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Process and Supplier Capability, Collaboration in New Product Development and Competitive Advantage: The Moderating Effect of Research and Development Capability

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Abstract
The purpose of the study was to examine the influence of process and supplier capabilities on collaboration in new product development and competitive advantage and the extent to which research and development capabilities moderates. An explanatory research design was used and the study relied solely on the quantitative method. A primary source of data was used. Convenience and purposive sampling techniques were used to select the respondents for the study. The total sample size of the study was two hundred and fifty (250). The findings of the study indicate that Process capabilities have a positive and significant influence on collaboration in new product development. Supplier capabilities have a positive and insignificant influence on collaboration in new product development. Collaboration in new product development has a positive and significant influence on competitive advantage. Research and development capability positively and significantly moderates collaboration in new product development and competitive advantage. The research is embarked upon to provide insight on the influences of process and supplier capabilities, collaboration in new product development and competitive advantage and the moderating effect of research and development capabilities of the firms on the output of SMEs within the context of Ghana.

Keywords: *Process and Supplier Capability, Collaboration in New Product Development, Competitive Advantage, Research and Development Capability*

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1.0 INTRODUCTION

The global economy has shifted as a result of technical, regulatory, and economic considerations which stem from industrial revelations. Systems have often struggled to adequately deal with such rapid changes, especially when it comes to dealing with rapid growth and the need to transfer (Jensen, 1993). Over the next few years, these trends will exert considerable pressure on the global economy, posing a serious challenge for unprepared systems. The only way to deal with the current challenges and prepare for the upcoming industrial revolutions is to invest in research and development (R&D). Yet, there is certainly less priority on implementing R&D as a significant tool within developing economics (Wang et al., 2013). Large firms especially the

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automotive industries are now enjoying growth due to the investment in R&D as a capability to come out with new ideas and also collaborating with other actors along the supply chain to product new product.

In order to acquire access to a supplier's technology, companies partner with them on new product development (NPD). It is critical for many companies, particularly major system integrators who use many technologies, to incorporate new technology into their products with the help of involving suppliers at the early stage of the product development (Brusoni et al., 2001; Takeishi, 2021). Most companies in the developed countries especially the automotive industry is an example of an industry that has worked with major suppliers on product development for many years (Womack et al., 2017; Lamming 2013; Liker et al., 2016). The development of the air conditioning system is one example of supplier engagement that has been researched in the car industry (Zirpoli and Camuffo, 2019). The automobile industry has been able to make better use of their suppliers' knowledge and expertise by incorporating them in product development.

Technical knowledge as a result, reduced costs, higher quality, and faster innovation are now possible (Wasti and Liker, 1999; Ro et al., 2018). Other industries benefit from involving suppliers in NPD since it is critical to get new competitive products to market quickly, as development durations are said to be shortening (Eisenhardt and Tabrizi, 2015). Supplier involvement in New Product Development will grow in industries including Small and Medium-sized Enterprises, other than the automobile industry, according to Wagner and Hoegl (2006). The authors give numerous explanations for the increased involvement of suppliers in New Product Development. First, a reduction in the firm's Research and Development resources; second, a desire to obtain supplier knowledge; and third, a goal to achieve a faster time to market and lower New Product Development costs. However, numerous companies within the developing countries are still confronting various technological obstacles due to decelerating advancements towards their ideas creation. (Mazurkiewicz, Poteralska, 2017)

Furthermore, new product development is one of the most important components for each country's progress and competitive advantage. Changes in production technology and service organization are affecting businesses all around the world. Because the product life cycle has never been shorter than it is now, one of the most critical business jobs is new product development. It is impossible for small and medium scale Enterprises (SMEs) or other larger firms to stay on the market using solely traditional ways of enhancing competitiveness, such as cost reduction. Only a consistent approach and the development of fresh ideas can assist a firm in operating successfully. New product or service creation is critical for economic growth and welfare development in every economy.

For many SMEs (small and medium-sized enterprises) and their clients, developing supplier capacity has become increasingly vital. Large firms are increasingly using external specialists and outsourcing different portions of their manufacturing and support services to contract manufacturers as a backdrop to this change (Henrekson and Stenkula, 2006; Huin et al., 2002; Kim et al., 2017). Parallel to this, many customers seek a small number of system suppliers or partners who can play a larger and more complex role in the supply chain, as well as complement and support the customer's manufacturing and product development processes (Gadde and Snehota, 2000; Handfield et al., 1999; Helander and Möller, 2008; Maloni and Benton, 1997; According to the resource-based view (RBV), when a firm lacks the resources or capabilities needed to maintain a competitive advantage, those resources or capabilities can be obtained through interfirm collaboration or strategic alliances (Eisenhardt and Schoonhoven, 1996; Erramilli and Rao, 1990; Gulati et al., 2020) that impact a firm's performance and competitive advantage (Chen and Paulraj, 2004; Dyer and Singh, 2018). Toyota, for example, makes use of

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suppliers' resources by establishing a comprehensive knowledge-sharing network (Dyer and Nobeoka, 2020). Coca-Cola also has a partnership with Nestle, which has aided in the development of Nescafe vending machines (Hamel and Prahalad, 2014). Collaboration between small and medium-sized businesses and their suppliers also benefits their competitive edge (Takeishi, 2011) particularly in the new product development process (e.g., Clark and Fujimoto, 1991).

Many businesses must engage with their suppliers to achieve technical innovation as market rivalry intensifies. Using supplier experience and component and part information can help companies build a broad knowledge-sharing network, improve product design (Hong et al., 2004; Oh and Kim, 2015), or develop innovative ways for generating higher-quality products (Hong et al., 2014). (Tsai, 2019). Involvement of suppliers may also help organizations quickly discover potential technological issues that impede design revisions or enable concurrent engineering (Hilletofth and Eriksson, 2011). Firms can also benchmark best practices/processes with suppliers, improving their capacity to respond to consumer demands and wishes (Stank et al., 2001). Overall, including suppliers can help speed up the creation of new products and save costs. Competitive advantage (Langerak and Hutlink, 2008; Lau, 2011; Oh and Rhea, 2010).

When division of resources is combined with the concept of productive capabilities, then production and research and development capabilities emerge as the two fundamental productive capabilities in the automotive parts industry (Jacobides and Winter, 2015). Process capability is related to competitive priorities in operations strategy (Boyer, 2018; Noble, 2017) therefore this necessitated the need to examine the influence of process capabilities and collaboration in new product. Chen and Chen (2013) investigated supply flexibility and responsiveness and also the effect of supplier collaboration on buyer responsiveness. The results reveal that production flexibility, supplier responsiveness, production modularity and supplier collaboration have a positive and meaningful impact on the buyer responsiveness. This calls for the need to examine the influence of supplier capability and collaboration in new product development in SME's.

In several studies, knowledge is witnessed as one of the foundations of long-term competitive edge and is also a basic source of new product development (NDP) performance (Kafetzopoulos et al., 2019). Naudé et al., (2018) investigated how collaborative innovation networks affect new product performance: Product innovation capability, process innovation capability, and absorptive capacity. They found out that the effects of collaborative innovation networks on either product or process innovation capability is significant only in the presence of absorptive capacity and finally proposed that in the case of process innovation capability, collaboration with research organizations and suppliers is the most important factors. The suggestions called for the need to assess the influence of process and supplier capabilities on collaboration in new product development.

In addition, a study by Kim et al. (2017) investigated the relationship between research and development capability on process capability and the findings indicate that there is no significant positive relationship. Korean Innovation Survey (2010) investigated the relationship between new product development and research and development capability. The study concluded that there is positive relationship between research and development capability and new product development. Therefore, it became necessary to examine the moderating effect of research and development capability on the relationship between collaboration in new product development on process capability.

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Furthermore, in a paper named the impart of collaboration network on new product development, Chen (2019), the researchers agreed that collaboration networks can be an important implement in a firm's innovation process, and competitive advantage but there is limited empirical evidence on collaboration in new product development and competitive advantage. Buganza et al. (2017) also investigated on small and medium enterprises' collaborations with universities for new product development and service performance and established that collaborations with universities for new product development helped to achieve better service performance therefore a future study can consider collaboration in new product development and competitive advantage. Therefore, this study seeks to address the gaps by analyzing the influence of collaboration in new product development and competitive advantage.

2.0 MATERIALS AND METHODS

Capabilities are a critical success factor for the collaboration strategy as they represent both the value the firm can contribute to the collaborative relationships and the cost to manage them. Firm capabilities are organizational processes that integrate, build, and reconfigure the resource base to match changes in the marketplace, enable organizational learning, and help shape the environment to the firm's advantage (Eisenhardt and Martin, 2010). Static resources are transformed into capabilities to create a competitive advantage and realize superior financial performance. The existing capabilities of the firm are the basis on which the firm develops and strengthens its competencies through continuous, collaborative learning. The capabilities of the firm are its chief component for competitive advantage (Ketchen, and Wright, 2011).

A Firm's capability enables it to distinguish between transactional and collaborative relationships and manage them accordingly with differential governance mechanisms, thus safeguarding against potential opportunism and other risks (Faems et al., 2018). The more a firm can integrate with its diligent supply chain partners, and also protect its investment including its intellectual property, the more willing and motivated it is to partner with others, and the more it can profit from the integration (Faems et al,. 2015). Also, the capability of the firm helps to collect and transfer codified information and sharing of tacit knowledge embedded within organizations through building relational governance and informal communication channels. Thus, a firm capability is a fundamental element for the success and improvement of any form of Supplier Capabilities in the business environment (Faems et al., 2018).

2.2 Process Capability.

Capabilities for managing business processes have been studied from different angles, albeit mainly without measurement instruments. For instance, much of the literature considers the process lifecycle. While lifecycle variants exist (Weske, 2010; Dumas et al., 2018), they are initially derived from Deming's "plan-do-check/study-act" cycle (Deming, 2014). Since the PDCA acronym is also established in other management domains (e.g. change management and quality management), thesefour phases are generic for widespread acceptance and still able to categorize specific BPM methods and techniques such as modeling notations in the "plan" phase or Lean Six Sigma initiatives within the "act" phase (von Rosing et al., 2015). While some process lifecycles include managerial aspects (Weske, 2010), other studies clarify this holistic view in more detail. Such studies supplement the process lifecycle with process management and organizational characteristics, such as a process-oriented culture and structure but, again, generally without measurement instruments (Danilova, 2018; Kratzer et al., 2018; Trkman, 2010; vom Brocke et al., 2014).

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The capabilities for managing business processes have been used to propose MMs with measurement instruments. However, each MM uses its own set of capabilities and measurements (Röglinger et al., 2012). For instance, the model of de Bruin and Rosemann (2017) covers six capability areas, whereas the model of McCormack and Johnson (2011) is limited to three areas. Hammer (2017) takes another approach by measuring capability areas for both individual processes and the entire process portfolio.

2.3 Supplier Capabilities

When it comes to new product development, the value of supplier competencies has received less emphasis. Supplier capabilities are defined in this article as the ways in which suppliers interact with a buyer's operations by providing extensive input on the procurement of a product or service. Elements such as the functionality of the offered product/service, the characteristics of the service delivery process, and the fluency of the buyer-supplier engagement must all be considered in order to reap the benefits of supplier capabilities (Blut et al., 2015; Lee and Lin, 2005; Saunila et al., 2017) As a result, while the product and its technical basis are value enablers, the client base should be considered a development priority as well (Oliveira and Roth, 2012a). This entails looking at the service process in terms of information sharing, promise fulfillment, and empathy (Saunila et al., 2017; Haque and Islam, 2018), as well as relationships in terms of trust development (Saunila et al., 2017; Haque and Islam, 2018). (Corsten and Felde, 2005; Mitrega et al., 2017).

Understanding the buyer and their needs is a fundamental aspect of organizational marketing (Plank and Dempsey, 1980), and maintaining critical supply relationships necessitates organizational learning centered on what consumers want and value (Day, 2000; Ulaga and Chacour, 2001). To develop customer value, a set of supplier skills based on customer needs is required (Moller and to rro nen, 2003; Harmsen and Jensen, 2004; Roos and Roos, 1997). Customers regard capabilities as bundles of skills, information, and resources possessed by suppliers that are valuable to them and difficult to copy by competitors (Harmsen and Jensen, 2004; Ulaga and Chacour, 2001; Day, 2014). Capabilities, in turn, are seen as a fundamental determinant of organizational performance (Teece et al., 2017), and the organization frequently 'buys' these talents. (Vargo and Lusch, 2004; Croom, 2012). Therefore, supplier capabilities are important but before that the firm should also assess its capabilities in other to match their responsibilities.

2.4 Theoretical Background

According to Blome et al. (2013), theoretical review is the examination of individual ideas or sets of theories addressing parts of human endeavour that may be useful in the explanation of events. It is an examination of hypotheses that support a research's conclusions. The theoretical framework is made up of theoretical principles, constructs, concepts, and tenants (Grant & Osanloo, 2014). The study's argument was built on the foundation of two ideas. The Resources Based View Theory (RBV) and Dynamic Capability Theory.

2.4.1 Resource Based View

RBV posits that firms are a collection of resources, within which some of them can be considered to be strategic (Wernerfelt, 1984). Thus, firms that want to achieve a competitive advantage must combine resources in a unique and different way from other firms that might not be able to do it (Dyer and Singh, 1998). At the same time, a firm need to be concerned with the heterogeneous distribution of resources across firms involved in the integration processes (Barney, 1991).

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Therefore, the incentives for integration are laid on the acquisition of scarce and specific resources to protect and maintain the competitive advantage. In this way, the establishment of integrative links lead firms to leverage, as much as possible, the resources and knowledge of their suppliers and customers (Fawcett and Magnan, 2002) and, especially, to maintain this over time. This would allow them to maintain efficiency and be responsive to dynamic market needs. The focused of RBV on the resources or capabilities of the firm's critical resources may reach beyond firm boundaries (Dyer and Singh, 1998). Within this, elements such as trust, frequency of interaction or commitment are characteristics that help to understand these relationships. Through this, firms are able to maintain viable relationship, attain performances jointly which are above the average and of which could not be achieved in isolation but made possible through the combined contributions of integrated partners (Dyer and Singh, 1998; Lavie, 2006).

Also, as Supplier capabilities on new product development offers barriers to imitation, mainly derived from inimitable specialized assets from the suppliers and other firms, skills and information, it may help to attain a sustainable competitive advantage. Therefore, the ability of firms to create interactive rents by using collaboration and complementary resources is tied to elements such as prior integration experience, investment in their internal capability to the search for partners, and the ability to occupy information-rich positions within networks (Ritala and Ellonen, 2010).

2.4.2 Dynamic Capabilities Theory

The dynamic capabilities theory proposed by Teece and Pisano, (1994) is the extension from the company's resource-based point of view (RBV) (Barney, 1986, 1991). Based on the RBV, companies in the similar industry behave differently because they have different resources and skills (Barney, 1986, 1991; Peretaf, 1993), the RBV being viewed as static and not sufficient to give the company a competitive advantage explain in the changing market environment (Priem & Butler, 2001) Additionally, the company's resource-based view looks at the company's unique, rare, and imitable resources that have created competitive advantage and business growth (Barney, 1986).

However, the process of maintaining competitive advantage is limitless and the process is dynamic (Hung, Yang, Lien, McLean & Kuo, 2010), so scientists have suggested that in order to stay competitive in the market, the company should develop specific skills and continuous learning must (Argyris & Schon, 1978; Hammer, 2001; Jashapara, 1993; Senge, 1990; Zott, 2003), which applies from the perspective of dynamic capabilities in particular in a new or changing market environment (Wilden, Gudergan, Nielsen & Lings, 2013). The lack of dynamic skills will make it impossible for the company to maintain its competitive advantage, especially in a changing environment (Gnizy, Baker & Grinstein, 2014).

The application of dynamic capabilities in past literature has shown increasing interest among scholars since the inception of the international literature on ambidexterity (Hsu, Lien & Chen, 2013; Luo, 2002; Luo & Rui, 2009; Prange & Verdier, 2011) Explain ambidexterity as a company's ability to respond to environmental complexity and international experience in doing international business (Hsu et al., 2013)

According to dynamic capabilities theory, markets are more dynamic and companies differ in the skills they acquire and use different resources. these discrepancies explain the differences in performance between firms over time (Wang & Kim, 2017) Teece et al. (1997) describes dynamic

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skills as higher-order skills for selecting, developing and coordinating common skills, i.e., to capture, grasp and transform. These skills also enable companies to transform information based on their needs. It also encourages learning and experimentation, combines resources for the creation of a new product, and transforms existing systems (Jiang et al., 2016). A company with dynamic capabilities can integrate and redeploy knowledge sources to achieve higher performance. Previous studies have accepted that dynamic capability theory can lead organizations to perform (Khan et al., 2021)

2.5 Empirical Review

According to Blome et al. (2013). Empirical research is defined as any study in which the study's results are obtained solely from concretely empirical evidence, and hence verifiable evidence.
Squire et al. (2009) researched on the effect of supplier manufacturing capabilities on buyer responsiveness. This study examines the relationships between supplier capabilities, supply chain collaboration and buyer responsiveness using Extended Resource-based View (ERBV) theory. The sample used was drawn from UK manufacturing firms across eight Industry sectors. Data are analysed using a three-step hierarchical regression model to investigate main, interaction and quadratic effects. The results indicate that suppliers' capabilities (flexibility, responsiveness and modularity) directly impact buyer responsiveness but that the level of buyer-supplier collaboration moderates this relationship. Furthermore, the results show a curvilinear relationship directly between collaboration and buyer responsiveness, whereby there is an optimal point beyond which returns on the relationship decline

Also, Javanmard, (2011) conducted research on the role of supplier capabilities in buyer responsiveness which aimed at exploring the role of supplier capabilities and their collaboration in buyer responsiveness. Resource-based View (RBV) theory was used. The research sample was studied during the period of four month in production workshops located in Lauriston and Hamedan Provinces in Iran. In order to relate supply flexibility and responsiveness and also to model the effect of supplier collaboration on buyer responsiveness. The results reveal that production flexibility, supplier responsiveness, production modularity and supplier collaboration have a positive and meaningful impact on the buyer responsiveness

In addition, imparts of innovation type SME's R&D capability on patent and new product development, a study by Kim et al. (2017) aimed to verify the effectiveness and efficiency of corporate technology innovation activities used RBV theory. This study empirically analyzes the effects of research and development (R&D) capability on patent and new product development achievements on innovation-type small- and medium-sized enterprises (SMEs) by using the "Report on Korean Innovation Survey 2010: Manufacturing Sector" data released by the Science and Technology Policy Institute.

The results of the study indicate that staffing of the concentration of R&D human resource team and efforts toward open innovation are essential factors for the creation of corporate performance. The number of persons of the concentration R&D team in particular makes up essential resources for patent acquisition and new product development. In addition, in case of an SME's with relatively poor resources, it is necessary to acquire resources, both material and immaterial, learn from the external R&D activities and internalize those into key corporate capabilities rather than step up the R&D activities on their own.

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Another study by Parker (2000) on interfirm collaboration and the new product development process investigated the issue of collaboration in new product development within the context of the South African textile and clothing industry using RBV theory. Data was extracted from a questionnaire sent to the 200 companies which were selected randomly from the South African Textile and Clothing Federation directories. Each selected company was contacted to ascertain the name of the person who had the greatest responsibility for new product development in the company, and the questionnaire was sent directly to that person. The finding strongly suggests that textile and clothing manufacturers believe that involvement of their customers and/or suppliers in the development of new products is highly beneficial in helping them gain a deeper understanding of customers' needs, and exploit opportunities.

Furthermore, in a paper named the impart of collaboration network on new product development, Chen (2019), researchers agreed that collaboration networks can be an important implement in a firm's innovation process, but there is limited empirical evidence on actually how they facilitate the new product development (NPD). The paper aims to discuss these issues organisational theory using longitudinal and multisource data on a sample of firms engaged in the Chinese automobile industry, the authors examine the structural properties of collaboration networks and their possible influences on firms' NPD performance. The results indicate that the structural features of the technology-based collaboration networks in the automobile industry have a low degree of collaborative integration and they influence firms' NPD performance in diverse ways. The authors find that the direct ties, indirect ties and structural holes of the collaboration networks are all positively associated with firms' number of new products. However, the authors have not found the evidence that the number of direct ties can moderate the relationship between the indirect ties and the NPD performance.

Buganza et al., (2007) also investigated on small and medium enterprises' collaborations with universities for new product development. This study explores the impact of multiple firm-level capabilities and those interactions on firm growth under different market conditions, using panel data from 612 U.S. public firms across 16 years in 60 industries. This study utilized Structural Equation model Secondary data. This paper combines a qualitative methodology (five SME case studies) with a quantitative one (a survey of 28 SMEs). The quantitative data are used to support the preliminary results obtained through the qualitative analysis. SMEs engage in collaborations with universities following a progressive model; from the easiest collaborations during the testing phase to more complex collaborations during the research Phase. In this way, SMEs establish a trust-based relationship with universities. Furthermore, technology management capabilities and project management capabilities are crucial prerequisites for managing complex forms of collaboration with universities.

Similarly, Tsai et al., (2011) researched on supplier collaboration and new product performance: a contingency model. The purpose of this paper is to present a contingency model to examine how technological capacity, promotion capacity, and technological substitution affect the supplier collaboration-new product performance relationship. Using RBV theory, this study uses data from a government survey of technological innovation. A total of 201 machinery/electronics equipment manufacturing firms in Taiwan comprise the sample. A Tobit regression analysis is adopted to analyze the data. It is found that technological capacity and promotion capacity enhance the effect of supplier collaboration on new product performance. Technological substitution mitigates the relationship between supplier collaboration and new product performance.

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2.6 Conceptual Framework

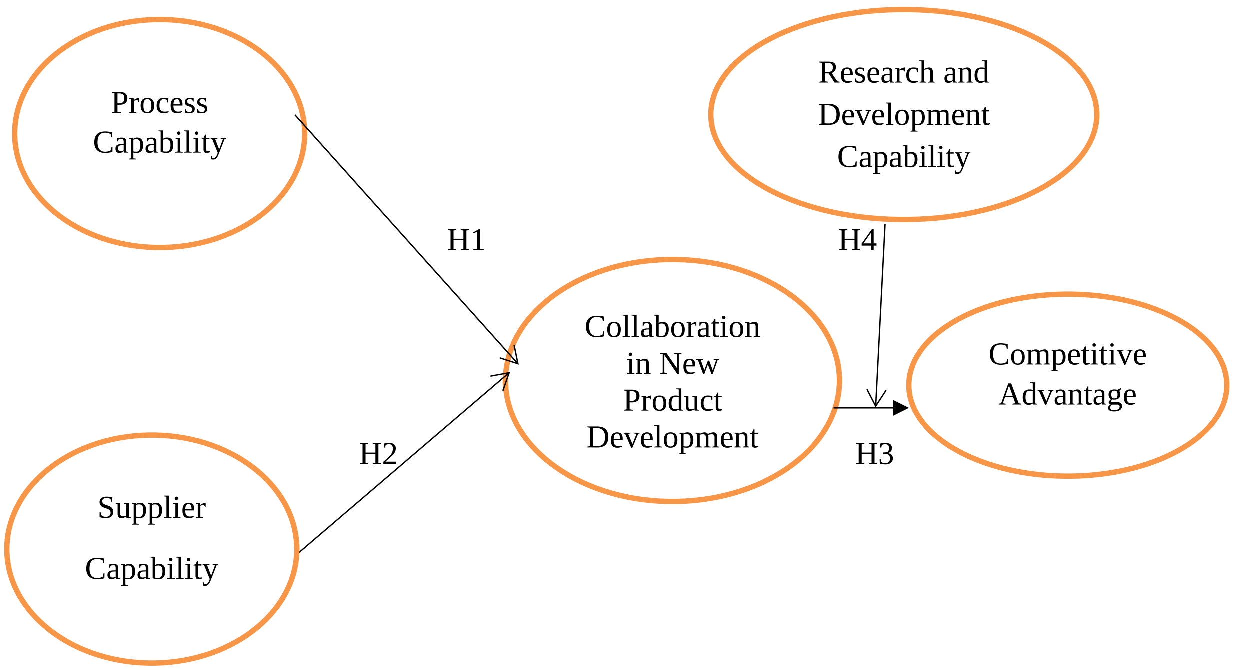

Figure 2.1 Conceptual Framework

2.6.1 The Relationship between Process Capability and Collaboration in New Product Development.
Simplest way to define process capabilities is by describing it as the function that makes the process. It includes complex processes, principles, techniques and tasks (Jobber and Lancaster, 2009). Montgomery (2005) defines Process capability as the ability of a process to produce products or services that meet the specified requirements. Many industries now use process capability to assess the ability of a process to meet customer requirements. Collaboration in new product development is a capability which generate the market success (Tatikonda and Montoya-Weiss, 2001) and NPD is as good as the NPD process is (Harmancioglu et al., 2007). NPD process aims to refine product ideas up to the product launch, including product design and operations planning (Harmancioglu et al., 2007). NPD process has several definitions, but one of the well-known is the stage-gate system. The result of process capabilities and collaboration in new product development could be used for new design applications, inspection planning and evaluation techniques Chen (2008). As a result, *it is hypothesized that*

H1: Process capability has a significant and positive influence on New Product Development

2.6.2 Influences of Supplier Capabilities on the Collaboration in new Product Development.
In order to develop a lasting competitive advantage, a firm may require the capabilities of other firms (Doz and Hamel, 1998), therefore obtaining those complementary capabilities will allow a firm to grow steadily by overcoming its resource-based limits (Hamel, 1991). As a result, other firms' complementary resources can be a source of relational rent (Dyer and Singh, 1998). For example, the quality of a product is influenced by the component parts it receives from suppliers, and the quality of the component parts is influenced by the suppliers' production and R&D skills.

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As a result, the capabilities of suppliers have an impact on the quality level of a new product and, as a result, the competitive advantage of a SMEs in Ghana. In this aspect, Dyer's (2000) claim is important: the assets allocated to a company by suppliers have a direct impact on the company's competitive edge. The growing transfer of previously conducted work to first-tier suppliers, combined with extended modularization and firm-wide supply-base reduction initiatives, has resulted in a rapid increase in outsourcing to suppliers (Cooper and Slagmulder, 2004; Doran, 2003; Harrison, 2004; Veloso and Fixson, 2001; Zirpoli and Caputo, 2002); Slagmulder, 2004; Doran, 2003; Harrison, 2004; Veloso and Fixson, 2001; Zirpoli and Caputo, 2002). As a result, supplier capabilities will continue to have an impact on firms' collaboration in new product development. As a result, the following possibilities are put forth:

H2 supplier capacity has a positive influence on a company's collaboration in new product development.

2.6.3 Influence of Collaboration in New Product Development on Competitive Advantage.

A company lacking the capabilities needed to establish competitive advantage will foster inter-organizational relationships in order to obtain such capabilities from another enterprise (Erramilli and Rao, 1990; Ingham and Thompson, 1994). Collaborative product development, according to Del Rosario et al. (2003), is the application of team collaboration strategies to an organization's product development initiatives. In addition, in a customer-focused environment, collaborative product creation includes concurrency, attention to the life cycle, suppliers, and information technology. Competitive advantage as the ability to stay ahead of present or potential competition, thus superior performance reached through competitive advantage will ensure market leadership.

Barney (1991) emphasized the ability of firms to establish entry obstruction in order to prevent imitation from its competitors and take advantage of their resource for the purpose of sustaining the international competitive advantage. Traditional sources of competitive advantage such as financial and natural resources, technology and economies of scale can be used to create value. However, the resource-based argument is that these sources are increasingly accessible and easy to imitate. Thus, they are less significant for competitive advantage especially in comparison to a complex social structure such as an employment system. If that is so, collaboration in new product development may be an especially important source of sustained competitive advantage (Jackson and Schuler, 1995). As a result, *it is hypothesized that*

H3: Collaboration in New Product Development positively relate with competitive advantage.

2.6.4 The moderating effect of research and development capabilities on the relationship between collaboration in new product development and competitive advantage

Albeit the available literature, available data on the moderation role of Research and Development Capabilities on CNPD and CA fall short. The role of research and development capabilities on collaboration in new product development cannot be left out in efficiency discussions. Research and Development Capabilities bring improvement and change within an organizational product development and also affects competitive advantage. The study revealed that R&D capabilities of an organization brings the improvement and change within the organization Korean innovation survey, (2010). Therefore, to achieve competitive advantage, research and development is important. The majority of developing economies spend less than 0.5% of their GDP on R&D (World Economic Forum: 2017). A study by Korean innovation survey

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(2010) found that there is a significant relationship between research and development and collaboration in new product development. The presence of R&D capabilities in enabling organizations to reach market faster such as collaboration in new product development is seen as effective. The study revealed the fact that the R&D capabilities as an asset which can bring improvement and change within the organization. As a result, the productivity and the competitive advantage of the organization is increased.

Research and development (R&D) can have a significant influence on the relationship between collaboration in new product development and competitive advantage (Oh and Rhee, 2010). Collaboration in R&D can lead to the sharing of knowledge and resources, which can speed up the development process and increase the chances of creating a successful new product. This can give a company a competitive advantage over rivals who are working independently. Additionally, Hatzichronoglou (2005) collaborating with external partners, such as suppliers or customers, can provide access to new technologies or markets, further enhancing a company's competitive position. In line with the above, this study sees R&D capabilities as a necessary condition or requirement to strengthen the effect of collaboration in new product development and competitive advantage, such that the more the firms' R&D capabilities supports the implementation of CNPD, the more they reap the full benefit. Thus, the study proposes this hypothesis:

H4: research and development positively and significantly moderate the relationship between collaboration in new product development capabilities and firms' competitive advantage

3.0 METHODOLOGY

3.1 Research Design

Research design is the general method for addressing research questions. Research design. It is a key scheme in which a researcher tries to address questions about thesis. Research design is a technique, structure and methodology for sample evaluation to achieve research findings. The research design helps the researchers to assess whether the analysis is a quantitative, qualitative, inductive or deductive approach to achieve the desired results by evaluating the methods used in the study. This simplifies the different analysis methods, making the study as effective as possible so that more knowledge can be generated with less effort, time and resources. The research design has a major impact on the accuracy of the findings obtained as it forms the basis for a strategy to reliably determine the causes and effects of the variables under analysis (Saunders et al., 2009; Ogula, 2005).

This study used exploratory design because according to Saunders et al. (2007), explanatory research aims to explain why relationships occur, identifying the cause-and-effect link between independent and dependent variables. In this study, the explanatory design is suitable as it explores how specific capabilities (e.g., process, supplier, and R&D) directly influence competitive advantage through NPD collaboration. The research also investigates whether R&D capability strengthens or weakens these relationships, further emphasizing the cause-and-effect dynamic. This research design is appropriate because it goes beyond merely describing the relationships (as in descriptive research) and instead delves into understanding the underlying mechanisms that connect these variables (Cooper & Schindler, 2014). The study's goal of understanding the moderating role of R&D capability aligns with explanatory research's focus on uncovering how different factors interact to produce specific outcomes, making it the best choice for achieving the study's objectives.

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3.1 Research Approach

According to Saunders et al. (2016), quantitative research is suited for studies aiming to establish relationships between variables using statistical techniques. In this case, the study aims to quantify the influence of independent variables (process and supplier capability, and collaboration in NPD) on the dependent variable (competitive advantage), while also examining how the moderating variable (R&D capability) affects these relationships. This approach facilitates hypothesis testing and provides generalizable insights (Creswell, 2014).

Moreover, quantitative research offers a structured way to analyze data using methods such as regression analysis, correlation, and structural equation modeling, enabling the researcher to assess the strength and significance of the relationships among the variables (Bryman & Bell, 2015). The use of this approach ensures that the study generates empirical evidence that can be validated through statistical analysis, making it ideal for understanding the causal effects in complex interactions between process capability, supplier capability, and NPD collaboration, all of which are central to achieving competitive advantage.

3.2 Population of the Study

The targeted population of the study comprises small and medium scale Enterprises (SMEs) within the Western Region of Ghana. The study adopted SMEs to assist in their Supplier Capabilities on competitive advantage and how collaboration in new product development has played critical role or otherwise in their operations. In relation to this, the study's population consists of 500 SMEs in the Takoradi Metropolis. Because of the enormous number of SMEs in the Western Region (Takoradi Metropolis) with a high population of employees and base on the nature of the study, data was collected via non-probability sampling. To be called a non-probability sample, a participant must be chosen base on the purpose of the study.

500 SMEs in the Takoradi Metropolis were chosen using a basic random selection method. The employees of these firms were selected for the purpose of analyzing the SMEs' Supplier Capabilities, competitive advantage, as well as collaboration in new product development. The researchers 'aim was to ascertain the employees' interpretation of the relationship with the above-mentioned variables. From the field work undertaken. The employees needed for the study comprise Top management (Chief Executive Officers (CEOs), Managing Directors and Departmental / Unit Heads.

3.3 Sampling Techniques and Sample Size

A sample is identified as a representative of the main targeted population to assist provide the requisite data from the field of study to answer the study questions. Sample size is essential in research study as researchers are not likely to cover the entire population during the research study. The selected size becomes the focus in the provision of the appropriate data on the study represent the target population. The sample size offers the study the ability to assess the ideas and behavior of the research population accurately.

The convenience and purposive sampling techniques were used to select the respondents from the targeted population made up of the top managers of the selected firms. Convenience sampling involves selecting participants who are readily available and willing to participate in the research (Etikan et al., 2016). In this context, convenience sampling is applied to CEOs, top management, and managing directors because they are often the most accessible individuals within organizations and possess significant insights into the organization's processes, supplier

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relationships, and new product development strategies. This method is practical in business research because it allows the researcher to quickly gather data from high-ranking officials without the complexities of more structured sampling techniques.

The use of convenience sampling is justified because these individuals are key decision-makers and have first-hand knowledge of the firm's capabilities and competitive strategies. Given the busy schedules and potential time constraints of such individuals, convenience sampling facilitates timely and efficient data collection. As Saunders et al. (2016) point out, convenience sampling is suitable when the population is difficult to access due to the high-ranking positions of the subjects or when time and resource constraints are present.

Purposive sampling, a non-probability technique, is used when the researcher selects participants based on their knowledge, expertise, and relevance to the study's objectives (Palinkas et al., 2015). In this study, purposive sampling is applied to CEOs, top management, and managing directors because these individuals are uniquely positioned to provide strategic insights into process and supplier capabilities, NPD collaboration, and the competitive advantages gained from these factors. Their specialized knowledge and experience make them ideal participants to assess the influence of R&D capability as a moderating variable.

The justification for using purposive sampling is that the study requires information-rich responses from individuals with specific roles and experience in strategic decision-making, supply chain processes, and new product development. As Palinkas et al. (2015) highlight, purposive sampling is beneficial for studies that require in-depth insights from experts. In this case, only CEOs, top management, and managing directors possess the necessary knowledge to assess the impact of R&D capability on the firm's competitive advantage, making purposive sampling appropriate.

The Yamane (1967) sample size determination formula from population at the confidence level of 95%, where P = 0.05 (e= 5%) was adopted for this study to help easily calculate a representative from the population of the study for the administration data collection instruments. The formula is presented below:

n=N/ 〖1+N (e) 〗^2

Where N= the population size,

N= sample size

e = level of precision or the margin of error

n=500/ 〖1+500(0.05) 〗^2

n= 500/ (1+500) (0.05)2

n= 500/ (1+500) (0.0025) = 250

From the above calculation, the sample size of the study stands at 250. Hence, 250 respondents would be chosen for the data collection exercise.

3.4 Source of Data

Sources of data are the methods through which data is gathered or collected and analysed (Bailey, 2018). Bailey (2018) further argues that, there are two main types of sources of data, namely; primary and secondary sources of data. A primary source or a secondary source might

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be used to gather information for a study (Mesly, 2015). However, this study relied on primary source of data because questionnaires were adopted from an existing literature.

4.0 RESULTS AND DISCUSSIONS

The findings of the study revealed that 119 of the respondents were male representing 47.8% whereas 130 of the respondents were male representing 52.2%. This shows that the study considered gender balanced. The age category, 23 of the respondents were within the 20-25 years of age representing 9.2%, 46 of the respondents were within 26-29 years of age representing 18.5%, 68 of the respondents were within 30-35 years of age representing 27.3%, 58 of the respondents were within 36- 49 years of age representing 23.3%, 44 of the respondents were within 50-55 years of age representing 17.7% and 10 of the respondents were representing 4.0% Years of working in organizations 40 of the respondents representing 16.1% have Less than 5 years working experience in their organizations. 91 of the respondents were of the respondents representing 36.5% have worked for about 5-10 years in their organizations. 39 of the respondents representing 15.7% have worked in their organizations for about 10-15 years and 79 of the respondents representing 31.7% have worked in their organizations for 15 years and above. The Level of education category, 56 of the respondents representing 22.5% were Higher National Diploma and Diploma graduate. 92 of the respondents representing 36.9% were first degree graduate. 70 of the respondents representing 28.1% were second degree-graduate. 31 of the respondents representing 12.4% were doctor of philosophy graduate.

Table 4.1 Respondents Demographics

Profile	Characteristics	Frequency	Percentage
Gender	Male	119	47.8
	Female	130	52.2
	Total	249	100
Age	20-25 years	23	9.2
	26-29 years	46	18.5
	30-35 years	68	27.3
	36- 49 years	58	23.3
	50-55 years	44	17.7
	56 - 60 years	10	4.0
	Total	249	100
Years of working in organizations	Less than 5 years	40	16.1
	5-10 years	91	36.5
	10-15 years	39	15.7
	15 years and above	79	31.7
	Total	249	100
Level of education	HND/Diploma	56	22.5
	Bachelor Degree	92	36.9
	Post-graduate	70	28.1
	PhD	31	12.4
	Total	249	100

4.1 Reliability and Validity Tests

One of the main requirements of any research process is the reliability of the data and findings. In the main, reliability deals with the consistency, dependability and replicability of "the results

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obtained from a piece of research" (Nunan, 1999, p. 14). Obtaining the similar results in quantitative research is rather straightforward because the data are in numerical form. To this end, Lincoln and Guba (1985, p. 288) point out that instead of obtaining the same results, it is better to think about the dependability and consistency of the data. In this case, the purpose is not to attain the same results rather to agree that based on the data collection processes the findings and results are consistent and dependable.

For analysis of the internal reliability of the factors in the questions on supplier capability, collaboration in new product development, competitive advantage, process capability, and research and development capabilities Cronbach's alpha values were tested (Kolbehdori & Sobhiyah, 2014: 347; Wahab, Ayodele & Moody, 2010: 67). Tavakol & Dennick (2011: 54-55) and Yount (2006) suggested that the acceptable values of Cronbach's alpha would range from 0.70 to 0.95. In the current study, a cut-off value of 0.70 was adopted. Furthermore, the optimal inter-item correlations mean (factor loadings) should range from 0.2 to 0.4, in order for the factor to be reliable (Pallant, 2013: 134).

However, in this study, a value of 0.3 and above was adopted. To confirm whether the data from the measurements was sufficient for factor analysis (test the validity), the Kaiser-Meyer-Olkin (KMO) test (Lorenzo-Seva, Timmerman & Kiers, 2011) and the Bartlett's sphericity test (Hair, Black, Babin, Andersen & Taham, 2006: 110) were performed. In the KMO test, as the values of the test vary from 0 to 1, values above 0.7 are recommended as being desirable for applying EFA (Hair et al., 2006) and a statistically significant Bartlett test ($p < 0.05$) indicates that sufficient correlations exist between the variables to continue with the analysis (Hair et al., 2006: 110; Pallant, 2013: 190). For factor extraction, Principal Components Analysis (PCA) was used to summarise most of the information into a minimum number of factors, by concentrating the explanatory power on the first factor (find the principal components of data) (Rossoni et al., 2016: 102).

In PCA, when the number of variables (measures) is between 20 and 50, it is more reliable to use Eigenvalues to extract factors, as it makes interpretation simpler (Johnson & Wichern, 2007). The highest Eigenvalues in the data is, therefore, the principal components in the data, which are retained to form a set of few new variables (less than the original variables started with in the analysis). In the present study, in order to guard against threats to internal reliability, the researcher has used the Cronbach's Alpha and Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity Approx. Chi-Square. The table 4.2 presents the reliability results.

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Table 4.2 Exploratory Factor Analysis for Supplier Capabilities

Kaiser-Meyer-Olkin Measure of Sampling Ade Value =.930		Bartlett's Test of Sphericity sig Value = .000	
Approx. Chi-Square Value = 1643.030		Cronbach's Alpha = .944	
Eigen % of Variance =71.863		Number of items = 8	
Item	Measure	Cronbach level after deletion	Factor loadings
SC1	We have a strong capability to integrate various suppliers into one.	.936	.732
SC2	We have a strong capability to coordinate with key suppliers.	.939	.657
SC3	My firms share resources to help suppliers improve capabilities and innovation	.936	.713
SC4	We have a strong technological capability for utilizing electronic devices.	.938	.682
SC5	It is easy to investigate quality problems in the organization.	.936	.726
SC6	We are involved in the design stage for new product development	.934	.757
SC7	We collaborate in developing new products.	.937	.705
SC8	We have good capability to acquire materials for new products.	.933	.777

The measurement of the supplier capability practice, the result posited that Cronbach's alpha was greater than 0.70 at .944, indicating acceptable internal reliability as recommended by Hair et al. (2006). The Kaiser – Meyer - Olkin (KMO) of .930 with Bartlett's Test of Sphericity of $p<0.000$, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$, as suggested by Pallant (2013:190). These results suggest that factor analysis could be conducted with the data. The eight measures (SC1, SC2, SC3, SC4, SC5, SC6, SC7, and SC8) expected to define the supplier capability practice attained factor loadings of (.732, .657, .713, .682, .726, .757, .705, and .777) as reported in the table 4.2. These were greater than recommended value of 0.40 as suggested by Hair et al. (2006) and Pallant (2013). An Eigenvalue greater than 5.479 was established in this factor; this explained 71.863% of the variance in the data and Approx. Chi-Square Value = 1643.030.

Table 4.2.1 Exploratory Factor Analysis for Collaboration in New Product Development

Kaiser-Meyer-Olkin Measure of Sampling Ade Value =.903		Bartlett's Test of Sphericity sig Value = .000	
Approx. Chi-Square Value = 1508.295		Cronbach's Alpha=.935	
Eigen % of Variance = 69.140		Number of items = 8	
Item	Measure	Cronbach level after deletion	Factor loadings
CNPD1	There is high level of participation of inter-organizational in the process of new product development.	.930	.651

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CNPD2	My organization collaborates with other departments by sharing relevant information in order to meet all needs.	.930	.635
CNPD3	My organization helps suppliers with improving their process to better meet my organization's needs.	.927	.676
CNPD4	By collaborating with suppliers, the speed of ordering system to procure materials have improved significantly.	.927	.694
CNPD5	Through organizational collaboration, there has been continuous improvement in efficient and effective use of resources.	.925	.735
CNPD6	Through collaboration, my organization involves key suppliers in continuous improvement programs thereby enhancing performance.	.925	.727
CNPD7	My organization has the capability to enhance productivity consistently through resources collaboration.	.924	.737
CNPD8	Collaboration among design, development, and marketing and production department is active.	.928	.676

The measurement of the Collaboration in New Product Development practice, the result posited that Cronbach's alpha was greater than 0.70 at .935, indicating acceptable internal reliability as recommended by Hair et al. (2006). The Kaiser – Meyer - Olkin (KMO) of .903 with Bartlett's Test of Sphericity of p<0.000, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of p<0.05, as suggested by Pallant (2013:190). These results suggest that factor analysis could be conducted with the data. The eight measures (CNPD1, CNPD2, CNPD3, CNPD4, CNPD5, CNPD6, CNPD7 and CNPD8) expected to define the Collaboration in New Product Development practice attained factor loadings of (.651,.635, .676,.694, .735,.727, .737 and .676) as reported in the table 4.2. These were greater than recommended value of 0.40 as suggested by Hair et al. (2006) and Pallant (2013). An Eigenvalue greater than 5.531 was established in this factor; this explained 69.140% of the variance in the data and Approx. Chi-Square Value = 1508.295.

Table 4.2.2 Exploratory Factor Analysis for Competitive Advantage

Kaiser-Meyer-Olkin Measure of Sampling Ade Value =.920		Bartlett's Test of Sphericity sig Value = .000	
Approx. Chi-Square Value = 1329.426		Cronbach's Alpha=.935	
Eigen % of Variance = 72.168		Number of items = 7	
Item	Measure	Cronbach level after deletion	Factor loadings
CA1	Our delivery time is fast.	.926	.715
CA2	Our delivery compliance is high.	.927	.697
CA3	We reduce cost through process innovation.	.921	.776
CA4	We are highly capable of responding to pressing orders.	.924	.731
CA5	Our degree of design modification is low.	.926	.708
CA6	Small and Medium Enterprises can increase cost competitiveness with our help	.927	.689

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CA7	Small and Medium Enterprises can increase quality competitiveness of a new product development with our help.	.924	.736

The measurement of the Competitive Advantage practice, the result posited that Cronbach's alpha was greater than 0.70 at .935, indicating acceptable internal reliability as recommended by Hair et al. (2006). The Kaiser – Meyer - Olkin (KMO) of .920 with Bartlett's Test of Sphericity of p<0.000, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of p<0.05, as suggested by Pallant (2013:190). These results suggest that factor analysis could be conducted with the data. The eight measures (CA1, CA2, CA3, CA4, CA5, CA6 andCA7) expected to define the Competitive Advantage practice attained factor loadings of (.715, .697, .776, .731, .708, .689 and .736) as reported in the table 4.2. These were greater than recommended value of 0.40 as suggested by Hair et al. (2006) and Pallant (2013). An Eigenvalue greater than 5.052 was established in this factor; this explained 72.168% of the variance in the data and Approx. Chi-Square Value = 1329.426.

Table 4.2.3 Exploratory Factor Analysis for Process Capabilities

Kaiser-Meyer-Olkin Measure of Sampling Ade Value =.924		Bartlett's Test of Sphericity sig Value = .000	
Approx. Chi-Square Value = 1442.556		Cronbach's Alpha=.934	
Eigen % of Variance = 68.462		Number of items = 8	
Item	Measure	Cronbach level after deletion	Factor loadings
PC1	Production cycle time is short.	.923	.719
PC2	Market cycle time of new product is short.	.924	.697
PC3	Product returning rate is low.	.925	.678
PC4	Inventory expense is low.	.924	.693
PC5	Frequency of re-work resulting is quality failure is low	.925	.673
PC6	My organization aims at eliminating waste	.924	.707
PC7	My organization trains its staff which bring them up to speed	.928	.634
PC8	We conduct quality engineering to cut down cost	.925	.674

The measurement of the Process Capabilities practice, the result posited that Cronbach's alpha was greater than 0.70 at .934, indicating acceptable internal reliability as recommended by Hair et al. (2006). The Kaiser – Meyer - Olkin (KMO) of .924 with Bartlett's Test of Sphericity of p<0.000, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of p<0.05, as suggested by Pallant (2013:190). These results suggest that factor analysis could be conducted with the data. The eight measures (PC1, PC2, PC3, PC4, PC5, PC6, PC7 and PC8) expected to define the Process Capabilities practice attained factor loadings of (.719, .697, .678, .693, .673, .707, .634 and .674) as reported in the table 4.2. These were greater than recommended value of 0.40 as suggested by Hair et al. (2006) and Pallant (2013). An Eigenvalue greater than 5.052 was established in this factor; this explained 72.168% of the variance in the data and Approx. Chi-Square Value = 1442.556.

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Table 4.2.4 Exploratory Factor Analysis for Research and Development (R&D) Capabilities

Kaiser-Meyer-Olkin Measure of Sampling Ade Value =.859		Bartlett's Test of Sphericity sig Value = .000	
Approx. Chi-Square Value = 773.145		Cronbach's Alpha=.939	
Eigen % of Variance = 82.209		Number of items = 5	
Item	Measure	Cronbach level after deletion	Factor loadings
RDC1	Developing new ideas to help new product development.	.924	.834
RDC2	Able to fast track new product development.	.928	.810
RDC3	R&D helps to differentiate products and enjoy cost-wise advantage	.922	.828
RDC4	My organization enables the development of new product and utilizes new process.	.924	.816
RDC5	Research on R&D within our firm examines a range of issues from different theoretical perspectives.	.927	.811

The measurement of the Process Capabilities practice, the result posited that Cronbach's alpha was greater than 0.70 at .939, indicating acceptable internal reliability as recommended by Hair et al. (2006). The Kaiser – Meyer - Olkin (KMO) of .859 with Bartlett's Test of Sphericity of $p<0.000$, indicating consistency with the recommended KMO cut off value of 0.60 and Bartlett's Test of Sphericity of $p<0.05$, as suggested by Pallant (2013:190). These results suggest that factor analysis could be conducted with the data. The eight measures (RDC1, RDC2, RDC3, RDC4 and RDC5) expected to define the Process Capabilities practice attained factor loadings of (.834, .810, .828, .816 and .811) as reported in the table 4.2. These were greater than recommended value of 0.40 as suggested by Hair et al. (2006) and Pallant (2013). An Eigenvalue greater than 3.288 was established in this factor; this explained 82.209% of the variance in the data and Approx. Chi-Square Value = 773.145.

4.2 Confirmatory Factor Analysis for the constructs

Construct validity requires a definition with clearly specified conceptual boundaries (Newman, 2002) and concerned with the underlying attributes rather than with the scores the instrument produces (Salkind, 2000). The validation emphasizes a logical analysis and tests the relationships predicated based on theoretical considerations. Convergent validity is a method to test construct validity. The word of construct shows a theoretical viewpoint to explain some phenomenon (Wiersma, 2000). According to (Van Dalen, 1973) states that construct usually refers to a complex concept which includes several interrelated factors. In this study, convergent validity was assessed by factor loading, Composite Reliability (CR) and Average Variance Extracted (AVE) (Fornell & Larcker, 1981).

Confirmatory Factor Analysis (CFA) is conducted to estimate factor loading of variables. In fact, a factor loading presents the level of a regression path from a latent to its indicators. According to (Hair et al.,2010), an acceptable factor loading value is more than 0.5 and when it is equal to 0.7 and above it is considered good for one indicator therefore items with factor loading more than 0.5 and above are considered for the validity test of this study. The level of CR is another guideline to review convergent validity. Although Cronbach's alpha is a very popular coefficient to test reliability (Bollen & Long, 1993) and (Garson, 2011). According to (Hair et al., 2010), the

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acceptable value of Composite Reliability is 0.7 and above. The table 4.3 presents the Convergent, Discriminant and composite Reliability tests.

Table 4.3 Convergent, Discriminant and Composite Reliability Tests

Construct	AVE	DV	CR
Supplier Capability	0.541	0.735	0.734
Collaboration in New Product Development	0.538	0.734	0.853
Process Capabilities	0.537	0.733	0.776
Competitive Advantage	0.508	0.713	0.774
Research and Development (R&D)	0.672	0.819	0.9111

Haire et al. (2019) recommended that an Average Variance Extracted (AVE) as convergent validity measure since AVE could explain the degree to which items are shared between the construct in Structural Equation Modeling (SEM) where AVE 0.5 or more are acceptable as convergent validity. Supplier Capability with an Average Variance Extracted value of 0.541 is within the threshold of 0.5. Collaboration in New Product Development with an Average Variance Extracted value of is within the recommended threshold 0.538. Process Capabilities with an Average Variance Extracted value of 0.537 is within the recommended threshold Competitive Advantage with an Average Variance Extracted value of 0.508 is within the recommended threshold. Research and Development (R&D) with an Average Variance Extracted value of 0.672 is within the recommended threshold.

Hair et al. (2010), the acceptable value of Composite Reliability is 0.7 and above. Supplier Capability Composite Reliability value of 0.734 is within the recommended the threshold stated by recommended by Hair et al. (2010). Collaboration in New Product Development Capability Composite Reliability value of 0.853 is within the recommended the threshold stated by recommended by Hair et al. (2010). Process Capabilities Capability Composite Reliability value of 0.776 is within the recommended the threshold stated by recommended by Hair et al. (2010). Competitive Advantage Capability Composite Reliability value of 0.774 is within the recommended the threshold stated by recommended by Hair et al. (2010). Research and Development (R&D) Capability Composite Reliability value of 0.9111 is within the threshold recommended by Hair et al. (2010).

Table 4.4 Correlations (among the variables)

			Estimate
CNPD	<-->	PC	.046
CA	<-->	CNPD	.818
SC	<-->	CA	.700
SC	<-->	RDC	.295
PC	<-->	RDC	.808
SC	<-->	PC	.380
SC	<-->	CNPD	.677

Haire et al. (2019) stated that discriminant validity could be established by correlating one construct to another. If the correlation value of both constructs is lower than 0.85, it means that the discriminant validity exists. The correlation table estimate figures are all less than 0.85 to confirm that discriminant validity exists.

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Table 4.5 Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	49	577.779	182	.000	3.175
Saturated model	231	.000	0		
Independence model	21	4939.055	210	.000	23.519

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.324	.841	.798	.663
Saturated model	.000	1.000		
Independence model	.698	.123	.035	.111

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.883	.865	.917	.903	.916
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.867	.765	.794
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	395.779	326.965	472.204
Saturated model	.000	.000	.000
Independence model	4729.055	4503.864	4961.497

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.330	1.596	1.318	1.904
Saturated model	.000	.000	.000	.000
Independence model	19.916	19.069	18.161	20.006

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.094	.085	.102	.000
Independence model	.301	.294	.309	.000

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Model	AIC	BCC	BIC	CAIC
Default model	675.779	685.319	848.134	897.134
Saturated model	462.000	506.973	1274.532	1505.532
Independence model	4981.055	4985.144	5054.922	5075.922

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	2.725	2.447	3.033	2.763
Saturated model	1.863	1.863	1.863	2.044
Independence model	20.085	19.177	21.022	20.101

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	93	99
Independence model	13	14

The model fit was also deemed necessary for further confirmation of the initial validity and reliability tests. The table 4.5 presents the results. The study also considered the model fit summary after the validity and reliability have been well established. The *CFI = .916; TLI = .903; IFI =.917; RFI = .865 and NFI =.883* had values exceeding 0.09 cutoff (Hair et al., 1998). The *RMSEA=.094* was within the acceptable recommended value ranging proposed by (Hair et al., 1998). The results of the alternatives indices provided evidence of the overall validity of the hypothesized model.

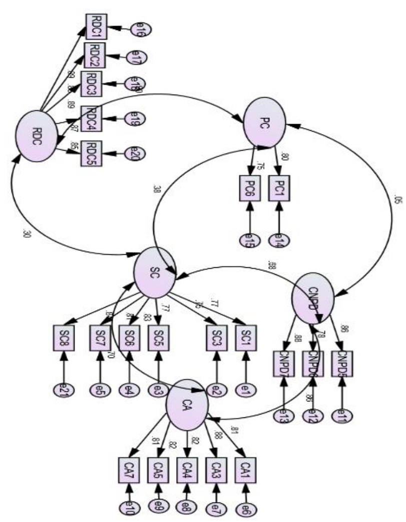

Figure 1 Covariance among the variables
PC= Process Capability, RDC= Research and Development Capability, SC= Supplier Capability, CNPD= Collaboration in New Product Development, CA= Competitive Advantage

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Table 4.6 Covariances

			Estimate	S.E.	C.R.	P	Label
CNPD	<-->	PC	.040	.028	1.415	.157	par_17
CA	<-->	CNPD	.751	.088	8.521	***	par_18
SC	<-->	CA	.571	.075	7.592	***	par_19
SC	<-->	RDC	.250	.048	5.162	***	par_20
PC	<-->	RDC	.847	.097	8.717	***	par_21
SC	<-->	PC	.307	.054	5.699	***	par_22
SC	<-->	CNPD	.527	.070	7.532	***	par_23

The relationship between collaboration in new product development and process capability (Estimate of =.040, S.E. = .028, C.R. 1.415, P< 0.157) indicate a positive but insignificant relationship between collaboration in new product development and process capability. The relationship between collaboration in new product development and competitive advantage, the (Estimate of =.751, S.E. = .088, C.R. 8.521, P< 0.000) indicate a positive relationship and significant between collaboration in new product development and process capability. The relationship between supplier capability and competitive advantage, the (Estimate of =.571, S.E. = .075, C.R. 7.592, P< 0.000) indicate a positive and significant relationship between supplier capability and competitive advantage.

The relationship between supplier capability and research and development and capability, the (Estimate of =.250, S.E. = .048, C.R. 5.162, P< 0.000) indicate a positive and significant relationship between supplier capability and research and development and capability. The relationship between research and development capability and process capability, the (Estimate of =.847, S.E. = .097, C.R. 8.717, P < 0.000) indicate a positive and significant relationship between development capability and process capability. The relationship between supplier capability and process capability, the (Estimate of =.307, S.E. = .054, C.R. 5.699, P < 0.000) indicate a positive and significant relationship between supplier capability and process capability. The relationship between collaboration in new product development and supplier capability, the (Estimate of =.527, S.E. = .070, C.R. 7.532, P<0.000) indicate a positive and significant relationship between collaboration in new product development and supplier capability.

4.3 Hypothetical model for the study

The hypothetical model of the study was tested by using AMOS, version 26. The structural equation model was used to test the direct influence of the independent variables on the dependent variables as well as the moderating effect. The figure 4.2 presents the results.

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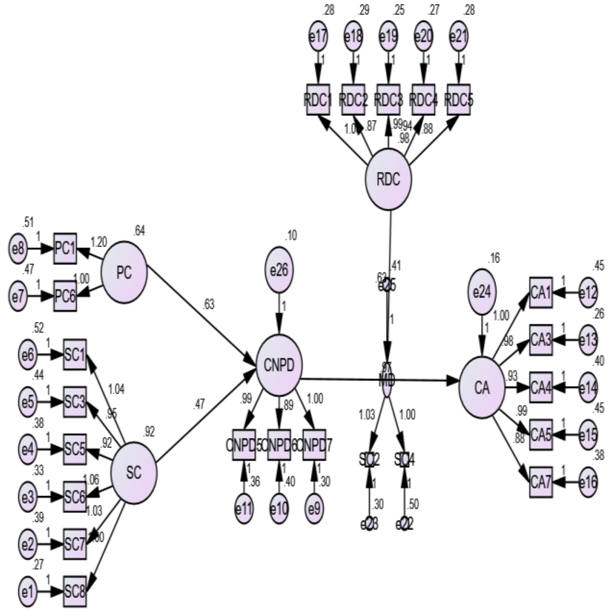

Figure 4.2 Hypothetical model for the study

Table 4.7 Hypothetical Model Results

Hypothesis	Estimate	S.E.	C.R.	P
PC---> CNPD	.447	.045	9.849	0.000
SC---> CNPD	.465	.043	10.893	0.000
CNPD--->CA	.412	.083	4.963	0.000
RDC - -> CNPD *CA	.966	.083	11.604	0.000

The influence of process capability on collaboration of new product development, the R Square indicates a total effect of 63%. Process capability is predicting collaboration of new product development of about 63%. The statistical (*Estimate value = .477, Standard Error value = .045, Critical Ratio value =9.849 and P<0.000*) indicate that process capability has a positive and significant influence on collaboration of new product development.

The study examined the influence of supplier capability on collaboration of new product development and the R Square indicates a variation of 47%. Thus supplier capability can overall affect new product development of about 47%. The statistical (*Estimate value =- .465, Standard Error value = .043, Critical Ratio value =10.893 and P<0.000*) indicate that supplier capability has a positive and insignificant influence on collaboration of new product development.

The influence of collaboration of new product development on competitive advantage and the R Square indicates a variation of 41%. Thus collaboration of new product development can overall affect competitive advantage of about 41%. The statistical (*Estimate value = .412, Standard Error value = .083, Critical Ratio value =4.963 and P<0.000*) indicate that collaboration of new product development has a positive and significant influence on competitive advantage.

The study then considered the moderating effect of research and development capability on the relationship between collaboration in new product development and competitive advantage and

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the R Square indicates a variation of 65%. This explains that research development capability can overall moderate the relationship between collaboration in new product development and competitive advantage. The statistical (*Estimate value = .966, Standard Error value = .083, Critical Ratio value = 11.604 and P<0.000*) indicate that research and development capability positively and significantly moderates the relationship between collaboration in new product development and competitive advantage.

5.0 CONCLUSIONS

The influence of process capability on collaboration of new product development, the R Square indicates a total effect of 63%. Process capability is predicting collaboration of new product development of about 63%. The statistical (*Estimate value = .477, Standard Error value = .045, Critical Ratio value =9.849 and P<0.000*) indicate that process capability has a positive and significant influence on collaboration of new product development.

The study examined the influence of supplier capability on collaboration of new product development and the R Square indicates a variation of 47%. Thus, supplier capability can overall affect new product development of about 47%. The statistical (*Estimate value =- .465, Standard Error value = .043, Critical Ratio value =10.893 and P<0.000*) indicate that supplier capability has a positive and insignificant influence on collaboration of new product development.

The influence of collaboration of new product development on competitive advantage and the R Square indicates a variation of 41%. Thus, collaboration of new product development can overall affect competitive advantage of about 41%. The statistical (*Estimate value = .412, Standard Error value = .083, Critical Ratio value =4.963 and P<0.000*) indicate that collaboration of new product development has a positive and significant influence on competitive advantage.

The study then considered the moderating effect of research and development capability on the relationship between collaboration in new product development and competitive advantage and the R Square indicates a variation of 65%. This explains that research development capability can overall moderate the relationship between collaboration in new product development and competitive advantage. The statistical (*Estimate value = .966, Standard Error value = .083, Critical Ratio value = 11.604 and P<0.000*) indicate that research and development capability positively and significantly moderates the relationship between collaboration in new product development and competitive advantage.

The study examined the influence of process capability on collaboration of new product development and the findings of the study indicate that process capability has a positive and significant influence on collaboration of new product development. The supports from this group of stakeholders are seen within the firm in the form of value creation opportunities, "customer relationship experiences and new product development. Suppliers help the firm sense changes in customer needs and enhance information acquisition" (Kim et al., 2013), which helps cultivate the firm's learning capability. Also, "supplier relationships support the firm's ability to generate product innovations" (Roy et al., 2004). "Early collaborations with suppliers in the product development process support a firm with improved, integrative problem-solving capabilities" (Takeishi, 2001).

The study examined the influence of supplier capability on collaboration in new product development and the findings of the study indicate that supplier capability has a positive and

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insignificant influence on collaboration in new product development. Literature posits that Strong buyer-supplier collaboration in the design and development of major product components allows the project's buyer and supplier participants to freely communicate necessary information" (Ancona & Caldwell, 1990). Open information exchange is also necessary for planning work schedules and ensuring that the sequence is followed. Minimizes unwanted gaps or overlaps in responsibilities" (Tannenbaum, Beard, & Salas, 1992). "When technical issues develop, the firm and supplier members must swiftly and completely inform one another of the new situation so that appropriate solutions can be sought jointly" (Katz, 1982).

Both the company and the supplier members may have some technical specifications going into the project, like a general product/part design or a basic technology. "The firm and supplier members will almost certainly need to comprehend each other's technical, budgetary, and organizational realities as well as adapt to and accommodate each other in a mutually supportive manner in order to ensure the highest integrity of the overall product (including the supplier's component)" (Littler et al., 1998). Firms can acquire insights into suppliers' capabilities and constraints (Huo, 2012), ultimately enabling more effective planning and forecasting, better product and process designs and reduced transaction costs (Zhang and Huo, 2013).

The influence of collaboration in new product development on competitive advantage, the statistical indicate that collaboration in new product development has a positive and significant influence on competitive advantage. Process capabilities related to competitive priorities are defined as process capabilities and subdivided into dependability improvement, cost reduction, quality improvement, and flexibility capabilities, according to previous operations strategy research" (Boyer, 1998; Neely et al., 1995) "Buyers assess and choose suppliers based on their capabilities, which include design, quality, dependability, and cost" (Asanuma, 1985).

The study finally assessed the moderating effect of research and development capability on the relationship between collaboration in new product development and competitive advantage and the findings of the study indicate that research and development positively and significantly moderate the relationship between collaboration in new product development and competitive advantage. Working with suppliers who are unable to study the business environment, bring new ideas and also handle technological challenges can quickly increase expenses, which is another risk of collaboration. As a result, there may be a technological threshold at which the collaboration's transaction-cost diseconomies outweigh its benefits and erode the enterprises' competitive edge.

As a result, in the event of serious technological challenges, companies may choose to perform the duties that were originally delegated to the cooperation themselves or, conversely, to delegate those responsibilities wholly to suppliers. Regardless of whether a course is taken, as technical issues increase in frequency, supplier and company collaboration will decrease. Hoetker (2005) "backed up this claim, stating that when a company faces rising technological challenges, it often begins to develop pieces and components". Manage similar responsibilities within the company to reduce transaction costs. As a result, research and development ought to benefit an enterprise's ability to compete, but this effect ought to be constrained by technological uncertainty.

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5.1 Theoretical implication

This study is strongly driven by dynamic capability theory because literature posits that companies in the similar industry behave differently because they have different resources and skills (Barney, 1986, 1991; Peretaf, 1993), the RBV being viewed as static and not sufficient to give the company a competitive advantage explain in the changing market environment (Priem & Butler, 2001) Additionally, the company's resource-based view looks at the company's unique, rare, and imitable resources that have created competitive advantage and business growth (Barney, 1986).

However, the process of maintaining competitive advantage is limitless and the process is dynamic (Hung, Yang, Lien, McLean & Kuo, 2010), so scientists have suggested that in order to stay competitive in the market, the company should develop specific skills and continuous learning must (Argyris & Schon, 1978; Hammer, 2001; Jashapara, 1993; Senge, 1990; Zott, 2003), which applies from the perspective of dynamic capabilities in particular in a new or changing market environment (Wilden, Gudergan, Nielsen & Lings, 2013).

The lack of dynamic skills will make it impossible for the company to maintain its competitive advantage, especially in a changing environment (Gnizy, Baker & Grinstein, 2014). The application of dynamic capabilities in past literature has shown increasing interest among scholars since the inception of the international literature on ambidexterity (Hsu, Lien & Chen, 2013; Luo, 2002; Luo & Rui, 2009; Prange & Verdier, 2011) Explain ambidexterity as a company's ability to respond to environmental complexity and international experience in doing international business (Hsu et al., 2013).

According to dynamic capabilities theory, markets are more dynamic and companies differ in the skills they acquire and use different resources. these discrepancies explain the differences in performance between firms over time (Wang & Kim, 2017) Teece et al. (1997) describes dynamic skills as higher-order skills for selecting, developing and coordinating common skills, i.e., H. to capture, grasp and transform. These skills also enable companies to transform information based on their needs. it also encourages learning and experimentation, combines resources for the creation of a new product, and transforms existing systems (Jiang et al. 2016). A company with dynamic capabilities can integrate and redeploy knowledge sources to achieve higher performance.

5.2 Managerial implication

Organizations seeking to achieve good supplier capability must consider a strong capability to integrate various suppliers into one. Create a good capability to acquire materials for new products, share resources to help suppliers improve capabilities and innovation, develop a strong technological capability for utilizing electronic devices and have a strong capability to coordinate with key suppliers. Management of organizations can achieve a good collaboration in new product development when they ensure high level of participation of inter-organizational in the process of new product development, collaborate to ensure that there is a continuous improvement in efficient and effective use of resources and create an enabling environment to enhance productivity consistently through resources collaboration. Also, organizations can achieve good process capability by ensuring that production cycle time is short, market cycle time of new product is short, product returning rate is low, inventory expense is low, the frequency of re-work resulting is quality failure is low, do everything possible to eliminating

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waste, frequent training of their staff which will bring them up to speed and conduct quality engineering to cut down cost.

5.3 Recommendations

Based on the findings and conclusions drawn from this study, the following recommendations were deemed necessary. The organizations should think of giving their staff periodic training and development to help them execute their tasks perfectly to help them achieve competitive advantage. Organizations helping their staff to gain new working skills and development will be able to perform better than their competitors and this could help them to be ahead of their competitors. Therefore, companies failing to organize training and development for their staff will encounter challenges of competing therefore it is important for companies to train and develop their staff to help them gain competitive advantage.

Organizations should create a unit that will be responsible for research and development to help them detect the most appropriate ways of carrying out their activities. Firms without a research and development unit will fail to respond to changes and also discover new ideas and how they should carry out their core activities. The research development unit will help the organizations to improve on their products and services to help them stay on top their competitors. This implies that companies that will fail to create their research and development unit will be in a serious danger in terms of competition. It is therefore important for organizations to develop their research and development unit to help them improve on their core activities.

Management of organizations in Ghana should be ready to modify their designs to help them meet customers demand and remain competitive. The highest degree of organizations responding to design modification will help them to achieve good customer retention and gain competitive advantage. Companies failing to respond to their products and service modification of meeting current trend will have a negative impact on their competitive advantage and financial performance. It is therefore very important for the organizations in Ghana to think of design modification to remain in business and achieve competitive advantage.

5.4 Areas for future studies

A future study can look at the moderating role of information technology on the relationship between supplier capability and competitive advantage.

Also, a study can consider the mediating effect of top management support on the relation between research and development capability and competitive advantage.

REFERENCES

REFERENCES

1) Ackah, D., Addo, K. S., K., Yornu, K. I., (2024), “Effect of Green Procurement Practices on Financial Performance”, African Journal of Procurement, Logistics & Supply Chain Management, 2024, 7(8): pp.13-40. DOI: https://dx.doi.org/10.4314/ajplscm.v7i8.2

2) Ackah, D., Addo, K. S., K., Yornu, K. I., (2024), “Enforcing Ethical Codes of Conduct in Procurement and Its Impact on Public Procurement Performance in Ghana”, African Journal of Procurement, Logistics & Supply Chain Management 2024, 7(8): pp.72-92. DOI: https://dx.doi.org/10.4314/ajplscm.v7i8.5

3) Ackah, D., Addo, K. S., K., Yornu, K. I., (2024), “Senior Management's Influence on Supplier Selection and Procurement Performance”, African Journal of Procurement,

Copyright © JPPS Assessment AJOL
ISSN: 2676-2730
https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

Logistics & Supply Chain Management, 2024, 7(8): pp. 93-113. DOI: https://dx.doi.org/10.4314/ajplscm.v7i8.6

4) Ackah, D., Dadzie. B., E., Yornu, K. I., (2024), "The Influence of Corporate Governance on Strategic Procurement and Competitive Advantage", African Journal of Procurement, Logistics & Supply Chain Management, 2024, 7(8): pp.13-40. DOI: https://dx.doi.org/10.4314/ajplscm.v7i8.7

5) Agarwal, R. (2013). *Development of a scale to measure consumer perception of sustainability in fashion industry*. Journal of Business Research, 66(1), 123-128. https://doi.org/10.1016/j.jbusres.2011.05.018

6) Aitken, J., Childerhouse, P., & Towill, D. (2005). Customer-driven supply chains: A model for managing supply chain complexity. *Supply Chain Management: An International Journal*, 10(2), 91-101. https://doi.org/10.1108/13598540510596966

7) Aitken, J., Childerhouse, P., & Towill, D. R. (2005). Designing the supply chain for customer satisfaction. *The International Journal of Logistics Management*, 16(3), 15-30.

8) Amin, S., & Zhang, J. (2013). A framework for supply chain design under uncertainty. *International Journal of Production Economics*, 145(2), 563-571.

9) Amin, S., & Zhang, Z. (2013). Supply chain design under uncertainty: A review. *International Journal of Production Research*, 51(1), 114-137. https://doi.org/10.1080/00207543.2012.658059

10) Arshinder, K., Kanda, A., & Deshmukh, S. G. (2008). Supply chain coordination: A review of literature. *International Journal of Production Research*, 46(20), 5745-5770.

11) Avolio, R., Bandinelli, R., & Rinaldi, R. (2015). Supply chain collaboration in the fashion industry. *Journal of Fashion Marketing and Management*, 19(3), 311-330. https://doi.org/10.1108/JFMM-03-2014-0034

12) Baker, G. P. (1992). Rewarding Managers in a Complex World. In J. E. McMillan (Ed.), *The Economics of Information and Uncertainty* (pp. 1-25). Chicago: University of Chicago Press.

13) Ben Naylor, B. J., Naim, M. M., & Berry, D. (1999). *Leagility: Interfacing the lean and agile manufacturing paradigms in the supply chain. International Journal of Production Economics*, 62(1-2), 107-118.

14) Bernard, H. R. (2002). *Research methods in anthropology: Qualitative and quantitative approaches* (3rd ed.). Altamira Press. Lescroël, A., et al. (2014). *Understanding data collection methods in research. Journal of Research Methods*, 9(2), 45-56.

15) Bernard, H. R. (2002). *Research methods in anthropology: Qualitative and quantitative approaches*. Rowman Altamira.

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https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

16) Bharadwaj, S. G., Varadarajan, R., & Fahy, J. (1993). *Sustainable competitive advantage in service industries: A conceptual model and research propositions*. *Journal of Marketing*, 57(4), 83-99.

17) Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices*. OpenStax College. Retrieved from OpenStax

18) Bless, C., & Higson-Smith, C. (2004). *Fundamentals of social research methods: An African perspective*. Juta & Company Ltd.

19) Borade, A. B., & Nansod, D. P. (2007). *Strategic Issues in Supply Chain Management. International Journal of Management and Strategy*, 4(1), 112-121.

20) Bowersox, D. J. (2000). Logistics management: The integrated supply chain process. *McGraw-Hill Education*.

21) Bowersox, D. J., & Closs, D. J. (1996). Logistical Management: The Integrated Supply Chain Process. McGraw-Hill.

22) Brun, A., & Pero, M. (2012). Supply chain choices in the fashion industry: Aligning supply chain strategy with product variety. *International Journal of Production Economics*, 135(2), 647-658.

23) Bureau of Labor Statistics Ghana. (2017). *Employment statistics*.

24) Cabral, J. A., Sweeney, E., & Tavares, S. (2012). Resilience in the supply chain: A review of the literature. *International Journal of Production Economics*, 137(1), 1-15. https://doi.org/10.1016/j.ijpe.2012.01.020

25) Campbell, D. T., & Fiske, D. W. (1959). *Convergent and discriminant validation by the multitrait-multimethod matrix*. Psychological Bulletin, 56(2), 81-105. https://doi.org/10.1037/h0046016

26) Childerhouse, P., & Towill, D. R. (2002). Annex 3: The impact of demand chain management on the supply chain. *Production Planning & Control*, 13(2), 89-97. https://doi.org/10.1080/09537280110107437

27) Chopra, S., & Meindl, P. (2007). *Supply Chain Management: Strategy, Planning, and Operation* (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall. Chopra, S., & Meindl, P. (2010). *Supply Chain Management: Strategy, Planning, and Operation* (4th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

28) Chopra, S., & Meindl, P. (2007). Supply chain management: Strategy, planning, and operation. *Pearson Prentice Hall*.

29) Chopra, S., & Meindl, P. (2019). Supply Chain Management: Strategy, Planning, and Operation. Pearson.

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ISSN: 2676-2730
https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

30) Christopher, M. (2000). *The agile supply chain: competing in volatile markets. Industrial Marketing Management*, 29(1), 37-44.

31) Christopher, M. (2005). Logistics and Supply Chain Management (3rd ed.). Financial Times/Prentice Hall.

32) Christopher, M. (2016). Logistics and Supply Chain Management (5th ed.). Pearson.

33) Christopher, M., & Peck, H. (2006). *Building the resilient supply chain. International Journal of Logistics Management*, 16(2), 1-14.

34) Clark, T. (1999). *Business performance: a multi-dimensional approach. International Journal of Business Performance Management*, 1(1), 1-15.

35) Cooper, M. C., Lambert, D. M., & Pagh, J. D. (1997). Supply Chain Management: More Than a New Name for Logistics. *International Journal of Logistics Management*, 8(1), 1-14. https://doi.org/10.1108/09574019710805556

36) Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.

37) Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.

38) Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). SAGE Publications.

39) Cronbach, L. J. (2004). *Two faces of validity: Stability and generalizability*. Educational and Psychological Measurement, 64(5), 743-757. https://doi.org/10.1177/0013164404263589

40) D'Avolio, A., Bandinelli, R., & Rinaldi, L. (2015). Collaborative supply chain management in the fashion industry: How to deal with demand uncertainty. *Journal of Fashion Marketing and Management*, 19(2), 195-209.

41) David, F. R., David, F. R., & David, M. (2006). Strategic management: Concepts and tools for creating real competitive advantage. *Prentice Hall.*

42) De Vaus, D. A. (2001). *Research design in social research*. SAGE Publications.

43) Demirbag, M., Tatoglu, E., & S. C. (2006). The impact of quality management practices on performance: A study of Turkish manufacturing firms. *Journal of Quality in Maintenance Engineering*, 12(3), 202-215.

44) Ellinger, A. E., & Ellinger, R. W. (2014). The role of supply chain management in firm performance: A focus on human resource management. *Journal of Business Logistics*, 35(2), 122-140.

Copyright © JPPS Assessment AJOL
ISSN: 2676-2730
https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

45) ElMaraghy, H. A., & Mahmoudi, A. (2009). Supply chain configuration in a geographically dispersed environment. *International Journal of Production Research*, 47(21), 6119-6139. https://doi.org/10.1080/00207540802112261

46) Fawcett, S. E., Ogden, J. A., & Magnan, G. M. (2007). *The role of supply chain management in the success of the firm*. *Journal of Business Logistics*, 28(1), 5-29.

47) Fisher, M. L. (1997). What is the right supply chain for your product? *Harvard Business Review*, 75(2), 105-116.

48) Fisher, M. L. (1997). *What is the right supply chain for your product?* Harvard Business Review, 75(2), 105-116.

49) Flynn, B. B., Huo, B., & Zhao, X. (2010). *The impact of supply chain integration on performance: A contingency and configuration approach*. *Journal of Operations Management*, 28(1), 58-71.

50) Fornell, C., & Larcker, D. F. (1981). *Evaluating structural equation models with unobservable variables and measurement error*. Journal of Marketing Research, 18(1), 39-50. https://doi.org/10.1177/002224378101800104

51) Frankforter, S. A., Davy, J. A., & Sweeney, P. J. (2000). *Shareholder Value and the Stockholder-Manager Relationship: A Dual Perspective*. *Strategic Management Journal*, 21(3), 313-329.

52) Furr, M., & Bacharach, V. (2003). *Psychometrics: An introduction*. SAGE Publications.

53) Gibilaro, L., & Mattarocci, G. (2019). The role of supply chain management in achieving competitive advantage. *International Journal of Logistics Management*, 30(3), 780-802.

54) Goodman, P. S., & Dienesch, R. M. (1983). *Theoretical and Methodological Issues in the Study of Organizational Performance*. *Research in Organizational Behavior*, 5, 123-157.

55) Greer, M. J., & Theuri, P. (2012). Supply chain management: A strategic approach. *Journal of Business Research*, 65(3), 435-441.

56) Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Prentice Hall.

57) Handfield, R. B., Monczka, R. M., Giunipero, L. C., & Peterson, K. J. (2009). *Supply Chain Management: A Strategic Perspective*. *Journal of Business Logistics*, 30(2), 11-14.

58) Heikkilä, J. (2002). *From supply to demand chain management: A transformation of the management paradigm in supply chains*. Supply Chain Management: An International Journal, 7(5), 251-263. https://doi.org/10.1108/13598540210450834

59) Heikkilä, J. (2002). From supply to demand chain management: Efficiency and customer satisfaction. *Journal of Operations Management*, 20(6), 747-764.

Copyright © JPPS Assessment AJOL
ISSN: 2676-2730
https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

60) Heizer, J., & Render, B. (2010). Operations management. *Pearson Prentice Hall.*Hong, P., & Jeong, J. (2021). Supply chain strategies for enhancing business performance: Evidence from the pharmaceutical industry. *Supply Chain Management: An International Journal*, 26(4), 597-612.

61) Hilletofth, P., & Eriksson, D. (2011). A framework for demand-driven supply chain management. *International Journal of Logistics Research and Applications*, 14(5), 347-367. https://doi.org/10.1080/13675567.2011.609133

62) Hoang, T. H., Luan, V. Q., & Hung, N. T. (2006). *A study on the impact of logistics service quality on customer satisfaction*. The 3rd International Conference on Logistics and Supply Chain Management.

63) Holmstrom, B. (1979). *Moral Hazard and Observability*. *The Bell Journal of Economics*, 10(1), 74-91.

64) Holmstrom, B. (1987). *Aggregation and Linearity in Continuous Time Models*. *Journal of Economic Theory*, 43(1), 138-153.

65) Hu, Y., Gurnani, H., & Wang, X. (2013). Supply chain disruptions: A review and future research directions. *International Journal of Production Research*, 51(7), 2093-2115. https://doi.org/10.1080/00207543.2011.643092

66) Huang, G. Q., Uppal, M., & Shi, L. (2002). Supply chain strategy selection: A case study. *Supply Chain Management: An International Journal*, 7(1), 24-32. https://doi.org/10.1108/13598540210418438

67) Hunt, S. D., & Morgan, R. M. (1995). *The Comparative Advantage Theory of Competition*. *Journal of Marketing*, 59(2), 1-15.

68) Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. (1997). *Personal computing acceptance factors in small firms: A structural equation model*. International Journal of Management Science, 25(3), 215-229. https://doi.org/10.1016/S0305-0483(97)00001-0

69) Igwenagu, I. C. (2016). *Research methodology: A step-by-step approach*. 1st ed. Nimo: Rex Charles and Patrick Limited.

70) Igwenagu, I. N. (2016). *Research methodology: A step-by-step guide for beginners*. Lambert Academic Publishing.

71) Ionescu, S., Topor, R., & Gulea, A. (2019). *Supply chain management processes: Linking customer relationship and order fulfillment*. *Management and Marketing*, 14(2), 156-169.

72) Jacobsen, R. (1987). *The robustness of the Return on Investment (ROI) as a performance measure: An empirical test of the relationship between ROI and the "bottom line"*. *Academy of Management Journal*, 30(3), 526-543.

73) Jensen, M. C., & Meckling, W. H. (1976). *Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*. *Journal of Financial Economics*, 3(4), 305-360.

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Journal Impact Factor (JIF): 6.782

74) Jüttner, U., Christopher, M., & Baker, S. (2007). Demand chain management: Integrating marketing and supply chain management. *Industrial Marketing Management*, 36(3), 377-392. https://doi.org/10.1016/j.indmarman.2006.04.003

75) Jüttner, U., Christopher, M., & Baker, S. (2007). Demand chain management: Understanding supply chain management. *Supply Chain Management: An International Journal*, 12(3), 209-214.

76) Kaipia, R., & Holmström, J. (2007). Demand chain management: The challenge of supply chain design. *International Journal of Production Economics*, 107(1), 285-295.

77) Kaipia, R., & Holmström, J. (2007). The role of demand information in supply chain management. *International Journal of Production Research*, 45(9), 2103-2118. https://doi.org/10.1080/00207540600720106

78) Kamaruddin, S., Zain, Z., & Mohamad, M. (2009). *Managing Complexity in Supply Chains: A Study of Factors Affecting the Complexity of Supply Chains*. *International Journal of Logistics Research and Applications*, 12(4), 233-248.

79) Kaplan, R. S., & Norton, D. P. (1996). *The Balanced Scorecard: Translating Strategy into Action*. Boston, MA: Harvard Business School Press.

80) Kaplan, S. (2014). Business strategy: The end of the road. *Harvard Business Review*, 92(12), 89-95.

81) Kim, Y. (2012). The impact of supply chain management practices on competitive capabilities and firm performance. *Journal of Supply Chain Management*, 48(3), 80-94.

82) Klemencic, A. (2006). *Supply Chain Management: A Review of Literature and a Proposed Research Agenda*. *International Journal of Business and Management Studies*, 1(1), 7-22.

83) Kothari, C. R. (2003). *Research methodology: Methods and techniques* (2nd ed.). New Age International.

84) Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Age International.

85) Krajewski, L. J., Ritzman, L. P., & Malhotra, M. K. (2007). *Operations Management: Processes and Supply Chains* (8th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

86) Kumar, R. (2008). *Research methodology: A step-by-step guide for beginners* (2nd ed.). SAGE Publications.

87) La Londe, B. J., & Cooper, M. C. (1989). Partnering to strengthen the supply chain. *International Journal of Logistics Management*, 1(2), 1-10. https://doi.org/10.1108/09574098910834566

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ISSN: 2676-2730
https://dx.doi.org/10.4314/ajplscm.v7i9.4
Journal Impact Factor (JIF): 6.782

88) Lambert, D. M. (2006). *Supply Chain Management: Processes, Partnerships, Performance* (3rd ed.). Sarasota, FL: Supply Chain Management Institute.

89) Lambert, D. M. (2008). *Supply Chain Management: Processes, Partnerships, Performance* (4th ed.). Sarasota, FL: Supply Chain Management Institute.

90) Lau, H., Lee, M. K., & Chan, F. (2002). The role of trust in supply chain management: A case study in the UK. *Supply Chain Management: An International Journal*, 7(4), 177-184.

91) Lee, H. L. (2002). *Aligning supply chain strategies with product uncertainties*. California Management Review, 44(3), 105-119. https://doi.org/10.2307/41166169

92) Lescroël, A., Labrosse, P., & Legrand, B. (2014). *Data collection for social science research: A practical guide*. Routledge.

93) Lieb, R. C., & Randall, H. L. (2017). A review of third-party logistics research: A service provider perspective. *International Journal of Logistics Management*, 28(1), 232-253.

94) Lo, C. K. Y., & Power, D. J. (2010). *A research framework for supply chain management in the context of the 21st century*. Supply Chain Management: An International Journal, 15(1), 16-23. https://doi.org/10.1108/13598541011022854

95) Macdonald, J. R., & Corsi, T. M. (2013). The role of uncertainty in supply chain design. *Transportation Research Part E: Logistics and Transportation Review*, 50, 1-9. https://doi.org/10.1016/j.tre.2012.10.002

96) Martin, M., & Patterson, D. (2009). Supply chain strategy and financial performance: An empirical investigation. *International Journal of Operations & Production Management*, 29(2), 117-131.

97) Mason-Jones, R., Naylor, B. J., & Towill, D. R. (2000). Engineering the leagile supply chain. *International Journal of Agile Management Systems*, 2(1), 54-61. https://doi.org/10.1108/14654650010353126

98) Mason-Jones, R., Naylor, B. J., & Towill, D. R. (2000). Engineering the leagility in the supply chain. *International Journal of Agile Management Systems*, 2(1), 54-61.

99) Mavrinac, S. C., & Siesfeld, G. (1997). *The Financial Performance of Business Units: A New Framework for Analysis*. *Journal of Management Accounting Research*, 9, 1-27.