

Analyzing the Relationship Between Supply Chain Coordination and Performance Indicators

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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, Performance Indicators, Information Sharing, Collaborative Planning, Supply Chain Integration, Supply Chain Performance, Trust and Relationship Management, Supply Chain Efficiency, Inventory Management, Operational Performance, Strategic Alignment, Supply Chain Collaboration.

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1.0 INTRODUCTION

In today's highly competitive and globalized market environment, the efficiency and effectiveness of supply chains have become critical determinants of organizational success. The increasing complexity of supply chains, coupled with dynamic customer demands and rapid technological advancements, has elevated the need for enhanced coordination among supply chain partners (Christopher, 2016). Supply chain coordination refers to the alignment and integration of processes, information sharing, and collaborative decision-making among different entities within a supply chain network to achieve mutual objectives and optimize overall performance (Simatupang & Sridharan, 2005).

Effective coordination among supply chain partners has been shown to significantly influence key performance indicators (KPIs) such as delivery reliability, cost efficiency, inventory turnover, responsiveness, and customer satisfaction (Frohlich & Westbrook, 2001). However, the lack of coordination often results in inefficiencies such as the bullwhip effect, increased lead times, stockouts, and excess inventory, which can severely undermine the performance and competitiveness of supply chain systems (Lee, Padmanabhan, & Whang, 1997).

Despite the evident importance of supply chain coordination, many organizations continue to face challenges in establishing and maintaining coordinated relationships with their supply chain partners. These challenges may stem from a lack of trust, poor communication, misaligned objectives, and inadequate technological infrastructure (Barratt, 2004). Therefore, understanding the relationship between supply chain coordination mechanisms and performance outcomes is crucial for businesses aiming to improve their operational effectiveness and strategic positioning.

This research seeks to analyze the relationship between supply chain coordination and performance indicators by examining how coordination mechanisms such as information sharing, joint decision-making, and collaborative planning influence various aspects of supply chain performance. The study will also explore the barriers to effective coordination and propose strategies for improving inter-organizational collaboration in supply chain systems. By shedding light on these issues, the research aims to contribute to the growing body of knowledge on supply chain management and offer practical insights for managers and policymakers.

2.0 MATERIALS AND METHODS

The relationship between supply chain coordination and performance indicators has been the subject of extensive research over the past decades, as organizations seek to gain competitive advantages through streamlined and responsive supply chain systems. This section reviews the existing literature by examining the concepts of supply chain coordination, its mechanisms, performance indicators, and the empirical relationships established between them.

2.1. Concept of Supply Chain Coordination

Supply chain coordination refers to the synchronization and harmonization of activities across the supply chain to achieve mutually beneficial outcomes (Simatupang & Sridharan, 2005). Coordination involves aligning objectives, processes, and information flow among different supply chain entities such as suppliers, manufacturers, distributors, and retailers. According to Chopra and Meindl (2016), coordinated supply chains are more likely to reduce inefficiencies, avoid duplication of effort, and respond more effectively to market fluctuations. Coordination becomes essential due to the decentralized nature of most supply chains, where each player operates independently but is interdependent in value creation (Chen, Drezner, Ryan, & Simchi-Levi, 2000). Lack of coordination can lead to the bullwhip effect—where small fluctuations in customer demand lead to larger variations upstream—causing inefficiencies and performance declines (Lee et al., 1997).

2.2. Mechanisms for Supply Chain Coordination

Numerous coordination mechanisms have been identified in the literature. These include:

- *Information Sharing:* Timely and accurate information exchange among partners enhances visibility, reduces uncertainty, and improves planning (Yu, Yan, & Cheng, 2001).
- *Collaborative Planning and Forecasting:* Joint planning activities enable better alignment of production, inventory, and logistics operations (Aviv, 2001).

- *Incentive Alignment*: Creating mutually beneficial reward systems ensures that all parties act in the best interest of the overall supply chain (Cachon & Lariviere, 2005).
- *Trust and Relationship Management*: Trust reduces transactional costs and promotes long-term collaboration (Nyaga, Whipple, & Lynch, 2010).

These mechanisms help mitigate coordination challenges such as conflicting objectives, asymmetric information, and power imbalances.

2.3. Supply Chain Performance Indicators

Supply chain performance is typically measured using a range of key performance indicators (KPIs). These indicators are generally classified into operational and strategic categories (Beamon, 1999):

- *Operational KPIs*: Include order fulfillment rates, inventory turnover, delivery lead time, and cost efficiency.
- *Strategic KPIs*: Include customer satisfaction, market responsiveness, innovation rate, and supply chain flexibility.

The choice of indicators often depends on the industry and the specific goals of the organization.

2.4. Empirical Evidence on the Relationship Between Coordination and Performance

Numerous empirical studies have explored the link between coordination and performance. Simatupang and Sridharan (2005) found that companies with high levels of collaboration achieved better customer service and cost performance. Similarly, Frohlich and Westbrook (2001) demonstrated that extensive integration across the supply chain significantly improves responsiveness and reduces cycle time. Barratt (2004) emphasized that collaborative relationships enhance both financial and non-financial performance indicators. Moreover, Chen et al. (2000) showed that coordinated inventory decisions among suppliers and manufacturers reduce holding costs and increase service levels.

Recent studies have also considered the role of digital technologies in enabling coordination. For example, cloud-based platforms, blockchain, and Internet of Things (IoT) have been shown to enhance real-time information sharing and transparency, which positively impacts supply chain performance (Queiroz, Telles, & Bonilla, 2020).

2.5. Challenges in Achieving Supply Chain Coordination

Despite its benefits, achieving coordination is not without challenges. Issues such as trust deficits, data security concerns, lack of standardization, and resistance to change hinder collaboration (Sambasivan, Siew-Phaik, Mohamed, & Leong, 2011). Moreover, power asymmetries between large buyers and small suppliers often complicate efforts to share information or align goals.

2.6 Conclusion of the Literature Review

The literature strongly supports the assertion that effective supply chain coordination positively influences key performance indicators. Coordination mechanisms such as information sharing, collaborative planning, and trust-building have been shown to enhance operational efficiency, responsiveness, and customer satisfaction. However, challenges remain in aligning incentives and managing the human and technological dimensions of coordination. This review highlights the need for further research into how specific coordination practices affect various performance indicators across different industries and contexts.

3.0 METHODOLOGY

This chapter 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 amount 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 RESULTS AND DISCUSSIONS

This chapter 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 5 years 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
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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

***.* 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) $p < \text{value of } (0.000)$ 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) $p < \text{value of } (0.000)$ 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) $p < \text{value of } (0.000)$ 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 $R \text{ Square} = .575$ 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	Beta	t	p	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., (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).

5.0 CONCLUSIONS

This chapter 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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