

The Influence of Information Technology on Firm Performance; The mediating and Moderating Role of Supply Chain Collaboration and Market Turbulence among Food Processing Industries in Ghana

Gloria Pokuaa-Duah¹, Emmanuel Agyekum², William Mills Abbey³ & Kenneth Asiamah Appah⁴

Koforidua Technical University, Ghana

Corresponding Email: pokuaaduah.gloria@ktu.edu.gh

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Abstract

Purpose: This study focused on the influence of Information Technology (IT) on Firm Performance with boundary conditions of mediating and moderating the role of Supply Chain Collaboration (internal and external) and Market Turbulence among Food Processing Industries in Ghana.

Methods: Quantitative research approach was applied in this study focusing on SMEs from four regions in Ghana (Accra, Ashanti, Eastern and Bono). Stratified random sampling technique was employed to come out with a total sample size of 400 participants constituting CEOs, senior managers and divisional heads of FPIs.

Results: Findings from the study suggested that IT usage positively and significantly affect the FPI performance, especially through supply chain collaboration. Market turbulence was found to exert moderating effect on IT usage and supply chain collaboration.

Conclusion: It has been said that performance enhancement of the FPI SMEs can be possible through IT adoption, the influence of collaborative efforts of other SC partners especially firms operating in an unstable market (like Ghana) require strong SCC to improve their performance.

Keywords: *Information Technology, Supply Chain Collaboration, Market Turbulence, Firm Performance, Food Processing Industry*

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1.0 Introduction

The success of a firm, whether production or service, mostly relies on its ability to interact and exchange information about its activities within and outside the firm. Operational information such as manufacturing plans and programs, design processes and product or service development effectively communicated among key supply chain (SC) partners mostly improve firms' performance (Mulwa, 2015; Aydiner et al., 2019). However, studies have suggested that not all firms are able to manage information within themselves and their SC partners effectively, especially in dynamic market environments (Bhatt et al., 2010) leading to wastages in information flow, resulting in demand disruption and failures or excessive demand and flaw in demand in and along the SC affecting performance (Hick, 2007; Redeker et al., 2019;

Vijayakumar et al., 2022). Although the Food Processing Industry (FPI) has become one of the widest developing industries worldwide (Berry et al., 2001; Ali, 2016), nonetheless, it is often affected by a lot of wastage; nearly half of total food produced worldwide is associated with waste (Fox & Fimeche, 2013). More than one-third (1.3 billion tons of edible food) of food produced is lost or wasted along the supply chain (SC) (Dora et al., 2016; FAO, 2018, p. 67), i.e., about 100 kilograms of edible food per consumer per year is wasted at the consumption stage (Gustavsson et al., 2011) in the developing countries. The reason has been partially attributed to factors such as demand-supply mismatches and distortions, low consumer demand awareness, lack of transparency, inadequate resources, lack of skills, knowledge, and low value-addition (VA) in processing, (Mukherjee et al., 2013) of which the Ghanaian FPI is not an exception.

Evolving information technology (IT) applications over the past years have given firms opportunities to enhance their attractiveness and performance (Marinagi et al., 2014; Kathuria et al., 2016) mostly in unstable market environments. IT is seen as a vehicle of economic progress and technical change toward firms' growth (Brynjolfsson and McAfee, 2014; Aydiner et al., 2019) in areas such as transmitting timely and accurate information, quick movement of goods and services, and encouraging collaboration among SC (Craighead et al., 2009; Gu et al., 2017). However, most FPIs are characterized by low performance and poor market responsiveness due to their inability to gain access to vital information and knowledge about the needs of the market, (lack of cooperative and collaborative relationships) (Klaus, 2015; Agboh, 2015, p. 8; Oduro & Nyarku, 2018). Ghana's 40% food wastage along Ghana's food supply chain (FSC) from production to consumption has been attributed to overproduction, product damage relating to over-processing, and technical problems at the manufacturing facilities (Andam et al., 2015; Adoo, 2016; Ghana News Agency (GNA) report, 29th October 2021). Further, the FPI's inability or difficulty in establishing collaborative working relationships within and outside their SC is due to challenges in information or knowledge exchange (ITC report on SMEs competitiveness in Ghana and Alliance for Action, 2016; Fatoki, 2021; Otoo & Mishra, 2018).

Besides, Ghanaian food market is an open or liberalized market economy (U.S. Commercial Trade, 2019 <http://export.gov/usoffices>; Owoo & Lambon-Quayefio, 2018; USDA GAIN Report, 2017). Its survival (performance) in a dynamic business environment demands its ability to adopt modern and advanced IT to gather information, locate opportunities in the market, swiftly transmit information within and outside to restructure operational activities especially when there are extreme changes in the taste and preference of customers and attain long-term competitiveness (Irani, 2010; Nakata et al., 2011; Brandon-Jones et al., 2014; ITC report, 2016; Vijayakumar et al., 2022). IT supports strengthening performance among firms and their SC members, nevertheless, literature offers little understanding of the effect of IT on FPI performance in a turbulent market such as Ghana (Appiah-Otoo & Song, 2021) through such collaborative actions within and outside the firm (Brandon-Jones et al., 2014; Duongh & Paché, 2016; Reid et al., 2016; Gunasekaran et al., 2017; Yu et al., 2018) in developing economies (Redeker et al., 2019; Chandran et al., 2020; Singh & Sharma 2020; Erumban & Das 2016; 2020). Furthermore, connectivity and integration of ICT systems associated with operational performance, and by extension, with overall firm performance has not been experienced much, especially among those in FPI in Ghana. This knowledge will be vital for FPIs as the understanding of the full value of its influence in firms' activities on performance attainment and deliberately advance and exploit their IT, market turbulence, and SCC capabilities.? This paper is designed as follows: Section 1 explores the research purpose and need; Section 2 reviews recent literature on theoretical background, firm performance, IT,

SCC, and market turbulence, and suggests hypotheses; Section 3 describes the research sample and measures; Section 4 presents the results of analysis; and Section 5 summarizes the findings and discusses the research implications.

2.0 Literature Review

2.1 Firm Performance

The performance of every firm is very perilous since it serves as the basis on which the organization can make decisions, choose operational strategies and convert these strategies into desirable outcomes and behaviours as well as improvements in the organization (Silvestro, 2014). Firm performance denotes firms' effectiveness and efficiencies in conducting their operations to achieve their best throughput (Rajab & Muchelule, 2016; Busse, 2016). Previous studies on firm performance, IT, and SCC, have revealed that performance fulfillment and enhancement depend on quality and relevance of information shared in relation to the business activities of the firm and its SC partners in areas such as planning and decision making (Hazen et al., 2014; Busse et al., 2017; Sener et al., 2019). For instance, studies have posited improvement in firm performance such as increase in productivity (Stocker, 2015) cost, quality, flexibility, and timeliness of goods delivery (Ye & Wang, 2013; Siagian et al., 2020) due to IT adoption (Wu et al. 2006; Campo et al., 2010; Kim et al., 2011), especially through the influence of SCC (Kim, 2017; Zeng & Lu, 2021; Asamoah et al., 2020).

2.2 Information Technology and Firm Performance

Locating opportunities and responsiveness in a dynamic market requires the sharing of accurate, fast, complete, and relevant information or knowledge among firms and their SC members (Li & Lin, 2006; Li et al., 2005). IT tools (connectivity and technical) such as computers, mobile phones, emails, web-based internet, radio frequency identification (RFID), electronic data interchange (EDI), enterprise resource planning (ERP), business-to-business (B2B) private (Ethernet), electronic point of sale (EPOS) play significant roles in firms day-to-day business activities. These tools can assist in gathering and swiftly transmit information to SC members within and outside the chain and restructure operational activities, especially when there are extreme changes in the tastes and preferences of customers (Irani, 2010; Nakata et al., 2011; Brandon-Jones et al., 2014).

For instance, Siagian et al., (2020) postulated that IT application has a significant effect on time savings and transportation costs of raw materials or equipment as far as procurement practices in the FPI are concerned because of paperless transactions.

Many firms that have adopted ITs such as computers, mobile phones, emails, web-based internet, radio frequency identification (RFID), electronic data interchange (EDI), enterprise resource planning (ERP), business-to-business (B2B) private (Ethernet), electronic point of sale (EPOS) into their day-to-day business activities can communicate or disseminate information effectively within and along their SC. Through advanced IT, real-time information on resources such as material and inventory, delivery, manufacturing, and processing plans are shared by organizations and their SC partners. According to Aydiner et al. (2019); Mackelprang et al. (2014); Prajogo and Olhager, (2012) and Lee (2000), IT usage streamlines and configures activities within and outside such as demand and supply forecasting and planning, sourcing, procurement and accomplishment of orders as well as enhancement of inter-firm coordination. For instance, Narasimhan and Kim (2001) study revealed that IT adoption by firms aids value creation activities i.e., it offers grounds for companies to create strategic connections with suppliers and customers. Wu et al. (2006) examination of the effect of information technology on supply chain capabilities and firm performance suggested a progressive connection between

IT investment and performance (market and financial), IT investment on supply chain capabilities i.e., supply chain capabilities mediate the relationship between IT and performance. Campo et al. (2010) confirmed this by measuring the link between information technology use and performance. The findings cited an indirect relationship between IT and perceived performance through both information sharing and satisfaction. Kim et al. (2010) consented that the adoption of RFID as part of a firm's infrastructure has the potential effect of permitting more effective and efficient decision-making using real-time data, performing routine and manual tasks better while reducing cost or possibly even reducing the need for those tasks, and allowing top management better visibility of operational transactions. Additionally, Powell (2013) assessed information technology as a competitive advantage using IT tools such as enterprise resource planning (ERP). It was revealed that ERP can assimilate all appropriate information such as planning, resource distribution and regulate activities for all the various intra-departments and its SC partners. Kim (2017) evaluated integrative IT and firm performance: the role of supply chain integration (SCI) using secondary data on manufacturing firms in Korea. The study affirmed the relationship between integrative IT, SCI, and firm performance i.e., integrative IT is positively associated with firm performance through SCI. However, the results of this study show that integrative IT does not have a positive correlation directly with firm performance. The authors recommended the use of other mediating SCI variables and other reliable instruments as their study was limited to one mediating variable (information sharing) and the use of perception of respondents as a means of measurement.

2.3 Market Turbulence

SC by its nature is very dynamic and frequently brings a situation of reliance and turbulence (Fang & Shou, 2015). The dynamism of the environment as well as the impulsiveness of the market are seen as exterior elements that may present prospects and threats to firms that most of them sometimes find difficult to contain (Ross, 2013). Thus, when changes such as inability to meet customers' expectations, a higher cut-off or growth in demand, increased competition as well as technological developments occur due to uncertainties in the business market, firms' survival with existing resources and operational abilities might be difficult (Volberda & Lewin, 2003). The sources of attractiveness that firms can use to react to let-downs with dexterity and promptness, may become feeble, especially if know-how gaps arise (Lavie, 2006) which can affect performance (Droge et al., 2008; Roberts & Grover, 2012; Srivastava et al., 2015; Wilhelm et al., 2015). A turbulent market is mostly characterized by unpredictability, instability, or impulsiveness (Achrol, 1991) which affects the performance and relational outcomes of manufacturing firms and their SCC (Amit et al., 2016); due to variations in customers' arrangements and tastes or expectations (Lee, 2010; Wilden & Gudergan, 2015). Information and knowledge sharing according to studies might be avenues by which firms can suitably react to market, creating long-term performance and ultimately retaining keenness (Hanvanich et al., 2006). Xue et al. (2008) recommend firms in disturbed markets to adjust not only their commercial models but also their core operations to maintain a competitive edge over their opponents. Thus, advancing IT investments and performance improvements (Imboden et al., 2013). Zainalabideen et al (2022) believed that appropriate IT usage has significance and a positive influence on firms' performance, where firms adopt measures that are reliable with its particular aims and those of the industry as a whole. However, Germin et al. (2008) postulate that collaborative relationships (information sharing) among SC partners tend to weaken and do not yield maximum benefits among SC partners in the advent of market uncertainty. This is because when the market becomes highly unstable, SC partners decrease the amount of information shared on their actual production plans and schedules, inventory, throughput rates, and delivery schedules preventing them from securing enough knowledge for

their operations. Vincent et al. (2008) contended that firms may find it difficult to obtain real-time information and knowledge on market intelligence and manufacturing functions to update their plans due to the lack of collaborative communication, thereby creating offerings that have partial usage or not meet the eye of the customer.

2.4 Supply Chain Collaboration and Firm Performance

As firms seek to increase their productivity, product quality, and market share in today's dynamic market environment, they frequently seek support by collaborating with SC members within and outside their firms to meet customers' needs (Rahbari & Jalali, 2016). Efficient supply chain collaboration (SCC) places all essential resources of all cooperative partners together and connects all functional processes to effectively utilize the resources (Zhang et al., 2015). Nonetheless, most firms face a number of resource gaps within and outside their SC with respect to information sharing, technology knowledge etc. (Chin et al., 2014S). Collaboration is referred to as an exclusive working practice where individual firms work together for a common purpose or achieve business benefits. For instance, Liao et al. (2017) use a situation where more than two partners work together with the aim of completing jobs and ultimately attaining mutual objectives. Whipple et al. (2010) see it as an extended term of affiliation where individuals liaise, exchange information, and commonly strategize and adjust their firms' processes to mutually enhance their performance. Simatupang and Sridharan (2002) and Cao and Zhang (2011) termed it as a corporative situation where two or more separate organizations mutually work together to design and perform SC activities to convey significant profits and advantages to the SC partners. It can be structured into vertical (customer, internal; cross-functional and suppliers), horizontal (competitors, internal and non-competitors), and lateral (Simatupang & Sridharan, 2002) or internal (internal function) and external (upstream and downstream members) (Khan & Mentzer, 1996; Barratt & Green 2001; Barratt 2002; 2004, Fawcett & Magnan, 2002). However, internal and external collaboration as adopted by Natour et al. (2011) and Cao & Zhang (2011) are connoted information and relational respectively.

This paper has adopted SCC (internal–SCCIN) and information integration, joint knowledge creation, and collaborative communication (external–SCCEX) as an exclusive working practice where FPIs work together for a common purpose (Cao & Zhang, 2011).

2.5 Internal Supply Chain Collaboration (SCCIN)

There is a consensus in academia and among professionals on the importance of internal collaboration, as firms that can collaborate effectively within their SC can perform better and survive than those in a less collaborative manner (Themistocleous et al., 2004; Myhr & Spekman, 2005; Han et al., 2013). Collaboration among SC partners within a firm can assist members in dealing with the adverse effects of the “bullwhip effect” by reducing wild inventory fluctuations and becoming more responsive to the whimsies and turbulence of markets (Holweg et al., 2005; Kim & Chai, 2016). SCCIN refers to the degree to which manufacturers or services arrange their own firms' approaches, methods, and activities into collective, harmonised processes, to realize their customers' requests and proficiently interact with their suppliers (Cespedes, 1996; Kahn & Mentzer, 1996; Wong et al., 2007; Flynn et al., 2010). SCCIN ensures smooth functioning of all processes within the organization thereby omitting functional barriers to improved performance (Flynn et al., 2010), effective coordination of activities of different functional units (such as purchasing, manufacturing, research and development, sales, etc.) (Huo, 2012; Wong et al., 2011) shipping, inventory and raw material management (Trkman & Groznik, 2006; Feyissa et al., 2019) to react quickly to changing

demands of customers and assist operational performance such as delivery, cost, quality, and flexibility (Wong et al., 2011).

3.0 External Supply Chain Collaboration (SCCEX)

3.1 Collaborative Communication

Research has it that poor communication quality between a firm and its SC members not only affects their relationship but can also hinder information disseminated between them (Jaworski & Kohli, 2006). When firms show a high level of collaborative communication (CC) (e.g., frequent and reciprocal communication) within and outside their SC, it can result in transparency, incorporating customers' wants, ideas, and suggestions to improve firms' decisions, hence, the willingness of SC partners to develop collaborative activities for value creation and performance enhancement (Payne et al., 2008; Claycomb & Frankwick, 2010). Chen et al. (2013) cited that, CC between firms and external chain members gives them ample opportunity to learn and acquire knowledge that influences development and application of certain operational strategies leading to improved performance.

3.2 Information Integration

Information integration (II) is explained as the exchange or sharing of vital information through the use of IT within a firm and along its SC linkage to ensure timely distribution and processing of necessary information in SC decision-making (Olhager, 2009), the use of digitalized systems in assisting SC partners to improve the consistency and promptness in accomplishing tasks (Leuschner et al., 2013), to disseminate strategic and operational information within and outside SC partners using IT tools (Prajogo & Olhager, 2012; Durugbo, 2014; Yu et al., 2018). Adams et al. (2015) believe that a firm's IT applications to data acquirement and storage systems simplify the sharing of accurate and timely information in support of cross-functional processes. This results in strong communication and alliance among persons, functional units, and cross-organizations such as manufacturing, purchasing, and materials management, increased mutual feedback to able solve problems and improve performance using information systems such as ERP, EDI, and RFID (Roh & Hong, 2015; Wang et al., 2016; Yu et al., 2018). Haque and Islam (2018) suggested that collaborations (information sharing) between the firms (internal and outside) solve error issues associated with forecasting (demand and replenishment) and meet customers' expectations (product quality). Rahbari and Jalali (2016) study published that a company's capabilities (relational, information, and innovation) can have a significant effect on the financial and market performance of a company. Adams et al.'s (2014) analysis of relationships between SCC (information integration) positively affects firm performance (cost, quality, and profitability). Cheng et al. (2012) posit that opportunities to strategize, create, and introduce an improved product are accorded to firms from customer cooperation; for exclusive customer needs to create a competitive edge over standardized products (Theilmann & Hukauf, 2014). However, II can also be a potential threat and opportunity that many manufacturing firms may not be able to deal with among themselves without involving other chain members (Mu et al., 2018).

3.3 Joint Knowledge Creation

Knowledge is considered one of the vital resources a firm could have due to its important role in ensuring improvements and the creation of value. A firm cannot produce all the knowledge and resources it requires by itself nor can it rely solely on their SC partners (Petersen et al., 2005). It needs to decide as to where it can acquire knowledge and resources for improvements. Therefore, once it decides to use internal and external resources, it must find from within or from SC partners that have ample knowledge and resources that are complementary and

beneficial; this is known as relational resources (Dyer & Singh, 1998). Through business interactions and communication, knowledge can be created, giving chance for firms to learn from a technical flow of knowledge related to products and processes, and restructuring to achieve a mutual objective (Chow et al., 2007). Joint knowledge creation (JKC) is explained as the degree to which firms and their SC partners jointly develop a better understanding of and react to the market and competitive environment from where they work together (Malhotra et al., 2005; Cao & Zhang, 2011). JKC boosts organizational performance while eliminating duplication of learning efforts (Sambasivan et al., 2009). Storey and Larbig (2017) opined that SCC enables firms to utilize external knowledge in acquisition, assimilation, and transformation of new knowledge to create and exploit performance opportunities. However, mass literature on knowledge management tends to focus on knowledge taking, storing, or retrieving in relation to competitive advantage (Ogiela, 2015).

4.0 Theoretical Research Framework and Hypotheses Development

4.1 Relational View (RV)

Over the past two decades, inter-firm relationships have progressively moved from arms-length transactions to partnerships to address environmental dynamism and improve performance since partnerships better respond to uncertainties and volatile changes (Corsten & Felde, 2005). Formation of a partnership is to reduce uncertainty, thereby gaining costs, cycle time, and quality advantages (Kumar & van Dissel, 1996; Dyer & Singh, 1998). Relational view per this study posits that firms engage in collaborative relationships if they believe that their capabilities will attain and sustain better performance, and create efficiencies and synergies through long-term alliances and mutually beneficial relationships (Madhok & Tallman, 1998; Cao & Zhang, 2011; Lee and Ha, 2018), for instance, the primary producers, manufacturers, wholesalers and retailers involved in the production and delivery of goods to consumers. According to Uddin (2017), interfirm associations are vital for firms competing in an unstable marketplace to achieve greater profit margins and performance. For instance, FPI's ability to invest in interfirm relation-specific activities is important for their survival and success in a dynamic and changing environment. Based on the RV, previous research has shown that performance improvement mainly embodies how firms manage their relationships with partners in SCM (Sambasivan et al., 2013; Jain et al., 2014; Park et al., 2017). Effective SCC can deliver a number of outcomes such as reduced product and service costs, enhanced quality and innovation, and better firm performance (Odongo et al., 2016). However, current research hardly explores the effects of SCC (internal and external) on FPI performance. To address these gaps, this study theoretically puts forward internal and external practices of collaboration from a relational view and examines its relationship with firm performance and their contingent factors, by using data from FPI in Ghana.

4.2 Dynamic Capabilities Theory

The dynamic capabilities theory (DCT) addresses issues by identifying strategic procedures that permit firms to alter their resources and capabilities to meet the changing situations in the environment (Teece, 2012; Teece et al., 1997). The main bone of contention that underpins the DCT is that when faced with changes, firms should be able to attain and even enhance their performance and become competitive by building, integrating, and reconfiguring their resources and competencies to adapt to the changes in the environments (Winter, 2003). Thus, a firm should be able to modify and align its internal and external know-hows to respond to the environment where it operates to attain and retain competitive performance (Drnevich & Kriauciunas, 2011; Wilden & Gudergan, 2015). The DCT, by this notion, explains how firms

perform and survive in unstable market conditions (Teece, 2012). The alignment between IT and SCC as DC aims at delivering what is termed as value to customers through systems information and knowledge sharing to effect decision-making. The essence of IT is to boost quality and productivity by involving all chain members within and outside the firm in the process of value creation (Shadur & Bamber, 1994; Schoenherr et al., 2014; Teece et al., 2016). To address these gaps, this study theoretically puts forward internal and external practices of collaboration from a DCT and examines its mediating effect between IT practices with firm performance and their contingent factors, by using data from FPI.

4.3 Information Technology and Firm Performance

Capabilities are dynamic; hence firms must continually build, adjust, and reconfigure internal and external competences to attain congruence with the changing market environment, specifically when there are fast changes in the level of technology and time-to-market, and the nature of future competition in market is difficult to predict (Teece, 2017). DC generates resource alignments that produce FPI in Ghana's strategies (Eisenhardt & Martin, 2000). The above contention indicates that organizational IT capabilities can play a significant role in integrating and coordinating information and various activities within functional areas and across firms' borders of the extended value addition (Wilkin & Chenhall, 2010); especially with a timely exchange of information on the flow of resources such as materials, ideas within the firms, or from upstream to the downstream and vice versa to aid decision making (Han et al., 2017). Melville et al. (2004) suggested that IT is essential in firms' activities since it ensures flexibility, quality improvements, cost reduction, and productivity enhancement. Campo et al. (2010) cited a positive indirect relationship between IT and perceived performance through both information sharing and satisfaction. Powell (2013) revealed that an IT tool such as ERP as a competitive advantage can assimilate all the appropriate information such as planning, resource distribution, and regulating the various intra-department and SC partners' activities. Aydiner et al. (2019) stressed that through advanced IT, real-time information on resources such as material and inventory, delivery, manufacturing, and processing plans are shared within organizations to enhance performance. Although IT systems such as RFID have indeed been cited to have an effect in terms of a positive value addition process (Quesada et al., 2012; Yousefi & Alibabaei, 2015), linkages and incorporation of ICT systems related to operational performance and, extension, to entire organizational performance has not been experienced much among SMEs, especially those in FPI in Ghana (Oduro & Nyarku, 2018). Therefore, it is prudent to conceptualize the direct effect of IT on organizational performance. From the above assumption, the study hypothesizes that;

H₁: Information technology affects firm performance.

4.4 Supply Chain Collaboration (SCCIN and SCCEX) on Performance

Prior studies have shown that SCC can increase the competitive standing of firms either by consolidating its current positions or creating additional avenues for firms to undertake improvements (Inemek & Matthyssens, 2013) through important information and knowledge i.e., competencies and superior resources that would not have been acquired by the firms alone without collaborative communication (Flynn et al., 2010; Chen et al., 2013). Xu et al. (2014) penned those intra-organizational variables such as top management support (TMS) and information technology (IT) affect performance through the influence of SCC (supplier and customer; information and involvement). However, both supplier and customer collaboration exert their influences in different ways. Wong et al. (2015) affirmed that inter-firm collaborations such as information and knowledge exchange permit firms to respond

quickly to market expectations through increased speed of development and heightened responsiveness to customer needs. Kim and Chai (2016) postulated a significant relationship between internal and external collaboration and improved performance under intense market dynamism and competition in the market (hostility). Yuen and Thai (2017) confirmed a positive relationship between internal and external integration on operational performance, although it was different with respect to the product and service supply chain. Even though SCC and its connection with performance have gained much attention from both researchers and industries over the past decades as a competitive tool to improve the business performance within firms and the entire SC, nonetheless a review of literature indicates FPI in Ghana tends to be more conservative than developed manufacturing companies, as they may not be as willing to over-expose or over-extend themselves in relationship-specific investments (Adams et al., 2014; Arend & Wisner, 2005). Besides, challenges such as limited trust, goal incongruence and priorities, and incompatible structures in the exchange of information and communication, as well as knowledge sharing among FPI in Ghana may inhibit performance, coupled with the inadequacy in the study on FPIs. Furthermore, how the various SCC maturity levels lead to different performance outcomes is less understood by Ghanaian FPI. Based on this assumption, the study hypothesizes that;

H_{2a&b}: Internal supply chain collaboration and external supply chain collaboration affect organizational performance

4.5 Effect of IT on SCCIN and SCCEX

One of the main aims of IT usage by firms is to accurately forecast changes in customer preferences and deliver better products and services (Guersola et al., 2018; De Luca et al., 2021). IT contributes to strengthening the relationships among SC members in and outside a firm. IT enables the transfer of knowledge, information sharing and collaboratively communicate within and outside a firm in an accurate, timely, transparent, and frequent manner (Durugbo, 2014; Handfield et al., 2015; Siawsh et al., 2021). Daddi et al. (2021) cited positive effect of IT skills and knowledge transfer on developmental strategies, as Guersola et al. (2018) revealed that managing sustenance and IT influence supply chain collaboration. Even though it could provide support for FPI operating in emerging economies, however, framework for this implementation has not been accepted wholly and even those who accepted it find it difficult to incorporate it due to IT challenges. From above points raised, it is practical to assume that IT adoption affects SCCIN and SCCEX. Therefore, the study hypothesizes that;

H_{3a&b}: Information technology affects internal supply chain collaboration and external supply chain collaboration.

4.6 The Mediating Effect of Supply Chain Collaboration (SCCIN and SCCEX) between Information Technology and Organizational Performance

According to DCT, firms that want to survive competition in dynamic markets will have to reshape, reconstruct, and reconfigure their internal and external processes, competencies, and resources to attain improvement and competitive edge. This regeneration can be done by the realigning and building of collaboration and process capabilities or competence within and across the SC (Hortinha et al., 2011). Collaborative relationship practices such as information sharing and knowledge creation are essential factors that combine information flow for two-way communications (Durugbo, 2014; Handfield et al., 2015; Siawsh et al., 2021). Although IT has been cited to affect organizational performance, its positive or negative outcomes drives on the influence of SCC (Kim, 2017).

Wu et al. (2006) postulated a positive association between both IT investment and performance (market and financial) via the mediating effect of supply chain capabilities. Campo et al. (2010) confirmed an indirect relationship between IT and perceived performance through both information sharing and satisfaction; while Kim et al. (2010) consented that the adoption of RFID as part of a firm's infrastructure has the potential effect of permitting internal collaboration i.e., for more effective and efficient decision-making using real-time data, and performing routine and manual tasks better. Prajogo and Olhager (2012) revealed a significant relationship between information integration and logistics integration on operational performance through SCI. Kim (2017) publicized that IT is positively associated with firm performance through SCI, but integrative IT does not have a positive correlation directly with firm performance. However, the authors recommended the use of an additional mediating SCI variable and other reliable instruments as their study was limited to information sharing as the mediating variable in their study. Despite the number of studies that have focused on technological resources in improving performance in areas such as frequency, accuracy, timely, quantity, and quality of information shared, without the effect of human interface (SCC) performance achievement might not be realized. Therefore, based on the above revelations, the study hypothesizes that;

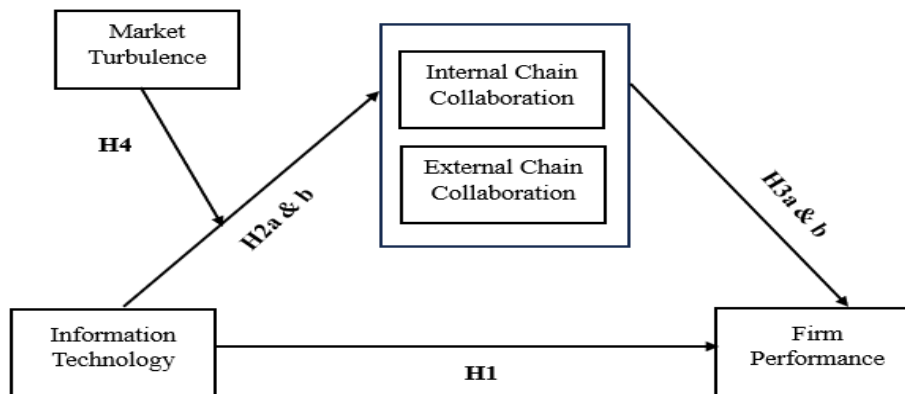
H_{4a&b}: Internal and external supply chain collaboration mediate the relationship between information technology and organizational performance.

4.7 The Moderating Effect of Market Turbulence on Information Technology and SCCIN and SCCEX

Contingency theory suggests that there is no one best way to structure a firm and its operations. This implies that the best way to shape a firm's structure and operations depends on the nature of the environment within which it operates. Firms restructure their structures and activities to fit environmental eventualities (Chenhall, 2003; Gerdin & Greve, 2004, 2008). Information and knowledge sharing might be avenues by which firms can suitably react to a turbulent market, creating long-term performance and ultimately retaining keenness (Hananiah et al., 2006). IT expertise has become necessary with respect to SCC since it aids in transmission of knowledge and the joint sharing of ideas that make SCC processes possible (Siawsh et al., 2021). Daddi et al. (2021) and Dugar and Fox (2022) believe that firms can be more efficient with their functional activities when they use purchase sites to communicate forecasting and planning production within and outside (supply chain partners) the firm. Xue et al. (2008) recommend firms in disturbed markets to adjust not only their commercial models but also their core operations to maintain a competitive edge over their opponents. Thus, advancing IT investments and performance improvements (Imboden et al., 2013; Zainalabideen et al., 2022). Daddi et al. (2021) found that IT skills and knowledge transfer substantially affect the development of strategies. Guersola et al. (2018) discovered that managing support and IT are essential to supply chain collaboration. Davis-Sramek et al. (2010) stress that firms in dynamic market environments require IT to strengthen collaborative relationship through information to influence decision-making. With increased market turbulence, firms are likely to explore broadly and conduct more exchange activities to survive.

H_{5a&b}: Market turbulence moderates the relationship between information technology and Internal and external supply chain collaboration.

Figure 1: Conceptual Framework



5.0 Methodology

5.1 Measurement Items

The survey instrument developed by this study is based on previous research performed by practitioners and academics in the FPI, hence, some adjustments were made to suite the FPI in Ghana. There are simple relationship ($x \rightarrow y$) sequences of linear connections called a mediating and moderating effect. The main questionnaire was divided into five sections. The first section gave the background information about the respondents, the second section contained questions relevant to the degree of IT usage in the FPI in Ghana. Section three included questions related to the degree of supply chain (internal and external) collaborative practices of the FPI in Ghana. The fourth section consisted of questions on the degree of perceived firm performance in relation to IT usage whereas the final section dealt with a set of questions on market turbulence. The measurements of this research's variables were performed by using the perceptual scale. Each question was to be answered through the Rensis Likert scale (Hair et al., 2010; Zikmund et al., 2010) and consisted of a set of the five-point scale descriptors from: strongly disagree (1); disagree (2); neutral (3); agree (4) to strongly agree (5) (Sekaran & Bougie, 2010). The researchers used a five-point Likert scale since it has been said to enhance respondents' understanding (Olakunke, 2003). The core measurement items are described below.

5.2 Supply Chain Collaboration (SCC) Measurement Items

Authors have generally distinct SCC as a multidimensional construct that contains different but related sides of partner associations (Kulp *et al.*, 2004; Jayaram & Tan, 2010; Sambasivan et al., 2013; Jain et al., 2014). Based on related studies, SC Collaborative practices (internal and external practices) were presented by two sub-constructs with a total of 25 items (internal collaboration 9 items and external collaboration i.e., information integration 5 items, joint knowledge creation 6 items, and collaborative communication 5 items) as indicated Table 2 (Flynn et al., 2010; Whipple et al. 2010; Cao & Zang, 2011; Wong et al., 2013; Yu et al., 2018; etc).

5.3 Research Method

The population of this research was FP SMEs who are members of Association of Ghana Industries (AGI). Others have registered with other agencies such as the Ghana Standards Authority (GSA), Food and Drugs Authority (FDA), National Board for Small Scale Industries (NBSSI), as well as some unregistered industries. FPI SMEs who operated from four (4) busiest and most populated regions in Ghana, namely Greater Accra, Ashanti, Eastern, and Bono were considered. Even though the various associations suggested 708 FPIs, however, a complete list of 500 was obtained from the records of the associations. Therefore, the five hundred (500) FPI SMEs from the four regions in Ghana were considered as shown in Table 3.1. was the assurance that firms (as the unit of analysis) have comparable characteristics. The study considered FPI SMEs who have operated for more than three (3) years, based on the assumption that these firms have fair knowledge about a number of changes that have occurred over the past three years. A cross-sectional survey was adopted as part of the research design (Easterby-Smith et al., 2008; Robson, 2002).

Table 1: FPI of SMEs from the Four Regions in Ghana

Region	Food Processing Industry	Population	Sample Size (FPIs)
Greater Accra	205	160	128
Ashanti	198	140	112
Eastern	142	106	85
Bono	165	94	75
Total	708	500	400

The sample size for this study was 400 i.e. 80% FP SMEs from the four regions in Ghana since the study proposed to use structural equation modelling (SEM) for data analysis, the sample size plays a critical role in the interpretation of SEM results as suggested by Hair et al. (2010). This study employed proportionate stratified and random sampling techniques, which is suitable to guarantee equivalent and independent representation of the research data (Cavana et al., 2001; Hair et al., 2007). Even though FPI has eight (8) categories of products, only four categories were considered for this study because of their immense contribution to the Ghanaian economy in terms of import value, job creation, and GDP (Quartey & Dankwah, 2015; Ampadu-Ameyaw & Omari, 2015; Tanko et al., 2019). The proportionate stratified sampling frame was divided into the four (4) products of the FPI. Inside each stratum, the name of the FPI was listed alphabetically and four hundred (400) FPI were randomly picked. For recording a reasonably acceptable response rate, as well as avoiding non-valid questionnaires, 400 food categories were selected based on proportionately stratified sampling.

6.0 Results and Discussion

6.1 Reliability and validity

Cronbach's alpha and a composite reliability test were utilized to assess the consistency of the model's constructs in this investigation. The validity of the model measurement was assessed by the use of indicator loadings, AVE, Fornell and Larcker, and HTMT tests. The 0.7 cut-off Cronbach alpha and composite reliability indices were employed to investigate the construct's internal consistency. The outcomes demonstrated that both the Cronbach alpha and the composite reliability indices were high enough to pass the threshold (Hair et al., 2016). This provides support for the validity and reliability of the measurement model's constituent elements in Figure 1 and Tables 7-9. Moreover, the findings demonstrated that the item loadings for all four constructs (Firm Performance, Information Technology, Market

Turbulence, and Supply Chain Collaboration) were over the 0.7 thresholds (see Table 2). This is proof of convergent validity. In addition, the study used AVE to verify the presence of convergent validity; the AVE results were over the 0.5 criteria (see Table 2). Furthermore, the Fornell and Larcker criterion was used, which entails contrasting the highest corrections of one construct with others by comparing their AVE square roots (Fornell and Larcker, 1981). Table 3 reveals that convergent validity was achieved because the square roots of the AVEs were higher than the within correlations. Considering the objections raised against the Fornell and Larcker method, the HTMT examination was also used in this study. Results as shown in Table 4 provide proof of sufficient discriminant validity, as the HTMT ratio should be smaller than 0.85, as recommended by Henseler et al. (2015).

Figure 2: Measurement Model Evaluation

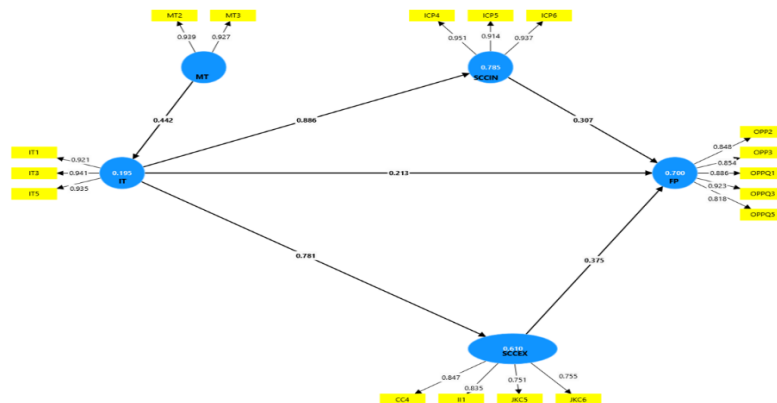


Table 2: Construct Reliability and Convergent Validity Measurement

Construct	Measurement Items	Cronbach's Alpha	(rho_A)	Composite Reliability	(AVE)
Firm Performance		0.917	0.918	0.938	0.751
	OPP 2				
	OPP3				
	OPPQ 1				
	OPPQ 3				
Information Technology		0.925	0.925	0.952	0.870
	IT1				
	IT 2				
Market Turbulence		0.851	0.855	0.930	0.870
	MT3				
Supply Chain Collaboration External		0.821	0.855	0.875	0.637
	CC4				
	II1				
	JKC6				
Supply Chain Collaboration Internal		0.927	0.927	0.954	0.873
	ICP 4				
	ICP 6				

Table 3: Hetrotrait-Monotrait Ratio of Correlation (HTMT) (Discriminant Validity)

	FP	IT	MT	SCCEX	SCCIN
FP					
IT	0.844				
MT	0.627	0.497			
SCCEX	0.843	0.844	0.450		
SCCIN	0.851	0.957	0.568	0.815	

FP= Firm performance, IT = Information Technology, MT= Market Turbulence

SCCEX = Supply Chain Collaboration External,

SCCIN = Supply Chain Collaboration Internal

Table 4: Fornell Lacker Criterion

	FP	IT	MT	SCCEX	SCCIN
FP	0.867				
IT	0.779	0.932			
MT	0.555	0.442	0.933		
SCCEX	0.779	0.781	0.420	0.798	
SCCIN	0.785	0.886	0.505	0.771	0.934

FP= Firm performance, IT = Information Technology, MT= Market Turbulence

SCCEX = Supply Chain Collaboration External,

SCCIN = Supply Chain Collaboration Internal

Figure 2 Structural Model

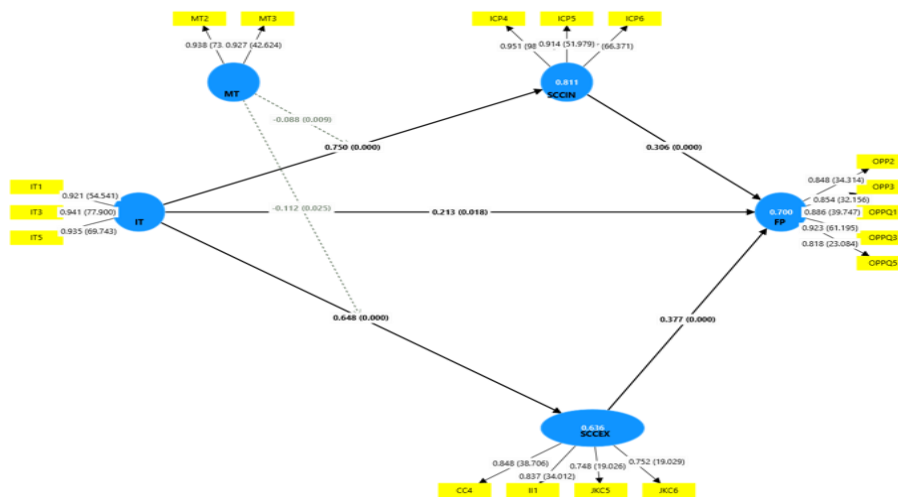


Table 5: Summary of results (Hypothesised paths)

Hypothesis	Path	(β)	T Statistics	P Values	Decision
H ₁	IT -> FP	0.213	2.368	0.018	Supported
H _{2a}	SCCEX-> FP	0.377	5.249	0.000	Supported
H _{2b}	SCCIN -> FP	0.306	4.8861	0.000	Supported
H _{3a}	IT -> SCCEX	0.637	8.092	0.000	Supported
H _{3b}	IT -> SCCIN	0.740	12.107	0.000	Supported
H _{4a}	IT -> SCCEX -> FP	0.244	5.274	0.000	Supported
H _{4b}	IT -> SCCIN -> FP	0.229	4.577	0.000	Supported
H _{5a}	MT ->IT ->SCCEX	-0.112	2.248	0.025	Supported
H _{5b}	MT ->IT ->SCCIN	-0.088	2.600	0.009	Supported

7.0 Summary of Results

7.1 Effect of IT on Firm Performance

The study projected sets three (3) direct effects of IT on firm performance (IT -> FP), IT on SCCEX and SCCIN (IT -> SCCEX and IT -> SCCIN), and SCCEX and SCCIN on firm performance (SCCEX -> FP, and SCCIN -> FP). The conclusions of the study suggested that all the hypotheses supported the objective. The study hypotheses IT affected firm performance which tends to be strong and positive ($\beta=0.213$, $t=2.368$ $p(0.018) < 0.05$) and this is consistent with the stream of prior studies that argued that IT investment influences firm performance (Quesada et al., 2012; Powell 2013; Yousefi & Alibabaei, 2015; Aydiner et al., 2019; Siagian et al., 2020). IT tools (phone, email, TV) can be significantly used to gather information, locate opportunities in the market, swiftly transmit information to their SC members, and restructure operational activities to meet the needs of the market, especially when there are extreme changes in the taste and preference of customers (Brandon-Jones et al., 2014). This presupposes that the positive effect of IT on performance of FPI SMEs of Ghana is because, they can locate opportunities within the market and share quality and relevant information within and outside the industry in relation to their business activities (short lead times, acceptable inventory, productivity, etc.) and waste reduction.

7.2 IT on SCCEX and SCCIN

Again, the study revealed that IT has a positive and significant effect on both SCCEX ($\beta=0.637$, $t=8.092$ $p(0.000) < 0.05$) and SCCIN ($\beta=0.740$, $t=12.107$ $p(0.000) < 0.05$) (Guersola et al., 2018; De Luca et al., 2021). IT systems such as ERP has a positive effect on planning, resource distribution and regulates activities for all the various intra departments and its SC partners (Aydiner et al., 2019; Siawsh et al., 2021; Daddi et al. (2021), IT enables the transfer of knowledge, information sharing and collaboratively communicate within and outside a firm in an accurate, timely, transparent and frequent manner (Durugbo, 2014; Handfield et al., 2015; Siawsh et al., 2021; Zainalabideen et al., 2022)). IT infrastructure impacts firms' processes, as it streamlines and configures activities such as demand and supply forecasting and planning,

sourcing, procurement, and accomplishment of orders among SC partners leading to enhanced performance (Aydiner et al., 2019). The alignment between IT and SCC as DC aims at delivering what is termed as value to customers through systems information and knowledge sharing to effect decision-making. The essence of IT is to boost quality and productivity by involving all chain members within and outside the firm in the process of value creation.

7.3 SCCEX and SCCIN on Performance

Likewise, on the hypothesis of SCC (SCCEX and SCCIN), the study demonstrated a positive and significant influence on firm performance, SCCEX ($\beta=0.377$, $t=5.249$ $p(0.000) < 0.05$) and SCCIN ($\beta=0.306$, $t=4.8861$ $p(0.000) < 0.05$). The result highlighted the relevance and impact of integrating SCC practices into the activities of FP SMEs in Ghana. The result has shown that RVT can be used to explain collaborative relationships (Cao & Zhang, 2011). The theory assumes that firms cooperate with one another for shared advantages, which infers that FP SMEs in Ghana need to focus on a high-quality collaborative affiliation internally and externally in areas of information integration, joint knowledge creation, and collaborative communication to aid performance attainment and meet competition.

A significant and strong influence of SCCIN ($\beta=0.306$, $t=4.8861$ $p(0.000) < 0.05$) on FP is reliable with Flynn et al. (2010) suggestion of SCCIN (members act as a unit to reduce NVA activities) and improve performance. Collaboration within Ghanaian FPI assists internal members in dealing with the adverse effects of the “bullwhip effect” by reducing wild inventory fluctuations and becoming more responsive to the whims and turbulence of markets (Kim & Chai, 2016). This finding could also be explained in relation to RVT, which posited that the accessibility, creation, and usage of information and knowledge are means of achieving a better performance (Cao & Zhang, 2011). This theory proposed that the Ghanaian FPIs’ success heavily depends upon how they can improve their information and knowledge base, incorporate or apply them within the functions of the organization, to improve performance (Fu & Piplani, 2004; Feyissa et al., 2019). Similarly, the outcome of SCCEX ($\beta=0.377$, $t=5.249$ $p(0.000) < 0.05$) on the performance of FP SMEs also is in line with Iyer et al. (2014). Effective and open communication, shared information and jointly created knowledge among firms and their SC members positively affect firm performance (Wong et al., 2015). Just as Wong et al. (2015) advocated, Ghanaian FPI SMEs’ collaboration with external chain partners would permit them to jointly streamline their processes through sharing of vital information, and knowledge as well as collaborative communication to respond quickly to market expectations as do their foreign counterparts.

7.4 The Mediating Effect of SCCEX and SCCIN on IT and Firm Performance

Additionally, the study assessed the mediating effect of SCCIN and SCCEX on IT and firm performance. The findings of the study revealed a partial mediation of SCCEX ($\beta=0.244$, $t=5.274$ $p(0.000) < 0.05$) and SCCIN ($\beta=0.229$, $t=4.577$ $p(0.000) < 0.05$) on IT and the performance of FPI in Ghana. This is one of the motivating and novel findings of this research using Ghana. The finding advocated that improvement of firms’ performance with respect to the use of IT is influenced by SCCEX and SCCIN. The result of the study is in agreement with the stream of research that proposed a significant mediating effect of SCC on IT and firm performance (Xu et al., 2014; Wong et al., 2015; Kim & Chai, 2016). For instance, Wu et al. (2006) postulated an optimistic relationship between both IT investment and performance (market and financial) via the mediating effect of SC capabilities, Campo et al. (2010) confirmed an indirect relationship between IT and perceived performance through both information sharing and satisfaction. Prajogo and Olhager (2012) revealed a significant

mediating effect of SCI on information integration (information technology and information sharing), logistics integration, and operational performance. Kim (2017) publicized a positive mediating effect of SCI on IT and firm performance. This study has affirmed the significant influence of SCC (internal and external) on IT usage on FP SMEs activities (demand and supply forecasting and planning, sourcing, procurement, and order accomplishment) performance improvement due to enhanced inter-firm coordination, especially when it comes to the location of opportunities in the market, swift transmission of information among SC members and restructuring of operational activities taking cognisance of the extreme changes in FPIs market. Thus, somehow, they can meet needs of the market timely due the collaborative efforts among them.

7.5 The Moderating effect of Market Turbulence on IT and SCCEX and SCCIN

With respect to the moderating effect of market turbulence on IT and SCCEX and SCCIN, thus, if the interactive effect of market turbulence would rather strengthen or weaken IT on SCCEX and SCCIN as far as FPIs activities are concerned. Empirically, the study has shown that the predicting variables, IT statistically and significantly interacted with the moderating variable (market turbulence) and SCCEX and SCCIN as displayed in Table 6. The two hypotheses actually supported the study; IT ($\beta = -0.112$, $t = 2.248$; $p(0.025) < .05$) and ($\beta = -0.088$, $t = 2.600$, $p(0.009) < .05$) interacted with the moderating variable (market turbulence) respectively, and SCCEX and SCCIN as suggested by Davis-Sramek et al. (2010).

It must be noted that the Ghanaian food market is threatened by immense competition due to its operation as an open market economy, liberalized and free trade. Therefore, this has attracted grants foreign industries such as USA, which owns almost 40 percent of the market. This has led to the proliferation of imported processed food products into the country's market affecting performance of local FPIs. In addition, the majority of the Ghanaian customers prefer imported processed food products over locally manufactured ones, since they are perceived to be of a higher quality. Moreover, the inconsistencies of FPIs in providing quality products, has always been a greater concern for most customers. Customers are dynamic due to their constant changing needs and preferences, therefore, what might be of quality today certainly might not be quality tomorrow. Hence these FPIs will need to build a strong collaboration within and outside the firm as far as research market engagements are concerned so as to meet the expectations and dynamics of the Ghanaian market. The use of IT within and outside the FPI to foster collaborative practices among its SC partners can streamline activities and increase the efficiency and effectiveness of FPIs by performance i.e., reducing waste (NVA, inventory), respond to timely customer needs and beat competition in the Ghanaian market (Chenet et al., 2010; Yen & Liu, 2014; Srivastava et al., 2015; Jangga et al., 2015). IT can help to increase FPIs' knowledge on operations when the market become unstable through feedback from SC members, and capture opportunities in the market, boost the local production of processed food, quality and meet competition in the marketplace. Furthermore, the study stressed on the need for Ghanaian FPIs to invest in efficient IT(s) that can lead intra and inter collaborative activities to curb constant and vivid changes, connect to industrial opportunities, and to face competition from cheap imports while maintaining their survival in this dynamic market.

8.0 Conclusion

We add to the understanding surrounding the prospective effect of IT on firm performance, the mediating and moderating role of SCC, and market turbulence of FPI SMEs in Ghana. It has been said that performance enhancement of the FPI SMEs can be possible through IT adoption, the influence of collaborative efforts of other SC partners especially firms operating in an

unstable market (like Ghana) require strong SCC to improve their performance. The discoveries made in this study partly explain the diverse results from past research that examined performance effects of SCC. This research could confidently be a springboard as far as finding solutions to manufacturing issues is concerned particularly in emerging countries such as Ghana. In terms of theory and practice, this study could equip FPI SMEs worldwide to take charge of their operations and meet competition anytime and anywhere.

9.0 Implications of the Study

9.1 Theoretical Implications

The impact among most of the items were hypothetically and evidentially supported. Thus, expectantly, this study expresses contributions to the body of knowledge, which are potted into different aspects. The study adopted (RV), DC, and the Contingency theories as far as the development of the research framework was concerned, to explain how all the variables IT, SCCEX, SCCIN, market turbulence, and firm performance interact with each other. This study adds to the IT literature which leads to firm performance. The results also confirmed that IT usage could affect FPI operating in an unstable market such as Ghana to achieve better performance through the influence of SCC. Additionally, inter-firm relationships are constantly moving from arms-length transactions to partnerships and alliances, where environmental dynamism (uncertainties and volatile changes) can be addressed, and performance be improved. RVT theorizes collaboration as a means of building new capabilities and creating relational rents among trading partners to attain and sustain better performance. The findings complement existing literature on SCC in explaining the relationship between SCC (internal and external) and organizational performance among SMEs. The study presents that SCC such as internal and external collaborative practices (information integration, joint knowledge creation, and collaborative communication) enhances performance, which cannot be achieved by members in isolation.

Furthermore, firm resources and operational competences are regarded as sources of attractiveness to react to let-downs with dexterity and promptness; sometimes becoming feeble in the face of environmental/market turbulence, especially if know-how gaps arise (Lavie, 2006) thereby affecting performance (Wilhelm et al., 2015). Based on Contingency theory, the study recognizes that building an inter-organizational collaborative relationship through the use of IT in the face of market uncertainties can result in improved performance and a competitive edge (Gerdin & Greve, 2008; Lee, 2010; Zainalabideen et al., 2022). Market turbulence has proven to affect performances such as quality, and productivity of firms such as SMEs with limited resources. The DCT emphasizes that, as markets become more globally connected with an increased rise in new forms of IT and competition, firms have to consider and specify strategic processes (SCC) that will enable them to exploit, adapt, and realign their capabilities and resources to meet the changes in the business environment. The theoretical inference is that market turbulence is essential for IT and SCC by reinforcing the implementation of (internal and external) to improve firm performance. Thus, the findings of this study validate support for strong IT usage on SCC performance under market turbulent. From the theoretical perspective, this study stressed the importance of fit by integrating concepts and theories.

9.2 Practical Implications

This study addresses managers and decision-makers of SMEs in FPI, encouraging them to consider adopting IT, collaborative activities (SCCEX and SCCIN) to affect their performance. Empirically, if an SME in FPI attempts to upsurge its performance then much attention should be on SCCEX (37.7%), SCCIN (30.06%), as well as IT (21.3%) which are capable of improving performance, especially looking at uncertainties regarding the Ghanaian markets. It is evident that until now, the majority of FPI SMEs in Ghana have not able to meet the needs of the market in terms of volumes and the quality needed by customers under any circumstances due to competition from cheap imported food products. The majority of FPIs in Ghana fail to collaborate or encounter challenges regarding collaboration within and outside their firms. The fact is that the various degree of SCC maturity leads to diverse performance misunderstandings (Amoako-Gyampah et al., 2019). The study recommends an intensive IT adoption to aid information sharing and knowledge creation among internal and external chain members of FPI SMEs in Ghana to minimize inefficiencies that lead to low productivity, substandard products, and wastage of resources. Effective collaboration among SC members can prevent waste (due to distortions or bullwhip effect) and increase FPI competitiveness through information exchange. Prioritizing collaborative practices among SC members through the use of IT can increase performance as competitive forces intensify especially those with the requisite capabilities and resources and resolve problems. Practitioners and other stakeholders can resort to SCC and match it with their present activities to gain more knowledge, and understanding and make informed decisions about its application. In addition, SCC via the use of IT can help the practitioners to assign duties inside and outside the firm and accomplish inter-firm performance enhancement. Finally, firms globally especially FPI of SMEs in Ghana should be able to acknowledge fact that, SCC can deliver a number of opportunities if it is well implemented. We anticipate that the submissions and thoughts revealed through this study will aid FPI SME specialists and executives to adopt it, meet and face competition. It is hoped that FPI practitioners and other stakeholders such as the government and policy makers can drive firms with active support into IT adoption and SC collaborative approach to enable them to always search for methods to eradicate NVA while seeking enhanced performance.

10.0 Limitations of the Study

As with all research, this study is not without limitations. It is necessary to unveil these limitations. One of them is the generalization of the results. The sample was restricted to CEOs, senior managers, and divisional heads of FPI SMEs in Ghana, therefore a single respondent from each firm was asked to supply responses to all the questions in the various sections. Further, data was obtained from focal firms only even though, supply chain consists of many partners such as suppliers, logistics service providers, retailers as well as customers.

11.0 Suggestions for Future Studies

To do away with common method bias, we suggest that the data should be collected from multiple sources. Also, since FPIs consist of many SC members, future research should collect data from dyadic, multilateral, or across all SC members. Since the study adopted a quantitative approach with a cross-sectional survey to test the framework in a snapshot at a point in time, future studies might consider the longitudinal approach. This is because improvement occurs largely due to the dynamism of the market and also considers the behaviour FPIs have towards SCC practices over a long period.

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