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EFFECT OF DYNAMIC MANAGERIAL CAPABILITY ON PERFORMANCE DURING TECHNOLOGICAL TURBULENCE: THE MEDIATING ROLE OF INNOVATION

BY

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DECLARATION

I hereby declare that this submission is my own work for the Master of Business Administration in Strategic Management and Consulting. To the best of my knowledge, it bears no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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ABSTRACT

This research discusses how technological turbulence affects Small and Medium-sized Enterprises (SMEs) and their performance and highlights the importance of dynamic managerial capability in sustaining and improving performance in turbulent business environments based on the model developed from the concepts of the Resource Base View (RBV) and Dynamic Capability (DC) theories. The study tests a model that examines the roles of technological turbulence and innovation as a moderator and a mediator in the relationship between dynamic managerial capability and firm performance and tests the model against 300 SMEs in Ghana. Partial Least Squares-Structural Equation Model (PLS-SEM) algorithm and bootstrap techniques justified the model. The results support the hypothesized direct and indirect effects of the three variables on the performance of SMEs and reveal that dynamic managerial capability is the most important variable, followed by technological turbulence and innovation. The findings suggest that dynamic managerial capabilities enhance and help maintain stable performance during turbulent business environments.

Keywords: SMEs, Dynamic Managerial Capability, Technological turbulence, Performance, Innovation, PLS-SEM**.**

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The business environment has become more dynamic over the past three decades due to shortened product life cycles, globalisation, and the blending of industry boundaries (Zhou et al., 2019b). Furthermore, the speed of technological advancement has produced unpredictable and dynamic environmental conditions. Companies aspiring to prosper in these volatile environments must show flexibility, speed, and management capabilities to execute internal and external competencies. Businesses that possess and manage their resources efficiently and effectively to take advantage of the quick and dynamic changes in the business environment have many opportunities. However, continually aligning an organisation's resources and strategies to a turbulent environment is an uphill task for managers. This continual alignment and reconfiguration require managers to have dynamic managerial capabilities that will enable them to understand the threats and identify and seize the opportunities within them. However, despite these extensive opportunities triggered by technological turbulence, many businesses need help in identifying and seizing these opportunities due to a lack of or underdeveloped managerial resources or capabilities.

How organisations adapt to rapidly changing environments has been highly interesting and has driven much scholarly work in dynamic managerial capability (Birkinshaw et al., 2016; Adner et al., 2003a; Beck et al., 2013; Bellner et al., 2015; Helfat et al., 2015). Dynamic capabilities research was made possible by the ground-breaking work of (Teece et al., 1997a). According to Teece et al. (2016), a dynamic capability framework helps to underlie the actions and decisions firms take in turbulent environments, which was later built on to introduce Dynamic Managerial Capability (DMC). According to Teece (2012), DMCs calculate the speed and

extent to which managers can realign the firm's resources to meet the demands and opportunities of the business environment to generate long-term profits (performance).

Adner et al. (2003b) first defined dynamic managerial capabilities as the tools managers use to develop, combine, and reorganise organisational resources and competencies. Later, it was described as having the ability to acquire, integrate, reconfigure, and distribute these resources (Michailova et al., 2015; Jurksiene et al., 2016; Hong et al., 2018). The patterned (routine) characteristics of managerial intentionality, deliberation, decision-making, and action are based on three underlying resources that Martin (2011) identified managerial human capital, managerial social capital, and managerial cognition.

This research aims to understand managers' functions as individuals and as members of teams, thus extending the dynamic capability perspective (Helfat et al., 2015). The relationship between dynamic managerial capabilities and firm performance has been studied by researchers over the years (Banerjee et al., 2019). An important topic of debate in academic circles has been whether and how a firm's dynamic capabilities contribute to its performance and competitive advantage (Zhou et al., 2019b). Research has indicated that dynamic managerial capabilities help organisations survive and attain high-performance levels in turbulent environments (Augier et al., 2008; Adner et al., 2003a; Teece, 2016; Banerjee et al., 2019).

Innovation has long been essential for businesses to change and adapt to their operating environments. According to Zhou et al. (2019c), innovation mediates between dynamic managerial capabilities and firm performance. There is a sufficient amount of scholarly literature on the benefits of innovation in advancing and enhancing organisational performance (Lin et al., 2016; Hombert et al., 2018). One aspect of this innovation is the development of technology to address the dwindling lifespan of competitive advantage. In addition, the

innovation process is closely related to dynamic capabilities as it involves several activities (e.g., resource allocation, sensing, and seizing opportunities). According to research studies by Camisón et al. (2014) and Saunila et al. (2014), how strong or weak a company's DMC is directly correlated with its innovation and capabilities.

In today's fast-moving world, where innovations follow each other quickly, companies constantly look for new ways to stay ahead of the competition. Today's businesses depend heavily on technology, making the current technological upheaval an essential context for business research. According to Celtekligil et al. (2019), environmental velocity, uncertainty, complexity, and ambiguity are all caused by technological change in the business world. Technological turbulence is the extent to which technological changes impact and affect market conditions (Pérez-Nordtvedt et al., 2015). Turbulent operational environments foster rapid innovation and necessitate more data on environmental elements. As a result, in times of significant technological volatility, innovation and DMCs are necessary to meet a company's performance requirements.

1.2 Problem statements

DMC is associated with attaining and maintaining performance, particularly at the managerial level (Augier et al., 2008; Adner et al., 2003b). Dynamic managerial capability's impact on performance is acknowledged by (Bellner et al., 2015; Zhou et al., 2019b). Many have written about dynamic capabilities relating to achieving and sustaining competitive advantage and believe they directly link to performance in a volatile environment (Augier et al., 2008; Teece et al., 1997). Others like Zott (2003) and Zahra et al. (2006) believe that dynamic capabilities do not directly affect company performance and may harm rather than help firms. Therefore, academic literature on DMC must be more consistent but often inconclusive in explaining how dynamic managerial capability influences performance. Other studies like Teece et al. (2016)

and Helfat et al. (2015a) have also considered innovation an outcome of dynamic managerial capabilities because firms often innovate to answer external pressures to change. Innovation is indispensable in DMC and performance, an excellent mediating mechanism for understanding the relationship.

Theoretical and empirical descriptions of the relationship between dynamic managerial capabilities and performance continue to omit a thorough evaluation of critical circumstances that may moderate this crucial relationship. Data from generalised business environmental turbulence has dominated previous empirical research on dynamic managerial capabilities. In this study stream, evidence from a specific environmental change, such as technological volatility, is still scarce. The knowledge gap in how and when these dynamic managerial capabilities work in technological turbulence and their impact on a firm's performance is an essential implication of these gaps in the DMC literature. In times of technological volatility, these studies have yet to examine how innovation can explain the relationship between dynamic management capacities and performance.

In their research, Zhou et al. (2019c) theorised that dynamic capabilities facilitate different innovations that improve firm performance; hence it serves as a mediating mechanism for understanding the DMC-performance relationship. Thus, this study concludes that innovation plays an intervening role in the dynamic managerial capability-performance relationship. Furthermore, via innovation, the link between dynamic managerial capabilities and performance is conditional upon technological turbulence.

1.3 Objectives of the study

1. To investigate the connection between performance and dynamic managerial capabilities.
2. To investigate how innovation mediates the link between dynamic managerial capabilities and performance.
3. Investigate the moderating impact of technological turbulence on the association between performance through innovation and dynamic managerial capabilities.

1.4 Research questions

1. How do dynamic managerial capabilities and performance relate to one another?
2. How does the relationship between innovative performance and dynamic managerial capabilities change due to technological upheaval?
3. How does innovation explain the dynamic relationship between managerial capability and performance?

1.5 Scope of the study

Small and medium-sized businesses in any industry operating in Ghana are the subject of the study. In small and medium-sized enterprises in Ghana, this study looks into the relationship between dynamic managerial capabilities and an organisation's performance. The study will also discuss how innovation functions when there is much technological uncertainty.

1.6 Relevance of the study

The work first expands on the literature on dynamic managerial capability, describing its relationship with performance and assessing how innovation can make this connection. Technological turbulence as a moderator of the effects of innovation on performance by

modelling dynamic managerial capabilities as an individual firm resource. Third, this study provides fresh managerial perspectives on maximising the performance advantages of dynamic managerial capabilities in times of technological upheaval. Finally, this study contributes to understanding this relationship by incorporating innovation as a mediator to the dynamic managerial capabilities-performance link.

1.7 Overview of the methodology

The researcher will use a qualitative data collection approach for this study through a structured questionnaire as the primary data source. A sample of 300 SMEs operating in a volatile environment characterised by various technology sources across Ghana's emerging economy industries will be studied. The mechanism for analysis will be structural equation modelling analysis to deal with the complex model and test the relationship between the variables, dynamic managerial capabilities as the independent or explanatory variable, and firm performance as the dependent variables, and conduct a mediation test simultaneously using Smartpls software. Also, the researcher will use the SPSS software for descriptive analysis and data cleaning.

1.8 Organisation of the study

The research is divided into five chapters, comprising the study's structure. The background of the study, problem statement, objectives, research questions, the scope of the study, the study's relevance, an overview of the methodology, and the organisation of the study are all included in Chapter 1's introduction. Chapter Two is the study's Literature Review, which examines the Theoretical framework and Hypothesis, Dynamic Managerial Capabilities, Innovation, Performance, and Technological Turbulence. Chapter Three is the Methodology. It also looks at the Research type, study population, Sample and Sampling Techniques, Data Collection, and Method of Data Analysis. Chapter Four contains the results and a discussion of the findings. It

looks at the Introduction, Sample Profile, Data Presentation Analysis, and Discussion of Research Findings—finally, chapter Five looks at the Findings, Conclusion, and Recommendation summary.

CHAPTER TWO

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Introduction

Dynamic managerial capability as a research topic is comprehensive. It cuts across multiple disciplines, including sociology, management, economics, and marketing; thus, it is almost impossible to cover every dimension in a single study. In developing a theoretical framework, this chapter focuses on the core of the research. The chapter begins with a brief review of organisational capabilities; this sets the scene for the forthcoming chapter section, where an attempt to understand the dynamic managerial capabilities-performance relationship is made. Finally, this section provides an overview of extant literature and identifies the key contributors to the DC and DMC debate.

The study focuses on three major issues at the centre of the research. The first is how DMC influences performance, the second is how innovation explains the DCM-performance relationship, and lastly, the effects of environmental shifts on the connection under study and the case of change that stems from the external environment. To what extent will DMC and innovation maintain organisational performance in a disruptive, high-velocity environment (technological turbulence)?

2.2 Organisational Capability

Organisational capability is theorised as a Resource-based view of the firm and a lower-level capability. The phrase "organisational capabilities" is used in this study to characterise capabilities that are similar to what Teece (2014b) refers to as "ordinary capabilities" and Schilke (2014b) as substantive capabilities.

According to Helfat et al. (2003a), organisational capabilities are an organisation's ability to carry out a coordinated set of actions while utilising organisational resources to achieve a specific end goal. These organisational or ordinary capabilities are combinations of resources the company has access to, owns, or controls, as well as routines developed via recurrent behavioural patterns. Some businesses can accomplish static, dynamic, or creative tasks better than their rivals, thanks to differences in these organisational capabilities (Collis, 1994).

Ordinary capabilities can be divided into three categories, according to Teece (2014b): operational, administrative, and governance. Furthermore, he notes that ordinary capabilities entail creating and marketing a fixed (static) range of goods and services. The level of proficiency, on the other hand, reflects the strength of the organisation's capability, and practice usually leads to perfection. With these capabilities, a current product or service can be manufactured, sold, and maintained. These capabilities only sometimes support or drive firm success unless there is little competition and no technological upheavals. Organisational capabilities allow organisations to maintain a competitive advantage for a while.

There is a general agreement in the academic literature that organisational capabilities serve as the foundation for dynamic capabilities (Zollo et al., 2002; Teece et al., 1997a; Eisenhardt et al., 2000). For instance, according to Wilden et al. (2013a), dynamic capabilities influence performance through specific organisational capabilities. The ability to affect change in the firm's existing resource bases (and the related support system, such as the firm's organisational and governance structure), its ecosystem, external environment, as well as its strategy is a collection of organisational capabilities known as "dynamic capabilities" (Schilke et al., 2018).

The findings of this study lend credence to the assertion made by Karimi et al. (2015) that the development of dynamic capabilities necessitates organisational capabilities in day-to-day business operations. The following organisational capabilities are listed by Acquaah et al.

(2015): marketing, innovation, management, technology, manufacturing, new product development, and customer service.

2.3 Types of organisational capability

2.3.1 Technological Capability

According to Tzokas et al. (2015) and Kang et al. (2017), technological capability refers to a company's ability to use a variety of technologies to carry out any relevant technical function or volume activity within the firm, including the ability to acquire, use, and create new knowledge. This capability is evident in most businesses these days which puts technological turbulence under the spotlight. According to the widely accepted theory of technological capability, companies with strong technological capability can successfully innovate new products by being able to quickly recognise technological opportunities and the value of technical resources, acquire those resources, and capitalise on them (Zhou et al., 2010; Wu, 2014; Srivastava et al., 2015; Blomkvist et al., 2017). This knowledge is the foundation for key concepts that support introducing new products. It is referred to as a company's capacity to generate or make use of new knowledge and expertise, whether generated internally or obtained externally.

2.3.2 Marketing/commercialisation capability

A company's marketing capability is determined by its capacity to (1) "detect and anticipate changes in market conditions" Mu et al. (2018) to generate new marketing insights; (2) plan product design, development, and launches based on these marketing insights; and (3) organise and deploy available resources and routines to effectively implement marketing mix strategies (Najafi-Tavani et al., 2016; Sun, Yao et al., 2019; Sun et al., 2020). It can be deduced that a firm’s ability to effectively implement marketing strategies is dependent on how efficiently it utilises its marketing capabilities. As accumulated from prior operating and learning

experiences, marketing capability is tacit and complex for competitors to copy (Morgan et al., 2012). It is an in-built ability developed through daily repetition of same activities and knowledge, hence very difficult to copy. According to Day et al. (2011) and Eisend et al. (2015), marketing capability refers explicitly to the organisational competency that enables businesses to build stronger relationships with their clients and more effectively recognise and react to market changes. Businesses use their marketing expertise to research and anticipate market trends and outperform rivals in presenting their offerings to customers (Mu, 2017a; Mu et al., 2018; Sun et al., 2020). Without marketing capabilities, firms will be unable to fully satisfy the needs of their current and future consumers which could result in various outcomes that do not support business growth.

2.3.3 Innovation Capability

Innovation capability is described by Adler et al. (1990) as the ability to:

(1) develop new products to meet market demands,

(2) apply appropriate process technologies to produce these new products,

(3) develop and adopt new products and processing technologies to meet future demands,

(4) respond to competitors' accidental technological activities and unanticipated business opportunities.

According to Boso et al. (2017) and Pratono (2020), a business that excels at introducing novel products and processes stands out among its competitors' offerings and is more likely to enjoy a competitive advantage that makes it difficult or prohibitively expensive for them to copy.

2.2.4 Manufacturing Capability

Drawing inference from Swink et al. (2007), manufacturing capability refers to the manufacturer's competitive power over its main rivals. This capability should align with the

organisation's strategic goals (Ho et al., 2002). In the context of the RBV framework, manufacturing capabilities are "valuable" and "unique" since they are produced domestically and are challenging to copy and transfer (Swink et al., 1998). The manufacturing capability concept includes process skills and operational results (Chavez et al., 2017). To be effective in helping businesses succeed, this capability must be aligned to firm's strategic aims.

2.3.5 New Product Development

A firm's most crucial and vital competency is new product development, which plays a significant role in the company's sustainability, growth, advancement, and competitiveness (Prasetyo et al., 2020; Land et al., 2012; Pratono, 2020). NPD capability has been examined as a best practice demonstrating how businesses reconfigure their resources and capabilities to respond to the environment in empirical investigations to define the nature of dynamic capabilities (Pavlou et al., 2011; Barrales-Molina et al., 2015). Land et al. (2012) defined new product development capability as regularly generating new goods by analysing client demands and comprehending new technologies and processes. Product launches regularly involve various actions that operate as catalysts for updating organisational practices, customer behaviours, and rival strategies, assuring environmental adaption across various industries (Helfat et al., 2011a). In addition, the reconfiguration of routines built into standard capabilities is triggered by capabilities like New Product Development (Drnevich et al., 2011; Wilden et al., 2013b).

2.3.6 Customer Service

Day (2000) and Morgan et al. (2009), customer service capability is the skills, competencies, and procedures required to build strong customer relationships, including recognising opportunities and potential clients to maintain those relationships. In addition, service capability refers to an employee's perception of how well they can serve the customers (Yu,

2013). From a marketing standpoint, a frontline worker, such as a salesperson or customer service professional, typically serves as the company's point of contact with the client. However, businesses must integrate capabilities from marketing, operations, and human resources departments to have excellent customer service competence (Moorman et al., 1999).

2.3.7 Managerial Capability

Organisations must have the skills and organisational knowledge necessary to be effective in various management aspects (Wu et al., 2020). Based on Birkinshaw et al. (2013), it can be deduced that, managerial competency determines why some organisations are better able to perform two different tasks equally well.

2.4 Resource-Based View

To explain variations in firm performance, the strategic management literature has put forth several of theoretical stances. The firm's resource-based view (RBV) is one such theory that the literature broadly accepts. Wernerfelt (1984) proposed the resource-based view (RBV), which Barney later popularised (1991). The Penrose (1959) theory significantly impacted the RBV because it proposed that "the resources with which a particular organisation is accustomed to working will shape the productive services its management is capable of providing." The RBV propounds that a firm's competitive advantage results from the possession and deployment of resources and capabilities, which are often heterogeneous, idiosyncratic, immobile, inimitable, and sometimes intangible. This bundle of resources and capabilities in possession of a firm increases the prospect of obtaining a competitive advantage and superior performance. According to the RBV (Habbershon et al., 1999; Barney, 1991; Peteraf, 1993; Romme et al.,2010), a firm's competitive advantage comes from the possession and use of resources and capabilities, which are frequently heterogeneous, idiosyncratic,

immobile, unique, and sometimes intangible. A firm can gain a competitive advantage and deliver superior performance thanks to this collection of resources and capabilities.

An organisation owns, controls, or has semi-permanent access to a resource as a tangible or intangible asset or production input. Resources are inputs that help a business perform its tasks. Amit et al. (1993) defined capabilities as a firm's capacity to combine and exploit resources through organisational routines to achieve its goals. Because capabilities are intricately woven within an organisation's routines and procedures, competitors cannot easily trade or copy them (Pratono, 2020). They could also be tangible but are more likely to be intangible. Drawing inference from Acquaah et al. (2015), capabilities are the unique employee skills, knowledge, and experience ingrained in an organisation's routines, managerial processes, marketing communications, and culture. Firms can maintain a competitive advantage over time because of the embeddedness of firm capabilities, which also significantly reduces the barriers to imitation (Day et al. 2011). A variety of marketing, technological, and production capabilities have been examined in previous research due to their significant impact (Ju et al., 2013; Eisend et al., 2015).

2.5 Difference between RBV and Dynamic Capability

The RBV strongly emphasises internal resources and competencies to establish and maintain a competitive edge and long-term company performance. According to Barney et al. (2012), RBV is a business performance model that strongly emphasises a company's ability to manage its resources and capabilities as sources of competitive advantage. The RBV framework empirically shows that internal resources and capabilities are sources of competitive advantage for organisations. The Resource-Base View is the foundation for the DC and DMC literary streams. According to RBV, a firm's resources and heterogeneity determine the chance of achieving long-lasting competitive advantages (Barney, 1991). However, today's dynamic and

chaotic environments are testing RBV. These tests have motivated academics to expand RBV to the DC view (Teece et al., 1997a; Eisenhardt et al., 2000b; Hitt et al., 2016). However, as a previous collection of essays has shown, one valid criticism of work based on the resource base is that; since 1991, its significance for many management research as well as other academic disciplines is still not as fully developed as it should be (Barney et al., 2021).

The resource-based view of the firm is at the foundation of the DC perspective, a well-established extension of the RBV. The RBV has become one of strategic management's most influential theoretical lenses. The DC view emphasises dynamics, changes, and firm performance than the resource-based theory of a firm, which is more concerned with resources, assets, and performance (Mu, 2017b). The resource-based view has been criticised for being a static and equilibrium-based model, which separates the DC view from those criticisms (Sirmon et al., 2007; Teece, 2007a). Additionally, it offers a solution to the problem when a resource-based advantage turns core competencies into core rigidities (Mu et al., 2012).

According to strategic management theory by Peteraf et al. (2013) and Teece (2014c), firms' dynamic capabilities keep them continuously more competitive than their rivals in the market. It is dynamic when a capability improves the firm's capacity for decision-making, problem-solving, opportunity and threat identification, and resource modification. Similarly, Helfat et al. (2011) described dynamic capabilities as "the ability of an organisation to develop, extend, and adjust its resource base actively." Based on this concept, DCs enable continuous alteration of the configuration of organisational resources, contributing to enhanced environmental adaption. According to Hart et al. (2011), the resource-based view theory has expanded to include a dynamic capabilities perspective that explains how businesses respond to conditions that are fast changing.

2.6 Different types of dynamic capability

The three distinct capabilities of sensing, seizing, and transformation comprise dynamic capabilities at their highest order (Teece, 2007a, 2014a). The core of every definition of dynamic capabilities, according to Teece (2018a), is sensing, seizing, and transforming activities. These activities consist of spotting technological opportunities in the outside world (sensing), using a company's resources to take advantage of them (seizing), and continuously renewing the organisation by adapting, reconfiguring, and maintaining the current resource base (transforming) (Albert-Morant et al., 2018).

2.6.1 Sensing Capability

According to Teece (2007a, 2014a), the ability of internalised analytical instruments to discover modifications to the existing inner or outer structures that could present a danger or offer opportunities for business models, new or old, is referred to as the first capability or sensing capabilities. Based on these insights, sensing capabilities enable the organisation to create, collaborate, and evaluate technological opportunities concerning customer needs. According to Teece (2018c), the sensing capability identifies customers with unmet needs and creates technical opportunities. Teece (2007b) posits that discovering new opportunities is closely related to scanning, creating, learning, and interpreting activities. Identifying opportunities involves customer needs, structural change, and technological development (Teece 2007b). It includes identifying opportunities, choosing technologies and product characteristics, and creating new business models to sustain growth and profitability (Teece, 2007b).

2.6.2 Seizing capability

For the organisation's benefit seizing capabilities refer to the capacity to mobilise resources, respond to needs, and take advantage of business opportunities (Teece, 2007a, 2018b).

Particular focus is placed on decision-making when utilising capabilities. The organisation uses this capability to realign the business model by creating value-capturing mechanisms, managing partnerships, designing cost structures, and choosing the combination of technologies and features to be "embedded in the product and service" (Teece, 2007a, 2014a). Managers must be able to interpret current developments and trends, choose the best technologies to use, and determine which market segments to concentrate on when opportunities are identified. First, managers define how the company offers value to its customers by choosing product features and related business models (Teece, 2018a). Next, managers concentrate on technologies and how to put them together, as well as product features that will include in the goods and services, improving performance. All these actions aim to create the best possible business model that will benefit the company in terms of performance and competitive advantage.

Because new information and knowledge can open up possibilities for innovation and performance, it is crucial for businesses to continuously detect, scour, and analyse technologies and markets (Zhou et al. 2019). It is crucial for businesses to continuously scan, search, and investigate opportunities across technologies and markets because new information and knowledge can lead to opportunities for innovation and performance.

2.6.3 Transforming capability

The final component, transforming capabilities, describes the ongoing repurposing and reconfiguration of resources and structures to support business models in fluctuating environments (Teece, 2007a). Organisations can renew their resource base continuously through decentralisation, decomposition, and co-specialisation. Organisations can strategically place assets within the value network. Businesses use reconfiguration capabilities when adding, redeploying, and combining resources (Karim et al. 2016). The managerial role of leadership

characterises it. Top managers must communicate a new strategic vision to implement the new strategy effectively and ensure the organisation fits the opportunities it intends to exploit during technological upheaval (Teece, 2016). Following the sensing capability, seizing capability is a prerequisite for transforming capability.

This chronological arrangement represents a gradual process-oriented viewpoint (Teece, 2007a). These mechanisms are crucial to explain the emergence of competitive advantages (firm performance), according to empirical studies (e.g., Tallon et al., 2011; Wilhelm et al., 2015; Breznik et al., 2019) or theoretical works by Matysiak et al. (2018) and Yeow et al. (2018).

2.7 Dynamic Managerial Capabilities

The function of managers in organisations has long been studied in the broad discipline of strategic management. Researchers studying dynamic capability have become increasingly interested in this role recently. The theory of dynamic capabilities initially viewed them from the perspective of organisations or firms, ignoring the management's role in utilising them. Individuals within the organisation must use their knowledge and skills to obtain, combine, and transform the available resources to advance the organisation's strategic goals if dynamic capabilities are to be developed (Teece 2014). Managers must interpret, reflect, and make decisions to recognise opportunities, seize them, and ultimately transform the resource base of their respective firms. All businesses depend on their managers (Sciascia et al., 2013); lacking management capabilities can account for firm failure (Lavia & Hiebl, 2014). Dynamic managerial capabilities enable managers to design and reorganise the organisation's resources (Inan et al. 2015).

DMC is a theoretical framework Adner et al. (2003a) introduced to explain the portion of firm performance heterogeneity related to managerial choices and actions. They accomplished this by utilising various underpinning administrative assets, including managerial human capital, social capital, and cognition. These resources are the foundation for managerial introspection, contemplation, a judgement call, and intervention (Martin, 2011).

Per Adner et al. (2003a), dynamic managerial capabilities are the capabilities managers use to develop, combine, and organise resources and competencies. Reconfiguring, integrating, acquiring, and disseminating these resources are all possible with DMC (Michailova et al., 2015; Jurksiene et al., 2016; Hong et al., 2018). DMCs are the tools that managers use to develop and alter how the company responds to environmental changes and upholds firm performance. However, managing these capabilities, instead of simply owning dynamic capabilities in general, is more likely to allow the organisation to reap superior performance-related benefits (Zahra et al., 2006).

According to Adner et al. (2003a), dynamic managerial capabilities have highlighted the importance of managers' contributions to renewing, developing, or creating the firm's resource base. Managers are the cornerstone of dynamic capabilities (Teece 2014; 2016). He goes into more detail, stating that managers can play either a leadership or an entrepreneurial role, supporting dynamic capabilities. These responsibilities extend beyond their operational responsibilities, which focus on expanding activities like budgeting and staffing. Helfat et al. (2015) also proposed that dynamic managerial capabilities explain the heterogeneity of these capabilities, which include not only managers' capabilities related to action but also their mental capabilities (cognitive) used when adapting the organisation to environmental changes. The capabilities can be assembled from different internal and external sources and then deployed in various aspects of the firm, including new product creation, routine changes, and new business models (Teece et al. 1997a; Teece, 2018).

DMC is a subset of high-level capabilities designed to adapt, integrate, and reconfigure internal and external organisational skills, resources, functions, and competencies in response to the constantly shifting business environment (Augier et al., 2008). These capabilities, which involve managerial decision-making and asset configuration, can only be developed over time (Markard & Worch, 2010). Due to their tacit nature and partial embedding in a specific network of connections and histories, DMCs are challenging to create and transfer across national boundaries. These strong roots make them difficult for others to replicate (Teece, 2014a). DMC involves more than ad hoc problem solving because they contain patterned, practised, and repeated (routine) elements (Martin, 2011a). Per Kor et al. (2013) and Townsend et al. (2015), DMCs serve as the firm's unique core resource, driving the creation, extension, and modification of the firm's resource portfolio and serving as the foundation for why different firms have different strategies and performance their strategies and performance.

2.7.1 The Antecedents of Dynamic Managerial Capabilities

Managerial human capital, social capital, and managerial cognition are the three forbearing resources of dynamic managerial capability Martin (2011a), which are intertwined. They are the foundation for managerial intention, thought, judgment, and action (Martin, 2011a). They aid in illuminating how managerial judgement, strategic change, and organisational performance are related (Helfat et al., 2015a). These three antecedents, which vary across managers, lead to diverse outcomes. Some managers have more potent dynamic managerial capabilities than others due to the unequal distribution of these three antecedents among managers (Helfat et al. 2015). Superior dynamic managers can change their strategy more successfully than organisations without them.

2.7.2 Managerial human capital

Managers' skills and knowledge and how their education has shaped them are referred to as managerial human capital (Kor et al., 2013). The managers' experience is a foundation for learning new information, gaining more practical experience, and enhancing personal abilities. Past experiences provide access to knowledge and skills that support the growth of specific managerial human capital types that support dynamic managerial capabilities (Martin, 2011a; Kor et al., 2013b). These resources can help managers identify and seize opportunities and threats and reorganise the resource base (Helfat et al., 2015). The idea of DMCs is crucial in innovation because it calls for considering entrepreneurial experience when evaluating managerial human capital.

2.7.3 Managerial social capital

Kor et al. (2013) ascertained that managers' connections and relationships have a knock-on effect that gives them some power, control, and influence. Managers can obtain information from various levels of the organisation thanks to internal social capital, which also has an impact. For instance, corporate managers influence resource allocation and the implementation of new strategies and procedures, and they also receive information from division managers and vice versa. According to empirical data from (Martin, 2011a), the entire company's performance is improved when managers of different business units collaborate and pool their resources and expertise to repurpose assets in innovatively to pursue potential business opportunities. As a result, managerial social capital will likely encourage taking advantage of opportunities and changing how resources are used (Helfat et al. 2015a). Therefore, managerial social capital will likely support seizing opportunities and reconfiguring the resource base. According to Weiler et al. (2019), managers use social capital to gain access to both tangible (such as money, equipment, and investments) and intangible (such as information, expertise, capabilities, and commitment) resources from their social network. Social capital's relational

and cognitive components define the ability to access those resources, while the structural dimension makes resources available (Ali-Hassan et al., 2015). Within the company, social capital helps to foster a sense of unity, trust, and cooperation. As a result, it makes it easier for people to share resources, knowledge, and information that are widely dispersed (Alguezaui et al., 2010). Social capital fosters the deliberate sharing of information and builds the relationships and networks necessary to foster the enabling environments (Pratono, 2020). According to academics, getting appropriate information is essential for improving performance (Sulaiman, 2020).

2.7.4 Managerial cognition

Helfat et al. (2015) used the phrase "managerial cognitive capability" to refer to a manager's capacity for mental activity. They outlined the specific cognitive processes that support the dynamic managerial capabilities of sensing (attention and perception), seizing (problem-solving and reasoning), and reconfiguring (language and communication). They discussed how these processes might affect strategic organisational change. Personal, professional, and interpersonal connections in internal and external networks influence managerial cognition. Manager cognition is essential for recognising market opportunities. It discusses the mental frameworks, belief systems, and interpretive frames applied when making decisions (Kor et al., 2013). Managers create distinctive cognitive frameworks that interpret information based on prior experiences and learning (Karhu et al., 2020). A manager with strong mental abilities will have the analytical skillset needed to deal with environmental change proactively (Helfat et al., 2015b). As a result, managerial cognitive heterogeneity influences business strategy by resulting in variations in managers' capacities to detect, seize, and reorganise the firm's asset portfolio (Helfat et al., 2015b).

2.8 Interrelation of the three antecedents of Dynamic Capabilities and Dynamic Managerial Capabilities

The manager's experience serves as their cognitive base, influencing managerial decisions in the same way that prior work experience does. According to Adner et al. (2003a), there is a connection between managerial cognition and social capital. Internal and external relationships provide access to information that broadens a manager's cognitive base. Social capital influences managerial human capital by encouraging information gathering that benefits managerial human capital by enhancing knowledge. All three foundations grow due to prior experience, which is crucial to note (Helfat et al., 2015b). In light of this, a single incident could simultaneously affect all three DMCs' characteristics (Beck et al., 2013).

These antecedents support the three stages of dynamic capabilities—sensing opportunities, seizing opportunities, and transforming the resource base (Teece, 2007b; 2014).

2.9 Innovation

Prior literature has argued that, innovation is one of the most critical elements for business survival and success. Despite the wide range of definitions for the term in the literature, there is still no universally accepted concept agreement on innovation. Innovation has gained popularity over the past 20 years. It is now a subject frequently studied by academics, business scientists, politicians, and individuals in industry’s public and private sectors (Purcarea et al., 2013).

According to Therrien et al. (2011), innovation, defined as the collection of resources a firm possesses and how innovative skills transform these, is a complex process connected to changes in production functions and processes that firms strive to acquire and expand upon. At the corporate level, "innovation" refers to a company's receptivity and propensity to take in novel ideas that lead to developing and introducing novel products (Rubera et al., 2012). The third

edition of the Oslo Manual (OECD, 2005) defines innovation as introducing a new or significantly improved product (goods or services), process, new marketing strategy, or new organisational system in business operations or workplace organisation. The basis for the study was the definition employed in the current study, which represents one of the international sources on the meaning and categories of innovation.

Additionally, some researchers distinguish between nontechnological innovations, such as marketing and organisational innovations, and technological advances affecting the process and product types. The current analysis is based on classifying four innovation categories—product, process, organisation, and marketing innovations—as stated in the OECD Oslo Manual (2005). Below is a brief definition of each of these categories.

2.9.1 Product Innovation

Introducing a good or service that is wholly new or hugely enhanced in terms of its characteristics or intended uses is called a "product innovation." Better usability or other functional qualities are included in this innovation, along with materially better technical specifications, materials, and software integration (for example, substituting inputs with materials that have improved characteristics: breathable textiles, light but strong composites, eco-friendly plastics).

2.9.2 Process Innovation

A "process innovation" is implementing a completely new or significantly improved manufacturing or delivery system. This category includes significant modifications to procedures, equipment, and software (such as installing new or enhanced manufacturing technology, such as automation tools, real-time sensors that can modify operations, or computer-aided product development).

2.9.3 Marketing Innovation

Applying a new marketing strategy that involves significant changes in product positioning, pricing, design, or packaging is known as innovation in marketing. Marketing innovations aim to satisfy customer needs better, grow into new markets, or reposition a company's product (for instance, by implementing a significant redesign of a furniture line to give it a fresh appearance and broader appeal).

2.9.4 Organisation Innovation

A new organisational strategy must be incorporated into a company's internal processes, external interactions, or both, known as corporate innovation. Organisational innovations boost a business' performance by cutting transaction or administrative costs. Additionally, it increases worker satisfaction at work (increasing labour productivity). It provides access to non-tradeable assets (like uncodified external knowledge) or lowers the cost of supplies (e.g., the initial implementation of management systems for general production or supply operations, such as supply chain management, business reengineering, lean production, or the quality management system).

2.10 Technological Turbulence

In environments that are changing at an increasingly rapid rate, innovation has been viewed as a critical source of competitive advantage (Abdi et al., 2018). According to Gilsing et al. (2014), businesses must collaborate and innovate to exploit technological opportunities and shifting environments. However, because of the numerous unpredictable environmental changes, businesses frequently deal with uncertainties. Today's digital entrepreneurs perceive and assess these environmental factors, affecting their actions (Gilinsky et al., 2019). Many academics have studied how technological upheaval has affected a company's performance over the last few decades. The majority of them concentrated on the phenomenon's moderating

effect between two or more related organisational constructs (for example, organisational learning and firm innovativeness) operating in a setting marked by technological turbulence, such as Baba et al. (2017) and Hung et al. (2013) as well as operating in an environment characterised by technological turbulence. Entrepreneurs' perceptions of how quickly and difficult it will be to predict technological advancements in their sector can be called perceived technological turbulence (Jaworski et al. 1993). This perception can also be used to identify opportunities for new product development.

2.11 Hypotheses Development

2.11.1 Relationship between DMC and performance

Previous research has shown that businesses benefit from having dynamic managerial capabilities when creating new things, business and corporate strategies, exploring different market spaces, intensifying some assets, and implementing innovative initiatives that induce strategic change. Performance is positively impacted by the three elements and traits of dynamic managerial capabilities: managerial cognitions, social capital, and human capital. Dynamic managerial capabilities positively impact firm performance in many ways, according to Protogerou et al. (2012). For instance, they align the firm's resource base with the dynamic competitive environments in which it competes (Teece et al., 1997a). Encourage market change regarding opportunities because it helps resource selection and improves performance (Gudergan et al., 2012). It also improves performance overall by promoting market change regarding opportunities that support resource selection. A firm's ability to respond to environmental changes more quickly, effectively, and efficiently is improved by dynamic managerial capabilities, which ultimately leads to better performance. They enable and permit the utilisation of chances to increase revenue and modify operations to lower costs (Drnevich et al., 2011). To contribute to creating performances, these resources must be uncommon, distinctive, and one-of-a-kind (Line et al., 2014).

H1. Dynamic managerial capabilities positively influence firm performance.

2.11.2 The mediating role of Innovation in the relationship between DMC and Performance

Long-term success is not possible through innovation alone. Drawing inference from Coad et al. (2016) and Teece (2014a) businesses must encourage DMC to increase or transform their valuable resource base. Researchers such as Camisón et al. (2014) and Saunila et al. (2014) found a strong correlation between a company's innovation and capabilities and the strength or weakness of its DMCs. According to Konsti-Laakso et al. (2012), these capabilities aid managers in addressing volatile environments, enhancing firms' innovation, and gaining competitive advantages.

Dynamic management capabilities boost firm innovation; this environment promotes collaboration, idea generation, communication, and creativity (Parnell et al., 2015). According to Pollack et al. (2016), organisations expect managers to use their human capital—skills, experience, education, and knowledge—to create strategies that motivate businesses to innovate and expand. According to existing research by Lefebvre et al. (2015), businesses can achieve multiple types of innovation by effectively managing their intangible resources and coordinating their operations. Additionally, by creating new innovative developments through strategies Maes et al. (2014) or by creating external associations with customers and suppliers (social capital) to create external knowledge and skills that complement their own (Subrahmanya, 2015). Like how employees interact internally, managers with such a system can more easily acquire information and other resources to improve business performance. According to Fallon-Byrne et al. (2017), crucial innovation-related strategies include building social capital and fostering favourable relationships with both internal stakeholders (staff and managers) and external stakeholders (customers).

Process innovation is one of the types of innovation that occurs when managers can effectively manage unique resources and find harmony among resources across various company divisions (Vasudevan et al. 2014). An organisational setting that fosters collaboration and support, essential for promoting innovation, can be created with the help of social connections (social capital) built on goodwill and trust (de Massis et al. 2015). Building relationships with employees, managers, and customers internally and externally (social capital) is essential. In order to foster a culture of positivity and encouragement among staff members, managers use their capabilities and human and social capital (Lins et al. 2017). This can reduce communication issues and enhance organisational performance. By utilising their technical expertise to develop strategies that motivate the company to improve its performance, managers can also contribute to the growth of thriving novel processes. Due to technological changes, businesses must adapt their resource base to meet innovation needs. To develop new capabilities, businesses with limited resources must acquire valuable, distinctive, dynamic, and innovative capabilities. Building dynamic capabilities can help a business increase the resources it has at its disposal and create new core competencies or capabilities that will speed up innovation in the volatile and complex dynamic environment. Business environments are becoming more active and volatile, and businesses need to strengthen their dynamic managerial capabilities for in-depth exploration. Therefore, a company's dynamic capabilities will impact its innovation in a dynamic environment. Dynamic managerial capabilities are crucial to corporate innovation because managing capabilities influence organisational decision-making (Teece, 2018b). Through their unique relationships, managerial human and social capital influence creativity, innovation, and strategic transformation (Helfat et al. 2015b).

H2. Dynamic managerial capability through innovation influences performance

Innovation is the foundation of competitive advantage (performance) and growth in markets that are increasingly competitive, globalised, and complex (Hacklin et al., 2018). Researchers

have shown great interest in innovation as they consider it an essential and decisive contribution to the long-term success of businesses (Lin et al. 2016; Hombert et al. 2018). According to Brettel et al. (2015), the ability of a company to pursue and support novel and creative ideas, experiment, and the innovative process, as well as its capacity to seize new opportunities, are all examples of an organisation's innovativeness. The complex process of innovation necessitates investment and efficient management of company resources. Therefore, firms must develop the skills necessary to support innovation in its complexity. Martín-de Castro et al. (2013) state that creating and maintaining an organisation's performance depends on developing successful technological innovations. It significantly impacts corporate performance by resulting in an enhanced market position that communicates superior performance (Kafetzopoulos et al. 2015). Recently, Cheng et al. (2014) provided evidence that innovation is essential for a company wishing to establish a dominant position and increase profits.

Since innovation is a crucial tool for businesses to adapt to and influence their operating environment, Zhou et al. (2019) proposed that innovation is a mediating mechanism between DC and firm performance. A company must constantly deploy, mobilise, integrate, and align its resources and capabilities to innovate and establish its competitive advantage (Yam et al. 2011).

H3: The relationship between dynamic managerial capabilities and firm performance can be mediated by innovation.

2.11.3 The moderating role of technological turbulence on the relationship between DMC and performance.

Technologies, machinery, and telecommunication, among others, have contributed to the rapidly evolving nature of the business environment and, as a result, the constant emergence

of new technologies and tools. Technological turbulence has become a notable phenomenon that businesses must handle. Research indicates that this disruption can serve as a force that improves innovation performance. Businesses must constantly come up with new tactics and resources that encourage innovation and superior performance due to the highly complex and turbulent business environment (technological turbulence) (Khan et al., 2020). Businesses must adapt to changes in the marketplace and develop new capabilities to keep up with this constant change due to the accelerating pace of this change. Since human capital entails skills, knowledge, education, and experiences, many studies have focused on its significance in helping businesses adapt to technological changes. Managers respond to opportunities and threats brought about by this technological change using their experiences, knowledge, and skills. Adomako et al. (2022) defined technological turbulence as the rapid change of technology in which a firm operates, where it realises its ideas through technological developments. According to Celtekligil et al. (2019), technological advancement is to blame for the ambiguity, complexity, and velocities characterising business life's environmental conditions, which are analogous to the airflow and gaps produced by turbulence in the physical world. This change occurs more quickly for businesses operating in a highly technological environment than other businesses. Regardless of size, every business operating in this dispensation faces some technological disruption. Organisations must regularly update their technologies to maintain superior competitive advantages. Remaining competitive in this rapidly changing climate typically demands unique, challenging-to-imitate resources (DMC) and organisational abilities, like cognitive capabilities.

H4. Technological turbulence has a positive impact on firm performance.

The threats of opportunism and misappropriation rise concurrently in the wake of technological turbulence, with a significantly increasing importance of technologies, especially in alliances and collaborations (Mukherjee et al. 2013). To avoid technological knowledge leaks and loss

of control, businesses hesitate to share valuable technologies with their industry partners in this highly uncertain environment (Qian et al. 2017). As a result, technology-sharing practices between different companies are frequently less open and more cautious (Jean et al. 2014). Moreover, technological turbulence makes information received less crucial because of rapid change. According to Kumar et al. (2011), it also affects these businesses' human and social capital capabilities, where information is vital to building knowledge. In times of intense technological disruption, the increased focus on technology protection makes it more difficult for businesses to share resources, impeding the effectiveness of dynamic social capital and the ability of exploratory innovation to seize opportunities.

H5. Technological turbulence weakens the effectiveness of dynamic managerial capabilities and innovation on firm performance.

2.12 Conceptual Framework

A conceptual framework is a review that connects concepts, empirical data, and pertinent theories to advance knowledge about linked concepts and concerns (Imenda, 2014). The conceptual framework depicts the areas of focus of the research or study. It traces and organises relationships between concepts, variables, and gaps found in the literature and is essential for analysing research findings, interpreting results, and generalising them (Grant et al. 2014a).

The conceptual framework reflects the researcher's grasp of the identified problem or gap. It considers questions that underline and build up the research work, such as the focus and direction the research will need to take and how the relations between the study's identified variables will be drawn out. What characteristics of the subject of interest are relevant to the research work, what instruments will be used, and how will the data be collected? (Kivunja, 2018).

A conceptual framework may be a graphic or visual depiction of an anticipated relationship between the variables of a study (Grant et al., 2014). The framework may offer a pictorial representation of how ideas and vital elements in the research are related.

The conceptual framework for the study is shown in Figure 2.1. The dependent variable is performance, the independent variable is dynamic managerial capabilities, the mediating factor is innovation, and the relationship between DMC and firm performance is moderated by technological turbulence.

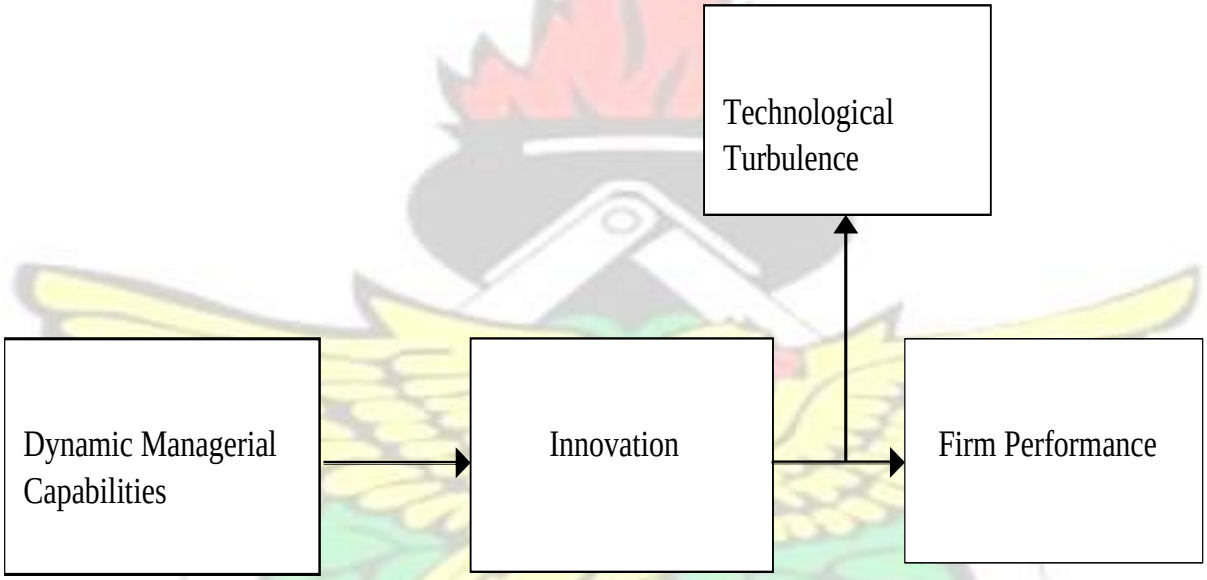

Figure 2.1 Conceptual Framework

2.13 Conclusion

RBV is the foundation for several business theories that help scholars and practitioners understand firms' competitive advantage. Despite significant flaws still does not take away from the substantial influence the resource-based view has on business-related theories. One such theory with its foundation in RBV is Dynamic managerial capability.

The DMC of the dynamic capability approach ensures that firms understand the roles managers play in them and how well-developed managerial capabilities set them apart from their competitors and boost the firm's performance.

There is a need to understand the current business environment and its influence on the capabilities in play through a crucial business mechanism for improving firm performance to benefit from DMCs. This research will assess the relationship between Dynamic managerial capability and firm performance through the eye of innovation in the context of technological turbulence.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter describes the research methodology for this study. Notably, it explains the nature and the philosophy of the research study, research design, the operational definition of variables, measurement of variables, population, sampling techniques, the unit of analysis, data collection procedure and tools, research approach, research method and data analysis techniques and ethical considerations.

Goundar (2012) defined research methodology as a methodical technique used to identify and resolve a specific problem and by researchers to conduct research. However, several research techniques are employed to gather samples and data to identify solutions to problems. These techniques involve various procedures, systems, and algorithms. Additionally, research approaches might be qualitative, which tends to be evaluative and subjective, or quantitative, which tends to be systematic and employs numbers. The research approach adopted to produce this thesis is described in the sections below.

3.2 Nature and Philosophy

Research philosophy is a way of considering the proper methods for gathering, analysing, and using data. The research philosophy understands the overarching framework guiding a study or research body (De Gialdino, 2009). Additionally, it alludes to beliefs and presumptions concerning expanding knowledge (Saunders et al., 2009). The expansion of the postulate of inquiry, as well as its character and comprehension, are involved. The postulation, intended to be an opening statement of thought, is based on stating people's perceptions and intuitions (Žukauskas et al., 2018). According to Tariq (2017), the three subfields of research philosophy are ontology, epistemology, and axiology. According to Myers (2013), two philosophical

schools comprise ontology philosophy: constructivism and positivism. Under epistemology, there are more philosophical schools such as essentialism, progressivism, and idealism. The researcher's method for this study was positivism. According to Moore (2010), a well-liked paradigm connected to quantitative studies is the positivist paradigm, also known as the scientific paradigm. The positivist philosophy is the most extensively used research paradigm in the social sciences (Neuman, 2011). Positivists use deductive inquiry to investigate ideas that suggest causal connections between different constructs. These are grounded in theories and empirical data from earlier research, with generalisations regarding the results (Creswell, 2009).

According to Creswell (2009), positivists believe that using experimentation and correlation to ascertain the cause-and-effect relationships between the variables can quantitatively represent social life. On the other hand, Neuman (2011) posits that a positivist seeks out exact quantitative measurements, uses statistics to test underlying hypotheses and recognises the value of replication in research. Furthermore, positivist researchers reduce all phenomena to empirical indicators that reflect reality.

Contrarily, the interpretive paradigm—also known as constructivism—is predicated on the notion that people actively create or construct their knowledge and that experiences shape reality for the learner (Olusegun, 2015). Adom et al. (2016) found that through interaction, knowledge is gained when people actively engage with the content. Contrary to the positivist paradigm, an interpretive or constructivist philosophical perspective emphasizes the need for a qualitative analysis of human social existence using various techniques, including direct observation, interviews, and case studies (Neuman, 2011).

Qualitative research aims to advance concepts contributing to understanding social occurrences in natural settings, emphasising the participants' meanings, experiences, understandings and

views. Similarly, qualitative researchers view things in their natural environment, attempting to interpret occurrences in the contexts of the meanings the individuals bring to them (Acs et el., 2003).

Numerous techniques, including qualitative and quantitative approaches, are used in business research. For example, positivists use quantitative measures, highly structured procedures, and written or oral surveys with predetermined response rates and sample sizes to evaluate causal links between constructs within a value-free framework (Hyland, 2015). However, most of the time, the qualitative research samples are meant to reflect something other than sizable populations. In contrast, interpretivism based on a qualitative paradigm is built on process and meanings employing in-depth and focus group interviews and participant observation (Maxwell, 2012).

The positivist paradigm is employed in this research since it is a better fit for the main goals of the investigation. Based on the created research model, the study uses a deductive methodology focusing on model testing and verification. In light of the philosophical presumptions raised above, the current study primarily uses the positivist paradigm technique to investigate.

3.3 Research Design

According to Yin (2009), a research design is a methodical approach for getting from point A to point B, where point A may be interpreted as the initial set of research questions to be addressed and point B as the conclusions (or answers) to these questions.

This procedure outlines the steps that must be taken to adequately address the research questions that emerged during the exploratory phase. It comprises deciding on an analytical technique, applying value theory, and creating an appropriate sampling plan (Florida et al., 2012).

The current study, as previously mentioned, assesses the structural connections between the constructs using a quantitative research methodology. Quantitative research is an empirical social study that uses empirical methods and assertions (Williams, 2011). By gathering and analysing numerical data using statistically based methodologies, quantitative research is defined by Minai et al. (2014) as qualitative research in which phenomena are explained. The quantitative approach produces predictions, tests causal hypotheses, identifies patterns and averages, and generic findings to larger groups (Bhandari, 2022). A quantitative outlook entails compiling data in numerical form and providing a concise introduction for examination using statistical techniques (Collis et al., 2013). The systematic investigation of phenomena using numerical, mathematical, and computer methods is another definition of quantitative research by Bhat (2019).

Per this research design, research will employ a cross-sectional research design, where information is obtained at a particular time during the investigation. It follows Williams' (2011) recommendations that support a specific time during the data-gathering process. The data are subsequently analysed and statistically interpreted to make inferences or assumptions about the population. The researcher chooses a cross-sectional approach over a longitudinal one due to its strength and simplicity and the researcher's resource constraints in terms of time and money, as Williams (2011) suggested. In addition, it is done to lessen specific constraints on the longitudinal research design that result in open-ended research output.

Because the research goal is to test hypotheses about dynamic managerial capability as an essential influence on firm performance in a technologically turbulent environment through the lens of innovation, the chosen design allowed for statistical measurement of the relationship between variables.

3.4 Population

The population is the complete set of relevant units from which a sample is statistically drawn (Bell et al., 2007). An entire group for which it is necessary to gather information is referred to as a population, according to Asiamah et al. (2017). The typical population constitutes businesses, communities, people, associations, and colleges. These are acceptable if the population is clearly defined and includes the appropriate individuals. The research question or objectives will provide a good distinction of the population to be examined, including its geography and restriction to a specific age group, sex, or employment. The population must be adequately defined so that those included and excluded are made plain (Banerjee, 2010). Based on this assertion, the population for this study was SMEs operating in the formal and informal sectors of all areas of business in two cities in Ghana: Accra and Kumasi. These cities, Accra and Kumasi, were selected because they have a more concentrated economic activity evident in (Akanpaaba et al., 2022).

3.5 Sample and Sampling Technique

The sample refers to the specific group within the population from which data is gathered. In research, the model is selected and considered representative of the whole population (Long, 2014; Etikan et al., 2016). Therefore, selecting the best sample is necessary to minimise the sampling error's financial and non-financial costs (Fincham et al., 2013).

Small and medium-sized businesses (SMEs), are undoubtably essential for economic growth in the present technological era. They actively promote economic growth in various ways; they accommodate the growing labour population by offering employment opportunities.

The United Nations Industrial Development Organisation's (UNIDO) definition of SMEs for developing countries and that of the National Board for Small-Scale Industries (NBSSI) were used as the prime bases for the sample.

The definition classified SMEs as follows:

Micro–firms with fewer than five workers

Small businesses with 5–19 employees

Medium-sized businesses with 20–99 employees

The above definition was employed because it captures a typical Ghanaian economy and, for that matter, Accra and Kumasi. The researcher used multiple sampling to arrive at the sample size. First, the SMEs identified were in the areas of manufacturing and service. The owner-managers, executives, and managers had to indicate the number of employees they had to qualify as SMEs.

The total number of respondents or businesses, when put together from all the categories, was three hundred (300). The researcher purposefully and strategically selected the sample from both the formal and informal sectors as a typical prototype likely to represent the different types of SMEs in Ghana. The sample figure may need to accurately present the relatively large number of SMEs in both cities. Owner-managers, executives, and managers constituted the sample because these are small firms, and these people are usually at the heart of the operations of these firms.

Sampling, on the other hand, involves gathering data from a fraction of the population for the study. According to McCombes (2022), the sampling method is carefully selected due to large population sizes, time, and others for which every individual in the population may not be tested. Both convenient and purposeful sampling is used in this study. They are methods of nonprobability sampling that aid in selecting a sample of individuals or groups from a population. When randomisation is impractical because of the size of the population and the subjective nature of sample selection, non-probability sampling is advantageous. This sampling

method may be helpful when a researcher needs more resources like time, money, or labour (Etikan et al., 2016).

There are few official statistics on Ghana's informal sector businesses because most SMEs must be registered, be organised well, and not subject to government oversight (Agyapong et al., 2016). It thus supports the convenience sampling strategy.

3.5.1 Purposive Sampling Technique

Since only SMEs operating in the formal and informal sectors and under the definition of UNIDO were considered, the purposive sampling technique was used. Purposive sampling, or judgmental sampling, is based on deliberately selecting subjects (people or objects) based on qualities, characteristics, or traits. It is a non-random sampling technique where the researcher exercises judgement in determining what data is needed and the source of collection (Palinkas et al., 2015; Etikan et al., 2016). This sampling technique generally focuses on subjects with specific qualities that can effectively contribute to the research or study (Etikan et al., 2016).

This research used this sampling technique to select all SMEs in the formal and informal sectors. First, the SMEs were scanned for eligibility because reliable databases related to underdeveloped nations were unavailable (Boso et al., 2013). Based on the SMEs' physical locations in Ghana, the primary criterion for screening them was their location. Second, businesses are individual firms that do not belong to a chain or an association of businesses. Those with a controlling stake in private enterprises come in third, followed by businesses with 1- 99 employees. Three hundred (300) SMEs in Accra and Kumasi were selected as the sample based on this sampling methodology.

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3.5.2 Convenience Sampling Techniques

Convenience sampling is a nonprobability or non-random sampling, frequently called accidental or haphazard. According to specific practical criteria, such as ease of accessibility, proximity to the study's location, availability, or willingness to participate, members of the target population are included in the study when using this type of sampling (Etikan et al., 2016).

Many strategic management academics that have studied Ghana use the convenience sample technique (Acquaah et al., 2015). This method was used because simple random sampling, a probability sampling technique, is challenging in a developing economy like Ghana to identify firms in the informal sector.

3.6 Data Collection Instruments

Gathering viable information on selected variables in a study is data collection (Bhandari, 2020). Data is the different values linked with a variable in research. According to Yin (2017), there are three general categories of data sources: primary, secondary, and tertiary. In a quantitative study, the primary data are the most convincing. Additionally, this data is gathered from primary sources directly; in other words, it is cumulated from first-hand sources through experiments, interviews, or surveys. Secondary data, which includes operational records, official publications, and census data, is gathered concurrently from tests, studies, or surveys carried out by other persons or for other research purposes (Rashid et al., 2021).

In line with this research topic, the study employed the questionnaire and practical activities to collect data within the shortest time possible. The researcher used the data collected to answer the questions posed. Preliminary data gathered for the study was in the form of questionnaires. Secondary data gathered for the study were books, articles, published and unpublished theses, and other documents related to dynamic managerial capability and performance.

3.6.1 Questionnaire

A questionnaire is a set of prepared questions circulated to collect responses or data for research. A questionnaire is handy when a researcher cannot personally see all subjects from whom desired responses are gathered. It allows for the easy dissemination and collection of desired responses. These questions exist in various forms. They may be structured or unstructured, closed or open-ended, and administered online (in softcopy) or hardcopy. The questionnaire comprised 5 sections comprising 52 questions to examine the hypotheses or assumptions. The measurable factors were adopted after a thorough literature assessment. The researcher collected data over two and half months (December to February) through the electronic distribution of the questionnaires (online survey) to business owner-managers, managers, and executives. A seven-point modified Likert scale was used to score all the questions (52 items) related to the six aspects and dimensions (1 = strongly disagree; 7 = strongly agree). The appendix contains a list of the measurement items.

Overall, 300 responses were obtained from the targeted participants within a period of data collection.

3.7 Measurement of Variables

In surveys, Likert-type scales are frequently used to evaluate attitudes and observations (Rashid et al., 2021). These rating scales, which may include five or seven answer options, each has advantages and disadvantages. For example, according to Rashid et al. (2021), a five- to seven-point Likert scale may measure items in a study focusing on individual behaviour. However, a seven-point scale is more likely to be justified, whereas a five-point Likert scale tends to be less so (Saunders et al., 2011).

All constructs from earlier research that examined the variables were modified to improve the survey's reliability and validity. A seven-point Likert scale was used to score the items, with 1

denoting a strong disagreement and 7 denoting a firm agreement. A few units were also changed to better suit the research and the participants' understanding.

3.7.1 Independent variable

Kor et al. (2013) proposed managerial human capital, social capital, and cognitions as the three characteristics of dynamic managerial capability. Human capital was measured using a scale of ($\alpha = 0.874$) with five conceptual dimensions (knowledge, experience, professional field, cognition ability, and proactivity), resulting in five (5) units of measurement. Six (6) factors were used to measure social capital: status, interlinking, family support, complicity, personal relationships, and social relations proposed by Felício et al. (2012) and Corrêa et al. (2019), resulting in four (4) measuring items on a scale of ($\alpha = 0.867$) adopted from (Akanpaaba et al., 2022). Finally, the managerial cognition score of ($\alpha = 0.832$) proposed by Corrêa et al. (2019) was evaluated using five (5) items.

3.7.2 Dependent variable

The financial and non-financial success of the business was used as an indicator to measure performance. Privately owned businesses comprise a large portion of the sampled companies for this study, making it challenging to determine an objective performance indicator. Accordingly, subjective measures of firm performance were applied to the samples in this study. Performance measurement is considered adequate in this research view of the data collection issues because prior research has revealed a good correlation between subjective ratings and their objective counterparts. Therefore, self-reported performance measurements were used in this study, a common technique considered valid as objective measures (Jaworski et al., 1993; Avci et al., 2011; Al-Ansari et al., 2013; Acquaah et al., 2015). Twenty factors gauged how well a firm performs Kropp (2006) and Al-Ansari et al. (2013), and once more, a seven-point Likert scale that ranges from "1" (much worse) to "7" (much better), as adapted

from studies measuring the financial and operational success of the firms. The researcher adopted a scale of (α = 0.920) from (Agyapong et al., 2016).

3.7.3 Mediating variable

By reviewing the existing literature and using a scale of (α = 0.920), Al-Ansari et al. (2013) determined that the innovation construct can be measured using ten (10) aggregate items on a Likert scale of "1" (much below) to "7" (much above) over three years.

3.7.4 Moderating variable

Participants were asked to rate each item's degree of accurately reflecting their business operations on a seven-point Likert scale. Technological turbulence (α = 0.854) was measured using a 7-point Likert scale (1 = very low to 7 = very high) to indicate the extent to which each of the following items characterises the operating environment of the firms. The items for technological turbulence were adopted from (Jaworski et al., 1993).

3.7.5 Control variables

The study added several additional factors to determine how vulnerable the results were to the possibility of a misleading association, even though the main goal was to build an economic model. The researcher introduced control variables to prevent these elements from unjustifiably influencing the results—the following adjustments since they impact firm performance: firm size, industry, and firm age. The adjusted variables correspond with previous research (Agyapong et al., 2016; Anning-Dorson, 2017). According to theories, firm age, or the number of years since its founding, impacts its performance and innovative activities (Qian *et al.*, 2017). Larger, more established companies may have a larger pool of resources and the ability and scale to invest in innovation. The company's size was determined by its total number of

employees, its age was determined by the number of years it had been operating, and its industry of operation was determined as manufacturing and services (Schilke, 2014a).

3.8 Data Analysis

The current investigation is quantitative, utilising measuring and analytical tools. To aid in interpreting the analysis, descriptive and inferential statistics were combined after the data had been collected. The data gathered for this investigation was analysed using the PLS-SEM method. PLS-SEM software was employed explicitly for data analysis and presentation, whereas SPSS software version 25 was used for descriptive analysis and data cleaning.

3.8.1 Descriptive Analysis

According to Sekaran et al. (2013), descriptive analysis is frequently used to describe interesting phenomena. The frequency, average score, or central tendency (mean and standard deviation) of various phenomena of interest are statistically examined in the individual analyses using descriptive data. Per Long's (2014) advice, the primary purposes of descriptive analysis in this study were to characterise the sample and all of the constructs under investigation. Data analysis for descriptive and correlative purposes was done using SPSS version 25.

3.8.2 Partial Least Square (PLS) Techniques (Structural Equation Modelling (SEM)

The proposed model was examined using software that applies the partial least squares (PLS) technique. Utilising several variables and multiple equations simultaneously, the researcher could analyse the data gathered from respondents using the statistical tool SEM, a multivariate statistical technique. SEM can be used to perform several multivariate statistical analyses, including regression, path, factor, correlation analyses, and growth curve modelling (Urbach et al., 2010). This method investigates one or more independent latent variables and one or more dependent latent variables for both direct and indirect relationships.

For data analysis, the study used SmartPLS software, version 4.0, a statistical tool. Instead of reducing the error terms of the endogenous constructs, the partial least squares (PLS) estimation procedure uses an ordinary least squares regression-based method to estimate the path relationships in the model (Hair et al., 2011; 2014). PLS-SEM operates successfully with a complex model and a small sample size while making no assumptions about the underlying data (Sarstedt et al., 2014). Studies with several indicators for each latent variable or small sample sizes are better suited for PLS (Hair et al., 2014b). PLS-SEM is a prediction-oriented method for SEM that relaxes the specifications for data and relationships set forth by CB-SEM (Rigdon, 2012). Because of its statistical characteristics, PLS-SEM is particularly useful for exploratory research contexts that are both data-rich and theory-primitive (Sarstedt et al., 2014). Since the latter results frequently need to be clarified and call for multiple separate analyses, PLS-SEM offers valid and meaningful results compared to other methods like SPSS (Lowry et al., 2014). PLS-SEM addresses the issues that family business researchers encounter, such as over-surveyed respondents, declining response rates, and theories and cause-effect models that are becoming more sophisticated (Mihic et al., 2015).

3.8.3 Reliability and Validity

Based on a thorough analysis of earlier works in DMC, the research conceptualises three categories of dynamic managerial capabilities. Also created from relevant empirical research are the measurement items for these dynamic capacities.

However, since the antecedents of DMC are recent creations, more proof is required to confirm the construct validity of the measurement items underlying these abilities. The alignment between conceptual ideas and the corresponding assessment items is probed through construct validity (Mihic et al., 2015). As an illustration, the three different forms of DMC are each represented by three sets of metrics mentioned above. However, as they are closely linked

concepts, it is possible to wonder if these indicators can accurately gauge the theory or if some indications in one set should be switched to the other to reflect the actual situation accurately.

The coefficient alpha was calculated to evaluate the reliability of composite variables and enhance the draft questionnaire's measurement scales. These analyses were carried out using the same SmartPls software.

3.8.3.1 Validity

Convergent and discriminant validity are measurement markers, and validity relates to the accuracy of the scale tool. The primary purposes of convergent validity are to detect the average variance extraction and to assess the correlation between items belonging to the same dimension (AVE). As a result, the suggested value should be greater than 0.5 (Hair et al., 2020). In the opinion of Urbach et al. (2010), discriminant validity is used to distinguish between the measures of a construct. Additionally, it gauges how differently overlapping structures are from one another (Hair *et al.*, 2014c).

Instead of convergent validity, discriminant validity looks at whether the items unintentionally measure something other than the intended construct. Fornell- Larcker's criteria and cross-loading are frequently employed measures of discriminant validity in PLS. When measuring the correlation between different facets of an item and its association with other items, the discriminant validity of the AVE is examined.

3.8.3.2 Reliability

Cronbach's alpha (α) and Cronbach's composite (CR) are two indicators of the reliability of the Construct in SEM. Both reliability metrics must achieve 0.70 to be considered reliable (Hair et al., 2020). Cronbach's alpha, composite reliability, and AVE all have values of 1.000 in the study, which the researcher has continued with a single measurement. The results must always

be consistent and considered reliable for anything measured using Coefficient (or Cronbach's alpha) (Hair et al., 2012; Wadkar et al., 2016). The coefficient alpha is a helpful indicator of reliability and items' internal consistency (Pontekotto et al., 2007). A good correlation between the scale items indicates high reliability. Values of the coefficient alpha are used as a measure of reliability. Values above 0.70 are acceptable, those above 0.80 are good, and those above 0.90 are exceptional (Hair et al., 2012).

3.9 Ethical Consideration

Ethical considerations are a crucial component of research noted throughout the process. It required conducting oneself with the highest professionalism, honesty, and integrity during the research process. The ethical considerations included processing only accurate data, producing only supported results, guaranteeing neutrality, using research data honestly and ethically, and avoiding adding personal opinions or biases to prevent results from being influenced.

The participants or respondents needed to receive both verbal and written explanations of the research's purpose. In addition, they needed assurances that their privacy would be respected, that the study would keep them anonymous, that their participation was optional, and that they could withdraw from it at any time for any reason.

3.10 Study Setting

Managers, executives, and owner-managers of SMEs in Ghana's manufacturing and service sectors made up the study setting for this research. Managers, executives, and owners of SMEs chosen for the study are a purposeful sample. Owner-managers, managers, and executives who have held their positions for a long time, have seen significant environmental changes, and have consistently displayed a certain level of performance in their roles were among the criteria for the sample selection (Marriam, 2009). Therefore, based on the literature, they would be more likely to use DMCs.

SME owner-managers, executives, and managers who provided information for the study would have witnessed a considerable external environment change because SMEs are very dynamic (i.e., the continuous evolution of innovation and technology—technological turbulence). Therefore, the research setting was valuable for understanding how managers produced and modified their resources toward achieving and maintaining firm performance in this environment.

3.11 Conclusion

This chapter explains why the research should use a quantitative method approach. Also included are the specific research techniques to be used. The conclusion discusses the justification for the quantitative study's research design as well as the general structure of the research process.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Overview

The chapter deals with the study's presentation, discussion, analysis, and interpretation. The research is divided into three sections; a validation study, a descriptive analysis of collected data relating to the various variables, and the third deals with the link between the variables (dynamic managerial capability, innovation, firm performance, and technological turbulence). The SPSS 25 version software was used for descriptive data analysis and data cleaning. As mentioned in chapter three, the data used for this study were collected from Ghanaian SMEs in Accra and Kumasi through an online survey between December and February.

The subtopics in this chapter are as follows: the respondents' profile; data screening and preliminary analysis; non-response bias; common method variance test; and the respondents' demographic profile. A summary of the results was then given after deciding on the data screening and critical characteristics of the data collected from the respondents.

The other sub-topics cover the findings of hypotheses put to the test to achieve the earlier-mentioned objective through the measurement and structural models. The model was employed to assess the measurement's convergent validity, discriminant validity, internal consistency reliability, and item reliability. Section three summarises the findings of the structural model and discusses the significance of the path coefficients, R-squared values, and the model's predictive value.

The results of the PLS-SEM analysis, which examines the effects of innovation and technological upheaval on the relationship between dynamic managerial capability and firm performance, are presented at the end of this chapter. The chapter summary is presented in the final section.

4.2 Data Cleaning and Cleansing

All 300 responses received were coded before their data was computed into SPSS, which was then used to assess the data screening. As recommended by Tabachnick et al. (2013), preliminary data analyses of the following types were carried out after data coding and entry;

(i) Value of missing analysis

(ii) Outliers Assessment

(iii) Normality test

(iv) Test for multicollinearity

(vi) Non-response bias

(vii) Common method variance

A non-response bias test, which can be considered a strategy that compares the early and late responses to the administered questionnaire, is also advised for research of this kind (Johnson et al., 2006). The common method variance test is also recommended for self-report survey studies.

4.2.1 Value of missing analysis

Suppose there are any data in the collection of data to be used that need to be included. In that case, the tools and techniques available in the structural equation model (SEM) analysis cannot execute the function (Johnson et al., 2006). Similarly, it should be highlighted that the suitability of data arrangement and subsequent conversion to an appropriate form of analysis heavily influence the quality of data analysis (Kristensen et al., 2010). Data screening is quite helpful to ensure that the data utilised was entered accurately. Due to the respondent's inability to grasp the questions, unwillingness to respond, or difficulty responding, data may need to be

included (Sekaran et al., 2013). However, data points were included in the original SPSS dataset used for the investigation.

4.2.2 Assessment of Outliers

Outliers in the collected data have the potential to skew significant estimates of regression coefficients in a regression-based analysis, leading to false conclusions (Verardi et al., 2009). Outliers are explanations or groups of observations that are inconsistent with the rest of the data (Hair et al., 2011). The confidence interval values were used in the frequency tables for all constructs to help identify any observations that, for example, fall below the value labels due to incorrect data input. The outcome indicates that 14 values were beyond the probable range. The data for this study were examined for univariate outliers using streamlined values with a cut-off of ±3.29. It was done following the recommendation of Tabachnick et al. (2013).

Table 4.1 Total number of datasets that exceeded the Z-score value

Item id no.	**Z-score Values**
10	4.98398
21	6.74455
22	4.555
27	4.0177
44	7.33575
75	4.6265
145	3.33957
172	3.31213
178	4.98398
186	3.55406
190	4.22189
210	4.42608
211	4.42608
212	4.42608
Total number	14

None of the examples was detected using standardised values as potential univariate outliers per Tabachnick et al. (2007) criteria for identifying outliers. In addition to using normalised values to identify univariate outliers, multivariate outliers were found using the Mahalanobis distance (D2). Mahalanobis distance (D2) is the distance between a case and the remaining cases, where the median is the point produced at the intersection of the means of all the variables (Rahi, 2017). Twelve (12) observed variables were above the Mahalanobis threshold. As shown in Table 4.2, these items are values for evaluating the Mahalanobis distance of 20.52 at p = 0.001 (Pallant, 2020).

Table 4.2 Total number of the dataset that exceeded the Mahalanobis values

Item id no.	**Mahalanobis values**
1	.00015
14	.00003
22	.00037
30	.00002
35	.00021
48	.00000
67	.00059
68	.00031
69	.00035
155	.00002
156	.00058
190	.00010
Total no.	12

Twelve of the dataset's elements were removed per the Mahalanobis values criteria because they might impact how accurately the data analysis method works. Normality Test

Due to skewness or kurtosis in the data, the bootstrapped standard error estimates might underestimate the statistical significance of the route coefficients (Chernick, 2011; Ringle et

al., 2012). Scholars should perform a normalcy test on their data, even though studies have long assumed that PLS-SEM offers reasonable model projections in situations with noticeably abnormal data (Hair et al., 2013; Henseler et al., 2014). Applying the normality test is necessary to determine whether something is normal.

This study followed Tabachnick et al. (2013) advice and employed a visual approach to examine the normalcy of the data it gathered. It suggests that rather than looking at skewness and kurtosis statistics values. According to this, it is necessary to visually examine the form of the distribution in large samples of 200 or more. The study discovered that a larger sample size decreases standard errors, typically raising the statistical values of skewness and kurtosis. Therefore, using the normality test's graphical approach is justified rather than statistical. The current inquiry also used a histogram to confirm that the normality assumptions were upheld. As a result, the normality test is shown in Figure 4.1.

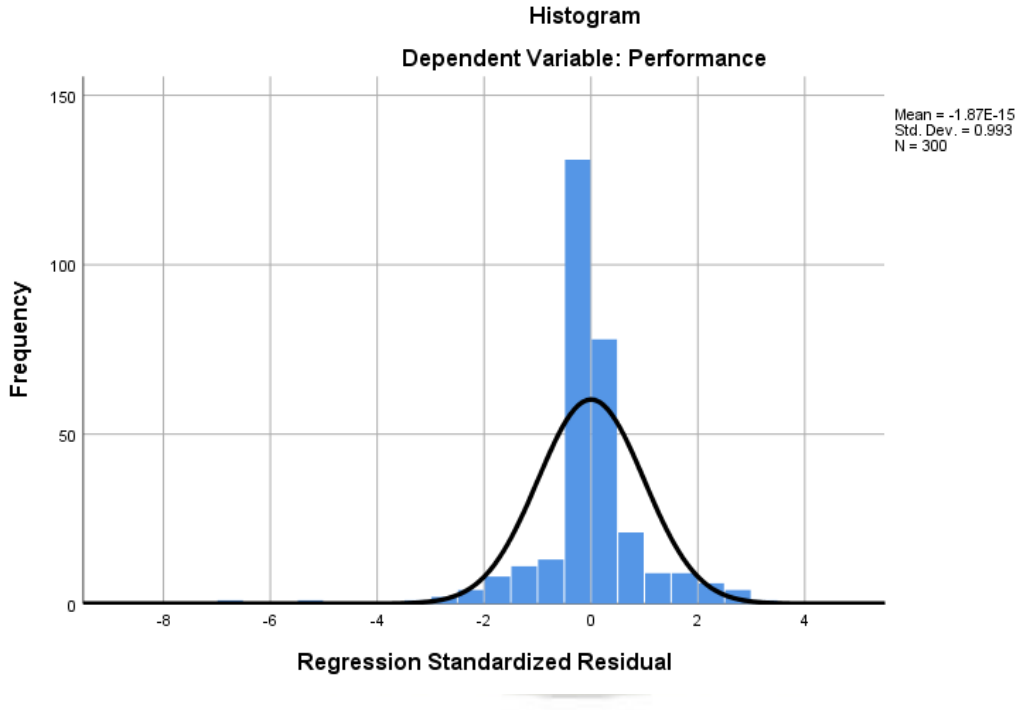

Figure 4.1 Histogram of Firm Performance

Due to the histogram's bars being restricted to a normal distribution curve, Figure 4.1 shows that the data collected for the research follow a typical pattern. The scores are evenly distributed, with the majority falling in the middle of the distribution, as seen in Figure 4.1.

4.2.3 Multicollinearity Test

Independent variables show a high degree of correlation when multicollinear (Henseler et al., 2015). However, when the independent variables are multicollinear, the estimations of the regression coefficients and associated statistical significance tests may be severely skewed (Henseler et al., 2015). In addition, Tabachnick et al. (2013) assert that multicollinearity may increase the standard error coefficients, rendering the coefficients statistically unimportant.

Two methods suggested by Peng et al. (2012) were employed in this study to identify multicollinearity. Investigating the independent variables' matrix came first. When the correlation coefficient is 0.90 or above, multicollinearity between the independent variables is likely. Table 4.3 displays the correlation matrices for each independent variable.

The interconnection of the independent constructs is sufficiently low, as demonstrated in Table 4.3, to fall below the indicated threshold values of.90 or more Hair et al. (2017), indicating that the causative constructs were distinct and not notably associated. Therefore, Hair et al. (2017) and Peng et al. (2012) recommended the threshold presented in this table.

Table 4.3 Correlation Matrix of the Exogenous Latent Constructs

No.	Variables	1	2	3	4	5
1	DMC	1				
2	Performance	.872**	1			
3	Demographics	.302**	.361**	1		
4	Innovation	-.597**	-.674**	-.373**	1	
5	Tech. Turb.	.701**	.809**	.289**	-.513**	1

*****. Correlation is significant at the 0.01 level (2-tailed).***

In identifying multicollinearity issues, the variance inflated factor (VIF) and tolerance value were analysed after the correlation matrix for the independent variables was examined. Once more, drawing inference from Hair et al. (2011) multicollinearity is concerning if the VIF value is greater than 5 and the tolerance value is lower than 0.20. The VIF values, tolerance values, and condition indices for the independent variables are displayed in Table 4.4.

Table 4.4 Tolerance and Variance Inflation Factors (VIF) Latent Constructs

Variables	Collinearity Tolerance	Statistics VIF
Dynamic Managerial Capability	.431	2.322
Demographics	.846	1.183
Innovation	.590	1.695
Technological Turbulence	.492	2.032

Because all of the causative variables' VIF values were less than 5 and their tolerance values were more significant than 0.20, the data in Table 4.4 do not demonstrate any multicollinearity among them. The study's multicollinearity is, therefore, fine. In addition, the data appeared to lack first-order linear auto-correlation, as indicated by the Durbin-Watson d value of 1.87. Hence, a value between 1 and 3 is considered concerning. Additionally, Barlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling suitability were conducted (Pallant, 2020). The results showed that KMO was .945 and Barlett test was ($p < .000$), indicating that the data were appropriate according to Tabachnick et al., (2007) and (Pallant, 2020), whom both stated that Barlett's test of sphericity is significant ($p < .05$) and Kaise-Meyer-Olkin (KMO) at 0.6.

4.2.4 Non-Response Bias

According to Berg (2008), non-response bias, or participation bias, is the error anticipated when estimating the characteristics of the sample because particular categories of the participant are somewhat represented because of non-response. Non-response bias is a technique that compares early and late responses to a questionnaire that has been administered. Johnson et al. (2006b) recommended a time-trend extrapolation approach since late responders share features with non-respondents (i.e., non-respondents).

Regardless of how few non-respondents there were, bias is probably present and has to be examined (Wetzels et al., 2009). Participation bias is the variations in responses between participants and non-participants (Tabachnick et al. 2013). Wingenbach (2002) determined that a participation rate of at least 50% is required. Vink et al. (2008) classified respondents into early and late respondents; early respondents responded in the first 30 days, and late respondents responded after 30 days. The majority of the sample's respondents, 259, or 86.3%, responded to the survey after the first 30 days, while the remaining 41 respondents, or 13.7%, responded in the first 30 days.

In identifying any potential non-response bias on the critical study variables, including (i) dynamic managerial capability, (ii) innovation, (iii) technological turbulence, and (iv) firm performance, an independent samples t-test was explicitly undertaken. The outcomes of the independent-samples t-test are shown in Table 4.5. When utilising the independent samples t-test to determine whether the means are equal, the findings show that the group means and standard deviation for early and late responses are seemingly the same (Vink et al., 2008)

As seen in Table 4.5, the results of the t-test indicate no significant difference between early and late responses, as recommended by (Pallant, 2020). The equal variance significance values for each of the four multiple study variables were higher than the 0.05 level of significance for

Levene's test for equality of variances. Because of this, the presumption that early and late respondents have equal variances has been upheld.

Therefore, this study did not contain response bias. Additionally, by Wingenbac's (2002) recommendation, the problem of participation bias is insignificant.

Table 4.5 Results of independence samples T-test for non-response bias

Variables		No	Mean	Std Dev	t-Stats	Sig.
Dynamic Managerial Capability	Early	41	5.3589	1.06815	-8.648	.000
	Late	259	6.5634	.89272		
Firm Performance	Early	41	104.5366	18.72311	-9.098	.000
	Late	259	129.7326	19.43327		
Innovation	Early	41	38.2683	15.29710	8.416	.000
	Late	259	18.0504	15.29863		
Technological Turbulence	Early	41	21.3171	4.92158	-5.411	.000
			25.5233	4.21520		

4.2.5 Common Method Variance Test

According to Podsakoff et al. (2003), "common method variance" (CMV) is the term used to describe discrepancy that is more closely related to the measurement method than it is to the variable of interest. Most studies indicate that researchers who use self-report questionnaires have severe concerns about common method variance (Podsakoff et al., 2003). It is because the correlations between the constructs measured through self-reports, for instance, are inflated, according to (Conway et al., 2010).

As advised by MacKenzie et al. (2012) and Chun Won et al. (2017), this study used some procedural remedies to lessen the effects of CMV. To allay respondents' concerns about the evaluation process, it was first explained to them that there was no right or wrong answer to

the questions on the questionnaire and that their confidentiality would always be maintained. In order to further improve scale items, no unclear questions were included in the questionnaire, and all of the questions were written in a clear, concise, and straightforward manner.

Furthermore, the Harman single-factor test was run. It is the standard test researchers use to look at CMV in studies. Because the variance in the common method was 47.8% and not more than 50%, it has been shown in the current study that it is not a significant problem and is unlikely to amplify connections between variables. This outcome is consistent with the recommendation (Podsakoff et al., 2012).

Table 4.6 Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	25.718	48.524	48.524	25.317	47.767	47.767
2	4.441	8.380	56.904			
3	3.231	6.097	63.001			

Extraction Method: Principal Axis Factoring.

4.3 Analysis Presentation

4.3.1 Profile of the Respondents and Firms' Demographics

The demographic breakdown of the sample's businesses and respondents is provided in this section. The 11 questions that comprise the demographic characteristics this study looked at are shown in the tables below.

Table 4.7 Describes the types of industry the business operates.

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1	219	73.0	73.0	73.0
	2	81	27.0	27.0	100.0
	Total	300	100.0	100.0	

Of the 300 responses, 219, representing 73% of the sample, were manufacturing firms. In contrast, the least 81 firms (27%) were service organisations.

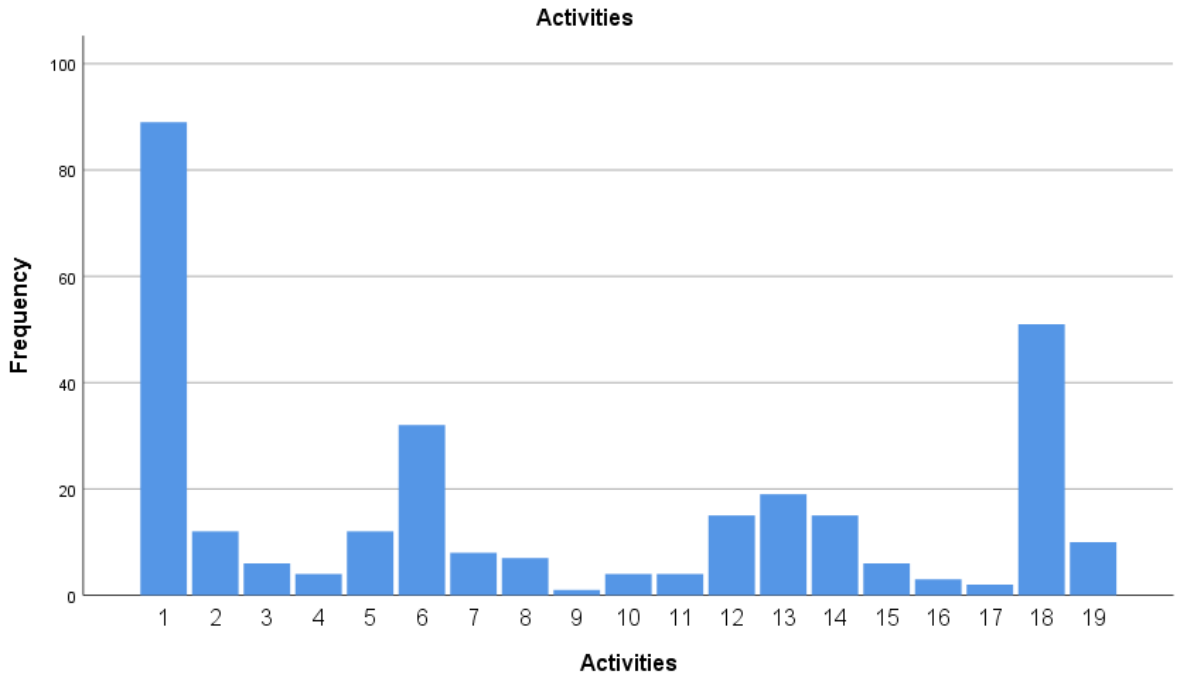

Figure 4.2 Firm activities

Since the question about business activities was open-ended, the responses were thematically coded. The themes are as follows;

Food=1; this constituted bakeries, farm produce, processed foods, and beverages. Food accounted for 89 (29.7%) businesses. Media=2; this included graphic design, photography, printing, and publishing, representing 12 (4%) firms. Financial=3; companies that provide financial services, for example, forex trading, savings, and loans. Of the 300 organisations, 6

(2%) were in the financial industry. Energy=4; organisations providing gas, water, and clean cooking energy were grouped under this theme. 4 (1.3%) firms could be accounted for under this category. Education=5; this theme comprises SMEs that provide some education to people and constituted 12 (4%) firms. Fashion=6; this theme comprised clothing, tailoring, bags, and shoes. It accounted for 32 (10.7%) businesses. Health=7; consisted of private hospitals, diagnostics centres, and manufacturers of health products and equipment. Out of the 300 firms, 8 (2.7%) were found to be in this category. Construction and Real estate=8; comprised of home rental firms, sale of lands and homes, construction, and architectural design businesses with 7 responses representing 2.7% of such companies. Entertainment=9; only 1 business was found in this category, making up for 0.3%. Planning=10; event planning and preparing bills were categorised under this theme, having 4 (1.3%) businesses. Logistic=11; courier services, air, and road transport company under this theme were 4 (1.3%). IT and Electronics = 12; this theme included software creation, electronic security systems, maintenance, and installation of electronic devices. It accounted for 15 (5%) of the SMEs in the study. Beauty=13; included services for applying makeup, making bath soaps, and producing body lotions and perfumes. 19 (6.3%) of the data were related to this theme. Water =14; water bottling and sachet companies contributed 15 (5%) of the data collected. Cleaning=15; Fabric=16; 3 (1%) of the data collected showed firms that were into fabric production. Furniture=17; only 2 (0.7%) were into furniture production. Essential items =18; ranging from stationaries such as books, pencils, and pens to household items like plastic and metal eat wares, chairs, buckets, and ceramics, 51 (17%) organisations fell under this theme. Agric=19; businesses that produce agricultural products such as manure, poultry, and fisheries fell under this theme and accounted for 10 (3.3%) of the companies.

Table 4.8 contains the frequency and percentage values for the current positions held by the respondents. For example, 42 (14%) of the respondents were executives in their respective firms, 40 (13.3%) were managers, and 218 (72.7%) were owner-managers.

Table 4.8 The current Position held by the respondent

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1	42	14.0	14.0	14.0
	2	40	13.3	13.3	27.3
	3	218	72.7	72.7	100.0
	Total	300	100.0	100.0	

The response for R&D is presented in Table 4.9. Again, 83 (27.7%) of the respondents indicated their firm does have an R&D (Research and Development) unit, while 217 said they do not have an R&D department.

Table 4.9 R&D Unit

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1	83	27.7	27.7	27.7
	2	217	72.3	72.3	100.0
	Total	300	100.0	100.0	

.

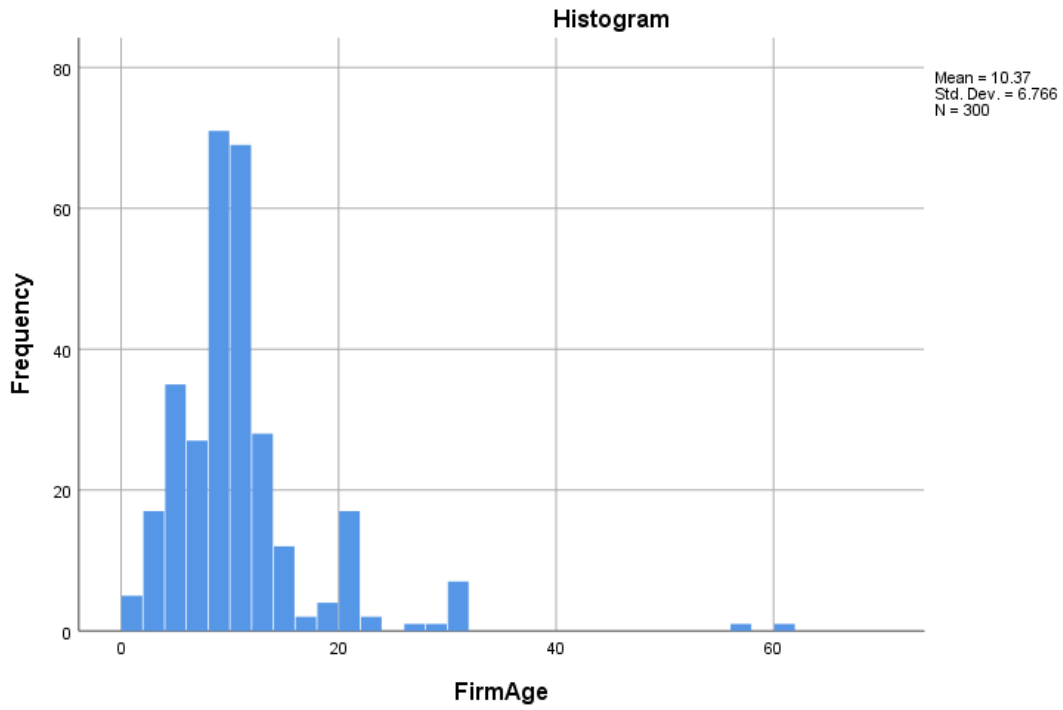

Figure 4.3 Firm Age

The results of the summary analysis presented in Figure 4.3 indicate that the average age of the firms is mean=10 years. In contrast, the median, which separates the higher half of the firm's age from the lower half of the data sample, is 9 years. The standard deviation (SD) measured was 6.8, and the age range was between a minimum of 1 to a maximum of 60. The first 25% of the distribution had firms that were 7 years old, at the 50th percentile, also known as the median, had firms that were 9 years old, and 75% of the distribution businesses were 12 years old.

Table 4.10 Number of Employees

N	Valid	300
	Missing	0
Mean		1.12
Median		1.00
Std. Deviation		.329
Range		1
Minimum		1
Maximum		2
Percentiles	25	1.00
	50	1.00
	75	1.00

The results of descriptive statistics presented in Table 4.10 indicate that the firms' average number of employees is 1.12 (Mean). At the same time, the median separates the higher half of the number of employees from the lower half of the data sample, which is 1. The standard deviation (SD) measured 0.329, and the range at minimum and maximum stood at 1. The first 25%, 50th percentile, also known as the median, and 75% of the distribution showed 1 employee.

Table 4.11 Number of Employees Retained Overtime

N	Valid	300
	Missing	0
Mean		20.29
Median		23.00
Std. Deviation		13.987
Range		90
Minimum		0
Maximum		90
Percentiles	25	10.00
	50	23.00
	75	25.00

The turnover of the firms is represented in Figure 4.11. On average (Mean), over 3 years, 20 employees are retained by the firms while the median stands at 23 employees. The standard deviation (SD) was 14, the minimum range was 0 retained employees, and the maximum was 90 retained employees over three years. The first 25% of the distribution had firms that could keep 10 employees; at the 50th percentile, also known as the median, had firms that could retain 23 employees, and at 75% of the distribution, 25 employees were retained.

Table 4.12 Gender of respondents

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1	190	63.3	63.3	63.3
	2	110	36.7	36.7	100.0
	Total	300	100.0	100.0	

Table 4.12 shows that the data set comprised 63.3% (190) males and 36.7% (110) females

Table 4.13 Age of respondents

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	1	1	.3	.3	.3
	2	74	24.7	24.7	25.0
	3	116	38.7	38.7	63.7
	4	65	21.7	21.7	85.3
	5+	44	14.7	14.7	100.0
	Total	300	100.0	100.0	

Table 4.13 shows the age range of participants; those younger than 20 with the least respondents of 1 represented 0.3% of participants. While those between 20 – 29, with 74 respondents, represented 24.7%, and the most extensive range was 30 -39, with 116

respondents (38.7%). The age range of 40 – 49, with 65 respondents, represented 21.7%, and the 50+ range, with 44 respondents, represented 14.7%.

Thus, the 30 - 39 age group was the most significant respondents of the sample. Therefore, looking at the results, the conclusion would be applied to the 30s age group.

Table, 4.14 Years Position, has been Held

N	Valid	300
	Missing	0
Mean		8.32
Median		8.00
Std. Deviation		4.897
Range		29
Minimum		1
Maximum		30
Percentiles	25	5.00
	50	8.00
	75	11.00

The number of years the respondents have held the positions is represented in Table 4.14. On average (Mean), respondents have held their positions for 8.3 years, and respondents were able to retain their jobs for 8 years (median). The standard deviation (SD) was 4.8 years, the minimum range was 1, and the maximum was 30 years of holding whichever position. The first 25% of the distribution had respondents keep their place for 5 years, at the 50th percentile, also known as the median, had people retain their positions for 8 years, and at 75% of the distribution, 11 years of working in that position.

Table 4.15 Family Business

		Frequency	*Per cent*	*Valid Percent*	*Cumulative Percent*
Valid	*1*	*86*	*28.7*	*28.7*	*28.7*
	2	*214*	*71.3*	*71.3*	*100.0*
	Total	*300*	*100.0*	*100.0*	

86 (28.7%) firms confirmed they were operating as a family business, while 214 (71.3%) confirmed they did not serve as a family business.

4.4 Descriptive Analysis of the Constructs

Mean, and standard deviation statistical values are used to assess the descriptive analysis of the broad statistical description of the variables used in this study. These values were computed for the independent, moderator, and dependent variables. In table 4.16 below, the outcomes are presented.

Table 4.16 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Innovation	300	10.00	70.00	20.8133	16.75912
Technological Turbulence	300	4.00	28.00	24.9300	4.54834
Dynamic Capability	300	2.43	7.00	6.3995	1.00489
Performance	300	60.00	140.00	126.2967	21.13586
Valid N (listwise)	300				

According to the descriptive statistical data in Table 4.16, the range of all variables' means is 6.40 to 126.30, and the range of all variables' standard deviations is 1.01 to 21.13. According to the descriptive statistics, the data indicates that the mean scores are higher than the average.

4.5 Assessment of PLS-SEM Path Model Results

Henseler et al. (2009) advised this study to evaluate and present the PLS-SEM path results in two steps. The following are the two-step processes used in the current study:

(1) Evaluation of a measurement model

(2) Evaluation of a structural model.

4.5.1 Evaluation of Measurement Model

Both the structural and measurement models have been evaluated in order to assess the quality criteria of the conceptual model used in this study. Validating measures prior to theory testing is necessary because measurement errors (random errors and method variance) can potentially jeopardize the research's validity. The evaluation process includes determining the item reliability, content validity, internal consistency reliability, convergent validity, and discriminant validity of a measuring model (Henseler et al., 2014). Partial Least Square-structural equation modelling (PLS-SEM) was used in this study's evaluation of the theoretical model using the SmartPLS software (Ringle et al., 2012). Factor analysis and multiple regressions are the two essential multivariate approaches on which PLS-SEM is found (Hair et al., 2019).

The validity test seeks to determine the accuracy of the measuring instrument, while the reliability test looks at the consistency of the measuring device. However, the device primarily aims to measure the items (Sekaran et al., 2013). Therefore, the outer model's construct validity, reliability, and individual item construct internal consistency are all evaluated. First, the standard path coefficient for each independent and dependent variables relationship using the endogenous latent variables' R-squared (R^2) values in PLS analysis was determined as posited by (Ramayah, 2010). The R^2 values follow the same interpretation as those from multiple

regression analysis. The R^2 value denotes the construct's variance described by the model (Ringle et al., 2012).

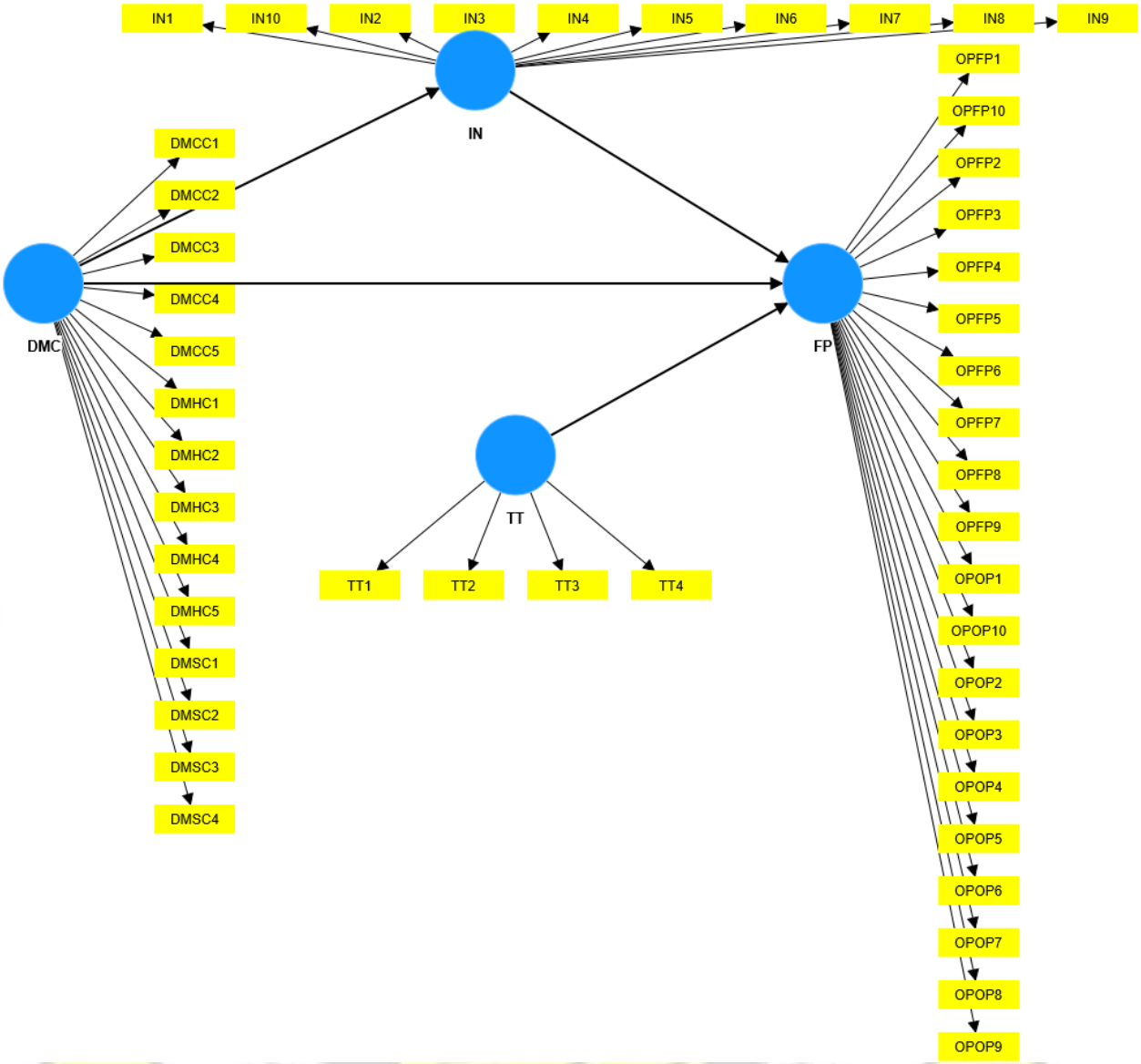

Figure 4.4 Measurement model

4.5.1.1 Individual Item Reliability

Each variable's outer loading was used to assess the dependability of each individual item. Individual item reliability is determined by the relationship between items and their respective latent variable. Items with loadings of 0.5 or higher are considered significant; however, indicators with loadings less than 0.5 should only be removed from the scale if their removal

improves construct reliability (Hair et al., 2013a). No item was dropped since none of went below the 0.50 threshold.

4.5.1.2 Convergent Validity

Convergent validity refers to the extent to which items correspond with other measures of the same latent construct and represent the intended latent construct (Henseler et al., 2015). It is the measure of an item's internal consistency. Cronbach's alpha, composite reliability, and average variance extracted (AVE) of the latent variables are used to determine it.

Cronbach's alpha is a measure of data consistency, whereas composite reliability is used to assess how well each indicator performs. Because it employs the item loadings obtained within the theoretical model, composite reliability outperforms Cronbach's alpha. Cronbach's alph weighs all items equally without taking factor loadings into account. Regardless, their interpretations are identical. As recommended by Hair et al. (2014), convergent validity was evaluated by assessing each variable's average variance extracted (AVE) and composite reliability (CR). Henseler et al., (2010) recommended that the AVE of each variable be at least.50 and the composite reliability at 0.70 to attain satisfactory convergent validity.

Table 4.17 Convergent Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	The average variance extracted (AVE)
DMC	0.976	0.977	0.976	0.746
Firm Performance	0.985	0.985	0.985	0.766
Innovation	0.978	0.979	0.978	0.816
Technological turbulence	0.891	0.908	0.898	0.691

AVE is the average amount of variance in indicator variables that is explained by a theoretically related latent construct (Henseler et al., 2015). According to Lee et al. (2013), the AVE values (see Table 4.17), which showed sufficient convergent validity, showed strong loadings (> 0.500); 50% of measurement variance is captured on the individual latent components and composite reliability (>0.700). The table also reveals that the AVE for each construct ranges from 0.691 to 0.816, indicating that the measurement model demonstrates adequate convergent validity. As a result, AVE values of 0.5 or higher generally are acceptable, but 0.7 is the cut-off for composite dependability (Memon et al., 2014).

for composite dependability.

4.5.1.3 Discriminant validity

After assessing the measurement model's individual and convergent reliability, the discriminant validity of the construct is evaluated. Discriminant validity describes how much one latent construct differs from others (Ab Hamid et al., 2017). To assess the discriminant validity of the measurement model, cross-loadings and the Fornell and Larcker (1981) criterion are used as two measurements. A measurement model is deemed to have adequate discriminant validity when both of the following conditions are satisfied. An indicator's loading is more

significant for the target construct than any other construct. The square root of the AVE exceeds the correlations between the measure and all other measures. This study uses AVE to assess discriminant validity, as advised by Hair et al. (2011); this was accomplished by using square root regression to examine the correlations between the latent components, as shown in Table 4.18. The loading of each variable in its construct is perceived to be greater than that of other constructs. As a result, every variable is represented by its own construct. Thus, the test validates construct discriminant validity.

Table 4.18 Discriminant Validity

	DMC	Firm Performance	Innovation	Technological turbulence	Technological turbulence x DMC
DMC					
Firm Performance	**0.891**				
Innovation	0.606	**0.684**			
Technological turbulence	0.76	0.87	**0.555**		
Technological turbulence x DMC	0.72	0.643	0.344	**0.697**	

Note: **Fornell-Larcker criterion***: Diagonals (boldface) signify the square root of the average variance extracted, whereas the other entries denote the correlations*.

The off-diagonal items in each row and column show that AVE's square roots exceeded. Table 4.18's bolded elements correspond to the AVE's square roots, whereas the not bolded values correspond to the constructions' intercorrelations. Fornell and Larker's condition is satisfied, as shown in Appendix A, because all off-diagonal elements are lower than the square roots of AVE (Henseler et al., 2015).

Each indicator in Appendix A loaded a distinct construct with a lower bound of 0.566 and an upper bound of 0.955. Additionally, compared to any other construct, each indicator loaded more heavily on its construct.

Indicator Cross-Loadings

The second assessment of discriminant validity involves looking at indicators and contrasting them with all concept correlations. The factor loading indications for the assigned construct should be more significant than those for the other constructs. The cross-loading output from the SmartPLS algorithm function is shown in Appendix A. Each measuring tool used in this study competed more fiercely with its intended latent variable than other variables. Additionally, the loading of each block differs from the loading of any other block in the duplicate rows and columns, differentiating each latent variable under the theory of the conceptual model. Thus, the cross-loading output confirms the measurement model's discriminant validity.

Overall, the validity and reliability tests of the measurement model are satisfactory, demonstrating that the items used to measure the constructs in this research are reliable and suitable for estimating the parameters of the structural model.

4.5.1.4 Internal Consistency Reliability

The degree to which items on a particular subscale evaluate the same concept is referred to as internal consistency reliability, according to Henseler et al. (2016). In organisational research, Cronbach's alpha coefficient and composite reliability coefficient are frequently used estimators of an instrument's internal consistency reliability, according to Mohajan et al. (2017). Hence composite reliability coefficient was used for this study's internal consistency reliability analysis. The composite reliability coefficient offers a significantly less biased measure of dependability compared to Cronbach's alpha, which assumes that all items

contribute equally to its construct without considering the actual contribution of individual loadings. Table 4.9 shows this.

4.6 Assessment of Significance of the Structural Model

The structural model's evaluation comes after the measurement model's evaluation (Henseler et al., 2016). The current study also used the bootstrapping approach by resampling 5000 bootstrap samples to assess the significance of the path coefficients for a direct and indirect link (Hair et al., 2014). When examining mediating effects, researchers should, per Hair et al. (2013b), follow Preacher et al. (2008) and bootstrap the sampling distribution of the indirect impact, which is effective for both straightforward and complex moderator models. So, the whole structural model is shown in Figure 4.4. With the help of technological turbulence acting as a moderator, this structural model seeks to explore the hypotheses that have been put forth regarding the relationship between dynamic managerial capability, innovation, and firm success.

The structural model comprises; (i) Hypotheses testing, (ii) Examination of Variance Explained in Dependent Variable and (iii) Assessment of Predictive Relevance (Q^2).

4.6.1 Goodness of Model fit

To satisfy the requirements outlined by Hair et al. (2014), SRMR must be less than 0.08, whereas NFI should ideally be more significant than 0.9. Table 4.19 displays these results, demonstrating a satisfactory fit for the research model.

Table 4.19 Goodness of Model Fit

	Saturated model	Estimated model
SRMR	0.047	0.054
d_ULS	2.62	3.411
d_G	5.175	4.881
Chi-square	6584.603	6707.261
NFI	0.727	0.722

As shown in the table above, SRMR falls below 0.08, which meets the criteria. However, NFI is less than 0.9 making it unable to meet the benchmark.

4.6.2 Hypotheses Testing

The suggested hypotheses and the structural model are tested by evaluating the path coefficients between latent variables. A path coefficient value (p-value) must be at least 0.1 for the model to consider a particular impact (Wetzels et al., 2009; Hair et al., 2011). These path coefficients in this model are consistent with all of the proposed hypotheses (see Table 4.20).

Table 4.20 Hypothesis Testing

Hypothesis Relation	Std Beta	Std Error	t – values	P values
IN -> FP	-0.719	0.04	17.98	0.000
TT -> IN	-0.527	0.053	9.941	0.000
TT -> DMC	0.719	0.036	19.763	0.000
TT -> FP	0.819	0.026	30.891	0.000
DMC -> FP	0.548	0.06	9.255	0.000
DMC -> IN	-0.6	0.05	11.818	0.000

The current study's hypothesis H1—that dynamic managerial capability positively influences firm performance—is supported by the structural model in table 4.20 and figure 4.4, which shows a significant positive relationship between DMC and performance in Ghanaian SMEs ($\beta = 0.548$, $t = 9.255$, $p < 0.05$).

In examining the effect of DMC on innovation, the result indicated that DMC significantly affects innovation (β= -0.6, t = 17.980, p < 0.05). However, since β= -0.6, the effect of DMC on innovation is negative. Therefore, hypothesis H2 is supported since the nature of the impact was not specified.

According to the findings presented in Table 4.20, innovation harms firm performance in Ghanaian SMEs (β = -0.719, t = 17.980, p < 0.05). The hypothesis is therefore supported because the null hypothesis H3 cannot be accurate.

The results (Table 4.20) for Hypothesis 4 on the impact of technological turbulence on performance revealed a significant positive relationship between the variables (β = 0.375, t = 6.64, p < 0.05). As a result, this hypothesis (H4) is confirmed.

As shown in Table 4.20, technological turbulence does not weaken the effectiveness of both DMC and innovation on performance since TT > DMC's β= 0.719. However, it weakens innovation's influence on firm performance due to a β =-0.527 supporting H5.

4.6.3 Testing Moderating Effect

This study used a product indicator approach to identify and evaluate the extent of the moderating impact of technological turbulence on the relationship between (i) dynamic managerial capability, (ii) innovation, and (iii) firm performance in SMEs in Ghana. As a result, the basic slope analysis and the Consistent PLS-SEM bootstrapping technique apply to this investigation.

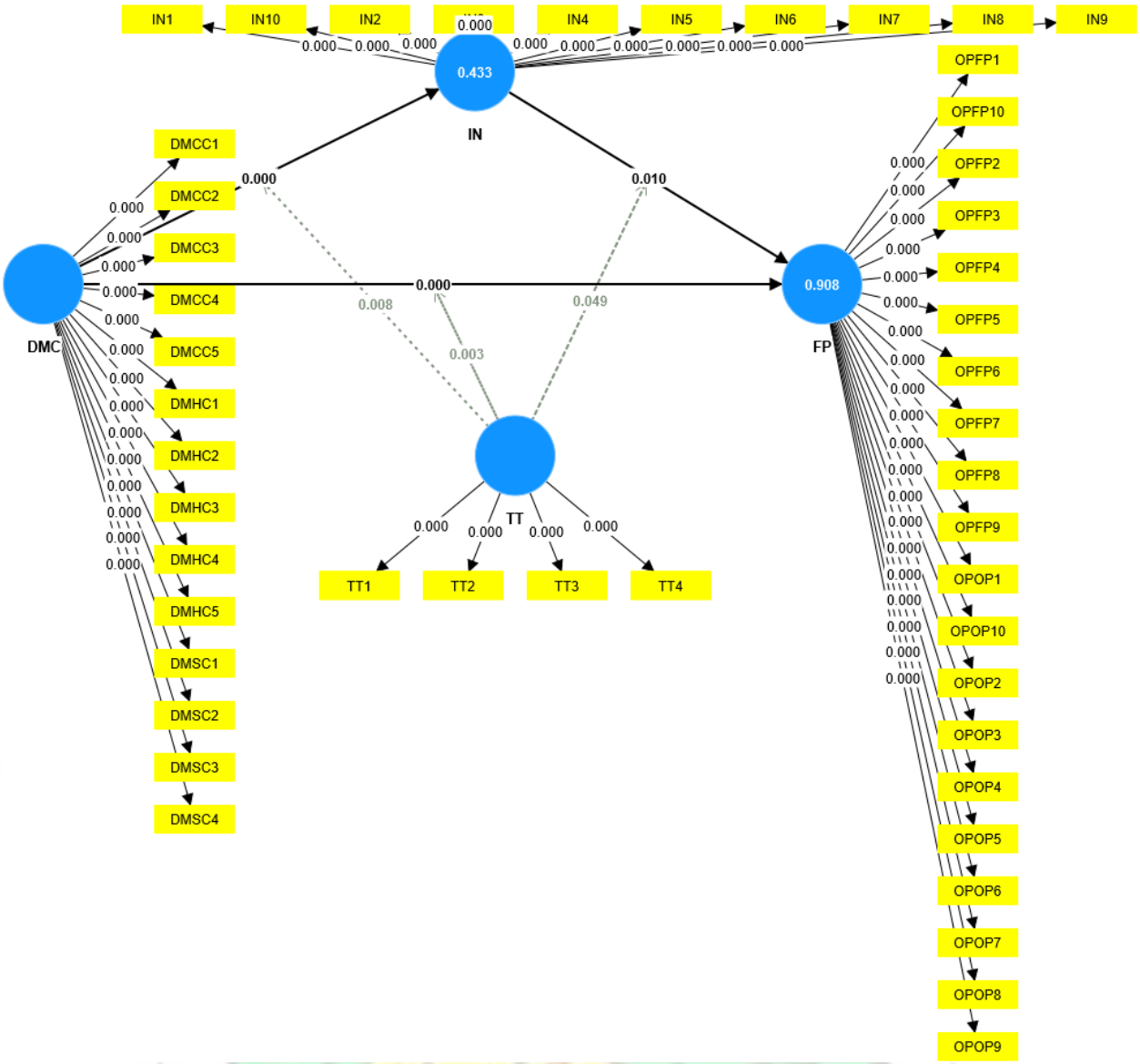

Figure 4.5 The structural model with Moderation Effect

According to figure 4.6, technological turbulence (TT) amplifies the beneficial impact of dynamic managerial capability (DMC) on firm performance (FP). The green line has more TT, while the red line has less. So, the positive effect has a steeper slope when TT is heightened. The impact is positive because the lines slope from right to left.

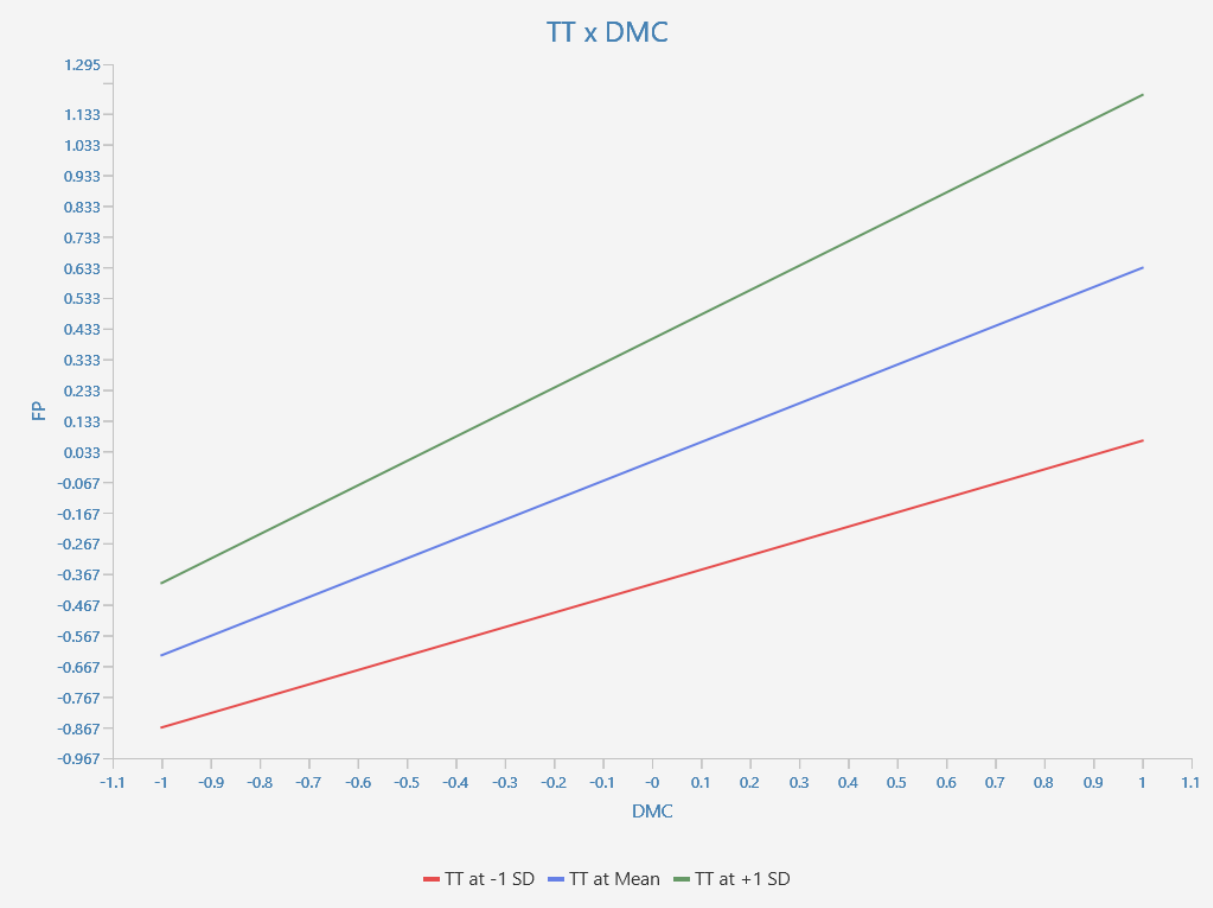

Figure 4.6 The moderating effect of TT on DMC and FP relationship

DMC harms the effectiveness of innovation (IN) as TT increases, as do lower levels of TT give a negative impact of DMC on innovation since the slopes are from left to right. For example, it is seen in figure 4.7.

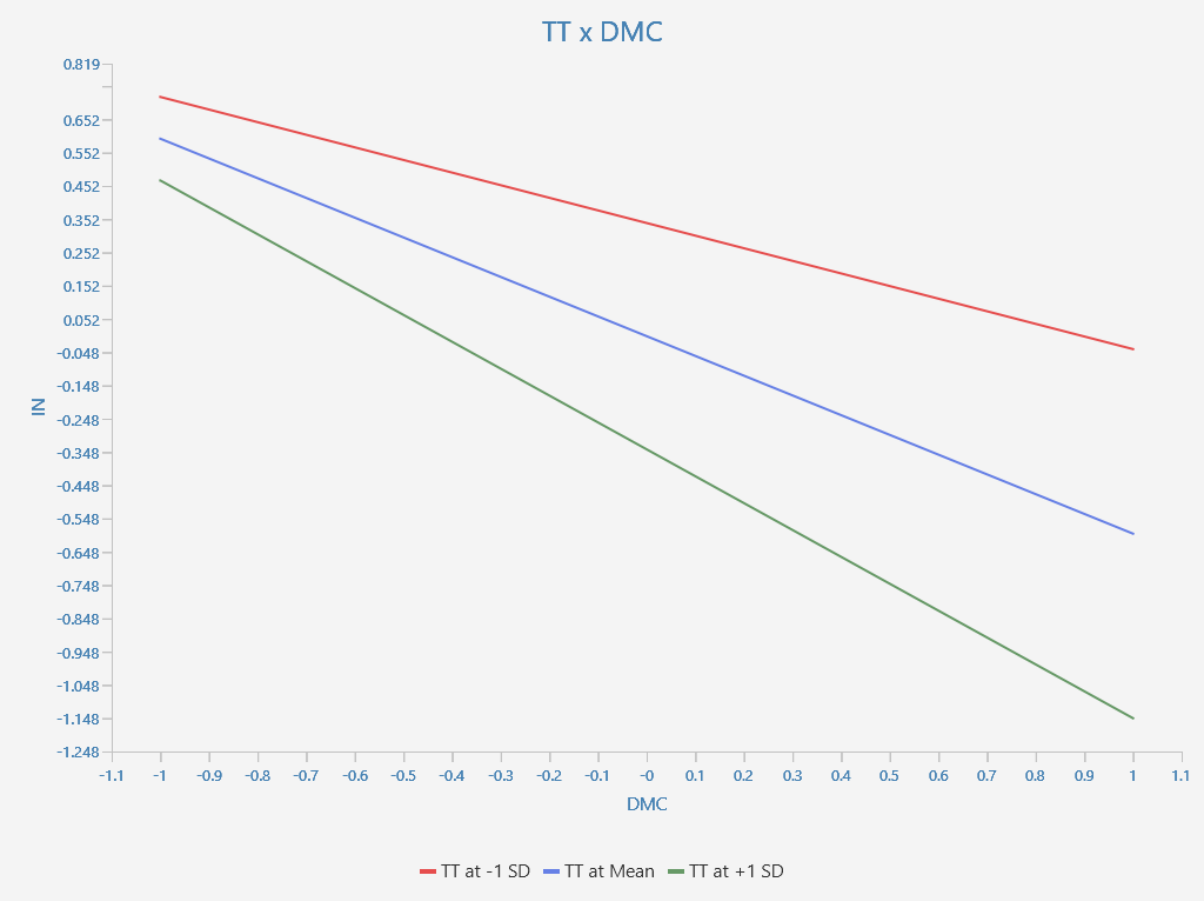

Figure 4.7 The moderating effect of TT on DMC and IN relationship

As shown in figure 4.8 below, innovation (IN) negatively affects FP as TT decreases, but when TT strengthens, there is almost no moderation effect since the green line does not slope much.

Figure 4.8 The moderating effect of TT on DMC and FP relationship

The p values were considered to explain the moderating relationship between the variables further. Since the p values were below 0.05, Table 4.21 demonstrates that the moderator significantly affects the link between DMC, innovation, and performance.

Table 4.21 Moderating Effect of Technological Turbulence

	Std Beta	Std Error	t – values	p – values
TT x DMC -> FP	0.164	0.059	2.796	0.003
TT x DMC -> IN	-0.236	0.089	2.423	0.008
TT x IN -> FP	0.135	0.072	1.66	0.049

4.6.4 Variance in the Dependent Variable

The R^2 statistic, which ranges from 0 to 100%, shows how closely the data matches the fitted regression line. According to Quinino et al. (2012), the coefficient of determination or

considerable determination is another name for multiple regression. R-squared is a statistic that expresses how much of the variance in a dependent variable(s) a predictor construct(s) can explain (Hair et al., 2012b). Hair et al. (2012) claim that the study environment determines the acceptable level of R^2 value. According to Hair et al. (2014), R^2 values of 25%, 50%, and 75% were considered low, moderate, and noteworthy, respectively. However, Lee et al. (2013) hypothesised that the R-squared values of 0.67, 0.33, and 0.19 in PLS-SEM might be considered significant, moderate, and weak, respectively. The values for the endogenous latent variable's R-squared are shown in Table 4.22.

Table *4.22* Variance in the Dependent Variable

	R-square (Variance)
FP	**0.896**
IN	0.370

According to Table 4.22, the research model (DMC, IN, and TT) accounts for a sizable 89.6% variance in firm performance (FP). At the same time, innovation has changed by 37% due to dynamic managerial capability (DMC) (IN). It implies that the three independent variables affect performance significantly.

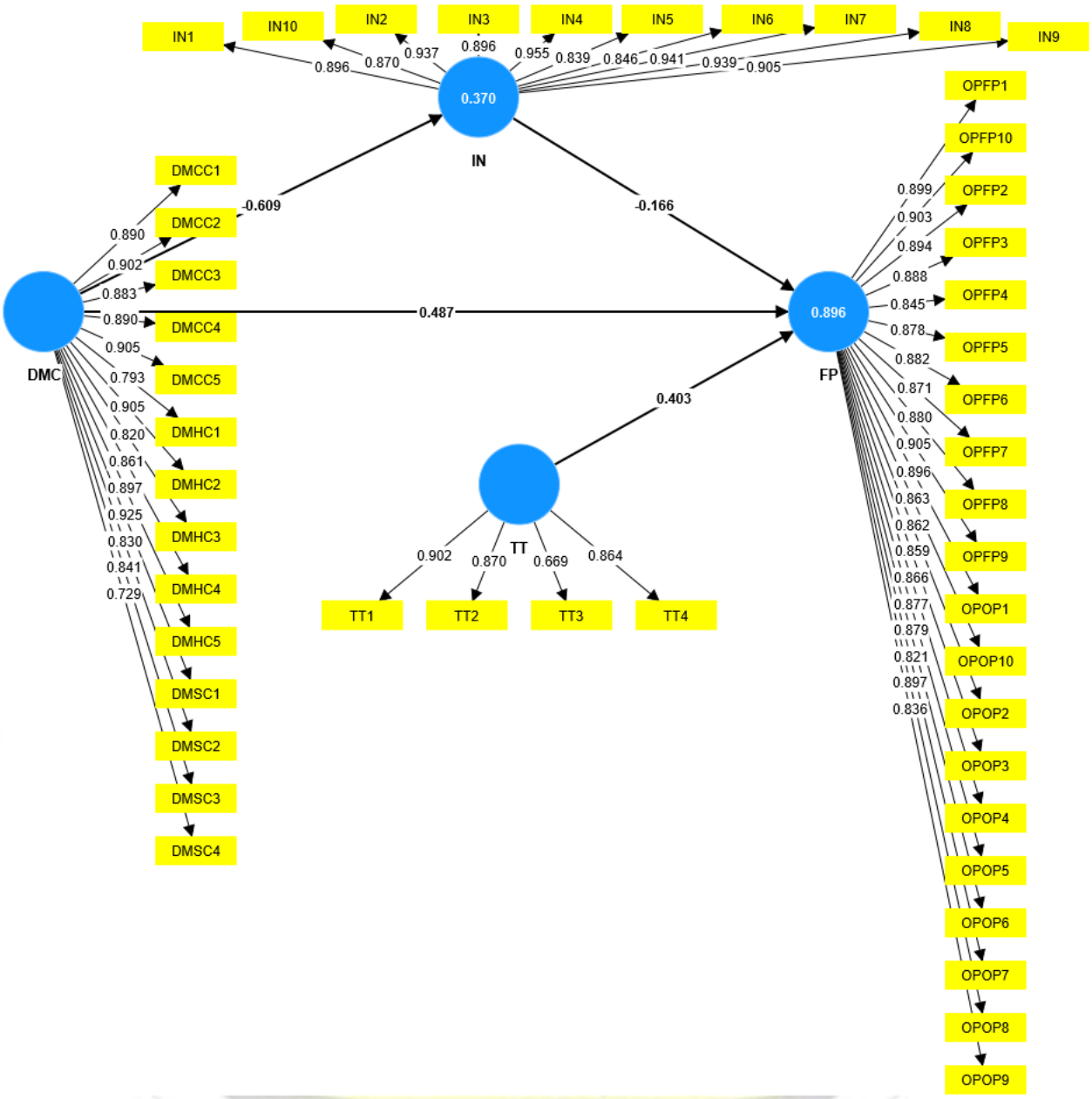

Figure 4.9 The model showing R Square explained

4.6.5 Assessment of Effect Size (f^2)

After the structural model's predictor significance was assessed and confirmed, the effects (f^2) size was calculated. Effect size f^2 or Cohen's Predictor measures how significantly a model varies for each construct (Sheko and Spaho, 2018). The effect size is essential to detect relationships. The effect size is a procedure that measures the importance of an exogenous contruct(s) on any endogenous construct by recalculating R^2. R^2 is measured when a particular

construct is removed from the model to determine the f^2 (Hair et al., 2017b; Sheko et al., 2018). The R^2 shift will be calculated using the f^2 and recorded when a specific construct is removed from the model (Hair et al., 2017a).

F-square effect values are categorised as low, medium, and high, respectively, at 0.02, 0.15, and 0.35. According to Hair et al. (2017b; 2019), impact sizes less than 0.02 have no impact on the values. Chin (2015) derives the effect size from the increase in the R-squared of the latent variable relative to the share of unexplained variation. Accordingly, the effect size could also be expressed using the following formula (Akter et al., 2011; Selya et al., 2012).

$$f^2 = \frac{R\ Squared\ Included - R\ Squared\ Excluded}{1 - R\ Squared\ Included}$$

Table 4.23 shows a 0.63, 0.15, and 0.85 effect size for technological turbulence, innovation, and dynamic managerial capability on firm performance. According to Cohen's guidelines, the three independent variables' effects on performance can be categorised as high, medium, and high, respectively. However, Lovakov et al., (2021) argued that it tends to overestimate the small, medium, and large effect sizes. The effect sizes deemed as medium or small can be very significant from a theoretical and practical standpoint (Aguinis *et al.*, 2005).

Table 4.23 Effect Size

R Squared	Included	Excluded	F Squared	Effect
TT	0.896	0.830	0.63	**High**
IN	0.896	0.880	0.15	**Medium**
DMC	0.896	0.808	0.85	**High**

4.6.6 Assessment of Predictive Relevance (Q^2)

The PLSpredit procedure was used to evaluate the research model's predictions' usefulness. PLSpredict is typically used as an additional tool in partial least squares structural equation modelling to evaluate the goodness of fit.

The predictive significance of the study model was evaluated specifically using a cross-validated redundancy metric (Q^2). Hair et al. (2014) used the Q^2 statistic to assess how well a model predicts the data from missing cases. A research model is considered to have predictive value if the Q^2 is more significant than zero, according to Henseler et al. (2010). On the other hand, a research model with larger positive Q^2 values may be more predictively useful.

According to Appendix B, RMSE, and MAE, which must have lower values to be required, were satisfied. The higher the numbers, however, the better because the Q^2 prediction is akin to the R-squared used in linear regression. Therefore, the PLS model is fit and capable of correctly predicting the associations because all the Q^2 values were greater than 0.

4.6.7 Mediation Analysis

Mediation analysis was carried out to evaluate the mediating function of IN on the relationship between DMC and FP. The findings (see Table 4) showed a significant overall effect of DMC on FP ($\beta = 0.878$, $t = 40.529$, $p = < 0.001$). The effect of DMC on FP became significant ($\beta = 0.140$, $t = 3.724$, $p = < 0.001$) when the mediating variable (IN) was included. Furthermore, it was determined that DMC's indirect effect on FP through IN was successful ($\beta = 0.738$, $t = 14.909$, $p =< 0.001$). It proves that IN mediates the relationship between DMC and FP to the fullest extent.

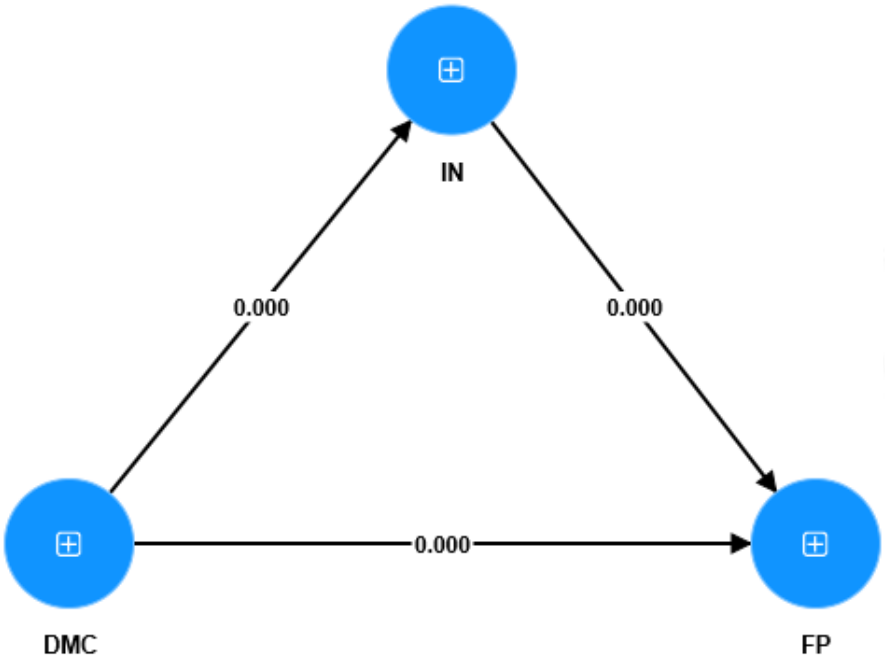

Figure 4.10 Measurement model for Mediating Effects

Table 4.24 Mediation Effect

Mediation				
Type of Effect	**Effect**	**Std Beta**	**t values**	**p values**
Total Effect	DMC -> FP	0.878	40.529	0.000
Indirect Effect	DMC -> IN -> FP	0.140	3.724	0.000
Direct Effect	DMC -> FP	0.738	14.909	0.000
VAF	IE/TE = 0.140/0.878 = 0.159 = 16%			
Conclusion	There is a partially weak mediation in the relationship			

4.7 Summary of Chapter

Self-report approaches have generally been constructive in examining the effects of dynamic management capacities on performance in technological upheaval and the mediating function of innovation in SMEs in Ghana.

Every construct had a composite reliability value of more than 0.7. Furthermore, all item loadings were significant at the level of 0.001 and fell within the range of suggested cut-offs, proving the dependability of the indicator. The convergent and discriminant validity of the measuring model was also satisfactory, with AVE values falling within the suggested range. Additionally, the square roots of AVE for each construct were higher than their intercorrelation, and each manifest variable loaded on its corresponding latent variable.

Second, satisfactory outcomes were shown during the structural model's validation. With moderate to acceptable values, the R^2 was significant. Furthermore, the structural model supported all five of the recommended pathways. The significance level for these postulated connections was 0.05, and their values were more significant than 0.1.

Third, the structural model shows a partially weak mediation between dynamic management competence, innovation, and firm performance.

The fourth section of this dissertation examined the moderating effect of technological turbulence and found that the relationship between dynamic managerial capability and firm performance is weaker at lower levels of technological turbulence and strengthened at high levels of technological turmoil.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Overview

The primary goal of the research was to investigate and test the mediating role of innovation and the moderating role of technological turbulence on the relationship between dynamic managerial capability and firm performance in SMEs in Ghana. The findings of this research, recommendation, theoretical and managerial implications are covered in this chapter, along with the findings presented in chapter 4's results. The chapter summarises the conclusions discussed in the preceding chapter, the study's limitations, and recommendations for future research based on those limitations.

5.2 Summary of findings and recommendations

The research findings from the previous sections are expanded upon and further analysed in this section by connecting them to theoretical and empirical viewpoints and earlier research on dynamic managerial capability and firm performance. This research tested and analysed the mediating effect of innovation and the moderating effect of technological turbulence on the link between dynamic managerial capability and company performance in SMEs in Ghana. Various significant factors have contributed to the success of this study and demonstrated using the following research questions and hypotheses;

1. What is the relationship between dynamic managerial capabilities and performance?

2. How does technological turbulence affect the relationship between dynamic managerial capabilities and performance through innovation?

3. How does innovation explain the dynamic managerial capability-performance relationship?

The impact of all constructs is explained initially before going into detail about how each affects firm performance. Figure 4.11 and Table 4.22 of the results demonstrated that all constructs (the three independent variables of the model, DMC, innovation, and technological turbulence) account for 89.6% of the variation in firm performance. The findings in the research unambiguously show that every argument and conclusion produced for this study are pertinent and should be carefully considered for both present knowledge and understanding and future reference. This result adds to previous studies to help find an answer to the debate of whether or not DMC contributes to firm performance (Zhou et al., 2019b).

The results showed that the AVE ranges from 0.691 to 0.816 and the CR ranges from 0.878 to 0.985 when considering the composite reliability between the constructs, Average Variance Extracted (AVE), and composite reliability (CR) of the individual variables as the convergent validity assessment (as per table 4.17). It shows that the several constructs in the study model have an appropriate level of correlation (Hair et al., 2014c; Chin, 2015). They recommend that to achieve satisfactory convergent validity, the AVE of each variable should be at least 0.500, and the composite reliability must have an average of 0.700.

The results show a direct and significant association between the dependent (performance) and independent variables (DMC, innovation, and technological turbulence), supporting the hypothesised relationship. It was evidenced when the tests conducted for the research demonstrated an acceptance of the hypotheses.

In addition, the model predicted a predictive relevance $Q^2 = 0.417$, or $Q^2 > 0$, which demonstrates the predictive significance of the model as shown in Appendix B. The predictive relevance of a PLS-SEM model, however, does indicate that it accurately predicts the data points of the indicators in the models (Sarstedt et al., 2014). This model demonstrates that each latent variable has predictive importance, which is substantial (Hair et al., 2013b).

Therefore, the independent constructs have predictive value for improving the performance of firms in SMEs in Ghana. The study concludes that three independent factors, such as civil and service organisations, should be considered in different contexts.

The discussion of effect size and its ability to illustrate the scope of the varied effects in a sample makes it relevant and vital (Kelley et al., 2012). The ranking of the independent variable in this situation is highly acceptable because the effect size reflects the application of the results. Dynamic managerial competence is the factor that has the most significant impact on how well SMEs succeed in Ghana, as well as technological upheaval and innovation, which is crucial to reiterate.

5.2.1 The Direct Effects of DMC on Performance

The result of this relationship is given as ($\beta = 0.643$, $t = 10.430$, and $p < 0.05$). According to this, the dynamic managerial capability is the most crucial element affecting a company's performance in this study. This result is in line with studies by Helfat et al. (2015), Tasheva et al. (2022), Mostafiz, et al. (2019), Permana et al. (2017), and Mehta et al. (2020), which point to a favourable correlation between DMC and firm performance especially during turbulent times. The findings also support previous works of Banerjee et al. 2019, that dynamic managerial capabilities do have a direct and positive effect in helping organisations survive and attain high-performance levels. In effect, the study's results do not agree with the work of Zott (2003) and Zahra et al. (2006) indicating that DMC does not directly affect firm performance and may harm rather than help firms.

As mentioned earlier, DMC contributes the most in terms of the effect of the latent variable found to affect performance. The component of DMC focuses on the ability of managers, owner-managers, and executives of SMEs to build up social capital and cognitive and human capital capabilities. The access and development of these capabilities increase firm

performance, while the lack of these capabilities often affects the business's potential to perform well. Furthermore, the results demonstrate the relevance of DMC as a determinant factor towards performance. Therefore, strategic planning, resource allocation, and formal and informal relations with clients and competitors enhance performance.

The dynamic managerial capability notion stands out due to its exclusive focus on the ability of managers to influence business performance individually and collectively. According to the hypothesis, businesses with managers who are more effective at dynamic management may better adapt to changing environmental conditions and maintain financial and non-financial performance than businesses with managers who are less capable of or incapable of doing so.

Recommendations

As a recommendation, managers, executives, and owner-managers need to develop an interest and invest in dynamic managerial capabilities as they help deal with the constant business environmental changes, especially in this technological world. This study further suggests that people in managerial capacities should be involved in training and should make deliberate efforts to develop cognitive, human capital, and social capital capabilities.

For managers, executives, and owner-managers, from a normative perspective, this research guides the relevance of investing in dynamic managerial capabilities and how they can be leveraged. Most of the SMEs that were observed think that managers are crucial to the success of their companies. However, the uncertainty brought on by technology increases concern over the effects of managerial choices. Social connections, or managerial social capital, are essential to SMEs' ability to make decisions and pursue business opportunities. Managers, executives, and owner-managers adopt the business networks, which help firms identify both direct and indirect opportunities. For example, Mostafiz et al. (2019) indicated managerial social capital; and strong business network connections are critical to ensure business growth. Businesses

with a high level of managerial social capital can use knowledge and information exchange within the business network to better understand the markets they serve. SMEs' well-organised managerial social capital opens doors for indirect opportunities when a direct opportunity is unavailable.

Therefore, dynamic managerial capabilities for SMEs must be developed with various scenarios that arise from a different level of these capabilities, allowing the firms to be more cautious under high technological turmoil or to take the initiative to exploit business opportunities under moderate technological turbulence.

Managerial human capital, for instance, is also a critical factor for maintaining stable financial and non-financial performance. Maintaining good performance levels is about identifying opportunities as a business and taking advantage of them. However, most SMEs in Ghana are informal and do not necessarily have the required high academic backgrounds or backgrounds in what they do; they instead learn as they go. Nevertheless, more specialised training to develop these capabilities still needs to be developed. To confirm growth and survival, human capital and performance heterogeneity necessitate unique, meaningful, and priceless experiences and training (Schueffel et al., 2011). Numerous other market prospects result from these managers' increased exposure to various industries and participation in skill development programs (Gruber et al., 2013). Therefore, managers, executives, and owner-managers (SMEs) should exercise dynamic techniques to uncover alternative prospects, manage their organisations and learn to forget irrelevant experiences.

For researchers, it is recommended that some capabilities required to successfully maintain and enhance firm performance, particularly in technological turbulence are defined, to further our understanding of dynamic managerial capabilities. Also, studies should be carried out more

about informal businesses in developing countries to help bridge the knowledge gap both in the academic and business world, unlike most prior studies.

5.2.2 The moderating effect of technological turbulence

The test's findings on the moderating role of technological upheaval in the relationship between DMC, innovation, and firm performance were conflicting, however, the tested moderation hypothesis received support.

The results from Figure 4.6 showed that in the event of high technological turmoil or turbulence, the relevance of DMC becomes very high as possession of these capabilities can positively boost performance. DMC, however, negatively impacts innovation when technological change is slow or modest. Figure 4.8 illustrates how innovation, on the other hand, harms business success as technological development slows down. These results are supported by Table 4.21, indicating a significant moderating effect on the relationship, either positively or negatively. These variations in results somewhat close the knowledge gap identified in the literature review on how DMC works at various levels of technological turbulence.

The study then concludes that technological turbulence is a very concerning environmental change for businesses operating in the world today since the results of this relationship; Technological turbulence -> Firm Performance is given as ~ = 0.458, t = 6.179 and $p < 0.05$) and also with a high effect size of 0.63.

Recommendations

Prior research works concentrated on formal businesses in developed countries and a generalised turbulent business environment. Consequently, researching dynamic managerial capability and firm performance with technological turbulence innovation playing a moderating role offers a rare opportunity, as most previous studies still need to combine these

variables. It transcends the size, location, and industry they operate in and should be highly considered in both managerial and academic spheres**.** However, it is important to acknowledge that other contextual factors may also contribute to the link between DMC, innovation and organisational performance. The inclusion of other moderating elements may contribute to a more thorough comprehension.

The study recommends managers, executives, and owner-managers need a thorough understanding of their business environment (technological turbulence) to be able to appropriately make decisions that will enhance the sustenance, survival and growth of the firm. There is the need to create adaptable capabilities that fit well their operations rather than imitating others especially those not in the same industry and take advantage of the opportunities that arise from it.

5.2.3 The mediating role of innovation

The indirect effect of DMC on FP through IN (mediation) was found effective ($\beta = 0.738$, $t = 14.909$, $p = <0.001$). In addition, the indirect effect of DMC on FP through IN was found effective ($\beta = 0.738$, $t = 14.909$, $p = <0.001$). This shows that IN fully mediates the relationship between DMC and FP. This proves that IN mediates the relationship between DMC and FP to the fullest extent as proposed by (Zhou et al., 2019). Additionally, it was shown that in some circumstances, innovation has a small or moderate impact on company performance with an effect size of ($f^2 = 0.15$). However, it does not diminish the importance of this variable in the model or real-world applications (business operations).

The small or moderate effect size may be attributed to the fact that DMC does possess some variant of innovation, the ability of managers to be creative in finding new ways to adapt and run businesses. In effect, the study draws inference from Camisón et al. (2014), Saunila et al.

(2014), Teece et al. (2016) and Helfat et al. (2015a) works which have all considered innovation as an outcome of dynamic managerial capabilities and turbulent environment.

Hence, this research concludes that innovation as a mediator in this model is significant and supports the notion by Pratono (2020) stated in the literature review those businesses that excel at introducing novel products and processes are likely to enjoy competitive advantage which translates into firm performance.

Recommendations

For researchers, it is recommended that an in-depth and comprehensive mediating mechanism be developed to resolve the disagreement on how and why dynamic managerial capabilities support and enhance firm performance. Besides innovation, there are additional factors that may act as mediators in the relationship between DMC and performance. The exploration of alternate mediators has the potential to enhance the comprehension of the intricate system involved. The conclusions of the research may be subject to the potential impact of different geographical locations or industrial sectors being examined. Subsequent investigations may delve into the extent to which these associations remain consistent across diverse geographical areas or sectors.

Businesses must promote innovative management practices and should therefore consider innovation in other contexts of management practices as it impacts firm performance. They should try as much as possible to like their innovative ideas and endeavours to the firm's management and strategic goals without trying to be like other competitors. They should also take time to carefully investigate innovative ventures that will be able to withstand various levels of technological change to be able to profit from their investment.

5.2.4 The collective contribution of the three constructs:

The model demonstrates that the three latent variables jointly explain the firm performance with R^2 = 89.6% (Table 4.14) of SMEs in Ghana, with each independent variable having a unique contribution to the model, the effect size of f^2 = 0.63, f^2 =0.15, and f^2=0.85 (Table 4.15) representing technological turbulence, innovation, and dynamic managerial capability respectively. As posited by Cohen (1988), the effect sizes of these three independent variables on firm performance are high, medium, and high, respectively. It implies that DMC has the most considerable effect on performance, followed by technological turbulence. Innovation, conversely, has a mild or medium effect on any change that may occur in performance.

Recommendations

The recommendation for managers, executives, and owner-managers is to consistently build dynamic managerial capabilities by fostering a learning and training environment (developer) amid intense environmental turbulence. SME owner-managers, executives, and managers should deliberately expand their skill sets as long as technological advancements and other environmental upheaval continue.

However, the discovery of innovation being harmful to business success as technological turbulence in the study calls for in-depth research into the variations in firm performance due to different levels of technological turbulence.

5.2.5 The Moderating Effect

This section explains how technological upheaval affects exogenous and endogenous variables like firm performance. The fourth section of this research, which examined the moderating impact of technological turbulence, found that the relationship between dynamic managerial capability and organisational performance is weaker at lower levels of technological turmoil and strengthened at high levels of technological turmoil.

Technological upheaval as an external environmental factor is crucial in deciding the homogeneity in the performance of businesses (SMEs) since the world is filled with rapid technological change. Hence, this study concludes that technological turmoil fully moderates the relationship under study.

Recommendations

In this study, SMEs with higher technological turbulence perceived more excellent performance due to dynamic managerial capability. To mitigate the impact of dynamic managerial capability and that performance, it is recommended that managers, executives and owner-managers pay close attention to the changes in technology.

Researchers are also encouraged to further investigate technological turbulence as one of the potential environmental factors (moderators) that significantly impact firm performance, especially in this technological age. Also, a more comprehensive research is required to fully understand its impact at different levels.

Secondly, environmental factors are said to be strong predictors of performance and managerial influence Banerjee et al. (2019). However, these factors still need to be empirically developed. Scholars are recommended to delve more into variations in performance at different levels of technological upheaval and develop empirical systems that can be employed to closely measure it.

5.3 Theoretical Implications

The conceptual framework of this study was built on the theoretical gaps observed in the literature and preliminary empirical evidence. It presents a more nuanced view of how they affect firm performance by empirically strengthening the claims regarding the implications of the many dimensions of dynamic managerial capabilities on firm performance. To begin, the

study delves into the elements that influence the success of SMEs in developing countries such as Ghana that operate in a volatile technological environment.

Most previous studies have not combined dynamic management competence, firm performance, and innovation as mediating factor. Therefore, studying these factors together provides a unique opportunity to explore their relationship. In this regard, this study contributes to the existing literature by conducting an empirical analysis that showcases how dynamic management skills can enhance the financial and non-financial performance of SMEs.

5.4 Managerial Implications

The majority of the SMEs that were observed believe that management is essential to their businesses' success. The managerial social capital, or social relationships, of SMEs, is critical to their decision-making and opportunity-seeking capabilities. When a direct chance is unavailable, SMEs' well-organized managerial social capital creates doors for indirect opportunities.

Consequently, to enable SMEs to be more proactive in taking advantage of business opportunities during periods of moderate technological turbulence or to be more cautious during periods of high technological turmoil, dynamic managerial capabilities for SMEs must be developed with a variety of scenarios that arise from a different level of these capabilities.

5.5 Limitation and Future Research Direction

The dynamic managerial capability concept's single-minded focus on managers' capabilities to influence performance presents numerous chances to contribute to the in-depth discussion of the importance of managers. Even though the study's results confirmed several hypothesised connections between the exogenous and endogenous latent constructs, the study's limitations must be considered when interpreting the results. Numerous concerns that span multiple levels

must be addressed more generally. For instance, dynamic managerial capability can be applied to teams of managers and individuals (Martin, 2011a).

First, the research model could account for 89.6% of the variance in firm performance, indicating that other latent variables may significantly impact how well SMEs perform in Ghana. In other words, other factors could account for the remaining 10.4% of firm performance. Future research should consider additional potential factors that impact the performance of SMEs in both positive and negative ways.

Secondly, this study only used self-reporting to collect the needed data. However, this method is consistent with previous dynamic managerial capability and performance studies. Self-report studies have validity problems; some researchers must be more convinced of the measure's reliability because of possible bias (Rosenman et al., 2011). Most of the survey respondents were SME participants, despite all efforts being made to ensure the validity of this research. The results of the online survey may be affected because the use of technology to complete it may have caused some participants to feel uncomfortable. Therefore, traditional sampling can be used in future studies to improve generalizability.

Thirdly, this research specified some industries, so the conclusions drawn may vary in other industries and the types of roles played by these industries. Comparative studies across various industries can gain deeper insights into dynamic managerial capabilities and performance. Also, due to the informal nature of these SMEs, some individuals play unspecified roles; the study might have overlooked individuals who might be playing managerial roles unofficially.

Fourth, this study did not study the individual antecedents of dynamic managerial capability. Thus, further research might address how these antecedents (dynamic social capital, human capital, and cognition) affect performance in technological turbulence and how innovation mediates the relationship in other SME industries.

From a research standpoint, it is also worthwhile to investigate this relationship in formal and informal SMEs and public organisations as it may shed light on the right and necessary types of training.

The measures for each of the three components can also be improved. Although our study is the first to examine all three aspects of dynamic managerial capabilities, it is not the only one. Looking more closely at various bundles or combinations of the three sources of DMC could be very beneficial for future research on dynamic managerial capability.

A cross-sectional study design was used for the research. Because data is only recorded once, there is no time difference when using this design. This makes determining causal inferences difficult because different outcomes could be obtained if a different time frame is used (Sedgwick 2014). Furthermore, the use of a large random sample of SMEs (N=300) as representative of Ghana's entire SME population addresses the generalisation of each research's findings. This is consistent with the findings of Barnett et al. (2012), whose findings were consistent with those of other researchers.

The study's cross-sectional and single-country analysis and its universal applicability are other areas that could be worked on. Given the limitations of a cross-sectional study, it is critical to investigate the effects of DMC on SMEs' innovation and performance using longitudinal data. A study like this would help to understand the impact of DMCs over time. Using longitudinal data would also shed more light on the moderating role of technological turbulence in the benefits of deploying DMCs. This can be minimised by repeating the study in other developing nations like Nigeria, Burkina Faso, and the Ivory Coast.

5.6 Conclusions

The study demonstrates the necessity for SMEs to invest in, and deploy, a set of DMCs which interact with each other, to sense and proactively respond to changes in its technological environment. The research findings support that DMC is one of the catalysts for the economic and social development of managers, executives, owner-managers, and SMEs' operational and financial performance. It is evident when businesses have become increasingly aware of the importance of dynamic managerial capabilities by including training and education and recruiting managers with specific capabilities as part of the organisations' development programmes.

Similarly, the government has implemented some form of management and business training, including business hubs for SMEs and start-ups and the youths and unemployed graduates to make SMEs and individuals contribute meaningfully to the country's socio-economy development.

In light of this, the study adds more proof to the body of knowledge about the moderating effect of technological turbulence on the relationship under investigation. The study's findings support vital theoretical claims.

In particular, despite some of its limitations, this study has successfully addressed all the research questions and objectives. Although the DMC has been the subject of many studies, only some focus on SMEs in Ghana. Additionally, technological turbulence was included in the current study to close the theoretical gap in the relationship between DMC, innovation, and firm performance. This study provides both theoretical and empirical support. More significantly, the conceptual framework used in the study adds to the body of knowledge by including innovation as a mediator in the relationship between DMC and firm performance. This study recommends further research on additional elements that could improve our

understanding of dynamic managerial capabilities by examining innovation and technological upheaval in developing nations.

Along with the theoretical contributions, the findings of this study have some significant practical ramifications for organisations, managers, executives, owner-managers, and particularly SMEs in Ghana. The study also identified many potential areas for further investigation.

Last but not least, the study contributes positively to the relative paucity of empirical research on the effects of dynamic managerial capabilities on firm performance, particularly on the mediating mechanisms by which these effects are mediated. Defining some capabilities required to successfully maintain and enhance firm performance, particularly in technological turbulence, furthers our understanding of dynamic managerial capabilities.

In summary, this research has made significant theoretical and practical contributions to the increasing knowledge base in management, SME growth, particularly dynamic managerial capability, and firm performance. It is hoped that this study will inspire additional empirical research and thus advance the dynamic management capabilities research, which has been viewed as the Hidden Treasure of strategic management.

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APPENDICES

Appendix A Cross loadings

	DMC	Firm Performance	Innovation	Technological turbulence	Technological turbulence x DMC
DMCC1	**0.89**	**0.801**	-0.533	**0.66**	-0.657
DMCC2	**0.902**	**0.827**	-0.518	**0.708**	-0.696
DMCC3	**0.883**	**0.81**	-0.505	**0.69**	-0.753
DMCC4	**0.89**	**0.806**	-0.525	**0.716**	-0.751
DMCC5	**0.905**	**0.828**	-0.522	**0.65**	-0.617
DMHC1	**0.793**	**0.697**	-0.498	**0.581**	-0.457
DMHC2	**0.905**	**0.786**	-0.583	**0.618**	-0.53
DMHC3	**0.82**	**0.735**	-0.496	**0.63**	-0.635
DMHC4	**0.86**	**0.751**	-0.549	**0.639**	-0.527
DMHC5	**0.897**	**0.76**	-0.607	**0.683**	-0.478
DMSC1	**0.925**	**0.806**	-0.593	**0.663**	-0.574
DMSC2	**0.83**	**0.764**	-0.473	**0.659**	-0.712
DMSC3	**0.841**	**0.755**	-0.506	**0.673**	-0.681
DMSC4	**0.73**	**0.658**	-0.435	**0.566**	-0.638
IN1	-0.542	-0.616	**0.896**	-0.494	0.275
IN10	-0.523	-0.601	**0.87**	-0.494	0.282
IN2	-0.588	-0.626	**0.937**	-0.54	0.333
IN3	-0.552	-0.608	**0.896**	-0.487	0.314
IN4	-0.582	-0.653	**0.955**	-0.485	0.321
IN5	-0.494	-0.589	**0.839**	-0.466	0.27
IN6	-0.506	-0.588	**0.846**	-0.456	0.268
IN7	-0.567	-0.65	**0.941**	-0.493	0.305
IN8	-0.595	-0.623	**0.94**	-0.55	0.413
IN9	-0.54	-0.629	**0.905**	-0.525	0.326
OPFP1	**0.812**	**0.9**	-0.621	**0.762**	-0.584
OPFP10	**0.803**	**0.9**	-0.641	**0.765**	-0.508
OPFP2	**0.791**	**0.89**	-0.636	**0.76**	-0.618
OPFP3	**0.763**	**0.88**	-0.638	**0.774**	-0.559
OPFP4	**0.729**	**0.838**	-0.603	**0.738**	-0.499
OPFP5	**0.758**	**0.873**	-0.613	**0.777**	-0.538
OPFP6	**0.778**	**0.877**	-0.631	**0.75**	-0.551
OPFP7	**0.754**	**0.863**	-0.629	**0.75**	-0.494
OPFP8	**0.753**	**0.871**	-0.634	**0.768**	-0.52
OPFP9	**0.788**	**0.898**	-0.647	**0.779**	-0.516
OPOP1	**0.807**	**0.902**	-0.575	**0.799**	-0.581
OPOP10	**0.816**	**0.874**	-0.557	**0.722**	-0.634
OPOP2	**0.805**	**0.87**	-0.57	**0.722**	-0.652

OPOP3	**0.846**	**0.881**	-0.513	**0.72**	-0.647
OPOP4	**0.787**	**0.866**	-0.604	**0.722**	-0.538
OPOP5	**0.804**	**0.884**	-0.574	**0.757**	-0.57
OPOP6	**0.83**	**0.894**	-0.532	**0.767**	-0.683
OPOP7	**0.724**	**0.817**	-0.582	**0.702**	-0.512
OPOP8	**0.793**	**0.9**	-0.58	**0.813**	-0.577
OPOP9	**0.682**	**0.821**	-0.614	**0.758**	-0.465
TT1	**0.659**	**0.779**	-0.52	**0.902**	-0.623
TT2	**0.65**	**0.751**	-0.476	**0.87**	-0.645
TT3	**0.483**	**0.577**	-0.36	**0.668**	-0.332
TT4	**0.703**	**0.746**	-0.467	**0.864**	-0.683
Technological turbulence x DMC	-0.719	-0.643	0.345	-0.7	1

Appendix B Predict Endogenous Q^2 (Model Fit)

	Q^2predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
OPFP1	0.683	0.637	0.332	0.7	0.354
OPFP10	0.698	0.739	0.374	0.864	0.452
OPFP2	0.634	0.762	0.383	0.847	0.432
OPFP3	0.637	0.741	0.386	0.805	0.413
OPFP4	0.597	0.755	0.384	0.843	0.451
OPFP5	0.64	0.74	0.362	0.828	0.398
OPFP6	0.64	0.759	0.392	0.824	0.452
OPFP7	0.621	0.847	0.434	0.962	0.516
OPFP8	0.622	0.795	0.385	0.877	0.445
OPFP9	0.681	0.726	0.364	0.837	0.439
OPOP1	0.707	0.575	0.321	0.694	0.35
OPOP10	0.651	0.605	0.313	0.649	0.314
OPOP2	0.614	0.668	0.338	0.698	0.344
OPOP3	0.681	0.564	0.319	0.605	0.304
OPOP4	0.629	0.691	0.346	0.778	0.39
OPOP5	0.664	0.594	0.302	0.675	0.351
OPOP6	0.676	0.612	0.33	0.648	0.302
OPOP7	0.567	0.877	0.41	0.931	0.482
OPOP8	0.694	0.732	0.395	0.769	0.399
OPOP9	0.554	0.895	0.479	0.945	0.485
IN1	0.297	1.66	0.89	1.759	1.069
IN10	0.275	1.57	0.845	1.726	1.088
IN2	0.34	1.467	0.835	1.526	0.916
IN3	0.282	1.477	0.762	1.58	0.938
IN4	0.309	1.471	0.76	1.55	0.94
IN5	0.236	1.612	0.85	1.698	1.058
IN6	0.243	1.601	0.823	1.715	1.064
IN7	**0.311**	**1.583**	**0.833**	**1.713**	**1.034**
IN8	**0.318**	**1.435**	**0.754**	**1.476**	**0.872**
IN9	**0.282**	**1.601**	**0.838**	**1.689**	**1.037**

Appendix C Questionnaire (Research Survey Questions)

SECTION A: FIRM'S BACKGROUND & RESPONDENT'S INFORMATION

1. This firm is mainly a… ☐ Manufacturing organisation ☐ Service organisation

2. Describe your firm's activities……..

3. How long has this firm existed/operated in the industry? .....Years

4. Number of employees in the firm ☐ 2 – 29 ☐ 30 – 99

5. On average, how many employees has this firm kept over the past three years.....employees

6. Does this firm have a research and development unit? ☐ Yes ☐ No

7. Please indicate your gender ☐ Male ☐ Female

8. Please indicate your age (years)☐ Less than 20 ☐20 to 29 ☐ 30 to 39 ☐ 40 to 49 ☐ 50+

9. Please indicate your current position in this firm ☐ Owner-manager ☐ Executive ☐ Manager

10. Please indicate the number of years that you have held your current position in this firm……

11. Is this firm a family business? ☐ Yes ☐ No

SECTION B: DYNAMIC MANAGERIAL CAPABILITY

*Please use a 7-point scale which measures from **"1=much weaker" to "7 =much stronger**" to indicate the strength of your firm in terms of:*

	1	2	3	4	5	6	7
Dynamic Managerial Human Capital							
DMHc1: Ability and expertise to design jobs to suit							
DMHc2: Ability to attract and retain creative employees							
DMHc3: Constantly keep abreast of new practices and technologies used in our line of business							
DMHc4: Many years of managerial experience							
DMHc5: Management's investment in extension courses in different areas of human knowledge							
Dynamic Managerial Social Capital (DMSc)							

DMSc1: Ability to build a great number of professional individuals							
DMSc2: Ability to always relate with co-workers openly and frankly whether subordinates or not							
DMSc3: Ability to work with external partners to always bring benefits to the organisation							
DMSc4: Manager(s) is/are sociable and easily approachable							
Dynamic Managerial Cognition (DMC)							
DMc1: Skills in developing clear operating procedures to run the business successfully							
DMc2: Ability to allocate resources to achieve the firm's goals							
DMc3: Ability to coordinate different areas of the business to achieve results							
DMc4: Ability to plan for the success of the business							
DMc5: Ability to implement policies and strategies that achieve results							

SECTION C: INNOVATION

Al-Ansari et al (2013)

To what extent do you agree that your firm can easily and quickly perform the following business actions ***(1= 'Strongly agree' to 7= 'Strongly disagree)***

1) totally agree 2) Agree 3) somewhat agree 4) not sure 5) somewhat disagree 6) disagree 7) totally disagree

	1	**2**	**3**	**4**	**5**	**6**	**7**
IN1: Our firm frequently tries out new ideas							
IN2: Our firm is the first to market with new products							
IN3: We consistently offer services/products that have new features.							
IN4: Our firm introduces several new products/services/processes/organizational or management systems							
IN5: Our management seeks out new ways to do things							
IN6: Our firm is creative in its methods of operation							
IN7: Our firm uses up-to-date technologies							
IN8: We spend resources on R&D for new products, services or processes							

IN9: Our firm develops new ways of establishing relationships with customers							
IN10: Our firm uses new marketing methods							

SECTION D: TECHNOLOGICAL TURBULENCE

Jaworski and Kohli, 1993 and Adid Ullah 2019

*Please use a 7-point scale which measures from **"1=very low" to "7=very high"** to indicate the extent to which each of the following items characterizes the firm's operating environment for the past three years:*

1) *very low 2) below average 3) slightly below average 4) average 5) slightly above average 6) above average 7) very high*

	1	**2**	**3**	**4**	**5**	**6**	**7**
TT1: The technology in our industry is changing rapidly.	☐	☐	☐	☐	☐	☐	☐
TT2: Technological changes provide big opportunities in our industry.	☐	☐	☐	☐	☐	☐	☐
TT3: It is very difficult to forecast where the technology in our industry will be in the next 2 to 3 years.	☐	☐	☐	☐	☐	☐	☐
TT4: A large number of new product ideas have been made possible through technological breakthroughs in our industry.	☐	☐	☐	☐	☐	☐	☐

SECTION E: ORGANISATIONAL PERFORMANCE

*Using a scale of 1 – 7 **[where 1=much worse; 7=much better],** indicate this firm's performance in relation to that of key competitors for the past 3 years:*

OPERATIONAL PERFORMANCE	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Op1: The extent of flexibility in production/service delivery processes							
Op2: The time it takes to serve customers							
Op3: The consistency in meeting the needs of customers							
Op4: The extent of variety in products/services offered to customers							
Op5: The nature of product/service support to customers							
Op6: Resource utilization (e.g., human skills, time)							

Op7: Cost of production/operation							
Op8: The time it takes to introduce new products/service offerings							
Op9: The extent of product returns/service failure							
Op10: The ability to handle varied customer/market needs							

FINANCIAL PERFORMANCE	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Fp1: Sales volume							
Fp2: Profit levels							
Fp3: Growth in sales							
Fp4: Growth in profitability							
Fp5: Return on investment (ROI)							
Fp6: Return on sales (ROS)							
Fp7: Market share							
Fp8: Growth in ROI							
Fp9: Growth in ROS							
Fp10: Growth in market share							

SECTION F

*Using a scale of **1 – 7** [where **1=strongly disagree; 4=indifferent; 7=strongly agree**], indicate the extent to which you agree or disagree with each of the following:*

	1	**2**	**3**	**4**	**5**	**6**	**7**
1: You have adequate knowledge of the issues you provided a response on							
2: You clearly understood all the items you provided responses on							
3: You are very confident in the responses you provided							
4: You are sure the responses you provided represent the realities in the firm							