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Organizational Capabilities and Resilience of Small and Medium-Sized Construction Firms in Ghana: The Mediating Role of Innovation and Moderating Effect of Environmental Factors

Humphrey Danso, PhD[a], Samuel Yaw Akomea, PhD[b], and Ahmed Agyapong, PhD[b]

[a]Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development; [b]Kwame Nkrumah University of Science and Technology

ABSTRACT

This study examined the relationship between organizational capabilities and resilience of small and medium-sized construction firms in Ghana. It emphasized that innovation would mediate the relationship between organizational capabilities and construction firms' resilience, and environmental factors would moderate the relationship between organizational capabilities and construction firms' resilience. A descriptive survey research design was adopted. The population of the study consisted of management members of construction firms. The convenience sampling technique was used for selecting and reaching out to the sample respondents. A closed-ended questionnaire was used to elicit data from the respondents. Data from 261 respondents were collected and analyzed. The study found a significant positive relationship between organizational capabilities and firms' resilience; a significant positive relationship between organizational capabilities and firms' innovation; and a significant positive relationship between innovation and firms' resilience. Furthermore, it was found that innovation wholly mediates the relationship between organizational capabilities and firms' resilience; and environmental factors partially moderate the relationship between organizational capabilities and firms' resilience. It was concluded that for small and medium-sized construction firms to grow and become resilient to various turbulences, there is a need for them to strengthen their capabilities, innovativeness, and environmental factors.

KEYWORDS

Construction Firms; Environmental Factors; Innovation; Organizational Capabilities; Resilience

EMJ FOCUS AREAS

Program & Project Management; Strategic Management

Introduction

Capabilities can mean the ability, skills, talent, or power required to do something. It can be defined as the expertise or skills of employees, or immaterial resources such as culture and character that are specific or individual (Bezerra et al., 2021; Carmeli & Tishler, 2004). Firms need to develop capabilities to effectively recognize, attain and integrate valued knowledge from the environment (Yang et al., 2020). According to Tuan and Yoshi (2010), there are three key categories of capabilities, which are explicit or individual, process, and organizational. Organizational capabilities are concerned about the firm's ability to use its assets (both tangible and intangible) to accomplish a job to improve performance and develop new and innovative products and offer excellent customer service (Muhura, 2012). Fiol (2001) also explained organizational capabilities as an organization's overall physical assets and employees' expertise and knowledge and abilities of top management of the firm.

In extremely unpredictable and uncertain periods, firms need to develop a resilience capacity that supports them to manage effectively with unforeseen events, recover from crises, and even ensure future success (Duchek, 2020). Organizations are now experiencing turbulence because of the COVID-19 crises, political changes, technological changes, and economic changes. Firms and academic interest in studying and understanding the key drivers of organizational resilience have increased in the recent past. Every firm is vulnerable to disruption due to the current turbulence and uncertainty in the business environment (Ambulkar et al., 2015). To be able to overcome such disruptions, firms are now increasing their resilient capabilities to foresee and make adequate preparations for change and recovery (Williams et al., 2017). Research indicates that resiliency is a key approach or intervention to minimize risk and recover from organizational disruptions (Hendricks & Singhal, 2005; Hora & Klassen, 2013). Globally, managers are increasingly analyzing their firms' ability to espouse and recover from operational disruptions (Australian Prudential Regulation Authority, 2019).

Innovation is an important element of the success of any firm (Fagerberg & Verspagen, 2009). Previous studies (Benedetto et al., 2008; Herrmann et al., 2007) on innovation have categorized innovation into process, product, and administrative. Propris (2002) explains process innovation as modifications in systems for creating products and services, while product innovation is the change that occurs after producing products and services. Kim et al. (2012) also classified innovation into incremental and radical. Incremental innovation is about small changes existing in

CONTACT Humphrey Danso hdanso@uew.edu.gh Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, P. O. Box 1277, Kumasi, Ghana

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function, quality, and features in coping with the needs of existing customers; is about upgrading, expanding, and refining existing technology, while radical innovation is about the adoption of new technologies to generate a demand that is new to the customers and the market; is a concern with technology push or market pull (Gatignon et al., 2002; Jansen et al., 2006; Li et al., 2008; Propris, 2002). Innovation is crucial in a present competitive business setting, which ensures the survival and resilience of successful organizations.

Businesses are normally faced with diverse degrees of environmental challenges which should be overcome to ensure survival. Firm managers find it challenging to adequately address the environmental demands and accordingly acclimatize business operations (Nisar et al., 2020). The growing internal and external environmental concerns of organizations usually lead to erratic, unexpected, and emergent occurrences, therefore growing environmental uncertainty causes significant challenges to organizations (Haarhaus & Liening, 2020). This creates turbulence in the organizations and therefore not surprising that the ability of organizations to survive with growing ambiguity is considered crucial for organizational success (Vecchiato, 2015). The heightened dynamic environment requires strategic alliances, the formation of partnerships, and innovation for the survival of business (Tajeddini et al., 2020).

The construction market is one of the important growing industries and has an impact on the economies of all nations. Its tentacles spread from residential and office buildings through road construction to gigantic structures such as the construction of dams. The Ghanaian construction industry has gone through various stages of development which has resulted in significant economic impact and increased participation of other players. The construction industry in Ghana has seen foreign direct investment, particularly in the construction of shopping malls, and hotels, among others (Kissi et al., 2015). There is therefore the need to ensure continuous development of the construction industry to yield improved economic benefits. According to Kamenetskii (2011), there is a need for the construction industry to adopt and implement modern business trends to keep in line with best international practices. However, the construction industry is faced with numerous challenges that militate against its smooth delivery of construction products. Construction firms face some serious challenges in their quest to deliver the needed and effective infrastructural projects (Abbasianjahromi et al., 2018; Ncwadi & Dangalazana, 2005). Contemporary construction firms, therefore, need to adopt strategies and capabilities that will make them sustainable in the presence of turbulent conditions.

The growing complexity of both national and international business activities characterized by turbulence and instability has compelled countless scholarly works (Ambulkar et al., 2015; Anderson et al., 2014; Coppola, 2019; Parast et al., 2019; Wishart, 2018) and managers of the business to identify the importance of organizational capabilities for survival and growth. Despite the scholars and managers' efforts, the literature on organizational capabilities is inconclusive in the attempt to explain the coverage of organizational capabilities' influence on business performance (Dev et al., 2018; Przyczynski et al., 2018). It is, therefore, crucial to study different organizational capabilities about their resilience to environmental disruptions and disturbances. There is a lack of literature on the relationship between firms' capabilities and their resilience.

Furthermore, resilience as a concept has been studied in many areas including business resilience (Coppola, 2019; Wishart, 2018), economic resilience (Dormady et al., 2018), supply chain disruptions (Ambulkar et al., 2015; Parast et al., 2019), climate change resilience (Pelling, 2010), disaster resilience (Cutter, 2016), enterprise resilience (Sanchis & Poler, 2013), metrics of economic resilience (Pant et al., 2012), employee resilience (Tonkin, 2016), regional economic resilience (Martin & Sunley, 2014), individual to organizational resilience (Olivos, 2014). Despite the numerous research interest in understanding resilience in different fields, there is a lack of empirical research studies focused on construction firms' resilience. Studying the relationship between organizational capabilities and resilience of construction firms will contribute to knowledge in the scope of literature on both organizational capabilities and resilience.

A critical capability that supports organizations to enhance strong resilience against turbulence is innovations. According to Kamalahmadi and Parast (2016), innovation is a key capability that helps organizations to build resilience to disturbances and disruptions. A study by Sabahia and Parast (2019) found that firms with more innovative environments are more resilient to disturbances and disruptions as the firms' capabilities positively influence their risk management capabilities. According to Kamalahmadi and Parast (2016), despite the reality that innovation is a key element of any firm's survival, the role of innovation in the enhancement of resilience has been ignored. Although studies have been conducted on innovation and resilience, there is however an absence of studies investigating the influence of innovation on a firm's resilience (Sabahia & Parast, 2019). This study aims at filling this gap by using innovation as an influencer on the resilience firms. Besides the influence of innovation on resilience, the study explicitly determines the mediating effect of innovation on the relationship between organizational capabilities and firms' resilience.

The heightened dynamic environment requires strategic alliances, the formation of partnerships, and innovation for the survival of business (Tajeddini et al., 2020). Nisar et al. (2020) examined the relationship between environmental performance and the decision-making capabilities of private and public hospitals in China. Suarez and Oliva (2005) studied the relationship between environmental change and organizational transformation. Ahmed et al. (2017) studied the effect of organizational capabilities and environmental factors on the strategies of SMEs. Mikalefa et al. (2020) examined the moderation effect of the external environment on the relationship between IT architecture and IT governance. There is, however, a lack of

studies on the influence of environmental factors on the relationship between organizational capabilities and firms' resilience. It is therefore expected that environmental factors will moderate the relationship between organizational capabilities and firms' resilience.

The research aims to examine the relationship between organizational capabilities and resilience of small and medium size construction firms in Ghana. It is emphasized that innovation would mediate the relationship between organizational capabilities and construction firms' resilience, and environmental factors would moderate the relationship between organizational capabilities and construction firms' resilience. The objectives of the research are to (1) establish the relationship between the organizational capabilities and resilience of construction firms in Ghana, (2) establish the relationship between organizational capabilities and innovation of construction firms in Ghana, (3) establish the relationship between innovation and resilience of construction firms in Ghana, (4) examine the mediating role of innovation on the relationship between organizational capabilities and resilience of construction firms in Ghana, and (5) examine the moderating effect of environmental factors on the relationship between organizational capabilities and resilience of construction firms in Ghana. The outcomes of the study are useful to construction firms' managers to be well-informed about the effect of organizational capabilities and innovative factors on resilience during disturbances, disruptions, or turbulence in their companies, thereby enlightening them to institute effective procedures to improve the resilience of their firms.

Conceptual Framework

The conceptual framework that supports the hypothetical relationship between variables used in this study is shown in Exhibit 1. The relationships established by the study are explained and hypothesized below.

Relationship between organizational capabilities and the resilience of construction firms in Ghana

Previous studies have focused on developing organizational capabilities in different industries (Almeida et al., 2013; Muhura, 2012; Schienstock, 2009). Muhura (2012) studied a firm's capabilities as means of competitive advantage in Kenya using Airtel as a case. The study identified branding, technology, research development, innovative practices, talent maturing, and physical infrastructure as the firm's strategic capabilities which provide a competitive advantage over the others. Almeida et al. (2013) examined the interactions between organizational capabilities, strategic kinds, strategic preparation, and strategic application capabilities that affect organizational performance in the Brazilian textile industry. Their study found a statistical significance between management capabilities and financial performance. Schienstock (2009) argues that various firms have different organizational capabilities. It is, therefore, crucial to study different organizational capabilities about their resilience to disruptions and disturbances. There is a lack of literature on the relationship between firms' capabilities and their resilience. Therefore, the following hypothesis is postulated:

H1: Organizational capabilities have a significant impact on the resilience of construction firms in Ghana.

This hypothesis is underpinned by the People Capability Maturity Model (People CMM) People CMM has attracted attention as means of managing people's capability. The import of People CMM is to effectively utilize available resources. People CMM has since its publication has gone through some revision since, however, the main process areas and the structure have remained the same (Toth, 2015). According to Toth (2015), capabilities can be seen from individual points of view, team as well as organizational capabilities. The individual capabilities include the skills of an individual, and the ability to utilize the skills to the firm's advantage. Therefore, the firm's capabilities are key to improving the resilience of the firm so that the firm can withstand and overcome any unexpected turbulence.

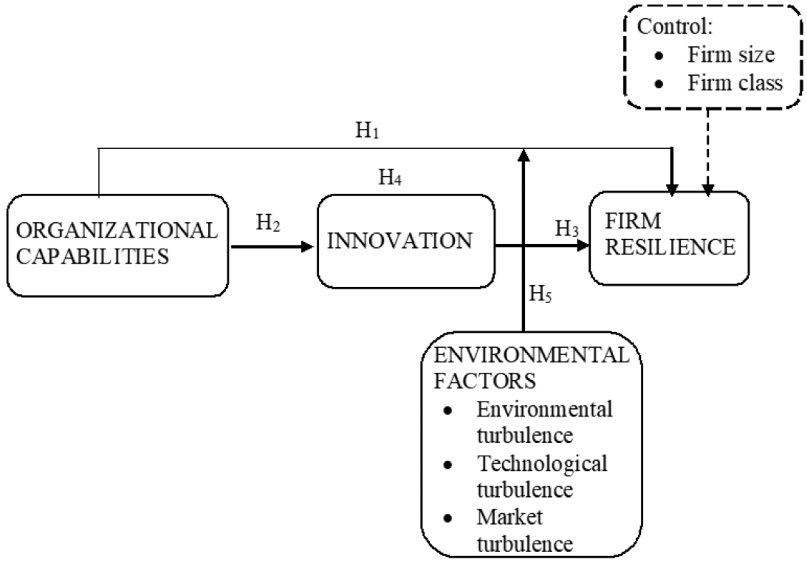

Exhibit 1. Conceptual Model of Hypothetical Relationship Among Variables.

Influence of organizational capabilities on the innovation of construction firms in Ghana

Organizations are normally faced with diverse degrees of market competition (Al-Rfou, 2012). The survival and success of organizations can be linked to the competitive intensity of the organization's environment (Lichtenthaler, 2009). Competitive intensity is, therefore, the amount of competition an organization encounters about its rivals' actions and responses in the effort to generate returns (Pecotich et al., 1999). Among the critical capabilities that support firms to develop strong resilience against turbulence are innovations. Innovation helps organizations to build resilience to disturbances and disruptions (Kamalahmadi & Parast, 2016). Firms with more innovative environments are more resilient to disturbances and disruptions as the firms' capabilities positively influence their risk management capabilities (Sabahia & Parast, 2019). Despite the reality that innovation is a vital element of any firm's growth, the effect of innovation on the enhancement of resilience has been ignored (Kamalahmadi & Parast, 2016). The lack of literature on the influence of organizational capabilities on the innovation of construction firms is evident. It is hypothesized that:

H2: Organizational capabilities have a significant impact on innovation of construction firms in Ghana.

This hypothesis is premised on the evolution theory. According to Kantarelis (2018), the evolution theory emphasizes the production processes, capabilities, and innovation. Kantarelis (2018) further explains that the theory considers the firm as both a creator of change and creator to change for the competitive advantage of the firm over the others. Therefore, the firm's capabilities can create a change that could impact the innovativeness of the firm so that the firm becomes competitive in the changing environment.

Influence of innovation on the resilience of construction firms in Ghana

A critical capability that supports firms to strengthen their resilience against turbulence is innovations. Innovation helps organizations to enhance their resilience against disturbances and disruptions (Kamalahmadi & Parast, 2016). Firms with innovative environments possess greater resilience to disturbances and disruptions as the firms' capabilities positively influence their risk management capabilities (Sabahia & Parast, 2019). Despite the reality that innovation is an important element of any firm's growth. Although literature exists on innovation and resilience, however, insufficient studies investigating the effect of innovation on a firm's resilience (Sabahia & Parast, 2019). This study aims at filling this gap by studying innovation as an influencer on a firm's resilience. The study, therefore, postulates the following hypothesis:

H3: Innovation has a significant impact on the resilience of construction firms in Ghana.

According to Kamalahmadi and Parast (2016), innovation is an important capability that assists organizations to develop resistance to disruptions. Innovation is linked to methods, application of ideas, knowledge, skills and diverse capabilities (Sabahia & Parast, 2019). Innovation is one of the emphasis of the evolution theory (Kantarelis, 2018) which this hypothesis is premised. This, therefore, suggests that innovation could impact on the resilience of firms.

Mediating effect of innovation on organizational capabilities and resilience of construction firms in Ghana

Despite recent research interest in understanding resilience in different fields, there is a lack of empirical research studies focused on construction firms' resilience. Coppola (2019), Wishart (2018), and Dormady et al. (2018) respectively study business resilience, economic resilience, and supply chain disruptions. Studying the resilience of construction firms will contribute to knowledge in the scope of literature on resilience. Resilience can be multidisciplinary and at the same time multifaceted, thus it can apply to different fields of specialization (Olivos, 2014). It is, therefore, appropriate to study how innovation mediates the organizational capabilities and resistance of construction firms as a field of specialization to fill the lacuna in literature as there has not been any study yet on the mediating effect of innovation on organizational capabilities and resilience in this field of specialization. Apart from the influence of innovation on resilience, the study specifically determines the mediating role of innovation between organizational capabilities and firms' resilience. It is therefore hypothesized that:

H4: Innovation positively mediates the relationship between organizational capabilities and resilience of construction firms in Ghana.

The evolution theory emphasizes the production processes, capabilities, and innovation (Kantarelis, 2018). The relationship between innovation, and capabilities and resilience of firms is key to the survival of the firm. Evangelisti et al. (2015) explained that irrespective of the subject area, the People CMM model can be applied in any capability development process. Resilience is the ability of a firm to bounce back after a catastrophic event through the path of recovery (Dormady et al., 2018). Both the evolution theory and the People CMM model support this hypothesis. This is because innovation could impact the relationship between organizational capabilities and resilience.

The moderating role of environmental factors on organizational capabilities and resilience of construction firms in Ghana

Market competition is one of the internal factors that influence the organization's environmental factors (Al-Rfou, 2012). Haarhaus and Liening (2020) studied the role of strategic foresight on the influence of dynamic capability to cope with environmental uncertainty. Tajeddini et al. (2020) examined the role of entrepreneurial orientation in a dynamic environment in the hospitality industry. Mikalefa et al. (2020) studied the moderation effect of the external environment on the relationship between IT architecture and IT governance.

There is a lack of studies on the environmental factors that influence the organizational capabilities and firms' resilience. It is expected that the moderating effect of environmental factors will influence organizational capabilities and firms' resilience. It is postulated therefore that:

H5: Environmental factors positively moderate the relationship between organizational capabilities and resilience of construction firms in Ghana.

According to Dubey et al. (2019), irrespective of the internal and external pressures from firm managers, deep-rooted environmental factors within the business lexicon are still argued. Firm managers find it challenging to adequately address the environmental demands and accordingly acclimatize business operations (Nisar et al., 2020). The growing internal and external environmental concerns of organizations usually lead to erratic, unexpected, and emergent occurrences, therefore growing environmental uncertainty causes significant challenges to organizations (Haarhaus & Liening, 2020). This creates turbulence in the organizations and therefore not surprising that the ability of organizations to survive with growing ambiguity is considered crucial for organizational success (Vecchiato, 2015). This, therefore, calls for organizational capabilities to rapidly address the changing organizational environment. Similarly, an organization with insightful capacities to grasp opportunities and restructure its resource is anticipated to be well-equipped if environmental turbulences need swift adaption (Teece & Leih, 2016). This, therefore, implies that environmental factors could impact the relationship between a firm's capabilities and resilience.

Research Methodology

Research design is a plan or framework that guides a scientific study, which considers the data organization, collection, and analysis (Adams & Schvaneveldt, 1991). It also deals with the structure and procedures for data collection and analysis and provides the link between the empirical data and the conclusion of a study (Bryman, 2004). A descriptive survey design was adopted to study a sample of the population at a single point in time. The reason for adopting a descriptive survey was that it offers a good understanding of the research problem and is appropriate for research about behavior and beliefs when responses are given to questions that measure variables (Neuman, 2007). According to Polit and Hungler (1999), a research population consists of all the individuals or objects from whom the study measurement is being collected. For this study, the population consisted of management members of small and medium size construction firms in Ghana. These management members include contractors, project managers, architects, civil/structural engineers, and quantity surveyors among other management members. Because the study is at the firm level, management members of the small and medium-sized construction firms were found to be appropriate to provide valid information concerning their firms. These groups of people shared common characteristics which their responses facilitated momentously in the data collection for the study.

A sample frame is a set of elements from which a researcher selects a sample from the targeted population of the study; because the researcher rarely has direct access to the entire population of interest, the researcher must rely on a sample frame to represent the entire elements of the population (Lewis-Beck et al., 2011). In this study, because the population was large, the small and medium-sized construction firms that are actively working on construction project sites across the 16 regions in Ghana were selected as the sample frame. Therefore, active small and medium-size building construction firms that were undertaking building projects in Ghana during the data collection period were used as the sample frame from which data was collected. Sampling size is the total number of individuals or entities that are selected from the population to participate in the study (Saunders et al., 2009). There are over 30,000 registered building construction firms with the Ministry of Water Resources, Works, and Housing in Ghana. Since the study is countrywide, the sample was taken from the entire sample frame. According to Nwana (1992), a sample size of 5% is adequate for a population of up to 10,000 or more, 10% for a population of up to 5,000, and 20% for a population of less than 5,000. In line with Nwana's (1992) suggestion, a sample size of 304 was taken for the study, as it is more than 5% of the population. Small and medium-sized construction firms that are actively working on construction projects across the 16 regions in Ghana were conveniently sampled for the study. 19 copies of the questionnaire were sent to each of the 16 regions in Ghana.

Sampling is the process of predetermining the number of individuals or entities selected from the population (Aluda, 2016). A convenience sampling technique was adopted for this study. Convenience sampling is a non-probability sampling technique that uses a sample that is accessible and willing to participate in the study (Saunders et al., 2009). Therefore, the study adopted convenience sampling to select the small and medium-sized building construction firms that were accessible during ongoing construction works and one management member of each firm who was willing to partake in the study. The construction firms' management members such as contractors, project managers, architects, civil/structural engineers, and quantity surveyors among others who are knowledgeable in their firms' capabilities, resilience practices, environmental factors, and innovation practices were selected for the study.

Data collected for this study was primary data. Currie (2005), explained that primary data are data that are hitherto not known and therefore collected afresh by the researcher. The study collected primary data through a questionnaire. Yin (2003) explained that the use of a questionnaire enables the use of a smaller group of people to make inferences for a large group of people in research. The questionnaire was deemed fit for this study because data were collected from a small number of construction firms and the results obtained inferred a large number of construction firms in Ghana. A closed-ended questionnaire was used which consisted of two sections; (A) demographic characteristics of the respondents with 7 question items, and (B) organizational capabilities, resilience, innovation, and environmental factors of the small and medium size construction firms with 58 question

items. These items in the questionnaire were adapted from literature (Abbas & Ul Hassan, 2017; Ambulkar et al., 2015; Coppola, 2019; Inan & Bititci, 2015; Muhura, 2012; Ng'ang'a et al., 2016; Parida, 2016). A 7-point Likert scale was adopted for the part B responses. The responses scale has strongly disagreed (1), disagree (2), somewhat disagree (3), neutral (4), somewhat agree (5), agree (6), and strongly agree (7). Validity refers to the extent to which a data collection instrument item measures adequately the real concept that it seeks to measure (Babbie, 2015). To ensure the validity of the questionnaire items to be capable of eliciting correct responses from the respondents, the questionnaire was subjected to scrutiny by construction experts from both academia and industry. The comments provided by the experts were used to revise the content of the questionnaire. This ensured good content validity.

Nineteen (19) copies of the questionnaire were sent to each of the sixteen (16) regions in Ghana for distribution to small and medium-sized construction firms with the help of research assistants. A total of three hundred and four (304) copies of the questionnaire were distributed conveniently to the small and medium-sized construction firms in Ghana. For each construction firm, one management member was contacted and a copy of the question was administered to respond on behalf of the firm. The participants were allowed enough time with phone call reminders to complete the questionnaire. Ethical issues were considered in the collection of data from the participants. This was ensured through two main approaches (informed consent; and anonymity and confidentiality). The informed consent was ensured through the provision of relevant information about the research to the respondents. This was done by clarifying the purpose of the study to the participants and eliminating any form of deception during the process. Anonymity and confidentiality were also ensured by informing participants of the study not to provide any form of identification such as name, firm's name, or contact address. All the responses provided by the participants were kept confidential and were used only for research purposes. Creswell (2008) explained data analysis as the process of screening, cleaning, converting, and molding data to underline valuable information for decision-making. The copies of the questionnaire returned were first screened to remove those that were not properly completed to obtain the useable ones. Statistical package for social sciences (SPSS) software version 20 and Lisrel software version 8.8 was used in carrying out the statistical analysis. Confirmatory factor analysis (CFA) was conducted to remove the problematic variables that were loaded poorly. A structural equation model was used to conduct a hierarchical regression analysis of the variables. Descriptive, differential, and correlation statistics were also employed to analyze the data.

Variables and Measures

Multiple item questionnaire was adopted for measuring all the factors and variables in the study. Five main variables, factors, or constructs used in the study are:

(1) Organizational capabilities (Independent variable)
(2) Firm's resilience (Dependent variable)
(3) Innovation (Mediator)
(4) Environmental factors (Moderator)
(5) Firm's size and class (Control)

Independent variable: organizational capabilities

Dev et al. (2018) explain organization capabilities as the context of the organizational members that work to contribute to the service, growth as well as goals of the organization. Muhura (2012) identified branding, technology, research development, innovative practices, talent maturing, and physical infrastructure as the firm's strategic capabilities which provide a competitive advantage over the others. For this research, three main capabilities were found to be expedient for describing the small and medium firms' capabilities, which are (1) information and communication technology (ICT) capabilities, (2) operational capabilities, and (3) human resource capabilities. These constructs were important in establishing the relationship between the organizational capabilities and resilience of construction firms in Ghana. The three components were measured by 13 items, which include ICT capabilities (4 items), operational capabilities (5 items), and human resource capabilities (4 items).

Dependent variable: firm's resilience

Holling (1973) explains resilience as the ability of a firm or a system to highly maintain its functionality when there is a shock. According to Coppola (2019), the ability of any firm to see the unpredicted earlier than competitors is a foundation for organizational resilience. Three main constructs are used in this research for measuring a firm's resilience, consisting of (1) resource resilience, (2) anticipated capabilities resilience, and (3) network relationships resilience. These constructs were measured by 18 items, consisting of resource resilience (6 items), anticipated capabilities resilience (8 items), and network relationships resilience (4 items). These constructs were important in establishing the relationship between the organizational capabilities and resilience of construction firms in Ghana.

Mediator: innovation

Grovermann (2017) explains innovation as the capacity to make a system or systems function at different levels of operation. Kamalahmadi and Parast (2016) also explain that innovation is an important capability that assists organizations to develop resistance to disruptions. Sabahia and Parast (2019) explained that empirical studies have identified innovation into five types, however, they can be broadly grouped into two (1) product innovation and (2) process innovation. Innovation was used in this research to establish the mediating role between organizational capabilities and resilience of construction firms in Ghana. This research adopted these two innovation constructs and was measured by 11 items. Product innovation was measured by 6 items while process innovation was measured by 5 items.

Moderator: environmental factors

According to Ahmed et al. (2017), the business environment consists of the opportunities and constraints that are crucial to the survival of the business, which can be responded to by the organizational capabilities and strategies. According to Mikalefa et al. (2020), organizational capabilities play a minor role in an environment that is stable, where external changes are infrequent and predictable. Contrarily, organizational capabilities play a major role in unpredictable and volatile environments to maintain competitiveness (Wilden & Gudergan, 2015). The authors further stressed that firms face environmental turbulence when technological and marketing capabilities become a liability. Environmental factors were used in this research to determine the moderating effect between organizational capabilities and resilience of construction firms in Ghana. Three main constructs were used in this research for measuring the environmental factors, consisting of (1) environmental turbulence, (2) technological turbulence, and (3) market turbulence. These constructs were measured by 16 items, consisting of environmental turbulence (4 items), technological turbulence (6 items), and market turbulence (6 items).

Control variables: firm size and class

The firm's information that was used as a control on the dependent variable is the firm's size and the firm's class. Two main firm sizes were used, thus small-sized construction employing up to 29 workers, and medium-sized construction with between 30 and 100 employees. For the firm class, the Ministry of Water Resources, Works and Housing in Ghana, has classified building construction firms as D1K1, D2K2, D3K3, and D4K4.

Results

Respondents and Firms Demography

Because this study is a firm-level study, one questionnaire was sent to each building construction firm to be completed by one management member. Out of the three hundred and four (304) questionnaires sent across all the 16 regions in Ghana, two hundred and sixty-eight (268) were returned. After a thorough screening, 7 questionnaires were removed due to incomplete and wrong ticking of the responses. This yielded a workable two hundred and sixty-one (261) questionnaires representing an 85.86% valid return rate. The characteristic of the 261 valid respondents is presented in Exhibit 2 showing the gender, academic qualification, profession/position, working experience, firm class, and firm size of the construction firms. It can be seen from Exhibit 2 that most of the construction professionals who participated in the research were males (84.7%). This result confirms the male dominance of the construction firms in Ghana as indicated by Danso and Obeng-Ahenkora (2018) and Danso (2012). About half (49.4%) of the respondents possessed undergraduate (first degree) qualifications, with the least (1.1%) haven Ph.D. qualifications.

In terms of the profession of the respondents, quantity surveyors, project managers, contractors, civil/structural engineers, and architects were 23.8%, 22.2%, 18%, 17.6%, and 15.3% respectively. The remaining 3.15 were those who ticked 'others', these include technicians, foremen, logistics officers, and accountants. 39.1% of the participants have work experience in the construction industry for 6 to 10 years, 29.1% had worked for five or fewer years, 19.9% for between 11 and 15 years, and 11.9% of the respondents gained over 15 years of work experience. The majority of the respondents (67.1%) were from D2K2 and D3K3 construction class firms. D1K1 construction class firms were 26.4% while D4K4 construction class firms were 6.5%. The Ministry responsible for housing infrastructure and construction (Ministry of Water Resources, Works and Housing) in Ghana classifies building construction firms as D1K1, D2K2, D3K3, and D4K4 for projects worth over $500,000, between $250,000 and $500,000, between $75,000 and $250,000 and up to $75,000, respectively. This means the majority of the construction firms that contributed to this study undertake building construction project worth between $75,000 and $500,000. In terms of firm size, the majority of the building construction firms (77%) are small-scale enterprises employing up to 29 employees. While 23% of the building construction firms are medium-scale enterprises with between 30 and 100 employees.

Exhibit 2. Respondents and firm demography (n = 261).

Demographic characteristics		Frequency	%	Cum. %
Gender	Male	221	84.7	84.7
	Female	40	15.3	100
Academic qualification	Diploma	65	24.9	24.9
	Undergraduate	129	49.4	74.3
	Masters	55	21.1	95.4
	PhD	3	1.1	96.6
	Others	9	3.4	100
Profession/position	Architect	40	15.3	15.3
	Civil/Structural Engr.	46	17.6	33.0
	Project Manager	58	22.2	55.2
	Quantity Surveyor	62	23.8	78.9
	Contractor	47	18.0	96.9
	Others	8	3.1	100
Work experience	≤5 yrs.	76	29.1	29.1
	6–10 yrs.	102	39.1	68.2
	11–15 yrs.	52	19.9	88.1
	>15 yrs.	31	11.9	100
Firm class	D1K1	69	26.4	26.4
	D2K2	103	39.5	65.9
	D3K3	72	27.6	93.5
	D4K4	17	6.5	100
Firm size	Up to 29 employees	201	77.0	77.0
	30–100 employees	60	23	100

Validity and Reliability of the Variables

The variables for the study were tested for validity and reliability through Cronbach's alpha (α) coefficient and CFA with the use of Lisrel software version 8.8. The factors loadings were significant consisting of constructs such as organizational capabilities, construction firms' resilience, innovation as a mediator, and environmental factors as moderators. The independent variables, mediating variables, and moderating variables were used to measure the relationship between organizational capabilities and the resilience of construction firms in Ghana. Exhibits 3 and 4 present the results of the validity and reliability of the variables. The CFA was adopted to estimate and establish the construct validity of the measurement. Exhibit 3 shows the values of the loadings, t-values, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). It can be seen that the composite

Exhibit 3. Confirmatory factor analysis results.

Construct	Variable	Code	Item	Loading	t-value	Alpha	CR	AVE
Organizational capabilities	Operational	OCO1	We ensure continues improvement in our operations	0.59	Fixed	0.856	0.910	0.510
		OCO2	We use lean productions operational technique	0.55	7.04			
		OCO3	We use quality management operational technique	0.85	8.89			
		OCO4	We use customer relationship management operational techn.	0.63	7.80			
	Human resource	OCHR1	We develop our human resource base	0.56	Fixed			
		OCHR3	We provide training for our staff to remedy any shortfall	0.84	9.15			
		OCHR4	We provide orientation training for our newly employed staff	0.84	9.13			
	ICT	OCIC1	We use ICT for our processes	0.87	Fixed			
		OCIC3	We use ICT for our communications	0.64	9.97			
		OCIC4	We have ICT resources in our firm	0.66	10.27			
Firms' Resilience	Resources	FRR1	Our financial resources are essential to planning and preparing for an emergency	0.58	Fixed	0.906	0.913	0.514
		FRR3	Our technological resources are critical to resilience	0.66	8.16			
		FRR4	We align our resources and processes in response to environmental changes.	0.80	9.11			
		FRR6	We configure our resources and processes in response to the dynamic environment.	0.71	8.51			
	Anticipation capabilities	FRA1	We scan the environment to detect critical developments	0.67	Fixed			
		FRA3	We have alternative courses of action during crisis	0.64	9.19			
		FRA4	We act faster to mitigate potential harm	0.68	9.69			
		FRA6	We take actions in the present to be well positioned in the post-crisis environment	0.68	9.65			
		FRA7	We maintain high situational awareness at all times.	0.78	10.84			
		FRA8	We are able to provide a quick response to the disruptions	0.77	10.76			
	Network relationships	FRN2	We have social network	0.82	Fixed			
		FRN3	We have network for dissemination of innovation	0.84	14.71			
		FRN4	We collaborate with other organizations	0.52	8.33			
Innovation	Product	IPT1	We provide new or significant products onto the market	0.83	Fixed	0.889	0.913	0.640
		IPT2	We provide new services	0.87	14.46			
		IPT4	We modify existing products to look significantly new	0.67	11.28			
	Process	IPS2	We provide new distribution methods for our process	0.87	Fixed			
		IPS3	We provide new process for our maintenance systems	0.82	15.02			
		IPS5	We provide new process for our computing software use	0.71	12.52			
Environmental Factors	Environmental turbulence	EFET2	We detect meaning through ongoing observation of environmental changes/ trends	0.83	Fixed	0.945	0.961	0.714
		EFET3	We develop anticipated outcomes on changes/trends	0.86	16.72			
		EFET4	We determine importance of environmental changes/trend for the firm's strategies	0.86	16.74			
	Technological turbulence	EFTT2	We adopt technological novelty	0.81	Fixed			
		EFTT3	We adopt to the rate of changes in technology	0.92	19.05			
		EFTT4	We regularly share new technological information	0.84	16.42			
	Market turbulence	EFMT2	We adopt client's product compositions	0.78	Fixed			
		EFMT3	We monitor changes that take place in firm's market	0.84	16.39			
		EFMT4	We observe our client's entry and exit from market	0.87	17.41			
		EFMT5	We target client where we have opportunity for competitive advantage	0.83	15.94			
		EFMT6	Competition for market share in our industry is intense	0.72	13.08			

OCO = Organizational capabilities (operational), OCHR = Organizational capabilities (human resource), OCIC = Organizational capabilities (ICT), FRR = Firm's resilience (resources), FRA = Firm's resilience (anticipated capabilities), FRN = Firm's resilience (network relationships), IPT = Innovation (product), IPS = Innovation (process), EFET = Environmental factors (environmental turbulence), EFTT = Environmental factors (technological turbulence), EFMT = Environmental factors (market turbulence).

Exhibit 4. CFA Goodness of Fit Indices.

CFA Model	χ^2	Df	P	χ^2/df	RMSEA	NNFI	CFI	SRMR
Organizational capabilities	61.71	32	0.001	1.93	0.062	0.960	0.971	0.048
Firm's Resilience	135.8	51	0.000	2.66	0.076	0.910	0.922	0.058
Innovation	24.13	8	0.002	3.01	0.075	0.959	0.978	0.037
Environmental factors	88.32	41	0.000	2.15	0.071	0.971	0.978	0.026
Overall	1704	647	0.001	2.63	0.067	0.818	0.841	0.0576

χ^2 = Chi-square, df = degree of freedom, p = p-value, χ^2/df = normed chi-square, RMSEA = root mean square error of approximation, NNFI = non-normed fit index, CFI = comparative fit index, SRMR = standardized root mean square residual.

Cronbach's alpha coefficient values ranged between 0.856 and 0.945 which are above the 0.7 threshold. According to Hair et al. (2010), the acceptable lower limit for Cronbach's alpha is usually considered to be 0.7. All the factor loadings were between 0.59 and 0.87, above the 0.5 limits, with a t-valued from 7.04 to 19.05. The composite reliability values were between 0.910 and 0.961, which are greater than the least recommended value of 0.6. The average variance extracted values were from 0.510 to 0.714, which are greater than the cutoff of 0.5 as indicated by Bagozzi and Yi (1988). The CFA goodness of fit indices (Exhibit 4) obtained are x2/df (1.93 to 3.01), RMSEA (0.062 to 0.076), NNFI (0.910 to 0.971), CFA (0.922 to 0.978) and SRMR (0.026 to 0.058). The ratio of chi-square to the degree of freedom for all constructs was ≤ 3. All the non-normed fit index and comparative fit index were > 0.9. All the standardized root mean square residual was also < 0.07. These fit indices measurements indicate the measurement model of the research is a good fit. These fit indices are acceptable model fit and support factor analysis for structural modeling.

Descriptive Statistics

The descriptive statistics of the data collected are presented in Exhibit 5. A 7-point Likert scale responses were used, which were strongly disagree [1], disagree [2], somewhat disagree [3], neutral [4], somewhat agree [5], agree [6], and strongly agree [7]. A theoretical mean of ≥ 5.0000 was set as the threshold for accepting that an item (variable) was agreed to be a contributing factor by the respondents. It can be seen from Exhibit 5 that all the items received mean values between 5.3218 and 5.9655, which are all above 5.0000. This suggests that the respondents agreed to all the items in the questionnaire as acceptable factors that contribute to their various dimensions.

Hypotheses Testing

In testing the hypotheses, two main statistical tests were adopted. The first was the use of the Person product-moment correlation coefficient to test hypotheses 1 to 3, where the interrelationship between the control variables, independent variables, and dependent variables was used. The second statistical test was conducted to test hypotheses 4 and 5, which adopted hierarchical multiple regression for testing the mediating and moderating relationships between the variables as recommended by Baron and Kenny (1986).

Correlation of the variables

To assess the relationship between the variables, a bivariate correlation was carried out and the result is presented in Exhibit 6. A two-tailed Pearson product-moment correlation was used to ascertain the direction of the relationship between the variables. The relationship between the variable were all found to be positive. The relationship between the variables is presented based on the hypothesis of the study as described below.

Hypothesis 1

H_1: Organizational capabilities have significant impact on the resilience of construction firms in Ghana.

Hypothesis 1 examined the relationship between organizational capabilities and resilience of construction firms in Ghana. It was therefore stated that "organizational capabilities have significant effect on the resilience of construction firms in Ghana". It can be seen from Exhibit 6 that positive relationship exists between organizational capabilities and firms' resilience ($r = 0.716$). The observed relationship was significant ($p = .00$) at a 0.01 significant level. This suggests that if the organizational capabilities increase then the resilience of the firm will also increase. It can therefore be argued that for the firms to thrive and boost their resilience, there is the need for them to build their capabilities. The hypothesis that "*organizational capabilities have significant impact on the resilience of construction firms in Ghana*" was supported.

Hypothesis 2

H_2: Organizational capabilities have a significant impact on innovation of construction firms in Ghana.

Hypothesis 2 determined the relationship between organizational capabilities and innovation of construction firms in Ghana. It was stated that "organizational capabilities significant impact on innovation of construction firms in Ghana." From Exhibit 6, it can be observed that there is a positive relationship between organizational capabilities and innovation ($r = 0.613$). The observed relationship was found to be significant ($p = .00$) at a 0.01 significant level. This suggests that if the capabilities of the firm improve then the innovativeness of the firm will also improve. It can therefore be argued that for the firms to improve their innovativeness, there is a need for them to strengthen their capabilities. The hypothesis that "*organizational capabilities significant impact on innovation of construction firms in Ghana*" was supported.

Exhibit 5. Descriptive Statistics ($n = 261$).

Variables	Min.	Max.	Mean	Std. Dev.
Organizational capabilities				
We ensure continuous improvement of our operations	1.00	7.00	5.8352	1.09178
We use lean productions operational technique	1.00	7.00	5.4215	1.29739
We use quality management operational technique	1.00	7.00	5.7854	1.08483
We use customer relationship mgt. operational technique	1.00	7.00	5.6782	1.06512
We use total quality management operational technique	1.00	7.00	5.6935	1.07682
We develop our human resource base	2.00	7.00	5.8429	.92103
We identify HR competencies at the recruitment stage	1.00	7.00	5.6130	1.22147
We provide continuous training for our staff	1.00	7.00	5.6398	1.22497
Provide orientation training for our newly employed staff	1.00	7.00	5.9119	1.10065
We use ICT for our internal processes	1.00	7.00	5.6552	1.24802
We use ICT for collaborating with our partners	1.00	7.00	5.6475	1.20187
We use ICT for our communications	1.00	7.00	5.6552	1.20410
We have ICT resources in our firm	1.00	7.00	5.5019	1.29384
Firm's Resilience				
Our financial resources are essential to planning and preparing for an emergency	1.00	7.00	5.5479	1.25062
Our human resources are critical to resilience	1.00	7.00	5.5670	1.20906
Our technological resources are critical to resilience	1.00	7.00	5.6207	1.10497
We align our resources and processes in response to environmental changes	2.00	7.00	5.5670	1.13014
We structure our resource base to react to the changing business environment	1.00	7.00	5.5556	1.12394
We configure our resources and processes in response to the dynamic environment	1.00	7.00	5.4943	1.14563
We scan the environment to detect critical developments	1.00	7.00	5.3716	1.28145
We build multiple plans for different scenarios	2.00	7.00	5.6245	1.10454
We have alternative courses of action during crisis	1.00	7.00	5.6897	1.08106
We act faster to mitigate potential harm	1.00	7.00	5.7356	1.12448
We adjust better when dealing with emergency	1.00	7.00	5.6054	1.10306
We take actions in the present to be well positioned in the post-crisis environment	1.00	7.00	5.6322	.96614
We are able to maintain high situational awareness at all times	1.00	7.00	5.5326	1.07948
We are able to provide a quick response to the disruptions	1.00	7.00	5.5249	1.24203
We have external network	1.00	7.00	5.3755	1.37450
We have social network for knowledge	1.00	7.00	5.3257	1.38303
We have network for dissemination of innovation	1.00	7.00	5.3218	1.36292
We collaborate with other organizations	1.00	7.00	5.6782	1.20091
Innovation				
We provide new or significant products onto the market	1.00	7.00	5.6513	1.29388
We provide new or significant services	1.00	7.00	5.7050	1.24079
We develop innovative products (structures)	1.00	7.00	5.6590	1.23514
We renovate existing structures to look significantly new	1.00	7.00	5.8544	1.11367
We provide quality products (structures)	1.00	7.00	5.9655	1.03532
Our products take us to new markets	1.00	7.00	5.9502	.92892
We provide new logistics for our construction process	1.00	7.00	5.6360	1.08561
We provide new distribution methods for our process	1.00	7.00	5.5900	1.16212
We provide new process for our maintenance systems	1.00	7.00	5.6667	1.08840
We provide new process for our operations	1.00	7.00	5.5785	1.13619
We provide new process for our software applications	1.00	7.00	5.4406	1.26541
Environmental Factors				
We identify early signals of environmental changes	1.00	7.00	5.3640	1.31035
We detect environmental changes and trends	1.00	7.00	5.4368	1.20927
We develop projections of anticipated outcomes	1.00	7.00	5.5057	1.18523
We determine changes and trend for the firm's strategies	1.00	7.00	5.4521	1.27800
We monitor changes in technology	1.00	7.00	5.5172	1.29075
We adopt technological novelty	1.00	7.00	5.5019	1.30568
We adopt to the rate of changes in technology	1.00	7.00	5.5249	1.31132
We regularly share new technological information	1.00	7.00	5.4751	1.34606
Our strategy for competitive advantage is based on technology adaptation	1.00	7.00	5.5977	1.18769
We constantly monitor our activities with technology	2.00	7.00	5.7510	1.11426
We monitor client's product preferences	1.00	7.00	5.6360	1.21595
We adopt client's product compositions	1.00	7.00	5.5900	1.14209
We monitor changes in the firm's competitive market	2.00	7.00	5.6207	1.23015
We observe our client's entry and exit from market	2.00	7.00	5.6513	1.16235
We target client for competitive advantage	1.00	7.00	5.6590	1.13451
Competition for market share in our industry is intense	1.00	7.00	5.6782	1.21365

Hypothesis 3

H_3: Innovation has a significant impact on the resilience of construction firms in Ghana.

The relationship between innovation and the resilience of construction firms in Ghana is determined by hypothesis 3. It states that "innovation has a significant impact on the resilience of construction firms in Ghana." From Exhibit 6, it can be seen that there is a positive relationship between innovation and the resilience of firms ($r = 0.721$). The apparent relationship was found to be significant ($p = .00$) at a 0.01 significant level. This means that if the innovation of the firm increased then the resilience of the firm will also increase. It can therefore be claimed that for the firms to reinforce their resilience, there is a need for them to improve their innovativeness. The hypothesis that

Exhibit 6. Correlation matrix of the variables.

	Correlations							
	1	2	3	4	5	6	7	8
Firm class	1							
Firm size	.082	1						
Organizational capabilities	.138*	.133*	1					
Innovation	.126*	.121*	.613**	1				
Environmental turbulence	.088	.112	.510**	.666**	1			
Technological turbulence	.119	.077	.540**	.678**	.732**	1		
Market turbulence	.122*	.086	.521**	.671**	.694**	.725**	1	
Firm resilience	.199**	.104	.716**	.721**	.699**	.688**	.688**	1

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Exhibit 7. The impact of organizational capabilities on firms' resilience: the mediating effect of innovation.

Path/effect	β	SE	R^2	t	*p*-value
a. Organizational Capabilities → Innovation	.692	.055	.382	12.649	.000
b. Innovation → Firm Resilience	.397	.045	.625	8.808	.000
c. (*direct effect*) Organizational Capabilities → Firm Resilience	.471	.051	.625	9.317	.000
a*b (indirect effect) Organizational Capabilities → Innovation → Firm Resilience Z = 7.223 (p = .000).					

β = Unstandardized Coefficients; SE = Standard Error; R^2 = R-square; $p < .05$; Z > 1.96 (5% sig., 2-tailed test); $t > 1.96$ (5% sig., 2-tailed test).

"*innovation has a significant impact on the resilience of construction firms in Ghana*" was supported.

Hierarchical Multiple Regression

Hypothesis 4

H_4: Innovation positively mediates the relationship between organizational capabilities and resilience of construction firms in Ghana.

Exhibit 7 presents the summary output of the mediation results on the relationship between organizational capabilities and resilience of construction firms in Ghana, and the mediating effect of innovation. According to the result reported in Exhibit 7, the independent variable (organizational capabilities) affects the mediator variable (innovation) under Path (a) positively with unstandardized regression coefficient with its associated standard error (β = 0.692; SE = 0.055) and significantly ($p < .001$). The R^2 value of 0.382 implies that organizational capabilities account for 38.2% of the variances in the firms' innovation. In Path (b), it was found that the mediator variable (innovation) affects the dependent variable (firm resilience) positively (β = 0.397; SE = 0.045) and significantly ($p < .001$). The innovation accounted for 62.5% of the variances in the firm resilience ($R^2 = 0.625$). The result of the indirect effect with the Sobel-Goodman test (a*b) as shown in Exhibit 7 and illustrated in Exhibit 8 showed that the relationship between the independent variable (organizational capabilities) and the dependent variable (firm resilience) was affected by the mediator variable (innovation) positively and significantly (Z = 7.223, $p < .01$). For a mediation effect to be established, a positive significant relationship between the predictor and criterion variables should be recorded (Segrin & Taylor, 2007). The hypothesis that "innovation positively mediates the relationship between organizational capabilities and resilience of construction firms in Ghana" was supported. A similar study by Ambulkar et al. (2015) found that resource configuration wholly mediates the relationship between a firm's resilience and supply chain disturbances in high-impact disruption.

Hypothesis 5

H_5: Environmental factors positively moderate the relationship between organizational capabilities and resilience of construction firms in Ghana. This section of the paper assesses the effect of the moderation effect of environmental factors on the relationship between organizational capabilities and firm resilience. Exhibit 9 presents the summary of the hierarchical regression model to test hypothesis 5. The unstandardized coefficient beta (B) and its associated t-values which are in the parenthesis are shown. Furthermore, the change in R^2, Adjusted R^2, the change in F-statistics, and the degree of freedom values are also presented. The result reveals that Model 1 which consists of the control effect (firm class and firm size) provided 4.7% of the variance (Adjusted $R^2 = 0.047$) in the firm resilience. The addition of the main effect (organizational capabilities, environmental turbulence, technological turbulence, and market turbulence) to Model 2 yielded 70.7% of the variance (Adjusted $R^2 = 0.707$) in the firm resilience, indicating a 66% change in the variance (Δ Adjusted $R^2 = 0.660$). There were also significant changes in the F-statistics (6.399 and 143.056, respectively for Models 1 and 2). The addition of the interactive effect (organizational capabilities*environmental turbulence, organizational capabilities*technological turbulence, and organizational capabilities*market turbulence) to Model 3 resulted in the variance of 70.9% (Adjusted $R^2 = 0.709$) in the firm resilience, indicating a 0.02% change in the variance (Δ Adjusted $R^2 = 0.002$). These confirm the fitness of the models. The result also shows that organizational capabilities positively and significantly predicted firm resilience (B = 0.419, $t = 9.548$, $p < .001$ for Model 2) and (B = 0.415, $t = 9.397$, $p < .001$ for Model 3), and the interaction between organizational capabilities and market turbulence positively and significantly predicted firm

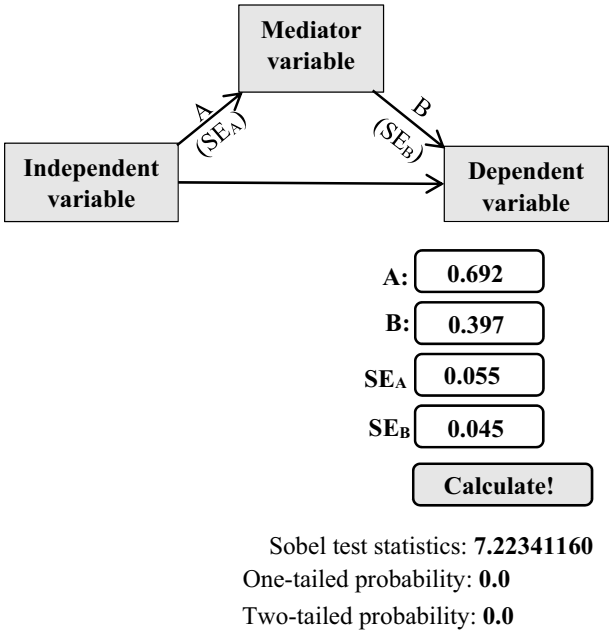

Exhibit 8. Sobel Test Result.

resilience (B = 0.067, $t = 1.183$, $p < .05$ for Model 3). These two effects are supported by the hypothesis. However, the interactive effect between organizational capabilities and environmental turbulence did not positively and significantly predict firm resilience (B = −0. 046, $t = -0.852$ for Model 3), and the interactive effect between organizational capabilities and technological turbulence also did not positively and significantly predict firm resilience (B = −0.023, $t = -0.460$ for Model 3).

The hypothesis that "*environmental factors positively moderates the relationship between organizational capabilities and resilience of construction firms in Ghana*" is therefore partially supported. Similar study by Adnan et al. (2016) examined the moderating role of competitive intensity, and found indirect effects of endogenous factors on the relationship between monetary performance and customer parity management.

Discussions

This study determined the relationship between organizational capabilities and resilience of construction firms in Ghana. It emphasized that innovation would mediate the relationship between organizational capabilities and construction firms' resilience, and environmental factors would moderate the relationship between organizational capabilities and construction firms' resilience. The study firstly hypothesized that 'organizational capabilities have a significant impact on the resilience of construction firms in Ghana', which was tested and supported. Secondly, it was hypothesized that 'organizational capabilities have a significant impact on innovation of construction firms in Ghana', and was tested and supported. Thirdly, the study hypothesized that 'innovation has a significant impact on the resilience of construction firms in Ghana', which was also tested and supported. The fourth hypothesis 'innovation positively mediates the relationship between organizational capabilities and resilience of construction firms in Ghana', was tested and fully supported. However, the fifth hypothesis 'environmental factors positively moderate the relationship between organizational capabilities and resilience of construction firms in Ghana', was partially supported because the main effect and one of the interactive effects were not supported while two of the interactive effects were supported.

Objective 1 was proven, as the positive relationship was established between organizational capabilities and firms' resilience, implying that if the organizational capabilities increase then the resilience of the firm will also increase. It was therefore argued that for the firms to thrive and boost their resilience, there is a need for them to build their capabilities. Duchek (2020) suggested three main resilience stages anticipation, coping, and adaptation, and provided an overview of fundamental capabilities that collectively form organizational resilience. Almeida et al. (2013) found a statistical significance between management capabilities and financial performance. Olivos (2014) used a literature review approach to develop a process of how individuals can affect the entire organization

Exhibit 9. Summary of hierarchical regression model for the moderation effect of environmental factors on the relationship between organizational capabilities and resilience of construction firms in Ghana.

	Dependent variable: Firm Resilience			
Predictors:	Model 1	Model 2	Model 3	Hypothesis
Control effects:				
(Constant)	4.990 (29.010)***	.648 (2.960)**	.643 (2.930)**	
Firm class	.173 (3.142)***	.074 (2.381)**	.069 (2.213)**	
Firm size	.147 (1.446) *	. −.019 (−.337)	−.010 (−.173)	
Main effects:				
Organizational capabilities (OC)		.419 (9.548)***	.415 (9.397)***	Supported
Environmental turbulence (EFET)		.183 (4.710)***	.192 (4.818)***	
Technological turbulence (EFTT)		.090 (2.389) **	.091 (2.410)**	
Market turbulence (EFMT)		.156 (3.654) **	.151 (3.494)***	
Interactive effect:				
OC_ EFET (H5a)			−.046 (−.852)	Not supported
OC_ EFTT (H5b)			−.023 (−.460)	Not supported
OC_ EFMT (H5c)			.067 (1.183) *	Supported
R-square	.047	.707	.709	
Δ R-square	.047	.660	.002	
Adjusted R-square	.040	.700	.699	
Δ F-statistics	6.399	143.056	.652	
Degree of freedom	258	254	251	

t-values are in the parenthesis; *$p < .05$; **$p < .01$; ***$p < .01$; hypothesized paths are evaluated at *t > 1.1645 (5% sig., 1-tailed test), **t > 1.96 (5% sig., 2-tailed test).

structure through resilience to understand the environment of the organization. The current study has also established that there is a positive significant relationship between organizational capabilities and firms' resilience.

Objective 2 was analyzed and supported, as there was a positive significant relationship found between innovation and organizational capabilities, suggesting that innovation is associated with the organizational capabilities of firms. It was therefore argued that for the firms to flourish in their innovativeness, there is a need for them to strengthen their capabilities. This result is in line with Parida and Örtqvist (2015) who identified strong interactions between network capabilities, and ICT capabilities in the performance innovation of small firms. Yang et al. (2020) found that capabilities positively enhance market learning and weaken the effect of market learning on management innovation. It has been observed in the present study that there is a positive significant relationship between innovation and organizational capabilities. Objective 3 was supported, as a considerable positive significant relationship was established between innovation and firm resilience, meaning that innovation is associated with the resilience of firms. It was, therefore, claimed that for the firms to reinforce their resilience, there is a need for them to improve their innovativeness. Ambulkar et al. (2015) observed that there was a synergy between a firm's resilience and supply chain disturbances when there is low impact disruption. According to Kamalahmadi and Parast (2016), innovation is an important capability that assists organizations to develop resistance to disruptions. The present study has established that there is a positive and significant relationship between innovation and firm resilience.

For objective 4, it was fully proven that the relationship between organizational capabilities and firm resilience was mediated by innovation, positively and significantly. Ambulkar et al. (2015) found that resource configuration wholly mediates the relationship between a firm's resilience and supply chain disturbances in high-impact disruption. Dorson (2015) studied and concluded that for firms to have a sustainable competitive advantage, their internal conditions such as leadership characteristics and innovative culture should be aligned with strategic innovations. The current study has found that innovation positively and significantly mediates the relationship between organizational capabilities and a firm's resilience. In the case of objective 5, it was partially supported as the organizational capabilities positively and significantly predicted firm resilience, and the interaction between organizational capabilities and market turbulence positively and significantly predicted the firm's resilience. While the interactive effect between organizational capabilities and environmental turbulence, and organizational capabilities and technological turbulence did not positively and significantly predict firm resilience. Adnan et al. (2016) examined the moderating role of competitive intensity and found indirect effects of endogenous factors on the relationship between monetary performance and customer parity management. Erdil et al. (2010) found a strong relationship between a firm's performance and organizational capabilities on the main employees' characteristics. The present study has established that environmental factors partially moderate the relationship between organizational capabilities and a firm's resilience. According to Yang et al. (2020), firms need to develop organizational capabilities to effectively recognize, attain and integrate valued knowledge from the external environment.

Conclusion

This study examined the relationship between organizational capabilities and resilience of small and medium size construction firms in Ghana. It emphasized that innovation would mediate the relationship between organizational capabilities and construction firms' resilience, and environmental factors would moderate the relationship between organizational capabilities and construction firms' resilience. It can be inferred from the findings of the study that for the small and medium-sized construction firms to grow and become resilient to various turbulence, there is a need for them to strengthen their capabilities, innovativeness, and environmental factors. This is justified based on the findings that there was a positive significant relationship between organizational capabilities and firm's resilience; a positive significant relationship between organizational capabilities and firm's innovation; a positive significant relationship between innovation and firm's resilience; innovation wholly mediates the relationship between organizational capabilities and firm resilience, and competitive intensity partially moderates the relationship between organizational capabilities and resilience. From the aforementioned, the study generally concludes that there is a positive significant relationship between organizational capabilities and resilience of small and medium-sized construction firms. It further emphasizes that innovation fully mediates the relationship between organizational capabilities and construction firms' resilience, and environmental factors partially moderate the relationship between organizational capabilities and construction firms' resilience. The study recommended that managers of small and medium-sized construction firms should improve their organizational capabilities to strengthen their innovativeness and resilience. Governments should create an enabling business environment that is conducive for small and medium-sized construction firms to thrive to minimize unexpected turbulent situations.

Implications for Engineering Managers

The research contributes to organizational capabilities literature by broadening the existing knowledge on the path from other organizations to the innovative factors of construction firms' resilience. The findings of the study are useful to construction firms' managers to be well-informed about the effect of organizational capabilities and innovative factors on resilience during disturbances, disruptions, or turbulence in their companies, thereby enlightening them to institute effective procedures to improve the resilience of their firms. Contemporary engineering managers who want to succeed should adopt strategic and innovative plans that will make them sustainable in the presence of turbulent conditions.

The outcome of this study suggests that for construction firms to thrive and boost their resilience, there is a need to build their operational, human resource, and ICT capabilities.

Managers of construction firms need to build their capabilities to help improve the construction firm's resilience. Duchek (2020) suggested three main resilience stages as anticipation, coping, and adaptation and provided an overview of fundamental capabilities that collectively form organizational resilience. This makes it imperative for the managers of construction firms to build their capabilities to help their firms to build strong resilience against turbulence. The current study has established that there is a positive significant relationship between organizational capabilities and firms' resilience.

For construction firms to improve their innovativeness, there is a need to strengthen their capabilities. Managers of construction firms need to improve their innovativeness to build strong capabilities. Parida and Örtqvist (2015) identified strong interactions between network capabilities, and ICT capabilities in the performance innovation of small firms. Yang et al. (2020) also found that capabilities positively enhance market learning and weaken the effect of market learning on managers' innovation. It has been observed in the present study that there is a positive significant relationship between innovation and organizational capabilities.

It is also suggested that for construction firms to succeed and improve their innovativeness, there is a need for them to reinforce their resilience. Managers of construction firms should ensure that the firms reinforce their resilience to improve their innovativeness and succeed. Ambulkar et al. (2015) observed that there was a synergy between a firm's resilience and supply chain disturbances when there is low-impact disruption. According to Kamalahmadi and Parast (2016), innovation is an important capability that assists organizations to develop resistance to disruptions. The present study has established that there is a positive and significant relationship between innovation and firm resilience.

Furthermore, it was established that innovation generally mediates the relationship between organizational capabilities and firm resilience. Managers of construction firms should be aware that innovativeness influences the firm's capabilities and resilience, therefore, there is a need for managers to become innovative. Dorson (2015) studied and concluded that for firms to have a sustainable competitive advantage, their internal conditions such as leadership characteristics and innovative culture should be aligned with strategic innovations. The current study has found that innovation positively and significantly mediates the relationship between organizational capabilities and firm resilience.

In addition, it was found that environmental factors partially moderate the relationship between organizational capabilities and a firm's resilience. Managers of construction firms should understand that a firm's capabilities and resilience partly influence the firm's environmental factors. Adnan et al. (2016) examined the moderating role of competitive intensity and found indirect effects of endogenous factors on the relationship between monetary performance and customer parity management. Erdil et al. (2010) found a strong relationship between a firm's performance and organizational capabilities on the main employees' characteristics. According to Yang et al. (2020), firms need to developing organizational capabilities to effectively recognize, attain and integrate valued knowledge from the external environment. Construction managers, therefore, need to be aware of these outcomes of the study to improve their capabilities, innovativeness, and resilience to ensure the success of their firms.

Limitations and Recommendations for Further Research

The report of this study had some limitations. The first limitation is about the sample frame used, which was limited to small and medium-sized building construction firms in Ghana. This limits the generalization of the research findings to the large construction firms in Ghana and other developing countries. Future empirical research across the large construction firms in Ghana and other developing countries would help enrich scholarly understanding in this field and mostly contribute to the knowledge of the generality of the findings. Secondly, the research concentrated on only one mediator and three moderating factors. There is a need for further research work to identify and explore additional contingencies and intervening factors, such as competitive intensity, firm structure, and firm creativity. This would help to provide a comprehensive and broader explanation of organizational capabilities in relation to firm's resilience.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Humphrey Danso is a Professor of Sustainable Construction at the Akenten Appiah-Menka University of Skill Training and Entrepreneurial Development (AAMUSTED), Kumasi, Ghana. His specializations are in Sustainable Construction Materials, Construction Management, and Competency-Based Training. Danso is a member of Institution of Engineering and Technology Ghana (IET-GH), International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM), Ghana Institute of Construction (GIOC), International Building Performance Simulation Association (IBPSA-England), and International Association of Engineers (IAENG).

Samuel Yaw Akomea is a Senior Lecturer at the Department of Marketing and Corporate Strategy of the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. Dr. Akomea lectures in Marketing and International Business. He holds an MPhil in Marketing and a PhD in International Business. Dr. Akomea is the Manager of Kumasi Business Incubator, KNUST. He is also a lawyer by profession, and a member of Academy of International Business.

Ahmed Agyapong is an Associate Professor of Strategic Management at the Kwame Nkrumah University of Science and Technology (KNUST). Ahmed serves as a reviewer for several journals and is currently an Associate Editor for Journal of Africa Business. His research interests focus on entrepreneurship and family businesses, strategic management, and Supply Chain Sustainability. He is a member of African Academy of Management (AFAM), Academy of International Business (AIB) and Academy of Management (AOM).

ORCID

Humphrey Danso PhD http://orcid.org/0000-0003-1913-6429

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