

Evaluating How Supply Chain Coordination Impacts Operations Performance

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Abstract

Supply chain coordination is considered a vital strategy for firms to increase profitability and stay competitive. With the growth in global competition, many researchers have expressed the need for a coordinated, unified, and long-term relationship between institutions and their supply chain partners. There is also a need to examine specific Supply chain coordination practices implemented at Senior High Schools. Since other countries have practiced the integration of upstream and downstream Supply Chain Coordination and has led to supply chain performance. This study had objectives, to assess the effect of supply chain coordination on supply chain performance, to determine the effect of information technology on supply chain performance, to assess evaluate the relationship between information sharing level and supply chain performance. To achieve these objectives, the study employed descriptive survey design, purposive sampling technique with a sample size of 150. The study has a response of 137 representing a response rate of 91.33%. The study's constructs have a KMO and Cronbach's Alpha results of 0.8 and 0.75 respectively. The regression analysis results of the study indicated that that supply chain coordination has a positive and significant effect on supply chain performance. . the findings of the study indicate that information sharing has a positive and significant effect on procurement performance. Again, the findings of the study indicate that information integration has a positive and significant effect on supply chain performance. The Test(s) of highest order unconditional interaction(s): statistically indicate that information integration partially moderates the relationship between supply chain performance and supply chain coordination. The study recommended that organizations should be willing to share the production plan and demand forecast information so that the organization can be in a better position to carry out some successful operations. Organizations should think of collaborative planning, forecasting and supplement so that they achieve better supply chain coordination. Companies can now enjoy the resources of their partners to be able to deliver effectively and efficiently.

Keywords: Supply Chain Coordination, Procurement System, Competitive Advantage and Company Performance, Technological Innovation

1.0 INTRODUCTION

With the growth in global competition, many researchers have expressed the need for a coordinated, unified, and long-term relationship between institutions and their supply chain partners (Lambert, Robeson, and Stock, 2017). Supply chain coordination is considered a vital strategy for firms to increase profitability and stay competitive (Al-Shboul, Barber, Garza-Reyes, Kumar, and Abdi, 2017). Supply chain coordination encompasses the planning and coordination of all activities involved in the process of sourcing, procurement, conversion, and all logistics coordination function (Ellrama and Murfield, 2019). The phrase "Supply chain coordination" originated in the early 1980s. Oliver and Webber (1982) define supply chain coordination as the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible.

Institutions adopt numerous business improvement methodologies to improve their performance. As competition intensifies, so do the challenges associated with getting a product or service to the right place at the right time at the lowest delivered total cost. Education system have begun to realize the potential benefits and importance of strategic and cooperative buyer-supplier relationships. They have started to involve strategic suppliers in resource coordination decisions (Morgan and Monczka, 2016). Instead of relying on tools such as acceptance sampling to establish the quality of incoming materials and component parts, manufacturers purchase

from a more limited number of qualified or certified suppliers and embrace the concept of supply base coordination, hoping to reduce costs by cutting inventory and improving efficiency throughout the supply chain (Watts and Hahn, 2013). In addition, institutions have come to place more emphasis on customer driven corporate policies that seek to simultaneously pursue objectives of customer satisfaction, quality and productivity improvement, and cost reduction.

Supply chain coordination comprises some particular tactics and practices to effectively and efficiently incorporate suppliers, manufacturers, distributors, and customers to improve the sustainable individual firms' performance and supply chain altogether in a unified business model (Tatoglu, Bayraktar, Golgeci, Koh, Demirbag, and Zaim, 2015). Supply chain coordination practices can be considered as a multi-dimensional paradigm that encompasses upstream and downstream sides of the supply chain (Li, Nathan, and Rao, 2006). supply chain coordination practices circumscribe some perspectives and practices that aptly connect all suppliers, manufacturers, distributors, and consumers to achieve all long-term performance objectives (Basheer, Siam, Awn, and Hassan, 2019).

Therefore, for staying competitive in the global race and for enhancing profitability, the understanding and practicing of supply chain coordination has become an important criterion (Al-tarawneh and AlShourah, 2018; Childhouse and Towill, 2003; Moberg, Cutler, Gross, and Speh, 2002). Leading scholars now agree that various Supply Chain coordination practices in the institution helps increase competitive capability (Bima, Hoque, and Munapo, 2020; Kim, 2006), productivity and operational cost efficiency (Brewer and Speh, 2000), market share (Tan, Limen, and Wisner, 2002), operational performance (Koh, Demirbag, Bayraktar, Tatoglu, and Zaim, 2007), Supply Chain Performance: (Attia and Eldin, 2018; Khan and Qianli, 2017),

Supply Chain Coordination practices have received numerous other definitions; Koh et al., (2014) defined Supply Chain Coordination practice as the set of activities undertaken by an institution to promote effective coordination of its supply chain; as the approaches applied in integration, managing and coordination of supply, demand and relationships in order to satisfy clients in an effective way (Wong et al., 2015); as tangible activities/technologies that have a relevant role in the collaboration of a focal firm with its suppliers and/or clients (Vaart and Donk, 2013); and as the approach to involve suppliers in decision making, encouraging information sharing and looking for new ways to integrate upstream activities. As a consequence, it involves developing customer contacts by customer feedback to integrate the downstream activities and delivering orders directly to customers (Chow et al., 2014). The concepts and practices of Supply Chain Coordination have been touted as improving the supply chain performance of institutions who participate in them.

Ghana Education Service positioned in a supply chain coordination must manage interactions in both upstream and downstream segments of this system (Andersen and Christensen, 2015). The upstream system of an organisation comprises of its suppliers as well as all the suppliers' upstream partners, while the downstream system includes the institution's customers and all the customers' downstream stakeholders (Andersen and Christensen, 2015). In the upstream system, the education system of Ghana Education Service links the local production joint ventures to suppliers. The upstream supplier system, supports lots of businesses that directly supply inputs and services to the system.

There are institutions in the upstream that supply the educational equipment's and chemicals. These producers also supply equipment such as books, pens, and many others. Business services include financial institutions, advertising agencies, sign makers, design firms, business consultants, accounting firms, law offices, repair services, and among others. Construction firms are major partners during expansion programs (Economic Impact Report, 2018). The flow of materials and information through a business from the purchasing activity, through the operations and out to customers, by way of distribution or service delivery activity can be described as immediate supply chain, there are often strategic benefits to be gained in managing the flow between customers and suppliers. Inter-company operations coordination of this nature is now commonly referred as Supply Chain Coordination practices. In light of the new business opportunities arising from information technologies, several traditional firm value chains are rapidly moving toward supply chain networks (Caputo et al., 2013). A supply chain

network incorporates all of the value-adding stakeholders involved in activities such as the development, production and commercialization of a product or service (Nagumey et al., 2015).

Nowadays, business is more challenging, and many of the institutions increase their focus on creating the best value to the targeted customer. The center of business concern is to provide value to Ghana Education services which can meet the customer's need (Sukati, Abdul-Hamid and Baharun, 2014). Supply chain coordination practices allow suppliers, manufacturers, distributors, and customers to integrate their operations in order to reduce costs and response time to the customer. Supply chain coordination is the integration of key business processes including the customary logistics activities of warehousing, inventory control, transportation coordination, and the non-traditional logistics activities including procurement, production support, packaging, and the processing of orders. Supply chain coordination assesses the operational strategies that impact the purchasing, production, logistics coordination, and also analyzes the entire flow of goods and services in the supply chain to improve profitability (Weeks and Mileski, 2013).

Supply chain coordination involves managing complex flow of information, materials, and money across multiple functional areas both within and among companies. The aim is to achieve goals related to total system performance rather than optimization of a single phase in a supply chain. Typically, the goals for Supply chain coordination are to develop value-added processes that deliver innovative, high-quality, low-cost products on time with shorter development cycles and greater responsiveness (Fawcett and Magnan, 2014). This necessitates companies to identify, evaluate, rank, and manage its supply chain risks. Company's obsession with speed and costs also causes supply chains to break down particularly during the launch of new products (Lee, 2014). According to Speckman and Davis (2015) as supply chain takes advantage of core competences of partnering firms it should also be prepared to manage the risks that may emanate because of partnering firms' practices related to environment and ethics. Supply chain coordination is concerned with managing flow of materials and information between the operations which form the strands or chains of a supply network (Douglas et al., 2013).

Recently, many institutions have shown great interest in Supply Chain Coordination because they finally realized that they can no longer compete effectively in isolation of their suppliers or other entities in the supply chain since better coordination of the supply chain improve customer delivery and at the same time reduce overall costs. From his research findings Christopher (2012) found out that currently businesses no longer compete as solely autonomous entities, but rather as supply chain. Therefore effective coordination of supply chains is seen as a must strategy for the survival of any company for purpose of staying competitive in the local market as well as in the global market.

Currently, there is an intensive global competition in the education system due to the fact there is an increase of international trade and foreign production that challenges local firms that previously relied on national regulations to protect them from international competition. Already, today, many retailers are increasingly focusing on their own private labels which will impact the distribution channels and/or product range of food processors (Hsiao, 2014). Vachon and Wassen (2013) in the study of "Extending green practices across the supply chain: The impact of upstream and downstream integration", argues that technological integration with primary suppliers and major customers was positively linked to environmental monitoring and collaboration. Mwanoyota (2014) in the study of "Integrating Supply Chain Coordination and Enterprise Resource Planning Systems. A survey of education in South Africa", argues that supply chain integration can encourage information sharing, collaboration and cooperation among supply chain partners.

The strategic benefits of upstream and downstream integration of supply chain include but not limited to: more efficient coordination of inventory, better focus on the company's competitive priorities therefore offering competitive advantage over competitors, encourage information sharing, collaboration and cooperation among supply chain partners, results in improved customer service due to its customer based approach, results to reduction in operating costs and focused approach thus increased profitability for the institution, results to formation of strategic business allowances and encourage, the adoption of current process technologies in managing business operations. However supply chain integration is faced by the following

challenges: it requires strong commitment and involvement by top coordination, supply chain risk coordination, need to react to dynamic market changes and developing, nurturing and maintaining strategic partnerships (Mwanyota, 2014).

Supply chain performance can also be defined as the ability of the supply chain to deliver the right product to the correct location at the appropriate time at the lowest cost (Zhang and Okoroafo, 2015). Leonczuk (2016) viewed supply chain performance as the capability of the entire supply chain to satisfy end-customer needs, including ensuring the availability of the product, on-time delivery, and appropriate inventory levels. Supply chain performance has become an indispensable source of sustainable competitive advantage in most public Senior High Schools. It considers multiple performance measures related to supply chain members, along with the integration and coordination of their performance (Al-Shboul et al., 2017).

1.2 Statement of the problems

Ghana the strongest economy in Eastern Africa region has taken a strong development path by institutionalizing research institutes in various aspects in a bid to meet its growing population demands (USDS, 2018). However with an increasingly knowledgeable population, such government agencies are facing ever increasing demands for accountability and quality services. The research institutions have to deliver on their core mandates while at the same time facing budgetary limitations. Faced with this challenge, research institutions have to re-evaluate their operations and seek greater efficiencies so as to reduce costs. One of the major areas that have been identified as having great potential to improve efficiencies and reduce costs is in the supply chain.

Burgess et.al (2006) noted that supply chain coordination has become very important but there appears to be little research that is focused on supply chain practices. supply chain coordination, coordinates and integrates the activities of supply chain members into a seamless process at a minimum cost (Cox, Blackstore, and Spencer, 1995). Any inefficiency incurred by any of the supply chain members can impact on the performance of the whole chain. This is because the inefficiencies get translated into increased costs. The right information exchanged in the supply chain coordination at the right time can help improve the performance of all the members in the chain (Chopra and Meindl, 2004) by reducing the bullwhip effect (Hav, Padmanabhan, and Whang, 1997). Information is a key factor in managing and coordinating the supply chain and therefore, has to be carefully managed so that all the supply chain members can achieve their objectives.

A number of studies on supply chain coordination practices had been conducted. For instance Mogire (2011) conducted research on Supply Chain Practices in Kenya Education Service in Kenya. Orukoh (2007) examined supply chain coordination practices in Numerical Machining Complex Ltd. He established that the company had not institutionalized a collaborative relationship with its suppliers and suggested that effective communication, continuous improvement, competitiveness, culture, quality control and review were required as good Supply Chain Coordination practices. However, the study did not try to find out the relationship between supply chain coordination and supply chain performance.

Mwirigi (2007) studied green supply chain coordination practices by manufacturing firms in Kenya. However, the study focused more on the private sector hence there is need to examine supply chain coordination in the public sector in Kenya. Gwako (2018) Studied Supply Chain performance measurement in Kenya Airways; This study was however limited in scope as it covered only one company hence there is need to widen the scope and find out supply chain coordination practices in public sector in Kenya. Onyango (2011) studied Supply Chain coordination practices and performance in cement industry in Kenya.

Empirical research provides that Supply Chain coordination practices contribute to performances of an institution. Tan et al. (2012) found that customer relation and purchasing practice impacts the effectiveness of Supply Chain Coordination strategies and lead to the financial and market performances and Ghana seem to be grappling with performances. Could this problem be due to lack of adequate Supply Chain coordination practices? This study therefore seeks to investigate the impact of Supply Chain coordination practices on Supply Chain Performance: s in Ghana. The question however is; to what extents do Supply Chain coordination

practices affect or influence the performance of businesses in Ghana? Is there a recognized and standardized framework for assuring business success through the application of the principles of Supply chain coordination in Ghana? This study therefore sought to find some answers to these questions particularly from a Ghanaian perspective and to establish whether Supply chain coordination practice affect supply chain performance in Senior High Schools .

The study further examines specific Supply chain coordination practices implemented at Senior High Schools. Since other countries have practiced the integration of upstream and downstream Supply Chain Coordination and has led to supply chain performance, it was necessary to find out how the education system in Ghana can benefit from this practices. Therefore As evidenced in the above studies there is no known study that has focused on addressing this gap. This study therefore seeks to answer the following questions related to supply chain coordination practices in Ghanaian education system by assessing and understanding the benefit to derive from Supply chain coordination practices as well as their effect on the supply chain performance.

1.3 Significance of the Study

This study would enable the coordination of Ghana Education Service and other similar institutions in Ghana to identify Supply Chain coordination practices, which could be employed to bring improvement in supply chain performance. The study would also help the education institutions in Ghana to establish the effect of supply chain coordination practices on their supply chain performance of the institution. Other non-education institution would also benefit from the findings of this study since it would shed more light on the effect of Supply Chain coordination practices on supply chain performance of the organisation. The study would provide an aid to the government of Ghana and policy makers towards their development process of improving the education institutions in the country. The study would come up with an understanding and encouragement to the regulatory bodies and policy makers to take some necessary actions to address the importance of implementing an effective and efficient Supply Chain coordination practices in education sector so as to improve their overall supply chain performance and increase their competitive advantage in the global markets.

1.4 Research Methodology

The research adopted a quantitative design with a survey method. This study will assess the effect of supply chain coordination on supply chain performance SME's in Ghana Education Service. The target population of the study is procurement managers in the cross-sectional companies sampled for this study. The study employed a simple random sampling technique to select the sample size due the similar environment of the population. The collection instruments were done by self-administered questionnaires which were mainly only closed ended questions. For the analysis, only primary data was gathered. A presentation of the actual information that was collected to accomplish the purpose of the analysis was then provided by the primary data. Primary data was collected using only closed-ended questionnaires administered to procurement officers in the institutions. For instance, in the work of Saleemi (2017) SPSS version 20 and Microsoft Excel version 16 was adopts for the analysis hence a similar study can also rely on SPSS.

1.5 Scope of the Study

This study focuses on supply chain coordination on supply chain performance SME's in Ghana Education Service. Senior High Schools were growing institutions in Ghana Education Service, Ghana. The study covers both senior and junior staff data were gathered from the coordination and staff of these Senior High School's with specific focused on senior and junior staff responsible for acquiring and managing the institution's supply chain operations. The study was carried out at three Regions in Ghana Education Service. The researcher uses procurement department for the study and use both senior and junior members of staff for the study.

1.6 Limitations of the study

As of time restraints, the study is limited only to three Senior High Schools in Regions for that matter, which could not authorisation a complete study on a large extent. Also, the research is limited to three Senior High Schools in Regions while divergence of improved different service sectors will have been better. The study mainly depended on the data provided by the respondents. This means that the accuracy of the data provided depended on the information provided. The respondents handled the problem by making calls to clarifications. Another limitation was the inadequacy of funds needed to conduct the study.

Organisation information is proprietary and confidential. Most of the respondents approached were reluctant in giving some information fearing that the information sought will be use to intimidate them or create a negative image of the firms they work for. The respondents busy working schedules which delayed the completion of the data collection process was another major challenge. The researchers had to exercise utmost patience and make extra effort in reminding respondents and making constant follow-ups so as to acquire sufficient data from respondents. The researcher also finds it difficult to more information's because of coronavirus epidemic. Due to that, it is very difficult get access to library for information's.

2.0 LITERATURE REVIEW

This presents the literature review on the topic the assessing the effect of supply chain coordination on supply chain performance. The chapter also considers the theoretical review, conceptual framework and what various scholars and authors have said about the supply chain coordination on supply chain performance, challenges in the implementation of supply chain coordination and summary

2.2 Supply Chain Coordination Practices

Supply chain coordination practices comprises a group of individual functional entities, approaches, and practices for increasing the long-term competitive performance of individual firms and their supply chain overall by integrating the internal functions within the firm and also effectively relating them with the external functions of suppliers, manufacturers, distributors, customers and their other channel members (Al-Shboul et al., 2017). It can be considered as the set of activities that taken place in an institution so that it can promote effective coordination of its supply chain (Attia and Eldin, 2018). Sundram, Chandran, and Bhatti (2016) defined Supply chain coordination practices as operational functions of an institution that helps to ascertain the effectiveness and efficiency of its supply chain.

Two specific purposes of supply chain coordination will be enabled to interpret the strategic nature of Supply chain coordination practices. These two are, namely, to enhance the performance of an individual institution and to increase the performance level of the entire supply chain (Trkman, McCormack, Oliveira, and Ladeira, 2010). Supply chain coordination requires more close integration of the firms' internal functions and also external involvement with their suppliers, customers, and other channel members to be highly competitive and to attain sustainable profitability growth. It can be possible to achieve this through the effective construction of various supply chain coordination practices (Sundram, Chandram, and Bhatti, 2016).

Supply chain coordination practices has numerous dimensions that have been identified by various authors. Chen and Paulraj (2004) mentioned various other dimensions to measure Supply chain coordination practices. Those are supplier base reduction, proper communication, cross-functional teams, long-term relationship, and supplier collaboration. Moreover, to conceptualize Supply chain coordination practices, Min and Mentzer (2004) added seven essential variables, such as supply chain leadership style, information sharing level, long-term relationship, agreed on vision and goals, risk and reward sharing, process integration, and its cooperation.

To successfully implement the Supply chain coordination practices; Mentzer, DeWitt, Keebler, Min, Nix, and Smith (2001) suggested the following necessary activities: integrated behavior, integration of processes, mutually sharing of information, cooperation, goal congruence, the same focus in serving customers, and, building and maintaining long term

relationships. So that Supply chain coordination practices have various dimensions and perspectives which ultimately enhance the supply chain performance of the overall institution. As a result, Supply chain coordination practices are considered as a multidimensional concept. This study has focused on five constructs or dimensions of Supply chain coordination practices. These five dimensions are strategic supplier partnership, customer relationship, information sharing level, information quality level, and postponement.

Table 2.1: Conceptual Definitions of Supply chain coordination

Author (Year)	Definitions
Langley et al (2018),	Supply chain coordination defined as an art and science that involves the integration and flows of the three components in the supply chain pipeline that is: products, information and finance starting from the suppliers' supplier and ending with the ultimate consumer or the customers' customer.
Assey (2015)	Supply chain coordination is focused on the coordination and examining of the network within the supply chain for gaining a better cost saving and providing a better customer service.
Ganeshan and Harrison, (2014)	Supply chain coordination define as a network or chain of facilities and distribution options that execute the process of the obtainment of products, the transformation of these products into intermediate and finished goods, and the distribution of these finished goods to customers.
Christopher (2016)	Supply chain coordination is focusing on both internal and external flow of processes and flows and like mentioned earlier, competition today is between supply chains rather than individual institutions.
Li, (2017)	defines Supply chain coordination as a strategic view of materials and distribution coordination that shows the benefits to the individual from the boost of performance of the supply chain as a whole through the lens of the business processes across functional and corporate borders supply chain coordination practices' is defined as "the set of activities undertaken by an institution to promote effective coordination of its supply chain"
Donlon, (2016).	Supply chain coordination practices as a multi-dimensional construct that includes both upstream and downstream sides of the supply chain
Tan (2014).	used quality, purchasing, and customer relations to represent supply chain coordination practices, in their empirical study.
Dawe (2017).	Dawe (2004) point that, for effective supply chain coordination, a comprehensive effort for improvement in all of supply chain functions within a firm should be made, and, first of all, the focus of supply chain practices should shift from functional and independent to general and integrative.
Dave (2016).	Supply chain coordination continues to be adopted by institutions as the medium for creating and sustaining a competitive advantage and points out that such a displacement is understandable considering the potential benefits of successful supply chain coordination
(Koh et al., 2007)	Supply chain coordination practices are defined as the set of activities undertaken by an institution to promote effective coordination of its supply chain such as the approaches applied in integration, managing and coordination of supply, demand and relationships in order to satisfy clients in an effective way
Al-Shboul et al., (2017)	Supply chain coordination comprises a group of individual functional entities, approaches, and practices for increasing the long-term competitive performance of individual firms and their supply chain overall by integrating the internal functions within the firm and also effectively relating them with the external functions of suppliers, manufacturers, distributors, customers and their other channel members

(Attia and Eldin, 2018)	It can be considered as the set of activities that taken place in an institution so that it can promote effective coordination of its supply chain.
Sundram et al. 2016)	Supply chain coordination requires more close integration of the firms' internal functions and also external involvement with their suppliers, customers, and other channel members to be highly competitive and to attain sustainable profitability growth. It can be possible to achieve this through the effective construction of various Supply chain coordination practices
Min et al, (2016)	(2001) suggested the following necessary activities: integrated behavior, integration of processes, mutually sharing of information, cooperation, goal congruence, the same focus in serving customers, and, building and maintaining long term relationships. So that supply chain coordination practices have various dimensions and perspectives which ultimately enhance the performance of the overall institution

2.2.1 Supplier Relationship Coordination

Supplier relationship is defined as the long term relationship between the institution and its suppliers. It is designed to leverage the strategic and operational capabilities of individual participating institutions to help them achieve significant ongoing benefits. A strategic partnership emphasizes direct, long-term association and encourages mutual planning and problem solving efforts. Such strategic partnerships are entered into to promote shared benefits among the parties and ongoing participation in one or more key strategic areas such as technology, products, and markets. Strategic partnerships with suppliers enable institutions to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products. Suppliers participating early in the product-design process can offer more cost effective design choices, help select the best components and technologies, and help in design assessment. Strategically aligned institutions can work closely together and eliminate wasteful time and effort. An effective supplier partnership can be a critical component of a leading edge supply chain (Li et al., 2004).

2.2.2 Information Sharing

Information sharing is defined as “The extent to which critical and proprietary information is communicated to one’s supply chain partner.” The advancements of information technology have greatly contributed to the evolution of sharing information throughout the supply chain. Regular exchanges of information enables supply chain parties to perform as a single body. Shared information has different kinds related to inventory, resources, products, demands, delays, and planning information. It may also include information about quality, logistics, customer and general market information, and design information. In order to yield best results, shared information has to be adequate, accurate, credible, and timely. Information sharing affects performance in terms of improved customer responsiveness, decreased costs, enhanced service levels, and reduced levels of complexity (Ayman, 2014).

2.2.3 Quality of Information Sharing

Includes such aspects the accuracy, timeliness, adequacy and credibility of information exchanged. While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom. Literature is replete with example of the dysfunctional effects of inaccurate/delayed information, as information moves along the supply chain. Divergent interests and opportunistic behavior of supply chain partners, and informational asymmetries across supply chain affect the quality of information. It has been suggested that institutions will deliberately distort information that can potentially reach not only their competitors, but also their own suppliers and customers. It appears that there is a built-in reluctance within institutions to give away more than minimal information since information disclosure is perceived as a loss of power. Given these predispositions, ensuring the quality of the shared information becomes a critical aspect of

effective Supply chain coordination, institutions need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion (Li et al., 2004).

2.2.4 Strategic Suppliers Partnership:

Strategic supplier partnership can be defined as the long-term and committed relationship that is developed between the institution and its suppliers (Al-Shboul et al., 2017; Li et al., 2006). It has been described as an SC collaboration, wherein more than two autonomous firms work together to plan and implement SC operations to achieve a fixed goal (Simatupang and Sridharan, 2002). Dell, Hewlett-Packard, Procter and Gamble, and IBM have all formed long-term collaborative connections with their main suppliers, and this has run to a decline of transaction costs and an increase in mutual competitive advantage (Sheu, Yen, and Chae, 2006).

That kind of collaboration allows firms to share risks (Kogut, 1988), measure their complementary resources (Park et al., 2004), provide a lower transaction cost, increase productivity (Kalwani and Narayandas, 1995), and improve firm performance in terms of profit and competitive advantage (Mentzer, Foggin, and Golicic, 2000). To operate a leading-edge supply chain, SSP is considered as a crucial strategy (Lonngren, Rosenkranz, and Kolbe, 2010). Azar, Kahnali, and Taghavi (2008) have examined the impact of supplier coordination on the performance level and they have found that effective coordination of the supplier is directly linked to a higher performance level. The partnership with suppliers and information integration with them have an influence on the performance of the supply chain (Khan and Siddiqui, 2018).

2.2.5 Customer Relationship:

Customer relationship (CR) practices are considered as a set of tactics employed by an institution to accomplish some essential customer requirements which may include, customer relationship coordination, dealing with customer complaints, and enhancing customer satisfaction (Sundram, Chandram, and Bhatti, 2016). Close customer relationship enables an institution to differentiate and modify its product from its competitors and extend the value which it provides to its customers and that leads to sustaining customer loyalty through customer satisfaction (Cox, 2004; Dadzie and Winston, 2007). According to Bayraktar, Demirbag, Koh, Tatoglu, and Zaim (2009), forming a close customer relationship is as necessary as establishing a close supplier relation.

And, Frohlich and Westbrook (2002) also claim the significance of establishing close customer partnerships to create customer value. It allows institutions to develop customized products, thus addressing different attributes of flexibility, enables tracking of and addressing changes in customer demand preferences and trends, thus addressing the attribute of responsiveness (Tarafdar and Qrunfleh, 2016). Customer relationship involves different forms and activities including integrated problem-solving initiatives, establishing long-term relations with customers, enhancing customer contacts, effective response to customer complaints, and increasing customer satisfaction (Boulding, Staelin, Ehret, and Johnston, 2005; Sousa, 2003).

2.2.6. Information Sharing Level

The information sharing level (IS) is a vital component in successful supply chains. It can be defined as the transfer of product-related information such as inventory levels, delivery schedules, order status, and performance (Khan et al., 2018). Shared information has several kinds related to inventory, resources, products, demands, delays, and planning information. It also contains various quality-related information, logistics, customer preferences, the firm's general market information, and design information (Singh, 2013). It can accelerate the flow of information in the supply chain, enhance the flexibility and efficiency of the supply chain, and also increase responsiveness to changing customer needs by sharing available data with other supply chain partners. More information sharing leads to greater visibility across the supply chain, and as a result, it enables lower inventory levels and lower supply chain costs considerably and reduces lead time through reductions in inventories and shortages (Nimeh, Abdallah, and Sweis, 2018). To create the best result, shared information has to be adequate, accurate, credible, and timely (Li, Nathan, and Rao, 2004). Information sharing affects performance in

terms of improved customer responsiveness, decreased costs, enhanced service levels, and reduced levels of complexity (Zhao and Benton, 2007)

2.2.7. Information Quality Level

Information quality level (IQ) involves some aspects to manage information properly and communicate effectively and efficiently in the term of accuracy, adequacy, timeliness, and credibility (Sundram, Chandram, and Bhatti, 2016; Li et al., 2006). Lee, Strong, Kahn, and Wang (2002) defined four distinct categories of the attributes of business information quality, those are named as intrinsic, contextual, representational, and accessible. Information exchanged between trading partners should have a certain quality (i.e. timely, accurate, complete, adequate, and reliable), in which such quality information will assist firms to make informed decisions on the updated-ness of their processes, techniques, and technology and thus being technologically competitive (Lee, Ooi, Loong, and Sohal, 2018). Hence, ensuring the quality of shared information becomes a critical aspect of effective supply chain coordination (Banerjee and Mishra, 2017; Feldmann and Muller, 2003).

2.2.8. Postponement

Postponement (POS) is perceived as an institutional concept whereby some of the supply chain activities are not executed until precise customer order information becomes available (Carbonara and Pellegrino, 2018). It enables an institution-institution to achieve a great level of product customization along with production flexibility (Kisperska Moron and Swierczek, 2011). Generally, inventories are retained undifferentiated for a specific period until customer demand is certain. Therefore, an institution becomes highly responsive as regards the changing pattern in customer demand (Li et al., 2006; Li, Rao, and Nathan, 2005). POS can bring several benefits to companies. It enables companies to control the risks related to product diversity and uncertain demand, increases flexibility, enables companies to keep their options open before the availability of sufficient information, reduces supply chain costs by keeping undifferentiated inventories, reduces levels of inventory, improves forecasting effectiveness, facilitates mass customization, and reduces production cycle times (Yang et al.,

2.2.9 Supply Chain Performance

Supply Chain Performance: refers to how well an institution achieves its market-oriented goals as well as its financial goals (Yamin, 1999). The short-term objectives of supply chain coordination are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Tan, 1998). Financial metrics have served as a tool for comparing institutions and evaluating an institution's behavior over time (Holmberg, 2000). Any institutional initiative, including supply chain coordination, should ultimately lead to enhanced Supply Chain Performance: . A number of prior studies have measured Supply Chain Performance: using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position represented by constructs like, Price/Cost.

“The ability of an institution to compete against major competitors based on low price” (Li, 2006). Quality. “The ability of an institution to offer product quality and performance that creates higher value for customers” (Koufteros, 1995), delivery dependability. The ability of an institution to provide on time the type and volume of product required by customer(s) (Li et al, 2006), product innovation. The ability of an institution to introduce new products and features in the market place (Koufteros, 1995) and Time to Market. “The ability of an institution to introduce new products faster than major competitors” (Li et al., 2006).

2.2.10 Supply Chain Coordination Practices and Supply Chain Performance

Supply chain coordination practices impact not only overall Supply Chain Performance: , but also competitive advantage of an institution. They are expected to improve an institution's competitive advantage through price/cost, quality, delivery dependability, time to market, and product innovation. Prior studies have indicated that the various components of supply chain

coordination practices (such as strategic supplier partnership) have an impact on various aspects of competitive advantage (such as price/cost). For example, strategic supplier partnership can improve supplier performance, reduce time to market (Hanfield, 1997), and increase the level of customer responsiveness and satisfaction (Power, 2001). Information sharing leads to high levels of supply chain integration by enabling institutions to make dependable delivery and introduce products to the market quickly. Information sharing and information quality contribute positively to customer satisfaction and partnership quality (Lee, 1999).

Postponement strategy not only increases the flexibility in the supply chain, but also balances global efficiency and customer responsiveness (Van, 1999). Firms with high levels of supply chain coordination practices will have high levels of competitive advantage. Having a competitive advantage generally suggests that an institution can have one or more of the following capabilities when compared to its competitors: lower prices, higher quality, higher dependability, and shorter delivery time. These capabilities will, in turn, enhance the institution's overall performance (Mentzer, 2000). Competitive advantage can lead to high levels of economic performance, customer satisfaction and loyalty, and relationship effectiveness. Brands with higher consumer loyalty face less competitive switching in their target segments thereby increasing sales and profitability (Moran, 2001).

Supply Chain Performance refers to how well an institution achieves its market-oriented goals as well as its financial goals (Yamin, 1999). The short-term objectives of supply chain coordination are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Tan, 1998). Financial metrics have served as a tool for comparing institutions and evaluating an institution's behavior over time (Holmberg, 2000). Any institutional initiative, including supply chain coordination, should ultimately lead to enhanced supply chain performance. A number of prior studies have measured supply chain performance: using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position represented by constructs like, Price/Cost.

"The ability of an institution to compete against major competitors based on low price" (Li, 2006). Quality "The ability of an institution to offer product quality and performance that creates higher value for customers" (Koufteros, 1995), delivery dependability. The ability of an institution to provide on time the type and volume of product required by customer(s) (Li et al, 2006), Product Innovation. The ability of an institution to introduce new products and features in the market place (Koufteros, 1995) and Time to Market. "The ability of an institution to introduce new products faster than major competitors" (Li et al., 2006).

2.2.11 Supply Chain Coordination Practices and Supply Chain Performance

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2.2.12 Benefits of Supply Chain Coordination

Supply chain coordination fosters a spirit of shared ownership of the problems and solutions: strong commitment and involvement by top coordination: consistent goals and objectives communicated to all levels and functions and across institutions in the supply chain, so that all programs are in consonance: and effective use of recognition and rewards. This acts as a motivating factor for employees in the institutions that constitute the supply chain (Zheng et al., 2000). Supply chain coordination leads to increased efficiency in transactions between supply chain partners due to enhanced information sharing, collaboration and cooperation IT has played a big role in facilitating improvements in supply chain coordination (Fischer, 1997). Supply chain coordination focuses the institution on competitive priorities that result in creating a competitive advantage over the institutions competitors (Chase et al., 2001).

Narasimhan and Jayaram (1998) similarly demonstrated that by managing suppliers strategically, a firm could improve its operational performance, in terms of dependability, flexibility, cost, and quality. Furthermore, in Groves and Valsamakis (1998), the strength of the partnership between a supplier and a buyer explained significant differences in the timeliness of delivery both from suppliers to the firm and from the firm to its customers. Most recently, Salvador et al. (2001) reported that when firms interact with suppliers and with customers on issues related to materials (low and quality, firms can expect better time-related operational performances in terms of speed and delivery punctuality.

2.2.13 Supply chain performance indicators

Supply chain performance is a two-dimensional definition which consists of effectiveness and efficiency (David et al., 2006). Effectiveness is about, doing the right things” and efficiency is about, doing things right”. Supply chain effectiveness relates to the preference of the end-consumer and the sole indicator is consumer satisfaction. Conversely, supply chain efficiency relates to the objective performance of processes. Efficiency indicators measure an output level against an input level (Wang and William, 2007). The supply chain operations reference (SCOR) model was introduced in 1996 by the Supply-Chain Council, which is a global institution of firms interested in supply chain coordination.

2.3 Theoretical Review

Theoretical review compares how different theories address an issue. The theories are strategic Theory of Constraints (TC) and Transactional Cost Analysis (TCA). These are discussed as under:

2.3.1 Network Theory

The network theory also known as networks perspective is mostly concerned with the value generation through inter-organizational relations. Harland (1996) defines a network as a specific type of relation linking a defined set of persons, objects or events. McNichols and Brennan (2006) observe that network theory focuses on both dyadic relationships and multi-party relationships. This theory was first developed in the 1970s and the 1980s with the focus on relationships between two entities, or strategic alliances, towards an approach which entails multiple relationships between different counters throughout the supply chain (Wellenbrock, 2013). According to Chang, Chiang and Pai, (2012) supply chain network is a complicated network model and its specific context depends on the relationships among the network members (Hakansson and Ford, 2002).

Peck, (2005) and Zhao, Anand and Mitchell (2005) affirm that networks perspective has been employed in studying both global supply chains and local specific industries supply chains. But little is known on how networks perspective can provide understanding of organizational performance. This theory was useful in explaining the relationship between the different supply

networks in the health supply chain and how they are linked for efficient and effective organization performance.

2.3.2 Stakeholder Theory

Friedman and Miles (2006) state that an organization is a grouping of stakeholders, and is designed to manage their interests, needs and viewpoints. Research on stakeholder theory has majored on defining stakeholders and identifying who are the stakeholders (Tate, Ellram and Brown, 2009). Typically, stakeholders comprise customers, employees, local communities, suppliers and distributors (Friedman, 2006). The stakeholder theory is premised on the fact that in contemporary business environment, individual businesses do not only compete as autonomous entities, but they also face competition from organizational supply chains (Drucker, 1998).

Thus, defining and identifying the key stakeholders associated with the business processes becomes increasingly complex. The stakeholder theory was used in this study to establish how different stakeholders in the health supply chain including departments of procurement, planning, drug regulatory board, human resources, and health programs of the ministries of health; central medical stores; donors; nongovernmental organizations regions and districts; health facilities; teams of community health workers; and private sector partners, such as third-party logistics providers, drug manufacturers, distributors, and private service providers influence the integration and how it affects the organizational performance.

2.3.3 Transaction Cost Theory (TCA)

Use of information technology in SCI has facilitated the reduction of coordination costs (Bakker et al., 2008). It is now a fact that the use of IT in electronic market places reduces the cost of searching information about product offerings and prices. Similarly, collaboration through information sharing can lower transaction costs, reduce supply chain uncertainties, and ease the cost of contracting. Arrowsmith (2002) observes that when a supplier is unable to accurately predict the price of his product inputs, he will be reluctant to enter into a contract, which locks him into a fixed price for an extended period of time. The manufacturing sector supply chains have historically experienced uncertainty out of uncertainties in supply, demand, new product development, and technology (Koufteros, 1999).

The transaction cost theory clarifies our understanding of how firms are linked together through supply chain integration. In explaining supply chain integration, the theory suggests that components of both internal and external integration are included. The application of the transaction cost theory provided a theoretical grounding to the developed theoretical framework across its levels of external supplier, external customer and internal company integration (Stank et al., 2001). In the context of this study, uncertainties in the health supply chain affects the stakeholders. The transaction cost theory was used to establish how information technology can be used to reduce transaction costs in the supply chain.

2.4 Empirical Literature Review

This section presents the empirical review of previous studies relevant to this one. The review revolves around each study variable as postulated from the theories and conceptualized on its own rationale. Lambert (2004) established that successful supply chain management needs cross-functional integration of key business processes within the firm and across the network of companies that form part of the firm's supply chain. He observes that through integration with suppliers, manufacturing firms are able to share order and inventory information with suppliers and crossfunctional integration of key business processes helps suppliers prepare high-quality materials and services on time.

Frohlich and Westbrook (2001) investigated supplier and customer integration and identified five different SCI strategies, characterized as various "arc(s) of integration", with a high degree of "arc" representing high levels of both supplier and customer integration. Their findings indicated that companies with the widest degree of arc for supplier and customer integration achieved the highest level of operational performance. Their research findings were collaborated by a follow up study by Frohlich (2002) which established that the operational performance of

manufacturers that relied on high-level integration outperformed that of manufacturers who relied on low-level integration, in such metrics like delivery time, transaction costs, and inventory turnover.

Lee (2007) found out that supplier integration, including communication, sharing of information regarding inventory data and production scheduling, and working together with suppliers can reduce upstream complexity which negatively affects schedule attainment. The work by Bozarth et al., (2009) collaborated these findings by establishing that working together with suppliers especially on matters pertaining to sharing information about production plans and demand forecasts can reduce the bullwhip effect, which is highly related to schedule attainment.

Zhao et al., (2008) carried out research from transaction cost theory perspective and found out that supplier integration can reduce transaction costs. Whenever visions and cooperative goals are shared in supplier integration, opportunistic behaviors are greatly reduced. The research was collaborated by Flynn et al., (2010) who found out that supplier integration can reduce transaction costs by reducing uncertainties. For instance, environment uncertainties are greatly reduced by investing in specific assets such as information systems and dedicated people, to facilitate information sharing and joint working.

Frizelle and Efstathiou (2003) found out that supplier integration plays an important role in reducing production costs. On one hand, higher-level supplier integration entails fewer suppliers which in general lead to economies of scale, whose net effect is reducing the material and product costs. On the other hand, with the trust and cooperation from suppliers, manufacturers are willing to invest in fixed assets and R&D activities to improve their suppliers' product and process quality to reduce production costs.

Numerous empirical studies (Shin et al., 2000; Frohlich and Westbrook 2001; Frohlich, 2002; Sanders and Premus, 2005; Devarajet al., 2007) have established that supplier integration helps manufacturers in reducing inventory and improving delivery speed, quality, and customer service whenever they share information and work with suppliers. Though empirical studies on the direct relationship between supplier integration and customer satisfaction are somewhat rare, some studies indicate the existence of indirect effects. The study by Swink et al., (2007), for instance, found that strategic supplier integration, when mediated by manufacturing competitive capabilities, is positively associated with customer satisfaction. Again, Frohlich and Westbrook (2001) and Vickery et al., (2003) found out that firms with higher levels of SCI achieve better customer service. Whenever there is high-level supplier integration, manufacturers usually become satisfied with materials or services provided by suppliers. This research investigated how supplier integration leads to customer satisfaction.

Internal integration emphasizes the coordination among internal functions and firm-wide standards and norms (Germain and Iyer, 2006). It is very helpful in attaining product scheduling. Through cross-functional coordination and working together, production planning and scheduling, customer order management, and demand planning are facilitated to meet the requirement of schedules (Rosenzweig et al., 2003). Firms are able to allocate available resources at suitable schedule costs because information on customer orders, inventory level, and purchasing and production schedule are effectively communicated among functions. In turn, good communication among functions quickly delivers demand information, thus reducing the "bullwhip effect" (Lee et al., 1997), and schedule modifications.

Rosenzweig et al., (2003) are of the view that internal integration, can help create and transfer knowledge effectively. With such arrangements experts from different functions work together as a team to meet customers' demands for new product development or product quality improvements. Internal integration, in addition includes the application of enterprise software systems like SAP, production planning and scheduling, and other integrated software platforms (Stratman & Roth, 2002; Sanders & Premus, 2005; Germain & Iyer, 2006). Similarly, information system research notably by Ahmad and Schroeder, (2001) and Hendricks et al., (2007) has demonstrated that manufacturers that have adopted enterprise resource planning or other integrated software platforms have posted better operational performance than those that failed to do so, thereby supporting the positive effects of internal integration on operational performance.

Internal integration can also improve customer satisfaction in many aspects. First, internal integration, via information transfer from marketing/sales departments to other departments, makes it easy for the whole company to understand customer requirements. Furthermore, integrated customer order fulfillment processes, are more rapid where all activities, functions and departments involved in fulfilling the order are integrated, and customer satisfaction is attained when production time is shortened, development costs are reduced, and delivery speed is increased. For instance, when a firm wants to introduce a new product, the marketing department must first present the needs of the customer in order to formulate the new product, followed by interactions between experts from the R&D, marketing, and production departments to develop product designs in fulfillment of the requirements of the customer (Yang, 2007).

Strategic integration with customers highlights frequent customer interactions, during which firms discover customer preference and improve demand forecasts (Swink, 2007). When manufacturers work with their customers, they improve on production schedules and reduce frequent schedule modifications. They also reduce bullwhip effects through effective information sharing and cooperation between them. Furthermore, communication of order information and capacity makes it easier for manufacturers to adjust their production scheduling and capacity in advance (Lee et al., 2007).

Swink et al., (2007) also confirmed that strategic customer integration is positively associated with competitive capabilities in manufacturing. Close interactions between customers and manufacturers offer opportunities for both to develop mutual forbearance and improve information accuracy. Swink et al., (2007) established that more accurate information about customer demand and preferences, as well as frequent information updates, can speed up product design, improve production planning, and reduce inventory obsolescence. Customer integration also generates remarkable opportunities to leverage the intelligence embedded in the collaborative processes, enabling businesses to reduce costs, create more value for customers, and quickly detect critical demand changes to design and execute optimal responses Swink et al., (2007).

In supply chain, the act of coordinating activities is important. This is more emphasized in information management, information management systems and the data transaction in the chain. Research has already established that coordinated and appropriate information between partners has positive impact on speed, accuracy, quality and other aspects of a firm. Information integration is the extent that operational, tactical and strategic information are transferred between business partners and the central company (Elahi et al., 2009). Frohlich and Westbrook, (2001) observe that downward flow of material in supply chain should be supported through information flows from bottom to top.

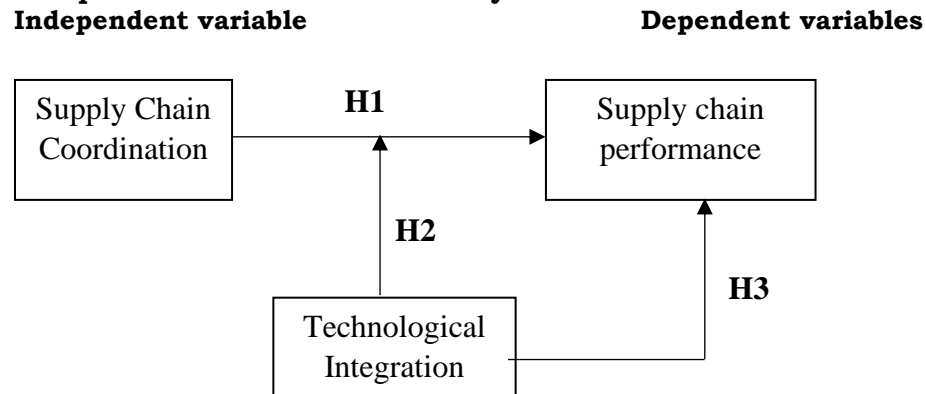
Kalakota and Robinson (2010) suggested that significant progress in supply chain management can be achieved through the integration of business processes and information flow between business partners. Lai et al., (2007) defined information integration as using information and communication technology in order to coordinate decisions and activities between an organization and its partner. Jayaram and Tan (2010) concluded that information integration has positive relationship with organizational performance of an organization. Information integration in this study is reviewed through two dimensions of information technology (technical) and information sharing (social dimension). More importantly, placing emphasis on information technology without the willingness to share critical information will not significantly associate organizations together

2.5 Conceptual framework

A conceptual framework is a research tool that purposes to develop an understanding of the situation under investigation. According to (Stratman, 2016) a conceptual framework considers the theoretical and conceptual issues surrounding research work and from a coherent and consistent foundation that will underpin the development and identification of existing variables. This study seeks to establish the effect of supply chain coordination on supply chain performance by Senior High Schools in three regions in Ghana. The researcher identifies the independent variables in this study as supply chain coordination and the depended variable as

on supply chain performance by Senior High Schools in three regions in Ghana as presented in Figure 2.1 below

Figure 2.1: Conceptual Framework for the Study



Source: Researcher's Own Construct (2022)

2.5.1 Supply Chain Coordination

Different academics have defined supply chain management in different ways and from different perspectives. Definitions given to supply chain management differ across authors and are categorized into three main classifications: management philosophy, implementation of a management philosophy, and a set of management processes (Petrovic-Lazarevic, 2013). Other individuals and groups define supply chain management in some other ways. Langley Coyle, Gibson, Psomas and Fotopoulos (2011) define supply chain management as an art and science that involves the integration and flows of the three components in the supply chain pipeline that is: products, information and finance starting from the suppliers' supplier and ending with the ultimate consumer or the customers' customer.

Assey (2015) mentions that supply chain management is focused on the management and examining of the network within the supply chain for gaining a better cost saving and providing a better customer service. Gibson et al., (2012) define supply chain management as a network or chain of facilities and distribution options that execute the process of the obtainment of products, the transformation of these products into intermediate and finished goods, and the distribution of these finished goods to customers.

H1: Supply Chain Coordination has a positive impact on Supply Chain performance

2.5.2 Supply Chain Performance

Supply Chain Performance refers to how well an institution achieves its market-oriented goals as well as its financial goals (Yamin, 1999). The short-term objectives of supply chain coordination are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Tan, 1998). Financial metrics have served as a tool for comparing institutions and evaluating an institution's behavior over time (Holmberg, 2000). Any institutional initiative, including supply chain coordination, should ultimately lead to enhanced supply chain performance: . A number of prior studies have measured supply chain performance: using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position represented by constructs like, Price/Cost.

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in the market place (Koufteros, 1995) and Time to Market. "The ability of an institution to introduce new products faster than major competitors" (Li et al., 2006).

H2: Supply chain Performance has positive impact on supply chain Integration

2.5.3 Supply Chain Integration

The increased complexity of products and hence the higher level of outsourcing have moved the level of competition from single companies to groups or chains of firms (Churchill, 2013) For this reason, literature widely acknowledges the strategic relevance of supply chain management as a source of competitive advantage (Christopher, 2012). This can be achieved by considering the network as a whole, and hence pursuing global instead of local optimization. This can be attained by integrating all the key business processes from end-users to original suppliers (Fawcett, 2014).

Supply chain integration has been approached in the literature from different perspectives. For example, Gibson et al., (2020) distinguish between customer integration, information integration, logistics and distribution integration and supplier integration. Differences have been also highlighted on the basis of the type of process involved: for example, Hsiao (2014) classify supply chain integration mechanisms into design links, quality links and logistic links.

According to Frohlich and Westbrook (2012), it is important to recognize two distinctive elements of supply chain integration which are forward physical flows and backward information and data flows. Some practices are aimed at integrating the forward physical flows (Saunders, 2012), while other practices are more oriented towards the coordination and integration of backward information and data flows from customers to suppliers (Christopher, 2012). These two ways of integrating supply chain processes are different in nature. The first type of integration requires a closer coupling of the production systems between the customer and the supplier, and even the co-location of plants. As a result, often the integration of physical flows is closely related to purchasing practices such as supply base leveraging and rationalization (Churchill, 2013). The second type of integration mechanism is aimed at leveraging information from the counterpart to improve internal activities and operations management.

H3: Moderating role of supply chain coordination on the relationship between supply chain performance and supply chain integration

3.0 RESEARCH METHODOLOGY

This presents the assessment of the effect of supply chain coordination on supply chain performance. This chapter covers the methodology employed to attain the purposes of the study. It comprises the area of study, research design, population study, sampling size, sampling procedure, sources of data, data collection instruments and data analysis procedure

3.1 Research Design

A descriptive survey design was employed to investigate the variables in the study. This is because, the purpose is to find out the opinions of respondents with regard to assess the effect of supply chain coordination on supply chain performance of Senior High School in the three regions, to determine the effect of supply chain coordination practices on supply chain performance. This study adopted a quantitative method in studying the variables.

3.2 Population of the study

Population could be defined as a group of variables that have common characteristics that are of interest to the researcher (Manson et al., 2016). The population of the study is Educational Institutions in the three Region in Ghana (Greater Accra, Eastern and Ashanti). However, the study used Ghana Three Senior High School, within the three regions. The target population for the study was the staff of the Senior High School at three regions in Ghana, whose number was about 2000 workers.

3.5 Sample size and Sampling procedures

Sampling Procedures is a process or technique of choosing a sub-group from a population to participate in the study; it is the process of selecting a number of individuals for a study in such a way that the individuals selected represent the large group from which they were selected (Ogula, 2015). Purposive sampling procedure is employed in selecting the junior and senior staff of the Senior High School. The purposive sampling procedure is considered the best option for selecting the sample for this study. Purposive sampling enabled the researcher, first, to select One hundred twenty (120) of the junior and senior members of the Senior High School. This sampling technique enabled the researcher to target those perceived to have some important and useful information in charge of training and development. The sample size for the study is One hundred twenty (120) respondents.

3.4 Data Reliability

Reliability is the extent to which data collection techniques or analysis procedures yields consistent findings (Mugenda & Mugenda, 2003). This means that if people answered the same question the same way on repeated occasions, then the instrument can be said to be reliable. Reliability analysis was used to test the internal consistency of the research instruments for the purposes of identifying those items in the questionnaire with low correlations in order to exclude them from further analysis. Cronbach's alpha a coefficient of reliability that gives unbiased estimate of data generalizability was used to test reliability of the answered questionnaires. According to Zinbarg (2005), Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalizability.

3.5 Data Validity

Validity refers to the extent to which an instrument measures what it is supposed to measure (Cooper & Schindler, 2006). Validity estimates how accurately the data obtained in the study represents a given variable or construct (Doodley, 2003). This research tested the validity using the Cronbach's alpha. Alpha values range from zero - no internal consistency to one - complete internal consistency. Validity of the instrument was tested by administering questionnaires to randomly selected respondents of different division in the strata, to identify any ambiguous and unclear questions. Feedback received was used to fine-tune the questionnaire before embarking on the actual data collection.

3.6 Data collection instruments

The tools used for the research were questionnaires. The questionnaire was used to collect quantitative data. Self-administered questionnaires were predominantly used in collecting data from respondents although existing literature provided additional information. A questionnaire is preferably used when there is a large number of respondents, when you have limited time and when the questions are of standardized character (Saunders et al., 2014). These were printed in english with neatly printed lines for respondents to provide their responses. It was numerically stated to differentiate one question from the other. Boxes were provided for respondents to tick where necessary. Before questionnaires were administered, they were subjected to thorough testing and amendments before they were dispatched to respondents. On the other hand, the pre-coded questions were given to respondents to answer. With these questions, answers were provided for respondents to select their views. Some of the questions were multiple choice whereas others were Yes / No. The length of the questionnaires were influenced primarily by the scope of the study and the depth of information desired.

3.7 Data Analysis

The quantitative data generated with the questionnaires were analysed using the SPSS and Microsoft Excel. The data from the interview was analyzed qualitatively and the results presented in the form of a summary. The quantitative result was presented in tables. The findings were discussed in relation to the research questions and literature review.

3.8 Area of Study

The study area could be defined as a geography for which data is analysed in a report and/or map (Leblance, 2012). The study is conducted in the Senior High School in the three regions of the Republic of Ghana. It comprises all workers of Senior High School and other oil industries within the Metropolis. The study used workers to enable the researcher assess the various inventory control system being employed in institutions like university. All respondents lived or worked in various regions at the time the data was collected.

3.9 Ethical Issues

The researcher acquired an approval letter from the department. The researcher undertook to keep private any information given by the respondents that touched on their persons or their private life. The researcher guaranteed the respondents that no private information will be disclosed to a third party. The environment and the objective of the research were explained to the respondents by the researcher. In view of the fact that the study used human participants in gathering primary data and to determine relationship between supply chain coordination and supply chain performance of Senior High School convinced ethical issues were addressed. The contemplation of these issues was essential for the aim of investigative the confidentiality as well as the security of the members.

Among the significant issues that were considered included permission, privacy and data protection. In the conduct of the research, the questionnaires were drafted in a very clear and concise manner to prevent conflicts among respondents. People who participated in the research were given an ample time to respond to the questions posed on them to avoid errors and inaccuracies in their answers. The respondents were given a waiver regarding the confidentiality of their identity and the information that they did not wish to disclose. The respondents' cooperation is eagerly sought after, and they were assured that the data gathered from them would be treated with the strictest confidence, so that they would be more open. This was done with the hope that this will promote trust between the researcher and the respondents.

4.0 DATA ANALYSIS

This presents the data analysis and discussion of the results. The chapter first considered the background of respondents followed by descriptive statistics, inferential analysis, hypothesis testing, and findings, and finally touched on the discussion of the results. In all, 150 questionnaires were administered to the respondents but 137 were received within the time frame representing 91.33%.

Table 4.1 Respondents' Background

Profile	Characteristics	Frequency	%
Age Band	19 years	5	3.6
	20-29 years	15	10.9
	30-39 years	53	38.6
	40-49 years	43	31.3
	50 or more	21	15.3
Gender	Male	92	67.1
	Female	45	32.8
Working experience Years	0-5 years	7	5.1
	6-10 years	43	31.3
	11-15 years	41	29.9
	16-20 years	26	18.9
	20+ years	20	14.5
Your position in your company	CEO	27	19.7
	Middle Manager	24	17.5
	Supervisor	30	21.8
	Senior Staff	35	25.5

	Junior Staff	21	15.3
Your level of education	A level or less	14	10.2
	Bachelor	74	54.0
	Master	42	30.6
	PhD	7	5.1
Type of your company	Private	120	87.5
	Public	17	12.4
Type of your production	Manufacturer	62	45.2
	Service provider	60	43.7
	R&D	2	1.4
	Product designer	13	9.4
Age of your firm	1 to 5years	47	34.3
	6 to 10 years	26	18.9
	11 to 15 years	23	16.7
	16 to 20 years	14	10.2
	21 or more	27	19.7
Number of employees	1 to 9 years	45	32.8
	10 to 49 years	75	54.7
	50 to 249 years	17	12.4

The age band of the respondents, 5 were within the age of 19 years representing 3.6%, 15 were between the ages of 20-29 years representing 10.9%, 53 were between the ages of 30-39 years representing 38.6%, 43 were between the ages of 40-49 years representing 31.3% and 21 were within 50 or more representing 15.3%. The gender of the respondents, 92 were male representing 67.1% whereas 45 were female representing 32.8%. The years of Working experience, 7 have worked in their organizations for about 0-5 years representing 5.1%, 43 have worked in their organizations for about 6-10 years representing 31.3%, 41 have worked in their organizations for about 11-15 years representing 29.9%, 26 have worked in their organizations for about 16-20 years representing 18.9% and 20 have worked in their organizations for about 20+ years representing 14.5%.

Concerning their positions in their company, 27 were Chief Executive Officers representing 19.7%, 24 were Middle Managers representing 17.5%, 30 were Supervisors representing 21.8%, 35 were Senior Staff representing 25.5% and 21 were Junior Staff representing 15.3%. Of their level of education, 14 were advanced level or fewer graduates representing 10.2%, 74 were bachelor's degree graduates representing 54.0%, 42 were master's graduates representing 30.6% and 7 were Doctor of Philosophy graduates representing 5.1%.

Type of their company, 120 were in a private organization representing 87.5% whereas 17 were in a public organization representing 12.4%. Type of their production, 62 were Manufacturer companies representing 45.2%, 60 were Service provider organizations representing 43.7% 2 were Research and Development organizations representing 1.4% and 13 were Product designer organizations representing 9.4%. The age of their firms 47 have existed for about 1 to 5years representing 34.3%, 26 have existed for about 6 to 10 years representing 18.9%, 23 have existed for about 11 to 15 years representing 16.7%, 14 have existed for about 16 to 20 years representing 10.2% and 27 have existed for about 21 or more representing 19.7%. The number of employees, 45 of the organizations have 1 to 9 employees representing 32.8%, 75 of the organizations have 10 to 49 employees representing 54.7% and 17 of the organizations have 50 to 249 employees representing 12.4%.

4.2 Validity and Reliability Tests

Reliability and validity are two key components to be considered when evaluating a particular instrument. Administration of surveys should consider the aims of the study, the population under study, and the resources available to enhance the validity and reliability of the study (Liamputtong, 2019). Reliability is concerned with consistency of the instrument, and an instrument is said to have high reliability if it can be trusted to give an accurate and consistent

measurement of an unchanging value (Vitiello et al., 2019; Gerlach et al., 2019). The minimum criterion of 0.7 is recommended (Creswell & Clark, 2017; Creswell & Creswell, 2017).

The validity of an instrument refers to how well the instrument measures the particular concept it is supposed to measure (Murphy et al., 2019). They further argue that an instrument must be reliable before it can be valid, implying that an instrument must be consistently reproducible; and that once this has been achieved, the instrument can then be scrutinized to assess whether it is what it purports to be (Eastwick, Finkel & Simpson, 2019). The validity of the procurement officers' questionnaire and the procurement heads were determined and improved through the use of expert judgment from my supervisors.

In this regard, after developing the questionnaire and the interview guide for the procurement heads, copies of the instruments were sent to my supervisors for them to peruse and make the necessary comments as well as corrections (Wahyuni, 2012; Oluwatayo, 2012). The face and content validity of the instruments was established by ensuring a logical link between the instruments' items and the study's objectives. This was done to ensure that the items in the instruments adequately and comprehensively cover all the objectives of the study. Table 4.2 presents the results.

Table 4.2 Reliability Results

Constructs	Cronbach's Alpha	Number of items
Supply Chain Coordination	.795	8
Service Supply Chain Performance	.822	18
Technological integration	.834	5
Constructs	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Approx. Chi-Square
Supply Chain Coordination	.621	2176.522
Service Supply Chain Performance	.723	3857.380
Technological integration	.811	934.921

Source: Field Data, 2022

A Cronbach's Alpha of 0.897 (with 8 items) was recorded for the internal consistency of the overall scale. The construct Supply Chain Coordination (Cronbach's Alpha = .795; items =8; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .621; Bartlett's Test of Sphericity Approx. Chi-Square = 2176.522); Service Supply Chain Performance (Cronbach's Alpha =.822; items = 18; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .723; Bartlett's Test of Sphericity Approx. Chi-Square = 3857.380); Technological integration (Cronbach's Alpha =.834; items =5; Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .811; Bartlett's Test of Sphericity Approx. Chi-Square = 934.921). The recordings of all the constructs Alpha Cronbach's were even above the recommended threshold of 0.7, Kaiser-Meyer-Olkin Measure of Sampling Adequacy was also above the threshold of 0.5 a, and their Bartlett's Test of Sphericity Approx. Chi-Square were all within the acceptable threshold therefore the constructs for the study are highly reliable.

Table 4.2.1 Factor loadings

Items	Loadings	Items	Loadings	Items	Loadings
CS1	.662	IFS1	.721	TI1	.635
CS2	.713	IFS2	.754	TI2	.734
CS3	.615	IFS3	.869	TI3	.783
CS4	.796	IFS4	.741	TI4	.764
CS5	.805	OTR1	.715	TI5	.605
CS6	.831	OTR2	.798		
RR1	.624	OTR3	.913		
RR2	.630	OTR4	.787		
RR3	.613				
FF1	.641				
FF2	.687				

FF3	.759			
FF4	.718			
RP1	.697			
RP2	.699			
RP3	.650			
RP4	.626			
RP5	.625			

The confirmatory factor analysis was carried out to know the items that are to be included during the inferential analysis as well as items to be deleted. Items with loadings less than 0.5 are excluded during the inferential analysis. Considering the excluding threshold of 0.5, only one item did not meet the threshold of 0.5.

4.3 Service Supply Chain Performance

In determining the Service Supply Chain Performance of the organizations for the study, literature was consulted and 18 items were adopted. The table 4.3 presents the results.

Table 4.3 Descriptive Statistics for Service Supply Chain Performance

Items	Min	Max	Mean	S.D
Our company has improved products/services based on customer feedback	1	5	4.21	.804
Customer satisfaction has improved in our company	1	5	4.25	.713
Our company has improved responses to meet customer needs and wants	1	5	4.30	.819
Our company has improved on service delivery to customer	1	5	4.17	.928
Our company can manage our customers' complaints	1	5	4.29	.683
Our company is able to improve customer retention	1	5		
The responsive to improve product/service quality according customer and supplier needs	1	5	4.24	.826
The ability to respond toward customer/supplier query time	1	5	4.45	.700
The ability to respond to help our customers by providing the services that the customers need	1	5	4.31	.797
The flexibility to change customer and supplier requirement whenever needed	1	5	4.15	.921
The flexibility to reduce the product/service lead times	1	5	4.13	.868
The flexibility in customer and supplier satisfaction	1	5	3.82	1.195
The flexibility in utilization of resource in the delivery of services	1	5	4.19	.825
The ability to perform the promised service dependably	1	5	4.24	.818
The ability to perform the service accurately	1	5	4.26	.760
The ability to inspire trust and confidence with customer and supplier	1	5	4.22	.808
The ability to have accurate forecasting techniques in fulfilling unexpected demand	1	5	4.24	.802
The ability to have reliable information systems in order to meet customer satisfaction	1	5	4.28	.709

The item “our company has improved products/services based on customer feedback” with a mean value of 4.21 and a standard deviation of .804 indicate an agreement that the organizations for the study have improved products/services based on customer feedback. The item “customer satisfaction has improved in our company” with a mean value of 4.25 and a standard deviation of .713 indicate an agreement that the organizations for the study have on their customer satisfaction. The item “our company has improved responses to meet customer needs and wants” with a mean value of 4.30 and a standard deviation of .819 indicate an

agreement that the organizations for the study have improved responses to meet customer needs and wants.

The item “our company has improved on service delivery to customer” with a mean value of 4.17 and a standard deviation of .928 indicate an agreement that the organizations for the study have improved on service delivery to customer. The item “our company can manage our customers’ complaints” with a mean value of 4.29 and a standard deviation of .683 indicate an agreement that the organizations for the study manage their customers’ complaints. The item “the responsive to improve product/service quality according customer and supplier needs” with a mean value of 4.24 and a standard deviation of .826 indicate an agreement that the organizations for the study are responsive to improve product/service quality according customer and supplier needs.

The item “the ability to respond toward customer/supplier query time” with a mean value of 4.45 and a standard deviation of .700 indicate an agreement that the organizations for the study have the ability to respond toward customer/supplier query on timely. The item “the ability to respond to help our customers by providing the services that the customers need” with a mean value of 4.31 and a standard deviation of .797 indicate an agreement that the organizations for the study have the ability to respond to help our customers by providing the services that the customers need. The item “the flexibility to change customer and supplier requirement whenever needed” with a mean value of 4.15 and a standard deviation of .921 indicate an agreement that the organizations for the study have the flexibility to change customer and supplier requirement whenever needed. The item “the flexibility to reduce the product/service lead times” with a mean value of 4.13 and a standard deviation of .868 indicate an agreement that the organizations for the study have the flexibility to reduce the product/service lead times.

The item “the flexibility in customer and supplier satisfaction” with a mean value of 3.82 and a standard deviation of 1.195 indicate neutral to affirm that the organizations for the study are either ensuring the flexibility in customer and supplier satisfaction or not ensuring the flexibility in customer and supplier satisfaction. The item “the flexibility in utilization of resource in the delivery of services” with a mean value of 4.19 and a standard deviation of .825 indicate an agreement that the organizations for the study have the flexibility in utilization of resource in the delivery of services. The item “the ability to perform the promised service dependably” with a mean value of 4.24 and a standard deviation of .818 indicate an agreement that the organizations for the study have the ability to perform the promised service dependably.

The item “the ability to perform the service accurately” with a mean value of 4.26 and a standard deviation of .760 indicate an agreement that the organizations for the study have the ability to perform the service accurately. The item “the ability to inspire trust and confidence with customer and supplier” with a mean value of 4.22 and a standard deviation of .808 indicate an agreement that the organizations for the study have the ability to inspire trust and confidence with customer and supplier. The item “the ability to have accurate forecasting techniques in fulfilling unexpected demand” with a mean value of 4.24 and a standard deviation of .802 indicate an agreement that the organizations for the study have the ability to have accurate forecasting techniques in fulfilling unexpected demand. The item “the ability to have reliable information systems in order to meet customer satisfaction” with a mean value of 4.28 and a standard deviation of .709 indicate an agreement that the organizations for the study have the ability to have reliable information systems in order to meet customer satisfaction.

4.4 Supply Chain Coordination

In determining the Service Supply Chain Coordination of the organizations for the study, literature was consulted and 8 items were adopted. The table 4.4 presents the results.

Table 4.4 Descriptive Statistics for Supply Chain Coordination

Items	Min	Max	Mean	S.D
Share the information of inventory levels	1	5	4.32	.761
Share the production plan and demand forecast information	1	5	4.30	.843

Collaborative planning, forecasting and supplement	1	5	4.18	.754
Share factories or other facilities with suppliers or customers	1	5	4.35	.685
Reach an agreement with delivery frequency	1	5	4.27	.811
Vendor managed inventory (VMI) and consignment inventory	1	5	4.28	.709
Just-in-time (JIT)	1	5	4.37	.812
Collaborative planning, forecasting and supplement	1	5	4.38	.718

The item “sharing of the information of inventory levels” with a mean value of 4.32 and a standard deviation of .761 indicate an agreement that the organizations for the study do share the information of inventory levels. The item “share the production plan and demand forecast information” with a mean value of 4.30 and a standard deviation of .843 indicate an agreement that the organizations for the study do share the production plan and demand forecast information. The item “collaborative planning, forecasting and supplement” with a mean value of 4.18 and a standard deviation of .754 indicate an agreement that the organizations for the study do collaborative planning, forecasting and supplement.

The item “share factories or other facilities with suppliers or customers” with a mean value of 4.35 and a standard deviation of .685 indicate an agreement that the organizations for the study do share factories or other facilities with suppliers or customers. The item “reach an agreement with delivery frequency” with a mean value of 4.27 and a standard deviation of .811 indicate an agreement that the organizations for the study have reach an agreement with delivery frequency.

The item “vendor managed inventory (VMI) and consignment inventory” with a mean value of 4.28 and a standard deviation of .709 indicate an agreement that the organizations for the study have vendor managed inventory (VMI) and consignment inventory. The item “just-in-time (JIT)” with a mean value of 4.37 and a standard deviation of .812 indicate an agreement that the organizations for the study are ensuring just-in-time. The item “collaborative planning, forecasting and supplement” with a mean value of 4.38 and a standard deviation of .718 indicate an agreement that the organizations for the study do a collaborative planning, forecasting and supplement.

4.5 Technological integration

In determining the Service Supply Chain Coordination of the organizations for the study, literature was consulted and 5 items were adopted. The table 4.5 presents the results.

Table 4.5 Descriptive Statistics for Technological integration

Items	Min	Max	Mean	S.D
Technology is an important enabler in this relationship between suppliers and buyer	1	5	4.25	.780
We are linked electronically so that we can share information of mutual interest	1	5	4.26	.820
In this relationship, we emphasize integrated information systems	1	5	4.31	.797
To make technology successful requires trust	1	5	4.28	.750
We frequently communicate through electronic media, such as the internet, intranets, e-mail or EDI systems	1	5	4.39	.748

The item “technology is an important enabler in this relationship between suppliers and buyer” with a mean value of 4.25 and a standard deviation of .780 indicate an agreement that the organizations for the study is aware that technology is an important enabler in this relationship between suppliers and buyer. The item “we are linked electronically so that we can share information of mutual interest” with a mean value of 4.26 and a standard deviation of .820 indicate an agreement that the organizations for the study are linked electronically so that

we can share information of mutual interest. The item “in this relationship, we emphasize integrated information systems” with a mean value of 4.31 and a standard deviation of .797 indicate an agreement that the organizations for the study emphasize integrated information systems.

The item “to make technology successful requires trust” with a mean value of 4.28 and a standard deviation of .750 indicate an agreement that the organizations for the study make technology successful requires trust. The item “we frequently communicate through electronic media, such as the internet, intranets, e-mail or EDI systems” with a mean value of 4.39 and a standard deviation of .748 indicate an agreement that the organizations for the study frequently communicate through electronic media, such as the internet, intranets, e-mail or EDI systems.

4.6 Correlation among the variables

This was conducted to ascertain the relationships among the variables and the table 4.6 presents the results.

Table 4.6 Correlations among the variables

Variables		1	2	3
SCC	Pearson Correlation	1	.758**	.707**
	Sig. (1-tailed)		.000	.000
	Sum of Squares and Cross-products	374.675	247.470	243.157
	Covariance	1.511	.998	.980
SSCP	Pearson Correlation	.758**	1	.652**
	Sig. (1-tailed)	.000		.000
	Sum of Squares and Cross-products	247.470	284.321	195.329
	Covariance	.998	1.146	.788
TI	Pearson Correlation	.707**	.652**	1
	Sig. (1-tailed)	.000	.000	
	Sum of Squares and Cross-products	243.157	195.329	315.888

Covariance	.980	.788	1.274
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****.** Correlation is significant at the 0.01 level (1-tailed).

The relationship between supply chain coordination and service supply chain performance, the Pearson Correlation coefficient of (.758**); Sum of Squares and Cross-products of (247.470) and Covariance (0.998) $p <$ value of (0.000) indicate that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between supply chain coordination and information technology, the Pearson Correlation coefficient of (.707**); Sum of Squares and Cross-products of (243.157) and Covariance (0.980) $p <$ value of (0.000) indicate that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between service supply chain performance and information technology, the Pearson Correlation coefficient of (.652**); Sum of Squares and Cross-products of (195.329) and Covariance (0.788) $p <$ value of (0.000) indicate that there is a positive and significant relationship between service supply chain performance and information technology.

4.7 The effect of supply chain coordination and integrated information on supply chain performance

The study examined the effect of supply chain coordination and integrated information on supply chain performance as well as the moderating effect of technological integration on the relationship between of supply chain coordination and supply chain performance and the table 4.7 and presents the results.

Table 4.7 The effect of supply chain coordination and integrated information on supply chain performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.758 ^a	.575	.573	.8030	
		ANOVA^a			
	Sum of Squares	df	Mean Square	F	Sig.
	215.395	1	215.395	334.019	.000 ^b
		Coefficients^a			
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
	.870	.048	.758	18.276	.000
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
2	.707 ^a	.500	.498	.8713	
		ANOVA^a			
	Sum of Squares	df	Mean Square	F	Sig.
	187.171	1	187.171	246.563	.000 ^b
		Coefficients^a			
	Unstandardized Coefficients		Standardized Coefficients		

	B	Std. Error	Beta	t	Sig.	
	.770	.049	.707	15.702	.000	
			Model 3			
R	R-sq	MSE	F	df1	df2	p
.7297	.5325	.6027	93.0330	3.0000	245.0000	.0000
	coeff	se	t	p	LLCI	ULCI
	.4074	.1575	2.5874	.0102	.0973	.7176
	.5829	.1575	3.7018	.0003	.2728	.8931
Int_1	.0358	.0420	.8535	.3942	.1186	.0469
Test(s) of highest order unconditional interaction(s):						
	Int_1	:	SCMP	x	PRINV	
	R2-chng	F	df1	df2	p	
X*W	.0014	.7285	1.0000	245.0000	.3942	

The study examined the effect of supply chain coordination on supply chain performance and the *R Square* = .575 indicates that supply chain coordination practices can overall affect supply chain performance of about 58%. The variation of 58% indicates that supply chain coordination is a good predictor of supply chain performance. The extent that supply chain coordination affecting supply chain performance, the (*Beta* = .758; *t*=18.276; *p*< 0.000) indicate that supply chain coordination has a positive and significant effect on supply chain performance.

The study examined the effect of information integration on supply chain performance and the *R Square* = .500 indicates that information integration can overall affect supply chain performance of about 50%. The variation of 50% indicates that information integration is a good predictor of supply chain performance. The extent that supply chain coordination affecting supply chain performance, the (*Beta* = .707; *t*=15.702; *p*< 0.000) indicate that information integration has a positive and significant effect on supply chain performance.

The study further examined the moderating effect of information integration on the relationship between supply chain performance and supply chain coordination. The Test(s) of highest order unconditional interaction(s): R Square-change = .0014 indicates that information integration can overall moderates on the relationship between supply chain performance and supply chain coordination of about 1.4%. This explains that information integration is not a strong predictor on the relationship between supply chain performance and supply chain coordination. The (*coefficient* = .0358; *standard error* = .0420; *t*=.8535; *p*=.3942) statistically indicate that information integration partially moderates the relationship between supply chain performance and supply chain coordination.

Table 4.8 Hypothesis testing and findings

Hypothesis	Relationship	<i>Beta</i>	<i>t</i>	<i>p</i>	Decision
H1	SCC - - >SCP	.758	18.276	.000	Supported
H2	IT- - >SCP	.707	15.702	.000	Supported
H3	IT - - > SCC * SCP	.0420	.8535	.3942	Partial support

4.9 Discussion of results

The study examined the effect of supply chain coordination on supply chain performance and the *findings of the study* indicate that that supply chain coordination has a positive and significant effect on supply chain performance. Definitions given to supply chain management differ across authors and are categorized into three main classifications: management philosophy, implementation of a management philosophy, and a set of management processes (Petrovic-Lazarevic, 2013). Other individuals and groups define supply chain management in some other ways. Langley Coyle, Gibson, Psomas and Fotopoulos (2011) define supply chain management as an art and science that involves the integration and flows of the three components in the supply chain pipeline that is: products, information and finance starting from

the suppliers' supplier and ending with the ultimate consumer or the customers' customer. Assey (2015) mentions that supply chain management is focused on the management and examining of the network within the supply chain for gaining a better cost saving and providing a better customer service. Gibson et al., (2012) define supply chain management as a network or chain of facilities and distribution options that execute the process of the obtainment of products, the transformation of these products into intermediate and finished goods, and the distribution of these finished goods to customers.

The study examined the effect of information integration on supply chain performance and the that information integration has a positive and significant effect on supply chain performance. Supply Chain Performance refers to how well an institution achieves its market-oriented goals as well as its financial goals (Yamin, 1999). The short-term objectives of supply chain coordination are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Tan, 1998). Financial metrics have served as a tool for comparing institutions and evaluating an institution's behavior over time (Holmberg, 2000).

Any institutional initiative, including supply chain coordination, should ultimately lead to enhanced supply chain performance: . A number of prior studies have measured supply chain performance: using both financial and market criteria, including return on investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position represented by constructs like, Price/Cost. "The ability of an institution to compete against major competitors based on low price" (Li, 2006). Quality "The ability of an institution to offer product quality and performance that creates higher value for customers" (Koufteros, 1995), delivery dependability. The ability of an institution to provide on time the type and volume of product required by customer(s) (Li et al, 2006), Product Innovation. The ability of an institution to introduce new products and features in the market place (Koufteros, 1995) and Time to Market. "The ability of an institution to introduce new products faster than major competitors" (Li et al., 2006).

The study further examined the moderating effect of information integration on the relationship between supply chain performance and supply chain coordination. The findings of the study *statistically* indicate that information integration partially moderates the relationship between supply chain performance and supply chain coordination. The increased complexity of products and hence the higher level of outsourcing have moved the level of competition from single companies to groups or chains of firms (Churchill, 2013) For this reason, literature widely acknowledges the strategic relevance of supply chain management as a source of competitive advantage (Christopher. 2012).

This can be achieved by considering the network as a whole, and hence pursuing global instead of local optimization. This can be attained by integrating all the key business processes from end-users to original suppliers (Fawcett, 2014). Supply chain integration has been approached in the literature from different perspectives. For example, Gibson et al., (202012) distinguish between customer integration, information integration, logistics and distribution integration and supplier integration. Differences have been also highlighted on the basis of the type of process involved: for example. Hsiao (2014) classify supply chain integration mechanisms into design links, quality links and logistic links.

According to Frohlich and Westbrook (2012), it is important to recognize two distinctive elements of supply chain integration which are forward physical How's and backward information and data flows. Some practices are aimed at integrating the forward physical flows (Saunders, 2012), while other practices are more oriented towards the coordination and integration of backward information and data flows from customers to suppliers (Christopher, 2012). These two ways of integrating supply chain processes are different in nature. The first type of integration requires a closer coupling of the production systems between the customer and the supplier, and even the co- location of plants. As a result, often the integration of physical flows is closely related to purchasing practices such as supply base leveraging and rationalization (Churchill, 2013).

5.0 CONCLUSIONS

This presents the summary of findings, conclusion, recommendations and suggestions for future studies.

5.2 Summary of findings

The relationship between supply chain coordination and service supply chain performance, the Pearson Correlation indicate that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between supply chain coordination and information technology, the Pearson Correlation indicate that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between service supply chain performance and information technology, the Pearson Correlation indicate that there is a positive and significant relationship between service supply chain performance and information technology.

- **The effect of supply chain coordination on supply chain performance:** The study examined the effect of supply chain coordination on supply chain performance, the findings of the study indicate that supply chain coordination has a positive and significant effect on supply chain performance.
- **The effect of information integration on supply chain performance:** The study examined the effect of information integration on supply chain performance and the findings of the study indicate that information integration has a positive and significant effect on supply chain performance.
- **The moderating effect of information integration:** The study further examined the moderating effect of information integration on the relationship between supply chain performance and supply chain coordination. The Test(s) of highest order unconditional interaction(s): statistically indicate that information integration partially moderates the relationship between supply chain performance and supply chain coordination.

5.3 Conclusion

The relationship between supply chain coordination and service supply chain performance, the findings of this study concluded that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between supply chain coordination and information technology, the findings of this study concluded that there is a positive and significant relationship between supply chain coordination and service supply chain performance. The relationship between service supply chain performance and information technology, the findings of this study concluded that there is a positive and significant relationship between service supply chain performance and information technology.

- **The effect of supply chain coordination on supply chain performance:** The study examined the effect of supply chain coordination on supply chain performance, the findings of the study concluded that supply chain coordination has a positive and significant effect on supply chain performance.
- **The effect of information integration on supply chain performance:** The study examined the effect of information integration on supply chain performance and the findings of the study concluded that information integration has a positive and significant effect on supply chain performance.
- **The moderating effect of information integration:** The study further examined the moderating effect of information integration on the relationship between supply chain performance and supply chain coordination. The findings of this study concluded that information integration partially moderates the relationship between supply chain performance and supply chain coordination.

5.4 Managerial implications

Management of organizations can achieve better customer service when their organizations ensure that there is an improvement on their products/services based on customer feedback, responses to meet customer needs and wants, service delivery to customer, manage our customers' complaints, and able to improve customer retention. Organizations can also ensure responsiveness when they are able to improve product/service quality according customer and supplier needs, respond toward customer/supplier query time and help their customers by providing the services that the customers need companies can achieve flexibility when they are able to change customer and supplier requirement whenever needed, reduce the product/service lead times, able to perform the promised service dependably, and are highly reliable on information systems in order to meet customer satisfaction.

5.5 Recommendations

The organizations that looking forward to achieve better supply chain coordination must ensure that they do share the information of inventory levels. With no isolation or information asymmetry across the units, each unit will then do well to avoid stock out that can have a negative effect on the success of the organizations. It therefore very important for the organizations to share the information of inventory levels so that good suggestions and decisions will be made to help the organizations to grow.

Management of organizations should be willing to share the production plan and demand forecast information so that the organization can be in a better position to carry out some successful operations. Failure to share production plan and demand forecast information may hinder the progress of the organization. It therefore very crucial for managers in organizations to share the production plan and demand forecast information

Organizations should think of collaborative planning, forecasting and supplement so that they achieve better supply chain coordination. Firms that think of supply chain collaboration can then grow better than those that do not consider collaborative planning, forecasting and supplement because this will gather relevant information from all functional managers for better decision to be taken for the betterment of the organization. It is therefore very important for the firms to consider that they do a collaborative planning, forecasting and supplement to achieve good supply chain coordination.

Firms with limited resources should consider the sharing of factories or other facilities with suppliers or customers. Considering how your firm can depend on the resources of the supplier or customer is very crucial to sustain a business. Companies can now enjoy the resources of their partners to be able to deliver effectively and efficiently. Because resources are limited an organization that may try to get its own resources will find it difficult therefore it is important for the firms to look how best they can create the relationship that will help them to share resources of their partners.

5.6 Suggestion for future Study

A future should consider the moderating effect of organizational resources capability on the relationship between supply chain coordination and supply chain performance.

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