allowing for the continual gathering and analysis of data, which fosters continuing learning and adaptation. Automated systems may track and evaluate business operations, giving information about performance trends and opportunities for improvement. This real-time feedback enables SMEs to learn fast from both triumphs and mistakes, fine tuning their strategy and operations accordingly.

Also, Sobczak (2022) identifies that, automation may help with training and development programs by delivering individualized learning experiences and measuring progress, ensuring that employees' abilities are regularly upgraded. Automation assists SMEs in being nimble and inventive by incorporating these learning opportunities into daily operations (Cubric & Li, 2024), therefore strengthening their capacity to adapt and survive in a changing business environment.

Based on the accessions above, the following hypothesis is developed:

H_{3c}: Automation has a positive impact on the learning resilience of SMEs

3.6.4 E-commerce

By utilizing e-commerce platforms, SMEs may operate beyond geographical boundaries, providing products and services to a worldwide client base. E-commerce improves capital resilience by allowing SMEs to access larger markets and generate more income streams (Subriadi & Kusuma, 2022). SMEs may reach clients outside their local areas via online sales platforms,

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expanding sales prospects and decreasing dependency on physical stores. E-commerce's scalability enables enterprises to develop without making substantial capital investments in infrastructure.

However, D'Adamo et al. (2021) posit that, adopting e-commerce presents challenges such as managing online competition and guaranteeing cybersecurity. Nonetheless, SMEs that efficiently use e-commerce are better positioned to weather economic downturns, assuring long-term stability and development.

Subriadi and Kusuma (2022) mention that, e-commerce systems provide useful data on customer behavior, allowing for more precise financial forecasts and inventory management. This data-driven strategy assists SMEs in optimizing pricing strategies and lowering expenses, so enhancing their financial stability and capital resilience. From the above discussions, it is hypothesized that:

H_{4a}: E-commerce has a positive impact on the capital resilience of SMEs

E-commerce promotes relationship resilience by facilitating consistent and individualized client contacts (Lakso, 2021). Online platforms enable SMEs to retain ongoing client involvement via targeted marketing, automated communication, and specialized product suggestions. This level of customization increases consumer happiness and loyalty, resulting in long-lasting partnerships.

Moreover, Brown et al. (2024) argue that online shopping enables seamless collaboration with suppliers and partners by utilizing integrated systems for ordering, tracking, and inventory management. These effective processes lessen the risk of interruption and foster trust, allowing SMEs to rely on their partnerships even during difficult times. As a result, it is hypothesized that:

H_{4b}: E-commerce has a positive impact on the relationship resilience of SMEs

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E-commerce helps SMEs build learning resilience by providing them with substantial data on consumer preferences, market trends, and competitive dynamics (Sutrisno et al., 2024). E-commerce analytics data enable firms to continually fine-tune their strategy, optimize their product offerings, and enhance customer experiences. Additionally, e-commerce systems frequently feature tools for real-time feedback, allowing SMEs to experiment with new ideas and quickly implement successful ones (Ehikioya & Guillemot, 2020).

This iterative learning approach helps SMEs to respond quickly to market and consumer changes, cultivating a culture of continuous improvement and guaranteeing long-term resilience. Consequently;

H_{4c}: E-commerce has a positive impact on the learning resilience of SMEs

3.7 The Concept of Organizational Leadership (OL)

Organizational leadership is a broad notion that includes the procedures, attitudes, and characteristics that leaders employ to influence and drive companies toward their objectives (Widyatmoko et al., 2020). There are numerous significant themes in organizational leadership, including transformational leadership, which focuses on inspiring and encouraging workers to surpass expectations by promoting creative thinking and a strong corporate culture. Another common element is transactional leadership, which is focused on organized roles and rewards while stressing efficiency and job completion (Widyatmoko et al., 2020).

Current studies have also looked at the relevance of adaptive leadership in navigating complex and dynamic contexts, emphasizing the necessity for leaders to be adaptable, resilient, and sensitive to change (Brunner et al., 2023). Furthermore, ethical leadership has gained popularity, emphasizing the importance of honesty, fairness, and ethical standards in building trust and achieving corporate goals.

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The changing nature of work settings, especially the advent of remote work, has widened the conversation around leadership, with a greater emphasis on digital leadership and the abilities necessary to effectively manage virtual teams (Brunner et al., 2023). Overall, studies have highlighted the significance of leadership in creating organizational results, encouraging innovation, and enhancing resilience of organizations.

3.8 The Moderating Effect of Organizational Leadership on the Relationship between DI Practices and OR

The importance of leadership in promoting digital innovations has received considerable emphasis in recent years, as firms negotiate the quick changing technology world. Effective leadership is vital for creating an atmosphere that promotes innovation, adaptation, and long-term competitive advantage (Srivastava et al., 2013).

Leadership is crucial in establishing the digital strategy of organizations. According to Fritz (2001), successful digital leaders must strike a balance between exploring new technologies and using existing skills. They must develop a vision for digital transformation that is consistent with the company's strategic goals, while also promoting a culture of constant learning and flexibility (Ahsan, 2024).

3.8.1 The Moderating Role of Leadership on Social Media and Capital Resilience

Capital resilience refers to the ability of organizations to manage tangible and intangible resources in the face of challenges. Leadership's role in moderating social media use for resource allocation is paramount (Spencer et al., 2012). Leaders with strategic foresight leverage social platforms to

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crowdsource funds, disseminate resource updates, and maintain stakeholder trust, enhancing financial adaptability.

In contrast, weak leadership can lead to misinformation and reputational damage, that can weaken financial resilience (Jahng, 2021). Studies suggest that leadership strategies can have impact on how effectively organizations utilize social media for financial recovery (Yadav et al., 2024). Hence, the impact of social media on capital resilience is not uniform but is highly dependent on leadership approaches that facilitate strategic communication and financial prudence.

$H5_a$: organizational leadership moderates the relationship between social media and capital resilience.

3.8.2 The Moderating Role of Leadership between Social Media and Learning Resilience

Learning resilience focuses on organizational adaptability and knowledge retention. Leaders who prioritize digital literacy and learning cultures can utilize social media for real-time feedback and knowledge sharing, improving problem-solving capabilities and fostering innovation during challenges. Leadership's ability to encourage open digital dialogue significantly enhances learning-oriented adaptability (Wallo et al., 2022).

Literature identified that organizations with visionary leadership are more likely to capitalize social media for developing learning resilience, especially in volatile environments (Iftikhar, 2024). Thus, leadership can serve as a catalyst in translating social media interactions into sustainable learning resilience.

$H5_b$: Organizational leadership moderates the relationship between social media and learning resilience

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3.8.3 The Moderating Role of Leadership between Social Media and Relationship Resilience

Relationship resilience reflects the strength of networks within and beyond the organization. Leadership styles such as transformational leadership promote transparent and empathetic communication, which, when amplified through social media, fosters trust and collaboration among stakeholders (Musaigwa & Kalitanyi, 2024). This ensures unified efforts during competitions and strengthens inter-organizational relationships.

Studies also indicate that transformational and servant leadership styles improves the positive effects of social media on relationship resilience by promoting a culture of transparency and inclusivity (Kyambade et al., 2024). Leadership also aids in reducing social media risks such as cyberbullying and digital burnout, hence ensuring that social media engagement strengthens rather than undermines relationship resilience (Tan et al., 2024).

$H5_c$: Organizational leadership moderates the relationship between social media and relationship resilience

3.8.4 The Moderating Role of Leadership Data Analytics and Capital Resilience

Capital resilience is enhanced when leaders utilize data analytics for resource optimization (Alonge et al., 2024). By interpreting predictive insights, leaders can allocate financial and physical resources more effectively during crises, mitigating risks. Leadership fosters a data-driven culture that maximizes organizational adaptability, ensuring resource sustainability under pressure.

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Without the appropriate integration and governance, data analytics can lead to deceptive interpretations and poor financial outcomes (Aldoseri et al., 2023). Therefore, data analytics serves as a moderating factor, enhancing or limiting the degree to which organizations can develop capital resilience in uncertain economic conditions.

$H5_d$: Organizational leadership moderates the relationship between data analytics and capital resilience

3.8.5 The Moderating Role of Leadership between Data Analytics and Learning Resilience

Learning resilience is accelerated by leaders who prioritize data-driven decision-making and continuous learning. By leveraging analytics to evaluate organizational performance and predict future trends, leaders can create adaptive learning systems (Ahsan, 2024). This enhances organizational capacity to innovate, pivot, and retain institutional knowledge during crises.

Firms that use big data analytics in their learning systems tend to have more agile and innovative workforces. Conversely, over-reliance on analytics without human interpretation can create learning rigidity, where employees follow algorithmic recommendations without critical thinking (Kaur, 2023). Hence, data analytics plays a crucial moderating role in shaping how organizations build learning resilience, with its impact contingent on strategic implementation and organizational readiness.

$H5_e$: Organizational leadership moderates the relationship between data analytics and learning resilience

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3.8.6 The Moderating Role of Leadership between Data Analytics and Relationship Resilience

Data analytics facilitates understanding of stakeholder needs and preferences, while leaders translate these insights into actionable strategies (Omar et al., 2019). This enhances trust, collaboration, and the ability to maintain strong networks during disruptions. Leaders act as bridges, aligning analytical insights with interpersonal dynamics to foster robust partnerships.

However, organizations that misappropriate analytics for intrusive surveillance or deceptive practices risk earning stakeholder trust, hence weakening relationship resilience (Aivaz et al., 2024). Thus, while data analytics has the potential to enhance relationship resilience, its effectiveness depends on responsible implementation and adherence to ethical data practices.

$H5_f$: Organizational leadership moderates the relationship between data analytics and relationship resilience

3.8.7 The Moderating Role of Leadership between Automation and Capital Resilience

Leadership-driven automation strategies that optimize resource allocation usually aids Capital resilience. Automation tools provide real-time insights into financial and material resources (Parimi, 2024), but it is leadership's strategic guidance that ensures these technologies are aligned with organizational priorities. Leaders promote a culture that maximizes automation's potential while minimizing disruptions.

Also, research suggests that leaders who integrate automation with long-term financial planning make room for more adaptable and financially resilient organizations (Moşteanu, 2024). Thus,

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leadership acts as a moderating factor, ensuring that automation is strategically leveraged to strengthen capital resilience rather than create financial instability.

$H5_g$: Organizational leadership moderates the relationship between automation and capital resilience

3.8.8 The Moderating Role of Leadership between Automation and Learning Resilience

When leadership leverages on automation to create adaptive learning environments for their employees, it enhances learning resilience. Automation enables continuous data analysis and knowledge dissemination (Cui, 2025), but leaders must encourage its integration into organizational processes. By fostering a culture of innovation and learning, leadership ensures that automation contributes to agility and knowledge retention in crises.

literature has indicated that organizations with proactive leadership integrate automation with human-centered learning strategies, resulting in greater workforce adaptability (Gomide et al., 2024). Therefore, the role of automation in enhancing learning resilience is contingent upon leadership's ability to align technological advancements with employee development.

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$H5_h$: Organizational leadership moderates the relationship between automation and learning resilience

3.8.9 The Moderating Role of Leadership between Automation and Relationship Resilience

Relationship resilience is strengthened when automation is strategically implemented to enhance collaboration and communication (Chiou & Lee, 2023). Leadership plays a crucial role in integrating automated tools for stakeholder engagement, ensuring these tools do not replace but

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complement human relationships. By maintaining a balance, leaders promote trust and collaboration, preserving critical interpersonal networks during disruptions.

On the other hand, poor leadership may lead to over-reliance on automation, dipping personalized interactions and eroding stakeholder trust (George et al., 2024). Organizations with adoptive leadership are more successful in capitalizing on automation to improve relationship resilience, ensuring technology serves as an enabler rather than a barrier to meaningful connections (Parekh, 2024). Thus, leadership plays a critical moderating role in balancing automation with relational dynamics.

$H5_i$: Organizational leadership moderates the relationship between automation and relationship resilience

3.8.10 The Moderating Role of Leadership between E-commerce and Capital Resilience

Effective leaders leverage e-commerce platforms to optimize financial and logistical operations, ensuring stable revenue streams during disruptions. SMEs benefits from leadership-driven e-commerce strategies which enhances capital resilience. By promoting innovation in digital payment systems and inventory management, leaders enable organizations to sustain operations and adapt to changing market conditions (Ononiwu et al., 2024).

Literature identifies that leadership that create a culture of continuous learning and experimentation enhance the positive impact of e-commerce on learning resilience, making organizations more flexible and innovation-driven (Mahdikhani & Yazdani, 2020).

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$H5_j$: Organizational leadership moderates the relationship between e-commerce and capital resilience

3.8.11 The Moderating Role of Leadership between E-commerce and Learning Resilience

Learning resilience is amplified through e-commerce when leadership encourages data-driven decision-making and adaptive learning processes. By utilizing e-commerce insights, leaders can identify emerging trends and foster innovation, ensuring the organization remains competitive and agile in dynamic environments (Munachi et al., 2024). Leadership ensures that e-commerce is not just a transactional tool but a learning mechanism for growth and adaptation.

$H5_k$: Organizational leadership moderates the relationship between automation and learning resilience

3.8.12 The Moderating Role of Leadership between E-commerce and Relationship Resilience

Relationship resilience in e-commerce is influenced by leadership's ability to maintain trust and collaboration among stakeholders. Through data analytics integrated with e-commerce, leaders foster personalized customer experiences and strengthen supplier relationships. Leadership also ensures that e-commerce interactions align with organizational values (Aswani, 2024), enhancing stakeholder confidence during crises.

$H5_l$: Organizational leadership moderates the relationship between e-commerce and relationship resilience

3.9 Summary of the Hypothesis

The hypothesis below will be tested in this study:

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H_{1a}: Data analytics has a positive impact on the capital resilience of SMEs

H_{1b}: Data analytics has a positive impact on relationship resilience of SMEs

H_{1c}: Data analytics has a positive impact on learning resilience of SMEs

H_{2a}: Social media has a positive impact on Capital resilience of SMEs

H_{2b}: Social media has a positive impacts relationship resilience of SMEs

H_{2c}: Social media has a positive impact learning resilience of SMEs

H_{3a}: Automation has a positive impact on the capital resilience of SMEs

H_{3b}: Automation has a positive impact on the relationship resilience of SMEs

H_{3c}: Automation has a positive impact on the learning resilience of SMEs

H_{4a}: E-commerce has a positive impact on the capital resilience of SMEs

H_{4b}: E-commerce has a positive impact on the relationship resilience of SMEs

H_{4c}: E-commerce has a positive impact on the learning resilience of SMEs

H_{5a}: Organizational leadership moderates the effect of social media on capital resilience.

H_{5b}: Organizational leadership moderates the effect of social media on learning resilience.

H_{5c}: Organizational leadership moderates the effect of social media on relationship resilience.

H_{5d}: Organizational leadership moderates the effect of e-commerce on capital resilience.

H_{5e}: Organizational leadership moderates the effect of e-commerce on learning resilience.

H_{5f}: Organizational leadership moderates the effect of e-commerce on relationship resilience.

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H_{5g}: Organizational leadership moderates the effect of automation on capital resilience.

H_{5h}: Organizational leadership moderates the effect of automation on learning resilience.

H_{5i}: Organizational leadership moderates the effect of automation on relationship resilience.

H_{5j}: Organizational leadership moderates the effect of data analytics on capital resilience.

H_{5k}: Organizational leadership moderates the effect of data analytics on learning resilience.

H_{5l}: Organizational leadership moderates the effect of data analytics on relationship resilience.

3.10 Chapter Summary

The chapter outlined the theoretic foundation of this study, beginning with the adoption of the Dynamic Capabilities Theory (DCT) as the guiding theoretical framework. DCT emphasizes how firms, particularly SMEs, can build, integrate, and restructure internal and external capabilities to stay operational in today's swiftly changing environments. This lens gives well-suited perspective to exploring the relationship between digital innovation and organizational resilience.

Based on this theory and understandings from the literature review, a conceptual framework was established to demonstrate the hypothesized relationships among digital innovation practices, organizational resilience variables, and organizational leadership as a moderating variable. The chapter further presented a set of hypotheses to be empirically tested. These hypotheses aimed to examine the direct impact of digital innovation practices on resilience, as well as the moderating role of leadership.

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The conceptual model provides a structured approach for analyzing how Ghanaian SMEs can leverage digital tools and leadership to improve their adaptive capabilities. This chapter sets the stage for the research design and data analysis presented in the subsequent chapter.

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CHAPTER FOUR

METHODOLOGY

4.0 Introduction

This chapter looks at the research paradigm, the research approach, the research design, population, sample size determination and sampling technique employed, description of the data collection instrument, and how the data was gathered, analysis of the data gathered and the ethical considerations of the research.

4.1 Research Paradigm

Research paradigm is the philosophy that underpins the research that is being conducted (Gannon et al., 2022). There are four types of research paradigms; these include, positivist, constructivist, pragmatism and transformative. All these paradigms include; ontology, epistemology, axiology and methodology.

A research paradigm refers to the philosophical framework that underpins the entire research process, guiding the researcher's assumptions about reality (ontology), knowledge (epistemology), values (axiology), and the appropriate methodology for inquiry (Gannon et al., 2022) . Four commonly recognized research paradigms in the social sciences include the positivist, constructivist, pragmatic, and transformative paradigms (Allemang et al., 2022).

The positivist paradigm, also referred to as post-positivism identifies that, reality is objective and can be measured through empirical observation and scientific methods (Tripathi et al., 2024). It

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emphasizes quantification, hypothesis testing, and the use of structured tools to collect data, with the ultimate goal of producing generalizable findings.

In contrast, according to Pilarska, (2021) the constructivist paradigm asserts that reality is socially constructed and subjective. It prioritizes the participation of participants using qualitative approaches to understand the meanings individuals assign to their social world.

The pragmatic paradigm does not commit to any one system of philosophy or reality. Instead, it uses mixed approach to address that problem (Allemang et al., 2022). Researchers rely on both the quantitative and qualitative research approach to understand happenings.

The transformative paradigm, on the other hand, is concerned with addressing issues of power, inequality, and social justice. According to Scharrer and Ramasubramanian, (2021) It promotes participatory research methods and is typically used in studies aiming to empower marginalized communities or challenge dominant structures.

This study applies the positivist paradigm, which is also known as post-positivism. This is because the study is more quantitative and was conducted from an objective perspective. The study aimed to examine hypotheses and the relationship between digital innovation and organizational resilience in SMEs in Ghana. It is grounded in an objective worldview, where variables can be measured, analyzed statistically, and interpreted to draw conclusions.

4.2 Research Approach

The research adopted a quantitative approach to test the effect of digital innovations on organizational resilience, and the moderating role of organizational leadership, adopting Dynamic Capability theory as its underpinning theory. Focusing on SMEs, the study aimed to draw generalized conclusions about the engagement of the sampled population with resilient practices

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and innovation. According to Sardana et al. (2023), quantitative approach helps researchers when testing theories or hypothesis, hence the right approach for this study. The study adopted the quantitative approach since it supports the use of structured instruments such as questionnaires (Hagan, 2014) which will be administered for data collection in this study.

4.3 Research Design

Research design encompasses quantitative, qualitative, and mixed methods designs that guide specific studies (Abutabenjeh & Jaradat, 2018). Quantitative designs typically adhere to a positivist approach and encompass both experimental and non-experimental designs. Survey designs represent one type of non-experimental design, alongside others. A survey design involves collecting data from a sample of respondents to characterize a larger population.

Survey designs can be categorized as either cross-sectional or longitudinal (Rindfleisch et al., 2008). Cross-sectional designs collect data from a sampled population at a single point in time, while longitudinal designs involve collecting data over a period of time. Due to constraints such as limited time and cost, the study opted for a cross-sectional survey design. The cross-sectional research design is a survey approach that collects data to develop insinuations concerning a population at a particular period (Asiamah et al., 2021).

The study positions participating SMEs within a unified analytical lens to facilitate direct examination of the proposed relationships. Although this design offers a lucid, time-bound depiction of digital innovation practices and organizational resilience, it inevitably masks the uneven pace at which such practices are embraced across firms. In Ghana, for example, many financially constrained SMEs gravitate more toward social media engagement than toward automation or e-commerce, largely due to disparities in infrastructure, technical expertise, and

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capital availability. Rather than presuming homogeneity, the study captures self-reported levels of usage, acknowledging this variability as a limiting condition that may shape the intensity of the relationships observed. Subsequent inquiries could unpack these differences through multi-group analysis, thereby yielding more nuanced and stratified insights.

4.4 Target Population

The target population for this study comprises Small and Medium-sized Enterprises (SMEs) operating in Ghana, specifically within the Greater Accra region. Ghana is a country located in West Africa and has witnessed significant economic growth and development in recent years (Aduhene & Osei-Assibey, 2021), with SMEs playing a critical role in driving innovation, employment generation, and economic diversification (Asiamah et al. 2021). The focus on SMEs is particularly relevant due to their inherent flexibility, adaptability, and potential for rapid growth, especially in response to the shifting market dynamics and technological advancements.

The choice of the Greater Accra region as the primary location for sampling SMEs is justified by several factors. Firstly, Greater Accra is Ghana's capital city and is characterized by a vibrant economic landscape, diverse industrial sectors, and a concentration of entrepreneurial activities. The region is home to a wide array of SMEs spanning various industries, including manufacturing, services, trade, and technology (Nyarku & Oduro, 2018).

Furthermore, Greater Accra boasts a robust infrastructure, including transportation networks, communication facilities, and access to financial services, which are conducive to the establishment and operation of SMEs. Again, the region serves as the main commercial center, attracting both domestic and foreign investments (Baidoo et al., 2024), thereby offering a rich and diverse pool of SMEs for study.

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The selection of SMEs in Greater Accra aligns with the research objective of exploring the impact of digital innovations on organizational resilience within the Ghanaian context. By focusing on SMEs in this strategic location, the study aims to capture insights that are representative of the broader SME landscape in Ghana while also acknowledging the unique socio-economic dynamics and challenges specific to the Greater Accra region.

4.5 Sampling Technique and Sampling Size Determination

The study adopted the probability sampling technique to select the targeted SMEs. Probability sampling implies that respondents are given equal chances of being selected (Alvi, 2016). Researchers prefer this method because it helps them arrive at more accurate and less biased results. A simple random sampling technique was adopted. Simple random sampling means that members from the population are selected randomly, implying that respondents are going to be given equal opportunities or chances of being selected.

According to Hair et al. (2016), 50 respondents is a good sample size to run an SEM analysis using Smart-PLS software. Also, for quantitative research analysis, engaging 100 respondents is a good sample size for a study (Hair et al., 2010). Zhang et al. (2022) conducted a study on digital transformation among SMEs in China using a sample size of 180 firms. Danso et al. (2024) similarly examined resilience capabilities in SMEs in West Africa using a sample size of 261. Also, Donkor et al. (2018) used 200 SMEs in Ghana including manufacturing and service firms as sample size in their study. Their study sort to investigate the interacting effect of market dynamism and strategic planning on the performance of small- and medium-scale enterprises (SMEs) in Ghana. These studies indicate that a sample size of 200 is consistent with recognized research practices in the field and sufficient to support quantitative study. This study therefore selected 200 SMEs and administered 2 questionnaires to each SME targeting the various managerial-level

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employees. In total, the study administered 400 questionnaires to the selected SMEs using the purposive sampling technique to select its respondents.

Personnel at the managerial level are the best point of contact with respect to the constructs (digital innovations, organizational resilience, organizational leadership, and dynamic capability) of the study. Therefore, factory managers, operational managers, administrators, general managers, and other employees at the managerial level were engaged as the sample elements for the study.

4.6 Data Collection Instrument

Data collection instruments are tools or methods used to gather data or information from various sources for research purpose (Sharma, 2022). There are a number of data collection instruments employed by researchers; however, questionnaires were employed in the gathering of data for this study. Questionnaires were employed because the study sort to obtain generalized view and uncompromised findings from the Ghanaian SMEs.

The questionnaire was designed to collect data on various constructs relevant to the study, including digital innovations, organizational resilience, the moderating role of leadership and digital innovation practices. The instrument was made up of closed-ended questions with Likert-scale responses to measure respondents' perceptions, attitudes, and experiences related to these constructs.

The questionnaire was divided into sections, each focusing on different aspects of the constructs under investigation. The questions were carefully crafted to ensure clarity, relevance, and alignment with the research objectives. The questionnaire encompassed two main parts (Part A and Part B). The Part A collected demographic data on the respondents, including, age, educational level, position held in the organization.

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The second (Part B) focused on key research constructs: digital innovations, digital innovation practices, organizational leadership and organizational resilience. This part was further divided into four sections:

Section A addressed digital innovations practices where questions we directed towards identifying the dominant digital innovation practices which are mostly used by SMEs, Section B inquired about digital innovations to understand how digital innovations have been used by these SMEs. The questionnaires were adopted from He et al.(2023), and modified to suit the objectives of this study. Section C explored organizational leadership's impact on digital innovations. Section D addressed organizational resilience, looking at capital, relationship and learning resilience as the main resilience pillars. The questionnaires were adopted from Chen et al. (2021) and adapted for the purpose of this study. The variables in part B were measured using a 5-point Likert Scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

4.7 Data Collection Method

The data collection method employed for this study was a structured questionnaire survey. Questionnaire surveys are widely used in the study to gather quantitative data from a large sample of respondents efficiently. Questionnaires allow for standardized data collection, ensuring consistency in responses and facilitating statistical analysis. Additionally, questionnaire surveys are suitable for capturing a diverse range of perspectives and opinions from participants.

The questionnaires were administered electronically using online survey platforms to facilitate data collection from a geographically dispersed sample of respondents efficiently. Participants were provided with clear instructions on how to complete the questionnaire and the number of respondents needed from the organization was clearly stated. Efforts were made to ensure a high

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response rate through reminders and incentives. Also, the responses were filtered to ensure that if any organization answered more than two, the number of responses was reduced to two, in order to maintain the originality of the results.

4.8 Data Analysis Method

The study employed Structural Equation Modeling (SEM) and the Statistical Package for the Social Sciences (SPSS) was used to analyze its results. SEM is a particularly suitable analytical technique as a result of its flexibility and robustness in handling compound path models with multiple latent variables and items. Unlike some other statistical methods, SEM does not make stringent assumptions about the distribution of data (Hair et al., 2019), making it especially useful when dealing with diverse datasets. Again, SEM permits for the examination of both direct and indirect relationships between variables, allowing for a comprehensive understanding of the underlying mechanisms at play.

SPSS on the other hand, offers a versatile platform for data analysis, allowing researchers to explore and uncover relationships among various topics and variables (Toyon, 2023). With its wide range of statistical tools and techniques, SPSS facilitates the identification of patterns, trends, and correlations within the dataset. Furthermore, SPSS provides user-friendly interfaces and visualizations that enable researchers to interpret and communicate their findings effectively.

By utilizing SEM and SPSS in tandem, the study conducted a rigorous and comprehensive analysis of the relationships between digital innovations, digital innovation practices, organizational resilience, organizational leadership and dynamic capability among SMEs in Ghana. This integrated approach enabled the study to generate valuable understandings and contribute to the existing literature on the subject.

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4.9 Ethical Considerations

Ethical considerations are very essential in the planning, execution, and dissemination of this study's findings. As such, the study adhered to the highest ethical standards to ensure the rights, well-being, and confidentiality of all participants involved. Several key ethical considerations were addressed throughout the research process:

1. **Informed Consent**: Prior to participating in the study, all potential respondents were provided with comprehensive information regarding the research objectives, procedures and benefits. Informed consent was obtained from each participant, indicating their voluntary agreement to participate in the study.
2. **Confidentiality**: All data gathered during the study were treated with the utmost confidentiality. Participant information was anonymized and stored securely to protect their privacy. Also, all identifiable information were removed during data analysis and reporting.
3. **Voluntary Participation**: Participation in the study was entirely voluntary, and participants were given the right to pull out from the study at any time without consequence. No coercion or undue influence was exerted to encourage participation.
4. **Conflict of Interest**: Transparency was maintained throughout the research process to uphold the integrity and credibility of the study.
5. **Responsible Data Management**: All data collected was used solely for research purposes and were handled in accordance with relevant data protection regulations. Measures were implemented to ensure the accuracy, reliability, and integrity of the data collected.

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By addressing these ethical considerations, this study sort to uphold the principles of integrity, respect, and beneficence in research conduct, thereby contributing to the advancement of knowledge in a responsible and ethical manner.

4.10 Chapter Summary

The chapter discussed the research methodology for this study. The chapter described the research paradigm, the research approach, where the study adopted a quantitative method. Also, the research design was discussed, research population which was made up of SMEs in the Greater Accra region of Ghana, the sampling technique and sample size was probability sampling and 300 respondents were engaged as the sample size. Questionnaires were administered as a means to collect data from the respondents. Data analysis method and the ethical considerations of the study was also discussed in the study.

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CHAPTER FIVE

DATA ANALYSIS AND DISCUSSION OF FINDINGS

5.0 Introduction

This chapter focused on the analysis of the data that was gathered as well as the findings of the study. The sections discussed in the chapter included the description of the demographic characteristics of the data as well as exploration of the relationship between the constructs of the study. The analyses of the relationships started with the evaluation of the measurement model, followed by the assessment of the structural model and the test of hypothesis. The discussion of the major findings is also presented in this chapter.

5.1 Response Rate

The data gathered were from 200 SMEs operating in the food processing and service provision sectors in the Greater Accra region of Ghana. Each SME was issued 2 questionnaires, summing up to a total of 400 questionnaires. A total of 330 questionnaires were retrieved, however 21 of the questionnaires retrieved were incomplete hence unusable. Therefore, and a total of 309 questionnaires were valid for use.

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The questionnaires were administered through WhatsApp and Emails of the various managers of the SMEs. The questionnaires were created using google forms and the link was shared through multiple WhatsApp platforms and 60 Email contacts from SME managers. In all, 330 responses were collected at the end of the data collection period. 297 links that were shared through WhatsApp and 33 links that were issued through Email, summing up to 330 retrieved responses. Out of the 330 retrieved responses, 309 of the responses were valid and used for the analysis. However, 21 responses were incomplete and therefore were discarded.

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According to Collett et al. (2014), having over 200 observations final analysis satisfies the general criteria that various researches have proposed for factor analysis (Twigg, 2010). Hence using the 309 responses retrieved is a fit for the study.

5.2 Descriptive Statistics

This section presents the demographic profile of the respondents covering gender, age, level of education and years of work as well as the descriptive statistics of the constructs being studied.

5.2.1 Demographic Characteristics of the Respondents

This section describes the demography of the respondents which include their gender, age, and level of education and their years of work. Regarding gender, as shown in Table 5.1, the table analysis shows that, out of the 309 respondents, 188 which represents 60.8% of the responses were males and 121 which represents 39.2% were females. This implies that large number of the respondents were males which indicates that SMEs are mainly made up of males.

Table 5.1: Gender

Gender			
		Frequency	Percent
Valid	Male	188	60.8%
	Female	121	39.2%
	Total	**309**	**100%**

With respect to age, as shown in Table 5.2, the response showed that 34 respondents which represented 11% of the total respondents were below 25 years, 143 representing 46.3% were

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between 26 years to 35 years, 62 respondents which were 20.1% of the respondents were between the ages of 36 years and 45 years. Also 55 respondents which made 17.8% of the total response where between 46 years and 55yrs and lastly, 4.9% were above 56 years.

From Table 5.2, 26 years to 35 years (46.3%) and 36 years to 45 years (20.1%) represented the highest age groups with respect to the ages that were operating in the various SMEs.

Table 5.2: Age Categories of Respondents

Age of Respondents			
		Frequency	Percent
Valid	Below 25yrs	34	11%
	26yrs - 35yrs	**143**	**46.3%**
	36yrs - 45yrs	62	20.1%
	46yrs - 55yrs	55	17.8%
	56yrs and above	15	4.9%
	Total	**309**	**100%**

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Again, as shown in Table 5.3, concerning the level of education, large number of the work force (45.6%) were Master's degree holders, followed by BSc holders which were 28.5% of the total number of respondents. PhD holders were next with 12.3% of the total respondents and also SHS certificate holders were 7.4% of the sampled population, with JHS certificate holders being the least with 6.1% of the respondents.

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Table 5.3: Educational Level

Educational level			
		Frequency	Percent
Valid	JHS	19	6.1%
	SHS	23	7.4%
	BSC	88	28.5%
	MASTERS	**141**	**45.6%**
	PHD	38	12.3%
	Total	**309**	**100%**

Lastly on the demographics, represented in Table 5.4, the data indicated that, 61 respondents making up 19.7% had worked in their various SMEs below 1 year, 138 respondents (44.7%) being the highest with respect to years of work had work in their respective SMEs between 1 to 5 years. 27 respondents representing 8.7% of the workers stood between 6 years to 10 years whilst 24 respondents summing up to 7.8% had worked between 11 years to 15 years. Also, 21 respondents which represented 6.8% of the respondents had worked between 16 years to 20 years and lastly, 38 respondents which totaled 12.8% had worked in SMEs above 20 years.

Table 5.4: Years of work

Years of work			
		Frequency	Percent
Valid	Below 1yr	61	19.7%
	1yrs - 5yrs	**138**	**44.7%**
	6yrs - 10yrs	27	8.7%

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	11yrs - 15yrs	24	7.8%
	16yrs - 20yrs	21	6.8%
	20yrs and above	38	12.3%
	Total	**309**	**100%**

5.2.2 Descriptive Statistics of the Study Construct

This section describes the view of the respondents with respect to the research constructs. The Table 5.6 to 5.9 shows the mean scores and standard deviation of the digital innovation practices of social media, e-commerce, data analytics and automation.

5.2.2.1 Digital Innovation Practices

This section discusses the results of the digital innovation practices proxied by social media, data analytics, e-commerce and automation. Table 5.5 shows that the average mean score for social media is 4.08 and the average standard deviation is 0.73. A mean score of 4.08 indicates that the respondents agree to the assertion that social media usage is a key practice. This is true because, using a five - point Likert scale, a mean score under 2.5 indicates that respondents were not in suppport, mean score between 2.5 and 3.5 indicates that the respondents are indecisive and a mean score over 3.5 indicates that respondents agree to the claim. Therefore, the data indicated that social media is a key practice among the SMEs surveyed.

Table 5.5: Descriptive statistics of social media usage

Social Media Usage	N	Minimum	Maximum	Mean	Std. Deviation
My firm uses social media to generate feedback from customers	309	2	5	4.06	0.743
My firm uses social media for marketing	309	3	5	4.1	0.721
My firm uses social media for marketing	309	2	5	4.06	0.709

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My firm uses social media to interact with internal and external stakeholder to generate new product ideas	309	3	5	4.06	0.727
My firm learns from other businesses through the use of social media platforms	309	2	5	4.1	0.763
Average				4.076	0.7326

Table 5.6 represents the responses relating to the use of data analytics by the various SMEs. The average mean score for data analytics was 4.1 and the standard deviation stood at 0.7. This also indicates that the respondents agreed that data analytics is a critical digital innovation practice among SMEs. This interpretation is based on the use of a five-point Likert scale, where a mean score below 2.5 indicates disagreement, a mean score between 2.5 and 3.5 reflects neutrality or indifference, and a mean score above 3.5 signifies agreement among respondents. Table 5.6: Data analytics description

Data Analytics Usage	N	Minimum	Maximum	Mean	Std. Deviation
My firm is able to make informed decisions by depending on insights from data gathered	309	2	5	4.05	0.763
My firm is able to identify areas of inefficiency helping to reduce waste and improve productivity using data analytics	309	2	5	4.07	0.733
My firm is able to use insights from data gathered to anticipate market trends and innovate faster	309	2	5	4.12	0.729
My firm is able to understand customer behavior and preferences leading to personalized customer experience by depending on insights from data gathered	309	2	5	4.1	0.723
My firm is able to identify potential risk enabling us develop proactive measures to mitigate them through the help of data gathered	309	3	5	4.13	0.72
My firm is able to analyze data to identify new revenue streams, optimizing pricing strategies which leads to increased revenue	309	2	5	4.1	0.74

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Average				4.095	0.73467

Table 5.7 indicates the responses of the respondents with regards to the use of e-commerce as a digital innovation practice. The average mean score of e-commerce was 4.1 with the average standard deviation standing at 0.7. The results indicated that, e-commerce significant digital innovation practice and is highly engaged in by various SMEs in Ghana. This is so because, a less than 2.5 average mean score indicates that the respondents disagree, between 2.5 and 3.5 indicates that respondents are indifferent and a greater than 3.5 average mean score indicates that the respondents agree.

Table 5.7: Descriptive statistics of e-commerce

E-commerce Usages	N	Minimum	Maximum	Mean	Std. Deviation
My firm sells products and services through digital channels	309	2	5	4.14	0.712
E-commerce has helped my firm to increase its market share	309	2	5	4.11	0.73
E-commerce has helped my firm to reduce its operational cost	309	2	5	4.1	0.747
E-commerce has increased my firm's response time to its customers	309	2	5	4.09	0.74
E-commerce has increased my firm's customer retention and loyalty	309	2	5	4.14	0.738
Average				4.116	0.7334

Table 5.8 describes the response of the respondents regarding automation as a digital innovation practice. The average mean score which is 4.1 and a standard deviation of 0.7 indicated that, automation is a digital innovation practice that is engaged in by SMEs in Ghana. Since a mean score below 2.5 implies that respondents disagree to the assertion, between 2.5 and 3.5 reflects a

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neutral stance and an average mean score higher than 3.5 indicates that respondents agree to the assertion.

Table 5.8: Description of automation statistics

Constructs	N	Minimum	Maximum	Mean	Std. Deviation
My firm's core processes are automated	309	2	5	4.1	0.738
My firm is more productive due to automation of certain business	309	2	5	4.1	0.751
My firm's errors are minimal as a result of automation in production processes	308	2	5	4.11	0.734
My firm is able to save cost by automating our processes	309	2	5	4.14	0.742
By automation my firm has improved our customer experience	309	2	5	4.09	0.733
Average				4.108	0.7396

5.2.2.2 Descriptive Statistics of Organizational Leadership

In this section, the study sought the views of the respondents regarding the role of leadership in achieving a resilient organization. Using the five-point Likert scale, where a mean score below 2.5 indicates disagreement, a mean score between 2.5 and 3.5 reflects neutrality or indifference, and a mean score above 3.5 signifies agreement among respondents. With an average mean score of 4.12 as seen in table 5.10, the data gathered indicated that, leadership influences the implementation and use of digital innovations and the resilience of SMEs. Table 5.9 shows the descriptive statistics of organizational leadership.

Table 5.9: Descriptive statistics of organizational leadership

Constructs	N	Minimum	Maximum	Mean	Std. Deviation
My organization's leadership inspire and motivate employees to achieve a shared vision	309	2	5	4.1	0.734
My organization's leadership often encourages experimentation and learning from failure	308	3	5	4.11	0.724

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My organization's leadership is proficient in using digital technologies to drive innovation and resilience	309	2	5	4.14	0.748
My organization's leadership often empowers employees to take ownership and make decisions	309	3	5	4.13	0.718
My organization's leadership communicate the organization's goals and visions clearly to the employees	309	2	5	4.14	0.705
My firm's leadership have a transformative vision of the digital future	309	3	5	4.1	0.707
Average				4.12	0.72267

5.2.2.3 Descriptive Statistics of Organizational Resilience

In this section, the researcher discusses the results of the respondents concerning the various organizational resilience constructs which is made up of; capital resilience, learning resilience and relationship resilience.

Table 5.10 describes the responses concerning capital resilience as an organizational resilience variable. The results indicates that the respondents agreed to the assertion that capital resilience is a relevant variable with regard to organizational resilience with an average mean score of 4.13 and standard deviation of 0.73.

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Constructs	N	Minimum	Maximum	Mean	Std. Deviation
My firm has a solid capital structure	309	2	5	4.14	0.714
My firm has multiple sources of financing	309	3	5	4.15	0.711
My firm makes profit maximization the ultimate goal of our business	309	2	5	4.13	0.751

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My firm has high capital utilization efficiency	309	3	5	4.12	0.725
My firm has good cash flow	309	2	5	4.13	0.733
Average				4.134	0.7268

Table 5.10: Descriptive statistics of capital resilience

Table 5.11 describes the responses of the respondents with respect to relationship resilience as a resilient variable for SMEs. The average mean was 4.11 and the standard deviation was 0.71 which signifies that the respondents agree to the assertion that relationship resilience is an important variable for resilience.

Table 5.11: Descriptive statistics of relationship resilience

Constructs	N	Minimum	Maximum	Mean	Std. Deviation
My firm creates unique value for its customers	309	3	5	4.14	0.719
My firm prioritizes customers in their decision making	309	2	5	4.14	0.723
My firm has good reciprocal relationship with their employees	309	3	5	4.16	0.707
My firm has good relationship with our investors	309	3	5	4.13	0.716
My firm is able to fully listen to the advice of our investors	309	3	5	4.15	0.705
Average				4.144	0.714

Table 5.12 describes the responses with respect to learning resilience as an organizational resilience variable. From the responses gathered, the assertion that learning resilience is an important variable in measuring organizational resilience is justified. This is justified by an average mean score of 3.67 and a standard deviation of 1.13 as shown in the table below.

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Table 5.12: Description of the statistics of learning resilience

Constructs	N	Minimum	Maximum	Mean	Std. Deviation
My firm chooses the better companies to study	309	1	5	3.59	1.129
My firm is able to make timely adjustments to our positioning	309	1	5	3.53	1.097
My firm is able to learn more about other experiences to help us	309	1	5	3.65	1.078
My firm is able to maintain a positive learning environment	309	1	5	3.81	1.249
My firm is able to reframe challenges into opportunities for growth	309	1	5	3.79	1.104
Average				3.674	1.1314

5.3 Summary of the Descriptive Statistics for Digital Innovation Practices

Table 5.13 describes the digital innovation practices that is largely employed by SMEs in Ghana. From the Table 5.13 below, Social Media has a mean score of 3.94 which is the highest among the various digital innovation practices. This implies respondents identified with Social Media as compared to the other digital innovation practices. E-commerce had a mean score of 3.67 which was the second highest engaged digital innovation practice according to the respondents. Automation and Data Analytics followed with 3.42 and 3.31 respectively according to the responses gathered.

Table 5.13: Descriptive Statistics of Digital Innovation Practices

Descriptive Statistics of Digital Innovation Practices					
	N	Minimum	Maximum	Mean	Std. Deviation

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Social Media	309	1.00	5.00	3.9366	0.90704
Data Analytics	309	1.00	5.00	3.3101	0.96283
ECOMMERCE	309	1.00	5.00	3.6706	0.90515
AUTOMATION	309	1.00	5.00	3.4162	0.99551
Valid N (listwise)	309				

From the Table 5.13 above, it was seen that the respondents identified that Social Media was largely engaged by SMEs in Ghana. This is due to its ease of use and ease of inclusion into work practices.

5.4 Model Evaluation

Partial least squares Structural Equation Modeling (PLS-SEM) involves assessing both the measurement and structural models. The measurement model shows the connections between constructs and their accompanying indicator variables, whereas the structural model shows the paths between constructs (Hair et al., 2017). This section focuses on evaluating these models.

Before examining the structural model, the measurement model was evaluated to ensure that it met quality criteria. This study investigated the reliability and validity assumptions of the structural measurement model using the standards established by Ahmed, Ahmad, and Jaaffar (2017). To ensure construct dependability, the measurement model in this study was carefully validated for both indicator reliability and internal consistency. Furthermore, the model's validity was thoroughly evaluated using convergent and discriminant validity tests, ensuring that the constructs measured accurately represent the intended theoretical concepts and are distinct from one another, thereby confirming the overall robustness of the measurement model.

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5.4.1 Indicator Reliability

The indicator reliability identifies the degree to which a variable or a set of variables are reliable with respect to what it measures. With regard to the rule of thumb, if the outer loadings of an indicator is 0.70 and above, it is said to be a reliable indicator (Hair et al., 2017). Table 5.14 shows the outer loading of the variables; loadings with asterisk indicates that they are below the threshold, (0.70), and were removed from the model.

Previous studies on the other hand identify that, indicators with loadings below the threshold but within 0.40 and 0.70 can be maintained only if their removal will affect the composite reliability and average variance extracted of the associated construct (Avkiran, 2018).

Table 5.14 Indicator Reliability

Cons	AT	DA	ECOM	OL	ORCR	ORLR	ORRR	SM	OL x AT	OL x ECOM	OL x DA	OL x SM
AT1	0.770											
AT2	0.780											
AT3	0.718											
AT4	0.799											

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AT5	0.648											
DA1		0.770										
DA2		0.660										
DA3		0.708										
DA4		0.750										
DA5		0.713										
DA6		0.710										
ECOM1			0.725									
ECOM2			0.735									
ECOM3			0.715									
ECOM4			0.804									

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ECO M5			0.702									
OL1				0.731								
OL2				0.757								
OL3				0.794								
OL4				0.749								
OL5				0.803								
OL6				0.773								
ORC R1					0.840							
ORC R2					0.719							
ORC R3					0.773							
ORC R4					0.768							

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ORC R5					0.705							
ORLR 1						0.834						
ORLR 2						0.812						
ORLR 3						0.846						
ORLR 4						0.757						
ORLR 5						0.769						
ORR R1							0.792					
ORR R2							0.749					
ORR R3							0.781					
ORR R4							0.760					
ORR R5							0.777					

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SM1								0.818				
SM2								0.787				
SM3								0.663				
SM4								0.856				
SM5								0.838				
OL x SM												1.000
OL x DA											1.000	
OL x AT									1.000			
OL x ECOM										1.000		

Source: Field Data (2024)

Subjecting the results to the rule of thumb, the loading with asterisks, including; AT5, DA2 and SM3 were retained since their removal will negatively affect the Cronbach's alpha and the average Variance Extracted (AVE).

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Below is Figure 5.1 showing the outer loadings for the analysis.

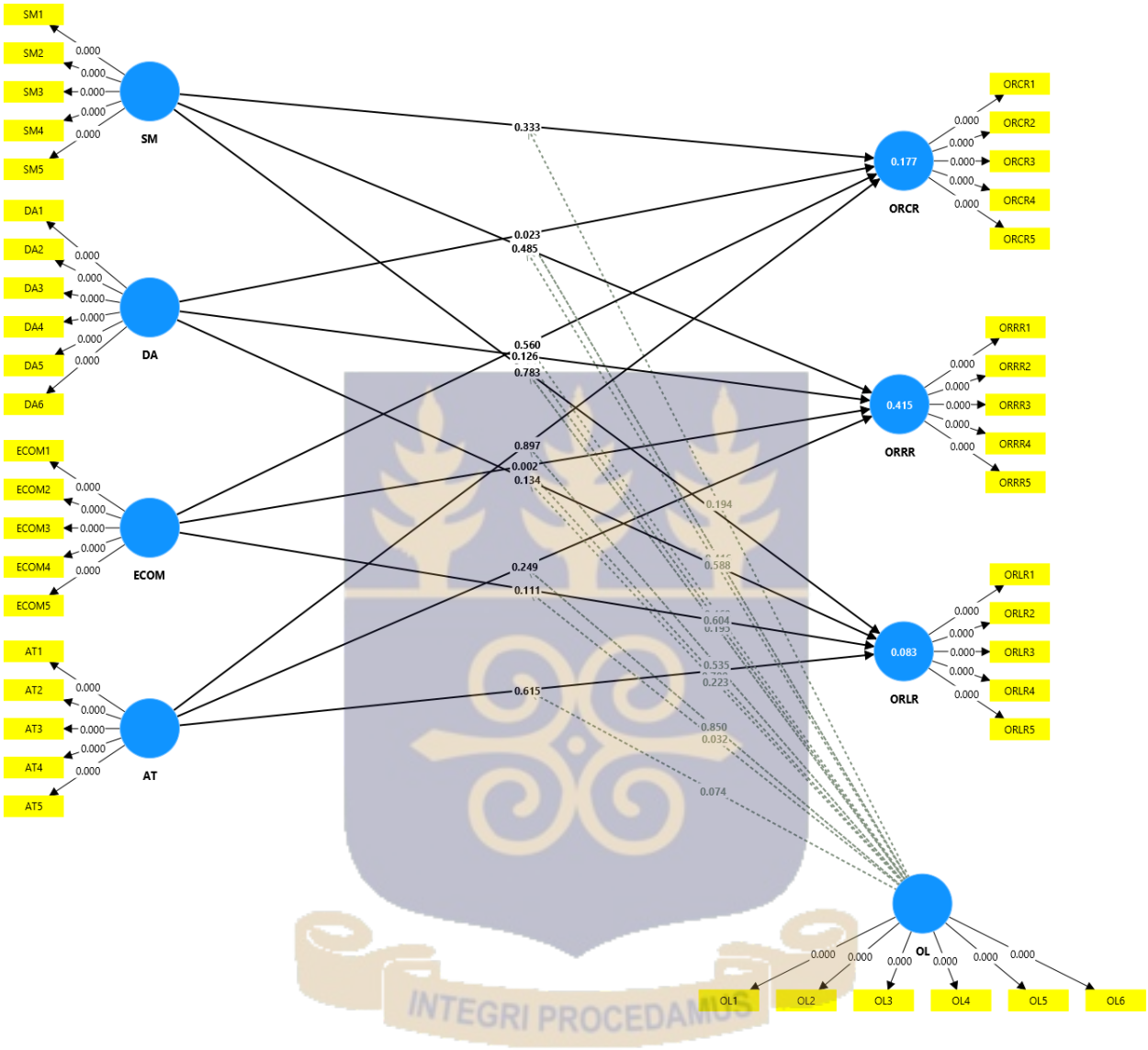

Figure 5.1: Indicator Outer Loadings

5.4.2 Internal Consistency Reliability

The internal consistency of the constructs was assessed using Cronbach's alpha and composite reliability, as presented in Table 5.15. According to established guidelines, values of 0.70 or higher for both Cronbach's alpha and composite reliability indicate acceptable reliability, whereas values below 0.70 are considered inadequate. As shown in Table 5.15, all constructs in this study recorded

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Cronbach's alpha and composite reliability values exceeding the 0.70 threshold, confirming their internal consistency and, thus, their acceptance for further analysis.

Table 5.15: Cronbach alpha, (rho_a), (rho_c) and average variance extracted (AVE)

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AT	0.810	0.835	0.861	0.555
DA	0.817	0.841	0.865	0.517
ECOM	0.791	0.803	0.856	0.543
OL	0.861	0.862	0.896	0.590
ORCR	0.820	0.833	0.874	0.581
ORLR	0.866	0.892	0.901	0.645
ORRR	0.830	0.831	0.881	0.596
SM	0.865	0.903	0.896	0.635

Source: Field data (2024)

5.4.3 Convergent Validity

The Average Variance Extracted (AVE) assesses the convergent validity of constructs, with values above 0.50 indicating that a construct explains more than 50% of the variance in its indicators. As shown in Table 5.15, all constructs recorded AVE values exceeding 0.50, thereby meeting the threshold for convergent validity and confirming that each construct explains a substantial portion of the variance in its respective indicators.

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5.4.4 Discriminant Validity

Establishing discriminant validity demonstrates the uniqueness of a construct and represents a phenomenon that other constructs do not capture (Hair et al., 2017). The discriminant validity of the constructs was analyzed using the Fornell-Larcker criterion, indicator cross-loadings, and the heterotrait-monotrait ratio (HTMT).

5.4.4.1 Fornell-Lacker Criterion

The Fornell-Larcker criterion is used to assess discriminant validity by comparing the square root of each construct's Average Variance Extracted (AVE) with its correlations to other constructs. According to this criterion, the square root of a construct's AVE should be greater than its highest correlation with any other construct (Fornell & Larcker, 1981; Hair et al., 2016). Additionally, AVE values must meet the minimum threshold of 0.50 to be considered acceptable.

Table 5.16 presents the results of the Fornell-Larcker analysis, displaying the square roots of the AVEs along the diagonal and the inter-construct correlations. The findings show that the square root of each construct's AVE exceeds its correlations with other constructs, with all AVE values surpassing 0.50. This confirms that each construct shares more variance with its own indicators than with others, thereby establishing discriminant validity.

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Table 5.16: Fornell-Lacker Criterion

Constructs	AT	DA	ECOM	OL	ORCR	ORLR	ORRR	SM
AT	**0.745**							
DA	-0.016	**0.719**						
ECOM	0.170	0.256	**0.737**					
OL	0.208	0.158	0.442	**0.768**				
ORCR	0.104	0.174	0.239	0.377	**0.763**			
ORLR	-0.033	-0.079	0.012	-0.154	-0.122	**0.803**		
ORRR	0.203	0.194	0.421	0.613	0.512	-0.191	**0.772**	
SM	0.070	-0.300	-0.184	-0.120	-0.109	-0.002	-0.079	**0.797**

Source: Field Data (2024)

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5.4.4.2 Indicator Cross-loadings

The cross-loadings technique is used to further assess discriminant validity by ensuring that each indicator's outer loading on its assigned construct is higher than its loadings on other constructs. In other words, the outer loadings should exceed any cross-loadings with unrelated constructs. As presented in Table 5.17, all measurement items exhibit stronger loadings on their respective constructs than on others, confirming that each indicator is more closely associated with its intended construct. These results provide additional evidence of discriminant validity.

Table 5.17: Indicator Cross-loadings

Constructs	AT	DA	ECOM	OL	ORCR	ORLR	ORRR	SM
AT1	**0.769**	-0.037	0.109	0.100	0.075	-0.029	0.182	0.123
AT2	**0.782**	-0.037	0.111	0.224	0.115	-0.068	0.150	0.042
AT3	**0.718**	0.005	0.134	0.120	0.006	0.013	0.109	0.039
AT4	**0.798**	0.029	0.185	0.185	0.093	-0.002	0.190	0.012
AT5	**0.648**	-0.017	0.060	0.116	0.054	-0.015	0.043	0.028
DA1	0.077	**0.772**	0.231	0.126	0.189	-0.043	0.195	-0.213
DA2	-0.082	**0.658**	0.055	0.031	0.085	-0.061	0.055	-0.227
DA3	-0.028	**0.710**	0.223	0.147	0.106	-0.029	0.123	-0.211
DA4	0.006	**0.748**	0.173	0.100	0.102	-0.113	0.149	-0.208
DA5	-0.060	**0.712**	0.178	0.109	0.103	-0.022	0.142	-0.201

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DA6	-0.056	**0.711**	0.188	0.143	0.127	-0.075	0.119	-0.254
ECOM1	0.161	0.200	**0.725**	0.349	0.168	-0.008	0.339	-0.168
ECOM2	0.157	0.152	**0.735**	0.236	0.159	0.042	0.267	-0.122
ECOM3	0.106	0.152	**0.715**	0.332	0.137	0.057	0.268	-0.156
ECOM4	0.070	0.220	**0.804**	0.368	0.241	0.008	0.370	-0.116
ECOM5	0.150	0.206	**0.701**	0.332	0.157	-0.046	0.285	-0.123
OL1	0.147	0.117	0.364	**0.731**	0.303	-0.101	0.504	-0.041
OL2	0.125	0.118	0.325	**0.757**	0.272	-0.112	0.433	-0.103
OL3	0.183	0.195	0.357	**0.794**	0.361	-0.157	0.482	-0.136
OL4	0.162	0.077	0.305	**0.748**	0.283	-0.100	0.438	-0.091
OL5	0.185	0.130	0.353	**0.803**	0.234	-0.144	0.459	-0.092
OL6	0.154	0.084	0.328	**0.773**	0.270	-0.095	0.499	-0.088
ORCR1	0.049	0.160	0.228	0.353	**0.842**	-0.120	0.436	-0.105
ORCR2	0.064	0.096	0.094	0.291	**0.731**	-0.049	0.363	-0.086

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ORCR3	0.142	0.117	0.202	0.275	**0.767**	-0.113	0.398	-0.101
ORCR4	0.083	0.181	0.196	0.269	**0.763**	-0.075	0.391	-0.101
ORCR5	0.065	0.097	0.183	0.233	**0.703**	-0.105	0.359	-0.005
ORLR1	-0.019	-0.117	-0.054	-0.125	-0.034	**0.771**	-0.154	0.101
ORLR2	0.014	-0.084	-0.029	-0.080	-0.083	**0.781**	-0.168	0.039
ORLR3	-0.031	-0.085	-0.029	-0.150	-0.083	**0.830**	-0.148	-0.011
ORLR4	-0.036	-0.046	0.052	-0.100	-0.156	**0.799**	-0.176	-0.006
ORLR5	-0.038	-0.018	0.070	-0.142	-0.116	**0.834**	-0.137	-0.076
ORRR1	0.205	0.159	0.348	0.466	0.437	-0.118	**0.789**	-0.076
ORRR2	0.153	0.162	0.292	0.456	0.445	-0.147	**0.750**	-0.045
ORRR3	0.151	0.127	0.366	0.482	0.386	-0.154	**0.778**	-0.112

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ORRR4	0.157	0.134	0.316	0.455	0.333	-0.142	**0.761**	-0.024
ORRR5	0.119	0.166	0.301	0.506	0.377	-0.174	**0.781**	-0.045
SM1	0.098	-0.265	-0.162	-0.137	-0.057	0.054	-0.090	**0.803**
SM2	0.058	-0.216	-0.142	-0.057	-0.065	-0.028	-0.035	**0.795**
SM3	0.033	-0.242	-0.185	-0.093	0.017	-0.030	-0.053	**0.669**
SM4	0.085	-0.269	-0.134	-0.077	-0.112	0.025	-0.077	**0.850**
SM5	0.002	-0.230	-0.163	-0.116	-0.121	-0.054	-0.053	**0.852**

Source: Field Data (2024)

5.4.4.3 Heterotrait-monotrait ratio (HTMT)

The HTMT was also used to test the discriminant validity of the constructs. The results show that values are below 0.9 or 0.85 which is the threshold for the HTMT. This implies that all the construct showed discriminant validity based on the HTMT method as shown in Table 5.18 below.

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Table 5.18: Heterotrait-monotrait ratio (HTMT)

Constructs	AT	DA	ECOM	OL	ORCR	ORLR	ORRR	SM
AT								
DA	0.091							
ECOM	0.205	0.297						
OL	0.239	0.183	0.530					
ORCR	0.128	0.196	0.287	0.441				
ORLR	0.051	0.112	0.092	0.171	0.144			
ORRR	0.220	0.222	0.511	0.722	0.620	0.229		
SM	0.099	0.364	0.238	0.147	0.115	0.089	0.091	

Source: Field Data (2024)

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5.5 Structural Model Assessment

The structural model is evaluated by assessing the associations amongst the constructs and the predictive power of the model which includes the multicollinearity assessment, significance of path, coefficient of determination, effect size, predictive relevance and model fitness.

5.5.1 Multicollinearity Assessment

The assessment of multicollinearity helps to avoid biases in route coefficients that might emerge when predictors are collinear. The variance inflation factor (VIF) was utilized to assess

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multicollinearity in the structural equation model. Hair et al. (2014) and Sarstedt et al. (2014) recommend a good VIF of < 5, with values over 5 suggesting possible collinearity difficulties. Table 5.19 demonstrates that all predictors have VIF values less than 5.0, suggesting the absence of multicollinearity issues across the predictor components.

Table 5.19: Multicollinearity Assessment (VIF)

CONSTRUCTS	ORCR	ORLR	ORRR
Automation	1.069	1.187	1.096
Data Analytics	1.175	1.190	1.324
E-commerce	1.335	1.335	1.376
Organizational Leadership	1.302	1.340	1.304
Social Media	1.359	1.126	1.153

Source: Field Data (2024)

5.5.2 Assessment of Path Significance

The significance level of the hypothesis relationships was tested by employing the p-value approach. The p-value aids in identifying path coefficients that have been incorrectly assumed to be significant whilst they actually are insignificant. The study employed the p-value (0.05) and two tailed tests in identifying statistically significant levels in the relationships existing between the dependent and independent variables. The p-value was estimated at 0.05 because previous study assessed their relationship at 5% significance level (Hair et al. 2017).

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With respect to the above, any hypothesis with p-value greater than 5% (0.05) is not accepted. Table 5.20 presents the results of the path significance of the hypothesized relationships at 0.05 significant level using the two-tailed test.

Table 5.20: Test of Direct Relationships

Constructs	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decision
AT -> ORCR	0.009	0.018	0.067	0.130	0.897	Rejected
AT -> ORLR	-0.037	-0.035	0.073	0.503	0.615	Rejected
AT -> ORRR	0.065	0.075	0.056	1.153	0.249	Rejected
DA -> ORCR	0.142	0.151	0.063	2.266	0.023	Accepted
DA -> ORLR	-0.093	-0.104	0.062	1.499	0.134	Rejected
DA -> ORRR	0.084	0.098	0.055	1.532	0.126	Rejected
ECOM -> ORCR	0.035	0.042	0.061	0.583	0.560	Rejected
ECOM -> ORLR	0.119	0.116	0.075	1.593	0.111	Rejected
ECOM -> ORRR	0.165	0.167	0.053	3.082	0.002	Accepted
SM -> ORCR	-0.088	-0.080	0.091	0.968	0.333	Rejected
SM -> ORLR	0.027	0.043	0.098	0.276	0.783	Rejected
SM -> ORRR	0.046	0.018	0.066	0.699	0.485	Rejected
OL x AT -> ORCR	0.046	0.038	0.074	0.621	0.535	Rejected
OL x AT -> ORLR	0.105	0.101	0.059	1.788	0.074	Rejected
OL x AT -> ORRR	-0.012	-0.021	0.061	0.190	0.850	Rejected

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OL x ECOM -> ORCR	0.050	0.041	0.069	0.726	0.468	Rejected
OL x ECOM -> ORLR	0.124	0.128	0.058	2.141	0.032	Accepted
OL x ECOM -> ORRR	0.016	0.014	0.058	0.267	0.790	Rejected
OL x DA -> ORCR	-0.061	-0.074	0.076	0.813	0.416	Rejected
OL x DA -> ORLR	0.071	0.074	0.058	1.219	0.223	Rejected
OL x DA -> ORRR	-0.032	-0.048	0.062	0.519	0.604	Rejected
OL x SM -> ORCR	0.118	0.102	0.091	1.299	0.194	Rejected
OL x SM -> ORLR	-0.103	-0.113	0.080	1.295	0.195	Rejected
OL x SM -> ORRR	-0.042	-0.011	0.078	0.542	0.588	Rejected

Source: Field Data (2024)

DA= Data Analytics; SM= Social Media; AT= Automation; E-com= E-commerce; OL= Organizational Leadership; ORCR= Organizational Resilience Capital Resilience; ORLR= Organizational Resilience Leadership Resilience; ORRR= Organizational Resilience Relationship Resilience

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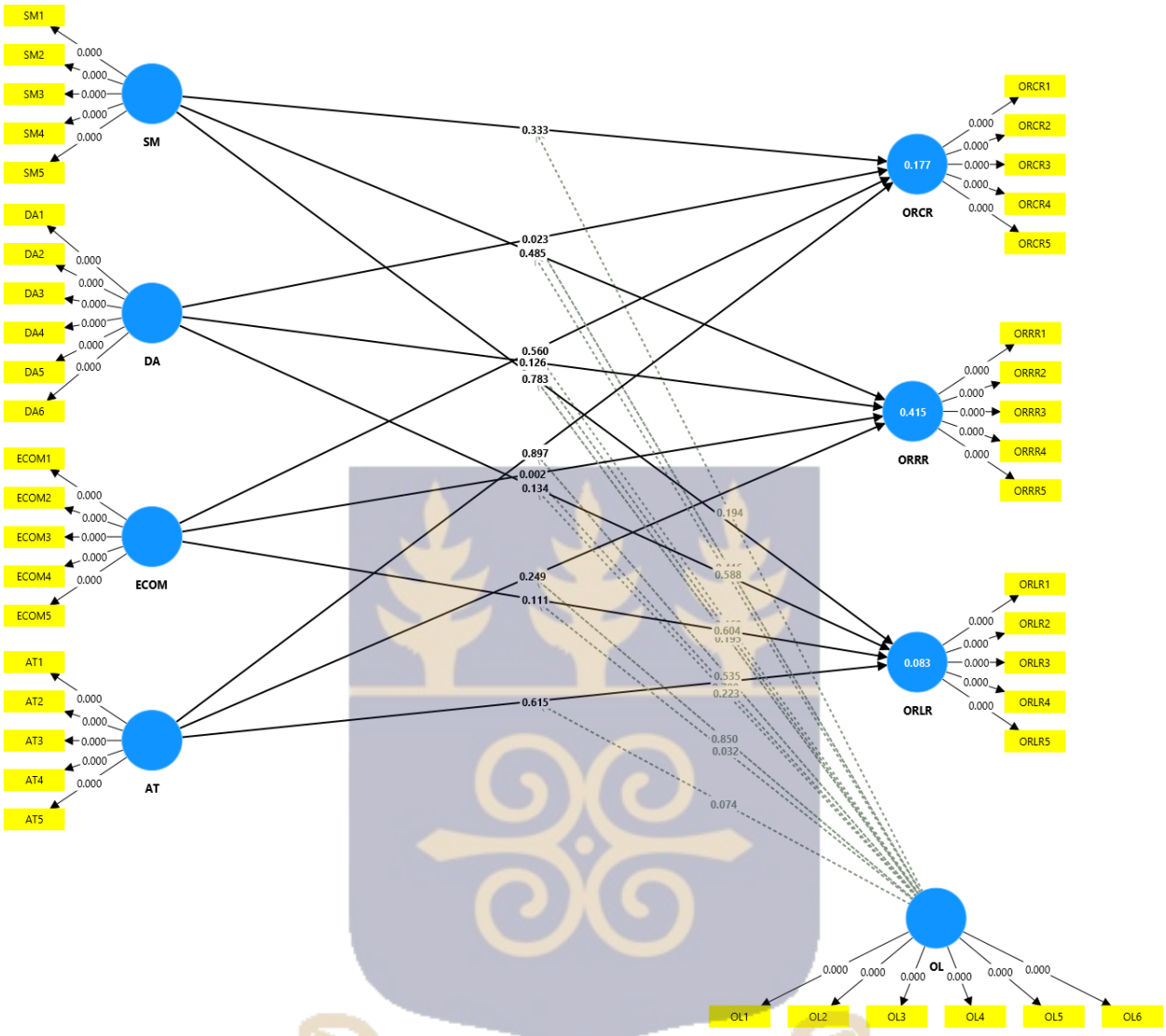

Figure 5.2: Bootstrapping output of direct relationship

From Table 5.20 above, the path relationships that were hypothesized for the various digital innovation practices, organizational leadership and the organizational resilience dimensions were demonstrated. The hypothesized relationship between Data analytics and Capital resilience was accepted (H_{1a}: *Data analytics has a positive impact on the capital resilience of SMEs*), however, that of Data Analytics and learning resilience (H_{1b}: *data analytics has a positive impact on learning*

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resilience of SMEs) and Data Analytics and Relationship Resilience (*H_{1c}: data analytics has a positive impact on relationship resilience of SMEs*) were rejected.

The hypothesized relationship between Social Media and Capital Resilience (*H_{2a}: Social media has a positive impact on Capital resilience of SMEs*), social media and Learning Resilience (*H_{2b}: Social media has a positive impact learning resilience of SMEs*) and that of Social Media and Relationship Resilience (*H_{2c}: Social media has a positive impacts relationship resilience of SMEs*) were all rejected.

Similarly, that of Automation and Capital Resilience (*H_{3a}: Automation has a positive impact on the capital resilience of SMEs),* Automation and Learning Resilience and Automation (*H_{3b}: Automation has a positive impact on the learning resilience of SMEs*) and Relationship Resilience (*H_{3c}: Automation has a positive impact on the relationship resilience of SMEs*) were all rejected.

The hypothesized relationship between E-Commerce and Capital Resilience (H_{4a}: E-commerce has a positive impact on the capital resilience of SMEs) and of E-Commerce and Learning Resilience (H_{4b}: E-commerce has a positive impact on the learning resilience of SMEs) were also rejected, however that of E-Commerce and Relationship Resilience was accepted (H_{4c}: E-commerce has a positive impact on the relationship resilience of SMEs); therefore, they showed significant relationship.

Organizational leadership was seen not to have any influence on the relationship that exists between social media and all the resilience variables. This implied that $H5_a$ (organizational leadership moderates the relationship between social media and capital resilience), $H5_b$ (organizational leadership moderates the relationship between social media and learning

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resilience) and $H5_c$ (organizational leadership moderates the between social media and relationship resilience) were all rejected.

Also, $H5_d$ (organizational leadership moderates the effect of e-commerce on capital resilience) was rejected. However, $H5_e$ (organizational leadership moderates the effect of e-commerce on learning resilience) was accepted and $H5_f$ (organizational leadership moderates the effect of e-commerce on relationship resilience) was rejected.

Again, organizational leadership did not have any moderation effect on the relationship between automation and the resilience variables. That is, $H5_g$ (organizational leadership moderates the influence of automation on capital resilience), $H5_h$ (organizational leadership moderates the influence of automation on learning resilience) and $H5_i$ (organizational leadership moderates the influence of automation on relationship resilience) were all rejected.

Finally, the hypothesized relationship of the moderating role of organizational leadership on the influence of data analytics on the relationship variables were all rejected. $H5_j$ (organizational leadership moderates the relation between data analytics and capital resilience), $H5_k$ (organizational leadership moderates the relationship between data analytics and learning resilience) and $H5_l$ (organizational leadership moderates the relationship between data analytics and relationship resilience) were also all rejected.

5.5.3 Coefficient of Determination (R^2)

The structural model is evaluated using the coefficient of determination, which is the R^2. The collective effects of the exogenous latent variables and the endogenous latent variables are usually represented by the coefficient of determination (R^2). The R^2 represents the squared correlation of

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the actual values and the predicted values. According to the rule of thumb, the R^2 is substantial of the value is 0.75, it is moderate when the value is 0.50 and weak when it is 0.25 (Hair et al., 2011).

Table 5.21 below shows the R^2 and the Adjusted R^2 of the Digital Innovation practices and the Organizational Resilience constructs. From the table, it is observed that, applying the rule of thumb, there is a weak combined effect of the digital innovation practices (Social media, Data Analytics, E-Commerce and Automaton) on the Capital Resilience of firms. This is because the R^2 obtained by Capital Resilience is 0.071 which is less than 0.75 which indicates a strong combined effect.

Also. the Relationship Resilience and Learning Resilience R^2 values were 0.194 and 0.009 respectively which also implies that, there is a weak combined effect of the digital innovation practices (Social Media, Data Analytics, E-commerce and Automation) on the Relationship Resilience and Learning Resilience.

Table 5.21: R Squared and R Squared Adjusted of the Constructs

Constructs	**R Square**	**Adjusted R Square**
Capital Resilience	0.071	0.059
Relationship Resilience	0.194	0.183
Learning Resilience	0.009	-0.004

Source: Field Data (2024)

5.6 Key Digital Innovation Practices Adopted by Ghana's SMEs

The study looked at digital innovation practices used by SMEs in Ghana, with a focus on the four key digital innovation practices: data analytics, social media, e-commerce, and automation. These

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digital technologies are frequently employed by SMEs to increase efficiency, broaden market reach, and develop stakeholder connections, all of which contribute to overall resilience.

From the analysis, social media was seen as the most engaged digital innovation practice by SMEs in Ghana, followed by E-commerce, Automation and then finally Data Analytics which was the list engaged. This is in line with the findings of Subagja et al. (2022) and Willetts et al. (2020), who identified that SMEs have high level of engagement with social media whereas there is low engagement of data analytics. This answers our first research question (What are the key digital innovation practices adopted by SMEs in Ghana?)

5.7 Discussion of Findings

This section presents a discussion of the findings obtained from the analysis of the data gathered from the respondents of the questionnaires. Additionally, the objectives of the study were discussed in the section. This section discussed the findings in accordance with the research questions in this study.

5.7.1 key Digital Innovation Practices Adopted by SMEs in Ghana

The first object of the study was to investigate which of the four digital innovation practices (social media, automation, e-commerce and data analytics) is largely adopted by the Ghanaian SMEs. The SMEs confirmed their adoption and use of these digital innovation practices in the running of their business activities.

The mean value for social media was 3.94, indicating that respondents perceived social media as a digital innovation approach that positively influenced their operations. This findings is supported by Subagja et al. (2022), who identified in their research that the use of social media played very important role on innovativeness among SMEs performance. Social media, being a popular digital

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innovation technique among Ghana's SMEs, helps provide a key platform for real-time client involvement and input (Akanfe et al., 2025), helping SMEs to respond swiftly to market developments. Social media platforms such as Facebook, Instagram, and WhatsApp have become indispensable tools for SMEs to engage with clients, get feedback, and establish long-term partnerships (Subagja et al., 2022).

The study, despite the acceptance of the other digital innovation practices as influential, found that Social Media is the most adopted digital innovation practice among the Ghanaian SMEs. With an average mean of 3.94, social media was concluded upon as the most adopted digital innovation practice among the Ghanaian SMEs. This finding is supported by Bruce et al. (2023) and Trawnih et al. (2021), who reported that social media is largely adopted by SMEs and assists firms productivity whilst enhancing their sustainability. Bruce et al. (2023) also indicated that social media had a positive correlation with SME manufacturing performance.

5.7.2 The Impact of Digital Innovation on Organizational Resilience

Digital innovations have become critical to improving the resilience of companies, particularly small and Medium Enterprises (SMEs) (Cueto et al., 2022). In Ghana, SMEs are confronted by a number of obstacles, including limited resources and increased risks owing to their small size. The second research object was to determine the impact of Digital Innovation on Organizational Resilience among the Ghanaian SMEs. The study indicated that SMEs asserted to the relevance of digital innovation in today's changing business world.

Despite the adoption of these digital innovation practices by the Ghanaian SMEs, the study found out that overall, digital innovation had no significant effect on organizational resilience. This finding is however different from that of Xiao and Su (2022), who identified that digital transformation impacted sustainability. However, He et al. (2023) also identified that investing in

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strategic technology may not necessarily influence the ability of employees to accurately perceive external turmoil, seeking available resources and developing adaptive solutions towards resilience.

The findings indicate that not all digital innovation practices exert uniform influence on the three dimensions of organizational resilience among Ghanaian SMEs. While data analytics showed a significant link with capital resilience and e-commerce with relationship resilience, automation and other paths were non-significant. These mixed results are interpreted in light of the analytical separation of the four practices adopted in this study. Although the practices were modelled as distinct to permit clear hypothesis testing, real-world overlaps (such as automation embedded in e-commerce systems or social media data feeding analytics) may have contributed to the non-significant effects observed. The selective influences therefore reflect both substantive relationships and the boundary conditions of construct operationalization in a developing-economy context.

5.7.3 Organizational Leadership Moderates the Impact Digital Innovation on Organizational Resilience

The third research object sort to determine the effect of organizational leadership which is the moderator on the relationship between digital innovation and organizational resilience. The study indicated that despite the influence of organizational leadership on sustainability, organizational leadership did not moderate the effect of digital innovation on organizational resilience. This findings is supported by Purbiyati et al. (2023) who indicated in their research that, empowering leadership does not moderate the influence of digital innovation on organizational resilience, this finding is in line with that of this study.

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5.8 Digital Innovation Practices and Organizational Resilience.

The study also sort to measure the individual effect of the digital innovation practices on the individual organizational resilience variables. This aimed at helping SMEs and policy to understand where to channel resources and energy. The study revealed different effects of these digital innovation practices on the organizational resilience.

5.8.1 Data Analysis and Organizational Resilience

Data analytics is a strong instrument for achieving financial stability (Mertzanis & American University in Cairo, 2018) and resource optimization. The study found that SMEs that use data analytics to monitor financial performance, minimize waste, and enhance decision-making had higher capital resilience. The study verified hypothesis H1a (Data analytics favorably influences capital resilience), indicating that SMEs that successfully manage their financial data using analytics are better suited to withstand financial turbulence. From the data, H1a was accepted and this finding is supported by ALI et al. (2020) who identified that, big data analytics strategies influence banks sustainability and their financial performance. Real-time surveillance of sales and customer data allows SMEs to find cost-cutting and revenue-growth possibilities. As a result, these businesses are better prepared to weather economic downturns.

The study on the other hand, revealed that, despite the capital resilience benefit of data analytics, SMEs are unable to build good relationship resilience using data analytics. From the study, H1b (data analytics positively influences relationship resilience) was not accepted. This findings is supported by Eisenberg et al. (2019), who established that during extraordinary events, data analytics may be useless during decision making. This may be as a result of the uniqueness of the event.

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The study also established that there is no positive influence of data analytics on learning resilience as suggested by H1c (data analytics positively influence learning resilience). From the study, the data gathered established that, the use of data analytics does not facilitate the building of good learning resilience.

5.8.2 Social Media and Organizational Resilience

Social media is crucial in helping SMEs build strong relationships with their stakeholders (Kaushik et al., 2018), such as customers, suppliers, and partners. Also, Mazzarol (2015), identified that SMEs who use social media sites like Facebook, Instagram, and LinkedIn efficiently communicate with consumers, develop loyalty, and maintain open communication lines. This participation increases relationship resilience because firms can respond rapidly to criticism, change their offerings, and keep client confidence amid crises.

According to Fernández-Miguélez et al. (2020) and Han et al. (2020), social media has a positive influence on the financial performance of restaurants and significantly contributes to relationship-building and knowledge sharing. However, this study's finding indicated otherwise, the data indicated that, social media has no positive influence on the capital, learning and relationship resilience of SMEs.

The evidence gathered from the data suggested that the influence of social media on organizational resilience is minimal. The hypothesis H2a (Social media has positive influence on capital resilience) was therefore rejected, H2b (social media has positive influence on relationship resilience) and H2c (social media has positive influence on learning resilience) were also rejected. The minimal influence of social media on the resilient variables can be attributed to organizational,

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technological and financial challenges (Lee & Kwak, 2012) relating to the adoption and usage of social media.

5.8.3 Automation and Organizational Resilience

Automation improves the learning and flexibility of SMEs by allowing for continual process improvement and decreasing human error (Tejani, 2024). Automation is not just a good digital innovation practice to have but a critical service for survival of organizations (Sobczak, 2022). Organizations largely adopt automation due to its cost saving benefit that improves their financial performances (Babatunde, 2024).

Regardless of the benefits identified above, this study proved otherwise, the H3a (Automation has positive influence on capital resilience) was rejected. In the same way, H3b and H3c (Automation has positive influence on learning resilience) and (Automation has positive influence on relationship resilience) respectively were also rejected by the SMEs. This result can be attributed to the lack of knowledge in automation technologies or software as this was identified by (Scott et al., 2021).

5.8.4 E-Commerce and Organizational Resilience

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The use of e-commerce has enabled SMEs to broaden their market reach and get better insights into customer behavior (Mazzarol, 2015). Small and medium-sized enterprises (SMEs) may fine-tune their marketing tactics, understand client preferences, and constantly refine their service offerings by exploiting data created by online transactions (Ehikioya & Zeng, 2021). This process of learning from customer contacts contributes to learning resilience as SMEs improve their ability to adapt to market changes and changing consumer requirements.

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According to Costa and Castro, (2021), more than past times, businesses are using digital marketplaces to become more important and stay competitive. They further established that, accessibility, flexibility and convenience make the internet the perfect place for today's consumers.

On the contrary, the H4a and H4b (E-commerce has a positive influence of capital resilience) and (E-commerce has a positive influence on learning resilience) of this study were all rejected. The findings of the study indicated that, online trading (e-commerce) does not however have significant impact on the capital resilience of SMEs as well as the learning resilience of the SMEs in Ghana.

However, hypothesis H4c (e-commerce has a positive influence on relationship resilience), was validated, emphasizing the importance of digital tools in developing adaptation. This finding is in line with that of Mazzarol, (2015) who identified that, e-commerce as a digital innovation practice aids SMEs in building a strong relationship resilience.

5.9 The Moderating Role of Organizational Leadership

Leadership has a vital role in regulating the influence of digital innovations on organizational resilience. Effective leaders promote digital transformation by cultivating a culture of innovation and adaptation inside their organizations (Asif et al., 2024). However, the study's findings indicate that apart from $H5_d$ (organizational leadership moderates the relationship between e-commerce and learning resilience), the rest of the hypothesized relationship of the moderating variables were all rejected. This aligns with the findings of Purbiyati et al. (2023), who established that empowering leadership does not moderate the influence of digital transformation on organizational resilience.

The hypothesis $H5_a$ (organizational leadership moderates the relationship between social media and capital resilience), $H5_b$ (organizational leadership moderates the relationship between social

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media and learning resilience), $H5_c$ (organizational leadership moderates the relationship between social media and relationship resilience) were all rejected.

Similarly, $H5_d$ (organizational leadership moderates the relationship between e-commerce and capital resilience) was rejected. However, $H5_e$ (organizational leadership moderates the relationship between e-commerce and learning resilience) was accepted, indicating that organizational leadership plays a key role in effect that e-commerce has on learning resilience. Nonetheless, $H5_f$ (organizational leadership moderates the relationship between e-commerce and relationship resilience) was rejected.

Also, $H5_g$ (organizational leadership moderates the relationship between automation and capital resilience), $H5_h$ (organizational leadership moderates the relationship between automation and learning resilience) and $H5_i$ (organizational leadership moderates the relationship between automation and relationship resilience) were all rejected. And on the same vine, $H5_j$ (organizational leadership moderates the relationship between data analytics and capital resilience), $H5_k$ (organizational leadership moderates the relationship between data analytics and learning resilience) and $H5_l$ (organizational leadership moderates the relationship between data analytics and relationship resilience) were all rejected. The rejection of these hypothesis may be due to the lack of adequate knowledge of leadership in these digital innovation practices as mentioned by (Bastidas et al., 2023). This implies that leadership does not necessitate the level of impact digital innovations have on the resilience of SMEs in today's business environment.

5.10 Chapter Summary

The chapter delved into the analysis of the data collected and the interpretation of findings. It began with an examination of demographic data for both respondents and firms, followed by the

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application of Partial Least Squares Structural Equation Modeling (PLS-SEM). The PLS-SEM process involved an initial evaluation of the measurement model, succeeded by an assessment of the structural model. Additionally, the chapter explored key digital innovation practices that influence organizational resilience and discussed how leadership moderates the relationship between digital innovations and organizational resilience.

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CHAPTER SIX

SUMMARY OF FINDINGS, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

6.0 Introduction

This chapter provided the summary of the findings of the study, the conclusions based on the findings, the contributions of the study, recommendations for future studies and also, the limitations of the study.

6.1 Research Summary

This study aimed to investigate the impact of digital innovation practices on the resilience of small and medium-sized enterprises (SMEs) in Ghana. Additionally, it examined the moderating role of organizational leadership in the relationship existing between digital innovation and organizational resilience. A quantitative research approach was adopted, employing a survey design for data collection.

Descriptive statistics relating to respondents' demographics, digital innovation practices, and organizational resilience were analyzed using the Statistical Package for the Social Sciences (SPSS). To test the study's hypotheses and assess the moderating effects, the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was utilized.

6.2 Summary of Key Research Findings

Generally, the result of the data gathered identified that, there is minimal effect of the digital innovation practices on organizational resilience of SMEs in Ghana. The analysis of the study indicated that social media is the most adopted or used digital innovation practice among the SMEs

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in Ghana. The data gathered identified that data analytics significantly impacted capital resilience and also, e-commerce was seen to have a significant impact on relationship resilience. Lastly, only the relationship between capital resilience and learning resilience is moderated by organizational leadership. Organizational leadership in general had no significant moderation role on the relationship between digital innovation and organizational resilience among the Ghanaian SMEs.

6.3 Conclusions of the Study

Table 7.1 below presents the conclusion of the study, answering the research questions and providing supporting literature to each finding.

Table 6.1 Summary of the Conclusion

Research Question	Research Findings	Supporting Literature
1. What are the key digital innovation practices adopted by SMEs in Ghana?	The findings from the study indicated that, social media is the most engaged digital innovation practices among the Ghanaian SMEs. This was attributed to it diverse benefits including it real-time interactions and engagement with customers. Also, the study identified that, SMEs engage social media to generate feedback from	Bruce et al. (2023) identified that; social media is largely adopted by SMEs as a result of its ability to assist firms in productivity whilst enhancing their sustainability.

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	customers and interact with internal and external stakeholders. The data also revealed that, SMEs use social media for marketing and also to learn from other businesses through social media.	
2. What are the impacts of digital innovations on the organizational resilience of SMEs in Ghana?	The study identified that, SMEs in Ghana adopted the four proposed digital innovation practices (data analytics, social media, automation and e-commerce) and employ them in their operations. The analysis of the impact of digital innovation practices on the resilience of the SMEs indicated that, only data analytics and social media had significant effect on capital resilience and	He et al. (2023) identified that investing in strategic technology may not necessarily influence the ability of employees to accurately perceive external turmoil, seeking available resources and developing adaptive solutions towards resilience.

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	relationship resilience respectively. Overall, digital innovations did not have a significant effect on organizational resilience. The results indicated that despite the use of digital innovations among SMEs, the impact of digital innovations on the resilience of SMEs is insignificant.	
3. How does organizational leadership moderate the relationship between digital innovations and organizational resilience among SMEs in Ghana?	The result indicated that apart from organizational leadership moderating the relationship between e-commerce and learning resilience, organizational leadership does not play any significant role in the relationship between digital innovations and	Purbiyati et al. (2023) indicated in their research that, empowering leadership does not moderate the influence of digital innovation on organizational resilience. Bastidas et al. (2023) also identified that lack of adequate knowledge of leadership in these digital

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	organizational resilience among the Ghanaian SMEs.	innovation practices can have significant effect on their support towards its effectiveness.

6.4 Contributions of the Study

The study's findings contribute to research/ theory, practice and policy. To begin with, this study contributes to literature by challenging the widespread assumption that digital innovations is a key driver of organizational resilience. By showing no significant relationship, the study suggests that digital innovations are not a panacea for enhancing the resilience of SMEs. The study also indicated that leadership cannot just implement digital innovation initiatives and expect improvements in organizational resilience. The findings provide a nuanced understanding of the relationship between digital innovation practices and organizational resilience. Also, by applying the dynamic capabilities theory to the context of SMEs in Ghana, this study extends the theory's applicability to emerging economies and provides insight into the limitations of digital innovations in enhancing organizational resilience.

Furthermore, the study's findings encourage SMEs to reassess their investments in digital innovations and consider alternative strategies for enhancing organizational resilience. The study's findings suggests that SME leaders should focus on developing leadership capabilities that foster a culture of resilience and adaptability within their organizations.

Lastly, the findings of the study suggest that, policymakers should reassess the effectiveness of policies promoting digital innovations as a means to enhance organizational resilience among SMEs. Also, policymakers can use the study's findings to inform the development of policies that

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directly address organizational resilience, such as providing resources for employee training and business continuity planning. These conclusions should be interpreted with the understanding that the analytical separation of digital practices, while necessary for hypothesis testing, may not fully capture their real-world interdependencies in Ghanaian SMEs.

6.5 Recommendations

This result of this study provides recommendations for various stakeholders including policy makers, SME leaderships. This will help these stakeholders to understand where to channel their resources in other to stay resilience in today's changing business environment.

6.5.1 Recommendation to Policymakers

For organizations to stay resilient in today's business era, Policymakers should consider allocating resources to initiatives that directly enhance their organizational resilience. Such policies can include employee training programs, risk management frameworks and business continuity planning that can enhance organizational resilience. In this way, SMEs can be empowered to allocate resources that will enhance their resilience.

Also, policy makers can focus on creating policies that support SMEs in developing robust organizational resilience strategies. Rather than solely promoting digital innovations, policymakers can look at developing policies that enhances solid strategies to make SMEs more resilient in today's business era.

Lastly, policymakers can foster partnerships between SMEs, industry experts and research institutions to share best practices and develop effective resilience strategies.

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6.5.2 Recommendation to SME Leadership

SME leadership must assess whether their digital innovation initiatives are aligned with organizational resilience goals. Leadership must consider redirecting resources to areas that directly enhances their resilience. Instead of directing resources towards digital innovations which does not significantly affect the resilience of the organization, SME leadership must consider looking at areas that directly enhance their resilience. They must direct their resources towards the aspects that enforces their resilience nature.

Also, SMEs leadership must establish a robust organizational resilience framework that incorporates risk management, business continuity planning, and employee training programs. SMEs leadership must invest in employee training and development programs that focus on building resilience, adaptability and crisis management skills.

The recommendations above are offered as practical guidance based on the study findings. Given the contextual nature of the results and the acknowledged overlaps in digital practices, policymakers and SME leaders are encouraged to adapt these suggestions to their specific operational realities rather than apply them uniformly.

6.6 Limitations of the Study and Future Research Directions

The study looked at the effect of some of the most common digital innovation practices among the Ghanaian SMEs. Previous studies have considered digital innovations as a whole, not taking into account the various digital innovation practices and their individual effects on Organizational Resilience. However, future studies can test the effect of more digital innovation practices such as cloud computing, and mobile commerce on the resilience of SMEs.

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Future study could explore the resilience impact of additional digital innovation practices and assess them in different industries beyond Ghana's SME sector. Studies could also focus on the specific digital competencies required by leadership to optimize resilience in technologically evolving environments. Additionally, research on the long-term effects of digital innovations adoption on resilience could provide deeper insights, allowing SMEs to make informed investment decisions in technology.

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APPENDIX

UNIVERSITY OF GHANA

DEPARTMENT OF OPERATIONS AND MANAGEMENT INFORMATION SYSTEMS

QUESTIONNAIRE

Dear Respondent,

My name is Tetteh Addo Isaac, an MPhil candidate pursuing MPhil in MIS at the University of Ghana, Legon. As part of the requirement for this program, I would like you to assist in completing this questionnaire.

This questionnaire is part of a research study on digital innovation and organizational resilience among SMEs in Ghana. The purpose of the study is to delve into how SMEs' digital innovation capabilities impact on their organizational resilience taking into account the moderating role of leadership.

Your response will provide valuable insights into the current state of digital innovations among SMEs and inform strategies for enhancing organizational resilience.

Your participation is voluntary and your response will be kept confidential. You may please contact me via email iatetteh005@st.ug.edu.gh or via phone; +233 (0)248600158 or reach out to my supervisor through jamanfo@ug.edu.gh should you need any clarification.

Thank you for your time and contribution to this research.

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PART A

INSTRUCTION: Please tick (√) the most appropriate response among the options provided.

BACKGROUND DATA:

1. **Gender?**

Male [ ]

Female [ ]

2. **Age?**

Below 25yrs [ ]

26-35yrs [ ]

36-45yrs [ ]

46-55yrs [ ]

56yrs and above [ ]

3. **Educational Level?**

JHS [ ]

SHS [ ]

BSC [ ]

Masters [ ]

PhD [ ]

4. **Years of Work?**

Less than 1yr [ ]

1-5yrs [ ]

6-10yrs [ ]

11-15yrs [ ]

16-20yrs [ ]

20yrs and above [ ]

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PART B

SECTION A: DIGITAL INNOVATION PRACTICES

Digital innovation practices involve using digital tools and platforms such as Social media, automation, data analytic tools, digital payment platforms and more to drive transformation in customer experience and generate value.

Kindly use the Likert scale provided to indicate your level of agreement or disagreement with the following statements measuring digital innovation practices in your organization where; 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree.

Social media	**1**	**2**	**3**	**4**	**5**
1. My firm uses social media to generate feedback from customers					
2. My firm uses social media for marketing					
3. My firm uses social media to develop new products or service ideas					
4. My firm uses social media to interact with internal and external stakeholders to generate new product ideas					
5. My firm learns from other businesses through the use of social media platforms					
Data Analytics					
6. My firm is able to make informed decisions by depending on insights from data gathered					
7. My firm is able to identify areas of inefficiency helping to reduce waste and improve productivity using data analytics					
8. My firm is able to use insights from data gathered to anticipate market trends and innovate faster					
9. My firm is able to understand customer behavior and preferences leading to personalized customer experience by depending on insights from data gathered					

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10. My firm is able to identify potential risk enabling us develop proactive measures to mitigate them through the help of data gathered					
11. My firm is able to analyze data to identify new revenue streams, optimizing pricing strategies which leads to increased revenue					
E-commerce					
12. My firm sells products and services through digital channels					
13. E-commerce has helped my firm to increase its market share					
14. E-commerce has helped my firm to reduce its operational cost					
15. E-commerce has increased my firm's response time to its customers					
16. E-commerce has increased my firm's customer retention and loyalty					
Automation					
17. My firm's core processes are automated					
18. My firm is more productive due to automation of certain business processes					
19. My firm's errors are minimal as a result of automation in production					
20. My firm is able to save cost by automating our processes					
21. By automation, my firm has improved our customer experience					

SECTION B: ORGANIZATIONAL LEADERSHIP

Organizational leadership refers to the governing body of an organization that drive the organization towards achieving the organization's goals and objectives. Kindly use the Likert scale provided to indicate your level of agreement or disagreement with the following statements measuring organizational leadership in your organization where; 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree.

Organizational Leadership	**1**	**2**	**3**	**4**	**5**
1. My organization's leadership inspire and motivate employees to achieve a shared vision					

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2. My organization's leadership often encourages experimentation and learning from failure					
3. My organization's leadership is proficient in using digital technologies to drive innovation and resilience					
4. My organization's leadership often empowers employees to take ownership and make decisions					
5. My organization's leadership communicate the organization's goals and visions clearly to the employees					
6. My firms leadership have a transformative vision of the digital future					

SECTION C: ORGANIZATIONAL RESILIENCE

Organizational resilience refers to ability of an organization to identify, seize and reconfigure its process to overcome changes in the business environment. Kindly use the Likert scale provided to indicate your level of agreement or disagreement with the following statements measuring organizational resilience in your organization where; 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree.

Capital Resilience	**1**	**2**	**3**	**4**	**5**
1. My firm has a solid capital structure					
2. My firm has multiple sources of financing					
3. My firm makes profit maximization the ultimate goal of our business					
4. My firm has high capital utilization efficiency					
5. My firm has good cash flow					
Relationship Resilience					
6. My firm creates unique value for its customers					
7. My firm prioritizes customers in their decision making					
8. My firm has good reciprocal relationship with their employees					
9. My firm has good relationship with our investors					
10. My firm is able to fully listen to the advice of our investors					

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Learning Resilience					
11. My firm chooses the better companies to study					
12. My firm is able to make timely adjustments to our positioning					
13. My firm is able to learn more about other experiences to help us cope with crisis					
14. My firm is able to maintain a positive learning environment					
15. My firm is able to reframe challenges into opportunities for growth					

Thank you

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