The Effect of Supply Chain Collaboration on Collaborative Advantage: the case of Besh Gebeya

By

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Advisor

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Declaration

I, Fikru Mulat Zerihun, declare that this paper is a result of my independent research work on the topic entitled "The Effect of Supply Chain Collaboration on Collaborative Advantage: the case of Besh Gebeya" for the partial fulfillment of the requirements for the Degree of Masters of Art in Logistics and Supply Chain Management at Addis Ababa University, School of commerce. This work has not been submitted for a degree to any other university. All sources of information in the study have been appropriately acknowledged.

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Date: 01/10/2023

Certification

This is to certify that Fikru Mulat Zerihun has carried out this research work on the topic entitled "The Effect of Supply Chain Collaboration on Collaborative Advantage: the case of Besh Gebeya" under my Advisory. This work is original in nature and it can be submitted for the partial fulfillment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management.

Tesfaye Belay (Assi.Pro.)

Advisor

Date _____ 01/10/2023

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List of Terms

BS	Business Synergy
CA	Collaborative advantage
CABS	Collaborative advantage-Business Synergy
CC	Collaborative communication
CNT	Collaborative Network Theory
CPFR	Collaborative Planning Forecasting and Replenishment
DS	Decision Synchronization
EAH	East Africa Holdings S.C
FMCG	Fast Moving Customer Goods
IOS	Inter-organizational Systems
IOSIG	Inter-organizational Systems use for Integration
IOSIN	Inter-organizational Systems use for Intelligence
IOSCO	Inter-organizational Systems use for Communication
PAT	Principal Agent theory
TCE	Transaction Cost Economics
RBV	Resource Based View
SET	Social Ex- change Theory,
RDT	Resource Dependency Theory
SC	Supply Chain
SCC	Supply Chain collaboration
SCM	Supply Chain Management
SCCDC	Supply chain collaboration Decision Synchronization
SCCCC	Supply chain collaboration Collaborative communication
VMI	Vender Managed Inventory

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Abstract

The study examines the effects of different variables on the dependent variable Collaborative advantage-Business Synergy (CABS). The analysis reveals that IOS use for integration has a statistically significant negative effect with a coefficient of -0.365, Decision Synchronization has a statistically significant positive effect with a coefficient of 0.499 and Collaborative Communication has a statistically significant positive effect with a coefficient of 0.448. On the other hand; IOS use for Communication, IOS use for Intelligence, and Supply chain collaboration Quality Information Sharing have a statistically insignificant positive effect on Business synergy due to collaborative advantage.

Based on the fitted model, the equation for CABS is CABS = 0.499 (SCCDS) + 0. 478 (SCCCC) + 0.171 (SCCIS) + 0.175 (IOSCO) + 0.042 (IOSIN) - 0.365 (IOSIG). This model provides insights into the relationship between the independent variables (supply chain collaboration decision synchronization, supply chain collaboration practice of collaborative communication, IOS use for integration and intelligence, and IOS use for communication) and the dependent variable (Collaborative advantage-Business Synergy).

In conclusion, the study reveals the significant negative effects of IOS use for integration, significant positive effects of supply chain collaboration decision synchronization and collaborative communication practice on by collaborative advantage Business synergy.

These findings contribute to understanding the factors that influence collaborative advantage in the context of Besh Gebeya supply chain collaboration.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In today's increasingly competitive, complex and interconnected business environment, organizations no longer operate in isolation (Cao Mei and Zhang, 2013). Instead, they were part of different supply chain networks, involving multiple partners, suppliers, distributors, and customers that they were constantly looking for ways to expand and gain competitive edge. One strategy that has gained significant attention is supply chain collaboration (Soosay and Hyland, 2015).

Through collaboration, organizations can build synergies through collaborative advantage, where resources and knowledge, and effectively respond to market demands, thereby gaining a unique competitive edge (Cao Mei and Zhang, 2013). Supply chain collaboration ensures timely delivery, accurate order fulfillment, and proactive responsiveness to customer needs, resulting in increased customer satisfaction and loyalty (Cao Mei and Zhang, 2013). Collaborative supply chains also foster innovation by promoting, joint research and development, knowledge sharing, and the exchange of ideas among partners (Soosay and Hyland, 2015). This enables organizations to adapt quickly to market dynamics, capitalize on new opportunities, and stay ahead of competitors.

Understanding the impact of supply chain collaboration on collaborative advantage is important for organizations as it provides insights into gaining a competitive edge, fostering innovation, and improving operational efficiency (Cao Mei and Zhang, 2013). Collaborative advantage refers to the ability to increase the benefits of supply chain collaboration collaborative correlations within the supply chain (Yılmaz, Çemberci, and Uca, 2016). By leveraging the benefits of supply chain collaboration, organizations can optimize their performance and achieve sustainable success in today's dynamic business environment.

When supply chain partners collaborate effectively, they can operate together making use of each other's resources (M. Cao and Zhang, 2011). This collaboration has the potential to generate a collaborative advantage and enhance operational performance. The value created through supply chain collaboration lies in its ability to facilitate better alignment of supply

and demand, ultimately leading to improved overall performance (Simatupang, T. M., 2008). Supply chain collaboration brings forth a range of benefits that encompass competitive advantage, cost reduction, revenue growth, flexibility, efficiency, joint competitive advantage (collaborative advantage), generation of new product ideas, better utilization of market opportunities, and meeting customer demands (Uca and Çembercİ, 2017). By engaging in effective supply chain partnering, organizations can gain a collaborative advantage, which refers to the strategic benefits they acquire over their competitors (Yılmaz, Çemberci and Uca, 2016).

To fully use these benefits, it is crucial to gain a good understanding of collaboration within the supply chain. This includes identifying the key elements of collaboration, determining suitable collaboration partners and understanding the reasons behind the need for collaboration (Barratt, 2016). Additionally, it is important to identify the factors that contribute to successful collaboration and the performance benefits that firms can achieve through supply chain collaboration (Ralston, 2014). As a result, this dissertation aims to investigate the topic of supply chain collaboration, shedding light on these critical aspects.

1.2 Background of BESH GEBEYA

BESH GEBEYA is a brand name for the East African Holding House (EATH) which is a prominent member of East African Holdings, a leading industrial conglomerate in Ethiopia. Over the past decade, EATH has played a significant role in the country's industrialization. It operates in three strategic clusters, namely Construction and Real Estate, FMCG Manufacturing and Agro Industry, and Distribution and Marketing.

EATH was established in 2017 through the combination of 16 PLCs that had been working since 1998. Currently EATH is identified as Besh Gebeya with the vision of becoming the largest distribution company in the Horn of Africa. Besh Gebeya's mission is to distribute various products from sister companies and other supply chain partners. The company handles distribution, wholesale, and retail operations for sister companies and partners engaged in the manufacturing of construction and FMCG brands throughout Ethiopia.

Besh Gebeya offers a wide range of products, with more than 1,360 different stock keeping units (SKUs) across 7 product categories. It boasts an annual turnover of over 3.5 billion

ETBs. EATH's distribution network includes six cash and carry stores named BESH-Mexico, BESH-Ayat, BESH-Saris, BESH-Lebu, BESH-4 kilo, and BESH-Bahir dar, as well as 12 wholesale branches located across the country. Besh Gebeya operates the largest distribution network in Ethiopia, with 22 distribution outlets spread throughout the country. This extensive network not only serves sister companies but also provides a distribution channel for other products from supply chain partners, achieving forward integration.

1.3 Statement of the Problem

Collaboration within supply chain networks has been known as a key factor for organizational success, driven by the need to adapt to globalization, competition, and the rapid growth of technologies (Soosay and Hyland, 2015). Inter-Organizational systems (IOS), Information and Communication Technologies (ICT) use, plays a important role in facilitating SCC (Cao Mei and Zhang, 2013).

The problem addressed in this study is the need to understand the impact of IOS-enabled SCC on collaborative advantage. While previous study has highlighted the benefits of collaboration in terms of knowledge transfer, operational efficiency, cost reduction and risk mitigation (Cao Mei and Zhang, 2013), there exits research gap concerning the specific influence of IOS enabled SCC on achieving collaborative advantage.

IOS technologies, such as integration platforms, intelligence systems, and communication tools, enable supply chain partners to share information, communicate effectively and engage in joint decision-making (Cao Mei and Zhang, 2013). However, the extent to which IOS adoption and utilization contribute to collaborative advantage within the supply chain remains unclear.

Understanding the connection between IOS-enabled SCC and collaborative advantage is essential for both researchers and practitioners. It provides insights into the indicators that drive successful collaboration and how organizations can make use of IOS technologies to improve their collaborative advantage (Ralston, 2014). By filling this research gap, this master thesis aims to contribute to the existing body of knowledge and provide practical recommendations for improving supply chain collaboration success.

1.4 Research Objective

The main objective of this research is to assess the correlation between SCC dimensions and IOS use dimensions on collaborative advantage-Business synergy for the case of Besh Gebeya FMCG supply Cain. The study evaluated how supply chain collaboration practices and IOS use impacted Besh Gebeya ability to achieve and sustain collaborative advantage business synergy in the dynamic business environment.

1.4.1 General Objective

The general objective of the study is to Effect of Supply Chain Collaboration on Collaborative Advantage the case of Besh Gebeya FMCG supply Cain.

1.4.2 Specific Objectives

The specific objectives of the study were:

- To examine the effect of SCCDS on Collaborative Advantage of Besh Gebeya
- To examine the effect of SCCCC on Collaborative Advantage of Besh Gebeya
- To examine the effect of SCCIS on Collaborative Advantage of Besh Gebeya
- To examine the effect of IOSCO on Collaborative Advantage of Besh Gebeya
- To examine the effect of IOSON on Collaborative Advantage of Besh Gebeya
- To examine the effect of IOSIG on Collaborative Advantage of Besh Gebeya

1.5 Research Question

Research Question 1: What is the impact of IOS use and Supply chain collaborative practices on collaborative advantages of Besh Gebeya?

By addressing these research questions, this study aims to add practical as well as theoretical understanding into the role of supply chain collaboration in enhancing collaborative advantage in the Besh Gebeya context. By studying the effect of supply chain collaboration on collaborative advantage, organizations can make informed decisions, develop effective collaboration strategies, and look after long-term partnerships that drive sustainable success.

1.6 Significance of the Study

The significance of the study lies in its contribution to advancing our understanding of supply chain collaboration and its relation on collaborative advantage. By examining the correlation between supply chain collaboration and collaborative advantage, the study addresses a research gap and provides valuable insights for both academia and practitioners.

1.7 Scope of the Study

The scope of this study is limited to the perception of employees within the focal firms involved in supply chain collaboration. The study aims to understand how employees perceive and experience the collaborative efforts within their organizations and how these perceptions relate to collaborative advantage. The study focuses on gathering insights and perspectives from employees at different levels and departments within the focal firms.

1.8 Delimitations of the Study

This study has certain delimitations that should be considered when interpreting the findings. Firstly, the study focuses solely on the perception of employees within the focal firms and does not include the perspectives of suppliers and customers in the supply chain. While the opinions and experiences of these external stakeholders were valuable, this study specifically narrows its focus to the internal dynamics and perceptions within the focal firms.

Furthermore, the study is conducted within a specific geographic location and industry context. The findings may be influenced by the unique characteristics, cultural norms, and business practices of this particular context. Therefore, caution should be exercised when extrapolating the results to different settings or industries.

1.9 Definition of Terms

1.7.1 Conceptual definition

BS - Business Synergy: Conceptual Definition: The combined positive effects that arise from the collaboration and integration of different components within a business entity, resulting in enhanced overall performance and outcomes.

CA - Collaborative Advantage: A strategic benefit gained by organizations through effective collaboration, enabling them to achieve outcomes that are superior to those attainable individually.

CABS - Collaborative Advantage-Business Synergy: The mutual reinforcement of collaborative advantage and business synergy, where effective collaboration enhances business synergy, leading to superior overall performance.

CC - Collaborative Communication: Conceptual Definition: The exchange of information, ideas, and insights among supply chain partners to enhance mutual understanding and coordinated decision-making.

CNT - Collaborative Network Theory: Conceptual Definition: A theoretical framework that examines the dynamics of interactions, relationships, and exchanges within collaborative networks, emphasizing the emergence of collective advantages.

CPFR - Collaborative Planning Forecasting and Replenishment: Conceptual Definition: A coordinated approach in supply chain management where partners collaboratively plan, forecast, and manage replenishment to optimize inventory levels and enhance overall supply chain efficiency.

DS - Decision Synchronization: The harmonization of decision-making processes across supply chain partners to ensure mutual alignment, minimize delays, and enhance overall operational effectiveness.

FMCG - Fast Moving Consumer Goods: Everyday consumer products that have a quick turnover rate, are relatively low-cost, and are consistently in high demand. FMCG encompass a wide range of items such as food, beverages, toiletries, and household essentials.

IOS - Inter-organizational Systems: The technology-based frameworks and tools that facilitate communication, information sharing, and coordination among multiple organizations in a supply chain or collaborative network.

IOSIG - Inter-organizational Systems use for Integration: The utilization of technology-driven systems to connect and integrate different components of supply chain partners' operations, fostering smoother collaboration and process alignment.

IOSIN - Inter-organizational Systems use for Intelligence: The strategic deployment of technology systems to collect, analyze, and leverage data and insights from different supply chain partners for improved decision-making and performance enhancement.

IOSCO - Inter-organizational Systems use for Communication: The implementation of technology platforms to facilitate seamless communication, information exchange, and collaboration among different entities in a supply chain.

PAT - Principal Agent Theory: A theoretical framework that analyzes the relationship between a principal (the entity with authority) and an agent (acting on behalf of the principal), considering issues of control, incentives, and information asymmetry.

TCE - Transaction Cost Economics: A theoretical perspective that examines how transaction costs influence the choice between different organizational governance structures, such as internalization or external contracting.

RBV - Resource-Based View: A strategic framework that focuses on an organization's unique resources and capabilities as sources of competitive advantage, emphasizing the importance of valuable, rare, inimitable, and non-substitutable resources.

SET - Social Exchange Theory: A sociological framework that examines the dynamics of social interactions, emphasizing the concept of reciprocity, where individuals engage in relationships to maximize rewards and minimize costs.

RDT - Resource Dependency Theory: A theoretical perspective that investigates how organizations minimize external resource dependencies by establishing relationships and networks to ensure access to vital resources.

SCC - Supply Chain Collaboration: The coordinated efforts of multiple entities within a supply chain to share resources, information, and responsibilities, with the aim of achieving common goals and enhancing overall efficiency.

SCM - Supply Chain Management: The strategic coordination and optimization of activities across the entire supply chain, encompassing sourcing, production, distribution, and customer relationship management.

SCCDC - Supply chain collaboration Decision Synchronization: The process of aligning decision-making timelines, criteria, and strategies among supply chain partners to facilitate coherent and timely actions.

SCCCC - Supply chain collaboration Collaborative communication: The practice of open, transparent, and continuous communication among supply chain partners to share information, insights, and feedback for improved coordination and mutual understanding.

VMI - Vendor Managed Inventory: A supply chain practice in which the supplier takes responsibility for monitoring and replenishing a customer's inventory, ensuring optimal stock levels and reducing supply chain disruptions.

1.7.2 Operational definition

BS - Business Synergy: Business Synergy refers to the measurable increase in operational efficiency, cost savings, and improved outcomes achieved through the integration of processes, resources, and strategies within a business organization.

CA - Collaborative Advantage: Collaborative Advantage represents the tangible competitive edge achieved by organizations as a result of successful collaboration, leading to improved market positioning, innovation, and efficiency gains.

CABS - Collaborative Advantage-Business Synergy: Collaborative Advantage-Business Synergy signifies the quantifiable benefits arising from the combination of successful collaborative efforts and integrated business practices, resulting in amplified operational efficiency and strategic advantage.

CC - Collaborative Communication: Collaborative Communication involves the consistent and transparent sharing of information, feedback, and insights among supply chain partners, enabling better coordination, quick adjustments, and informed decision-making.

CNT - Collaborative Network Theory: Collaborative Network Theory offers insights into the patterns of interaction, information flow, and resource sharing within collaborative networks, contributing to the understanding of how such networks achieve joint benefits.

CPFR - Collaborative Planning Forecasting and Replenishment: Collaborative Planning Forecasting and Replenishment (CPFR) refers to the joint efforts of supply chain partners to share data, align demand forecasts, and coordinate inventory replenishment processes, resulting in reduced costs and improved supply chain performance.

DS - Decision Synchronization: Decision Synchronization involves streamlining the decision-making timelines, processes, and criteria among supply chain partners, facilitating swift and well-coordinated responses to market changes.

EAH - East Africa Holdings S.C: A business entity operating in the East African region located in Ethiopia Addis Ababa, engaged in diverse industries, and responsible for various commercial activities.

Fast Moving Consumer Goods (FMCG): refer to products that are frequently purchased by consumers due to their essential nature and are rapidly consumed or used. These goods are characterized by their quick sales turnover, relatively low unit prices, and constant demand from consumers.

IOS - Inter-organizational Systems: Inter-organizational Systems (IOS) are digital platforms and technologies that enable seamless exchange of data, insights, and resources among different entities within a supply chain, fostering better collaboration and efficiency.

IOSIG - Inter-organizational Systems use for Integration: Inter-organizational Systems use for Integration refers to the practical application of technology platforms to link and harmonize various aspects of supply chain partners' activities, enabling cohesive operations and data sharing.

IOSIN - Inter-organizational Systems use for Intelligence: Inter-organizational Systems use for Intelligence involves harnessing technology to gather and analyze data from various stakeholders in the supply chain, enabling data-driven decision-making and enhanced operational intelligence.

IOSCO - Inter-organizational Systems use for Communication: Inter-organizational Systems use for Communication refers to the effective use of technology tools to enable swift and transparent communication, enhancing coordination and mutual understanding among supply chain partners.

PAT - Principal Agent Theory: Principal Agent Theory provides insights into the dynamics between individuals or entities with decision-making authority and those entrusted to carry out actions on their behalf, addressing challenges related to aligning interests, monitoring, and mitigating information gaps.

TCE - Transaction Cost Economics: Transaction Cost Economics explores how the costs associated with transactions, including negotiation, monitoring, and enforcement, impact the decisions made by organizations regarding whether to conduct activities internally or externally through contracts.

RBV - Resource-Based View: Resource-Based View analyzes how an organization's distinct resources, including tangible and intangible assets, contribute to its competitive advantage, highlighting the role of resources that are difficult for competitors to replicate.

SET - Social Exchange Theory: Social Exchange Theory explores how individuals engage in relationships and interactions, aiming to achieve favorable outcomes through mutual exchanges of value, such as trust, support, and cooperation.

RDT - Resource Dependency Theory: Resource Dependency Theory examines how organizations strategically form connections and collaborations to reduce reliance on external resources, ensuring a stable supply of essential inputs for their operations.

SCC - Supply Chain Collaboration: Supply Chain Collaboration involves the joint activities of supply chain partners to pool resources, align strategies, and foster mutual understanding, leading to improved operational performance and value creation.

SCM - Supply Chain Management: Supply Chain Management refers to the systematic management of interconnected activities that span from raw material sourcing to end-customer delivery, with a focus on efficiency, cost-effectiveness, and customer satisfaction.

SCCDC - Supply chain collaboration Decision Synchronization: Supply chain collaboration Decision Synchronization involves harmonizing decision-making processes among partners to ensure that choices and actions are well-coordinated, minimizing delays and maximizing mutual benefits.

SCCCC - Supply chain collaboration Collaborative communication: Supply chain collaboration Collaborative communication refers to the active exchange of information, ideas, and feedback among partners to enhance alignment, responsiveness, and effective decision-making.

VMI - Vendor Managed Inventory: Vendor Managed Inventory involves the supplier's active involvement in managing the customer's inventory levels, monitoring demand, and initiating replenishment actions to ensure consistent availability of products while minimizing excess inventory costs.

1.10 Organization of the Study

This thesis was organized into five sections or chapters (i.e., introduction, backgrounds, methodology, hypothesis development, findings and conclusions).

Chapter 1 introduces the background, rationale, contribution and organization of the thesis.

Chapter 2 Review of related literature the background section of the thesis which is consists of theoretical review, Empirical review and Hypothesis/conceptual framework development sub sections.

Chapter 3 (Methodology) describes methodology used including the research design, and the research methods.

Chapter 4 Data presentation, Analysis and Interpretation

Chapter5 Summary, Conclusion and Recommendation summarize answers to the research questions and conclude the findings of this thesis. It discusses limitations of the research and suggests future avenues of research.

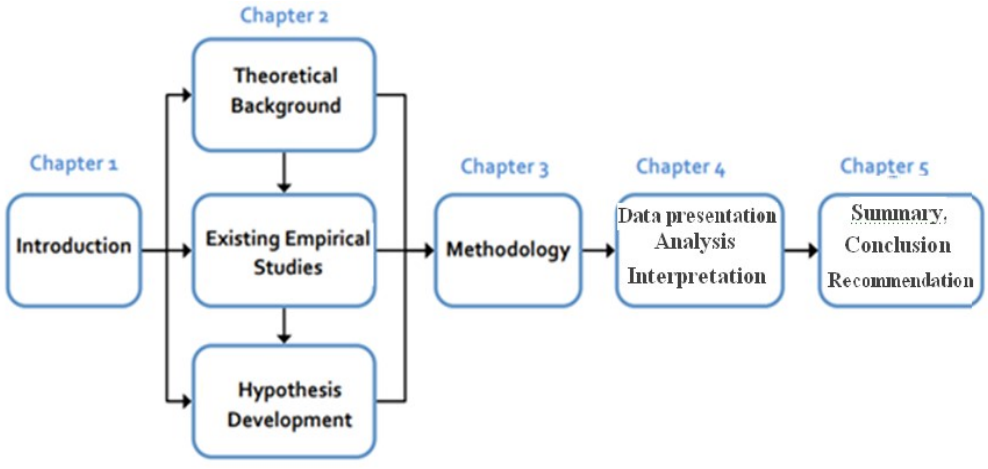


Figure 1.1: Chapter structure of this thesis Figure

CHAPTER TWO

LITERATURE REVIEW

2.1 Supply Chain Collaboration

Supply chain collaboration is commonly defined as the collaborative efforts of two or more independent firms working together to plan and execute supply chain operations (Simatupang and Sridharan, 2002). This collaborative approach brings significant benefits and advantages to the participating partners (Mentzer, J. T., Foggin, J. H. and Golicic, 2000) It is characterized by long-term correlation s where participants cooperate, share information, and adapt their business practices to enhance joint performance (Whipple, Lynch, and Nyaga, 2010).

Supply chain collaboration involves the joint efforts and coordination of activities among supply chain partners to achieve common goals happening at various levels, including internal collaboration within and external collaboration outside an organization with suppliers, manufacturers, distributors, retailers, and customers. It encompasses activities such as information sharing, joint planning, coordinated decision-making, and resource pooling (Lambert & Cooper, 2000; Simatupang & Sridharan, 2002). Effective supply chain collaboration entails building strong interaction and establishing open communication channels among supply chain partners.

2.1.1 Definition and Types of Collaboration

The definition of supply chain collaboration varies across literature, but it generally emphasizes the cooperative and mutually beneficial nature of interactions among supply chain partners. Various researchers have proposed different definitions of supply chain collaboration. Supply chain collaboration is characterized as a long-term correlation where participants cooperate, share information, and collaborate to plan and improve joint performance (Whipple et al., 2010). It aims to leverage the expertise and skills of individual firms to collectively deliver benefits to end consumers (Lebedeva, 2017). For our purpose in this study, we use the definition that: “a means by which companies within the supply chain network work together towards mutual objectives through :- the sharing of ideas,

information, knowledge, risk and rewards in order to accelerate entry in the new market, increased flexibility, share experience and increase revenues"

Types of collaboration commonly observed in supply chains include collaborative forecasting and planning, collaborative inventory management, collaborative product design and development, collaborative logistics, and collaborative correlation management (Lambert & Cooper, 2000; Simatupang & Sridharan, 2002).

2.1.2 Benefits and Challenges of Collaboration

Supply chain collaboration offers numerous benefits to organizations. It can lead to improved demand forecasting accuracy, reduced lead times, enhanced inventory management, increased flexibility and responsiveness, higher product quality, and lower costs through economies of scale. Collaboration also facilitates innovation and fosters long-term correlations based on trust and mutual dependency (Narasimhan, Swink, & Kim, 2006).

However, there were also challenges associated with collaboration. These include the need for information sharing and transparency, the alignment of goals and incentives among partners, organizational and cultural barriers, power imbalances, and the coordination of diverse processes and systems (Lambert & Cooper, 2000; Simatupang & Sridharan, 2002).

Several factors influence the success of supply chain collaboration. Trust and mutual commitment among partners were crucial for fostering collaboration. Effective communication, shared vision, and compatible organizational cultures also play a significant role. Incentives and performance measurement systems that encourage collaboration, as well as the presence of enabling technologies and information systems, were important enablers (Simatupang & Sridharan, 2002).

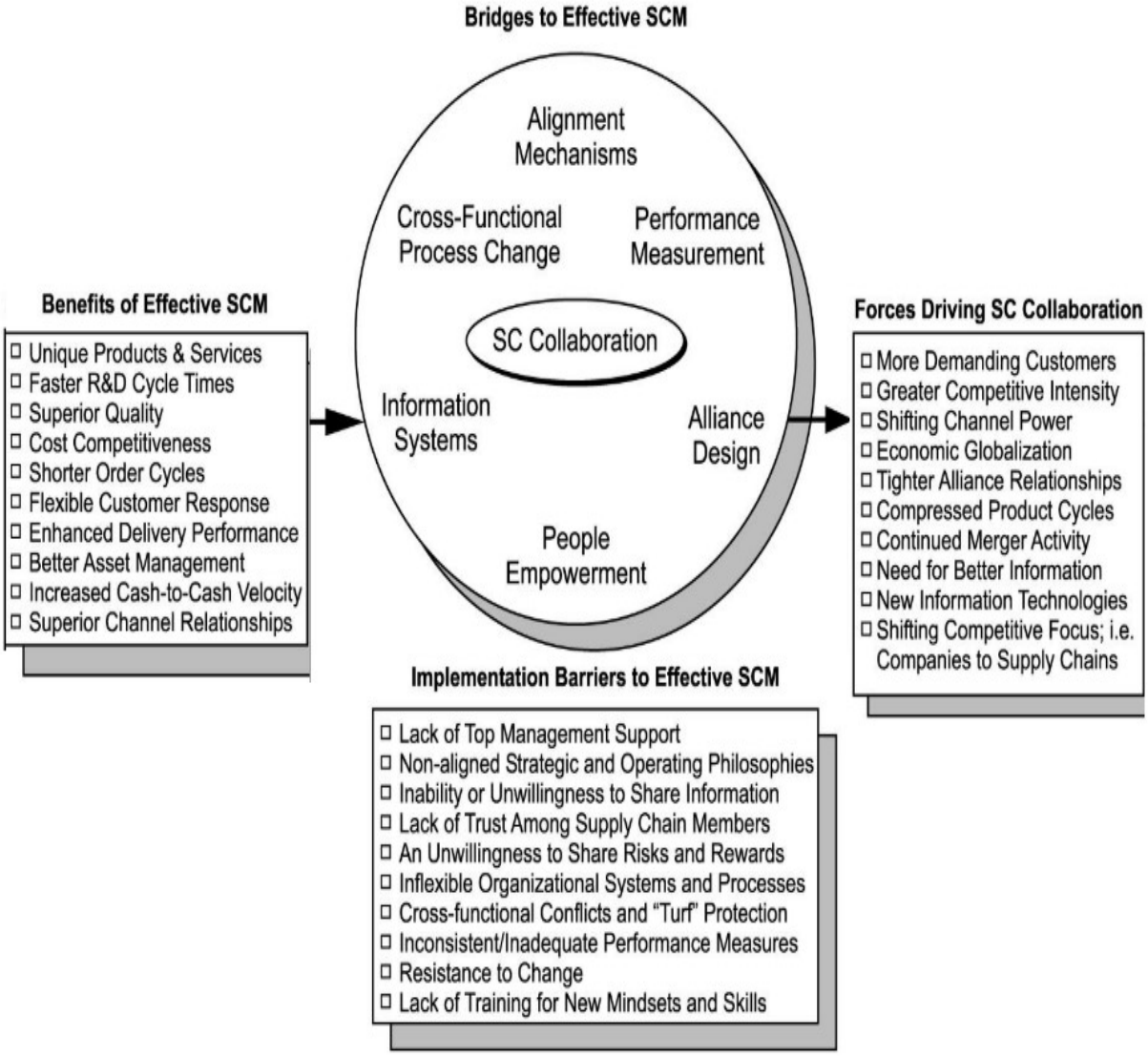


Figure 2.1 - Supply chain implementation contingency framework (Fawcett et al., 2008)

2.1.3 SCC Attributes

A summary of ten SCC dimensions adopted and adjusted from (Piboonrungroj, 2012) is presented in the following Table:-

	Simatupang and Sridharan (2005)	Simatupang and Sridharan (2004)	Simatupang and Sridharan (2002)	Nyaga et al.(2010)	Cao and Zhang (2011)	Ramanathan and Gunasekaran (2012)	Wilding and Humphries (2006)	Sheu et al. (2006)
Information sharing	Included	Included	Included	Included	Included	Included	Included	Included
Joint activities	Included	Not Included	Included	Included	Not Included	Included	Not Included	Included
Dedicated investment	Not Included	Not Included	Not Included	Included	Not Included	Included	Not Included	Included
Goal congruence	Included	Not Included	Included	Not Included	Included	Included	Included	Not Included
Collaborative communicatio	Not Included	Not Included	Not Included	Not Included	Included		Included	Included
Incentive alignment	Included	Included	Included	Not Included	Included	Not Included	Not Included	Not Included
Risk sharing	Not Included	Not Included	Included	Not Included	Not Included	Not Included	Included	Not Included
Joint knowledge	Not Included	Not Included	Not Included	Not Included	Included	Not Included	Included	Not Included
Synchronised decision	Included	Included	Included	Not Included	Included	Included	Included	Included
Resource sharing	Included	Not Included	Not Included	Not Included	Not Included	Included	Not Included	Not Included

Table 2.1 - summary of ten SCC dimensions

Out of the above summarized ten supply chain collaboration dimensions only information sharing, decision synchronization and collaborative communication was investigated in this thesis.

Definition of supply chain collaboration and subcomponents

Construct	Definition	Literature
Supply chain collaboration	A long-term partnership process where supply chain partners work closely together to achieve common goals and mutual benefits.	Bafoutsou and Metzas 2002; Bowersox et al. 2003; Burnes and New 1996; Ellram and Hendrick 1995; Ellram and Edis 1996; Grieger 2003; Golicic et al. 2003;
Information sharing	The extent to which a firm shares a variety of relevant, accurate, complete and confidential information in a timely manner with its supply chain partners	Angeles and Nath 2003; Cooper, Ellram, Gardner, and Hanks 1997; Cooper, Lambert, and Pagh 1997; Kim and Umanath 2005; Monczka et al. 1998; Sheu et al. 2006; Simatupang and Sridharan 2005c, Stuart and McCutcheon 1996; Tyndall et al. 1998; Ren et al. 2010; Cheung et al. 2011
Decision synchronization	The process by which supply chain partners coordinate activities in supply chain planning and operations for optimizing the supply chain benefits	Corbett et al. 1999; Harland et al. 2004; Simatupang et al. 2002
Collaborative communication	The contact and message transmission process among supply chain partners in terms of frequency, direction, mode, and influence strategy	Farace et al. 1977; Guetzkow 1965; Jablin, 1987; Mohr and Nevin 1990; Mohr et al. 1996; Prahinski and Benton 2004; Rogers and Agarwala-Rogers 1976

Table 2.2 Selected SCC dimensions Definitions

Decision Synchronization: Decision synchronization pertains to the degree to which decisions made within an organization are aligned and coordinated across different levels and functions. When decisions are synchronized, they are consistent and harmonized, promoting a unified approach and reducing conflicts or redundancies. Improved decision synchronization can enhance business synergy by ensuring that actions and initiatives across the organization are in harmony and working towards shared goals. (Cao Mei and Zhang, 2013)

Collaborative Communication: Collaborative communication refers to the extent to which individuals and teams within an organization engage in open, effective, and collaborative communication practices. It involves sharing ideas, feedback, and information to foster collaboration and teamwork. Higher levels of collaborative communication may positively influence business synergy by facilitating better coordination, understanding, and alignment of efforts among team members and departments. (Cao Mei and Zhang, 2013)

Quality of Information Sharing: The quality of information sharing refers to the accuracy, completeness, and relevance of the information exchanged within an organization. It encompasses the sharing of knowledge, data, and insights that are essential for informed decision-making and effective collaboration. High-quality information sharing can contribute to business synergy by enabling individuals and teams to make better-informed decisions, align their actions, and leverage shared knowledge for improved performance. (Cao Mei and Zhang, 2013)

2.1.4 SCC antecedents

According to the study done by (Cao Mei and Zhang, 2013) IOS appropriation has been distinguished as IOS use for integration, communication, and intelligence.

Definition of IOS appropriation and subcomponents

Construct	Definition	Literature
IOS appropriation	Patterns, modes, or fashions of IOS use	Chin et al. (1997), DeSanctis and Poole (1994), Malone et al. (1987), Saeed (2004), Salisbury et al. (2002), Subramani (2004)
IOS use for integration	The extent of IOS use in facilitating electronic process coupling between supply chain partners	Barki and Pinsonneault (2005), Barua et al. (2004), Bensaou and Venkatraman (1995),
IOS use for communication	The extent of IOS use in facilitating contacts and message flows between supply chain partners	Bafoutsou and Mentzas (2002), Chi and Holsapple (2005), Hill and Scudder (2002), Malone et al. (1987)
IOS use for intelligence	The extent of IOS use in enhancing learning and knowledge creation between supply chain partners	Chi and Holsapple (2005), Collins et al. (1998), Gini and Boddy (1998), Mehra and Nissen (1998), Milton et al. (1999), Nissen and Sengupta (2006), O'Leary (2003), Tsui (2003), Wurman et al. (1998)

Table 2.3 Selected IOS dimensions Definitions

IOS Use for Communication: Information and communication technology (ICT) tools, such as digital platforms, messaging apps, and collaborative software, play a vital role in facilitating communication within organizations. The use of ICT tools for communication can enhance collaborative advantage business synergy by providing efficient channels for sharing information, facilitating real-time collaboration, and enabling seamless communication across teams and departments (Cao Mei and Zhang, 2013).

IOS use for communication refers to the degree of IOS use in assisting contacts and message flows between supply chain members. IOS technologies and softwares for inter-firm communication include channel management, message services, communications network, and communication standards and protocols (Chi and Holsapple 2005)

IOS Use for Integration & Intelligence: ICT tools can also be utilized for integration and intelligence purposes, allowing organizations to streamline processes, integrate systems, and leverage data for informed decision-making. When organizations effectively use ICT tools for integration and intelligence, they can optimize operations, leverage data-driven insights, and foster synergy by aligning various functions and leveraging collective intelligence. (Cao Mei and Zhang, 2013)

2.2 Collaborative Advantage

Several studies in SCM have attempted to identify empirical evidence of the role of SCC for collaborative advantage (Cao and Zhang 2011). Collaborative advantage refers to strategic benefits gained over competitors in the marketplace through supply chain partnering(Cao Mei and Zhang, 2013). Supply chain collaboration systematically synchronizes the resources and capabilities of every supply chain participant to enhance service performance, lower total costs, develop innovation etc. All of this allows to predict a direct connection between dimensions of supply chain collaboration and collaborative advantages(Lebedeva, 2017).

Collaborative advantage involves accessing and leveraging supply chain partners resources, creating cost savings, efficiencies, integrated systems, and improved quality. It is based on the concept of relational-rents that produce common benefits for bilateral rent-seeking behaviors. Collaborative advantage encourages a positive-sum game where partners strive for mutual benefits rather than individual competitive advantage.

Supply chain collaboration generates value by creating joint advantages among supply chain partners through shared resources and knowledge. It helps achieve operating synergies, reduce costs, and enhance profits. Process efficiencies were achieved by meeting or exceeding cost estimates and productivity standards through collaboration. Flexibility allows for adjustments to unforeseen changes in the marketplace, meeting varying customer needs and remaining responsive in a dynamic environment. Quality, business synergy, and innovation were also impacted by collaboration, leading to excellent product or service offerings and greater benefits than the sum of individual efforts. This paper will investigate collaborative advantages business synergy dimensions.

Business synergy is defined as the realization of supernormal benefits after combining partner complementary and related resources (M. Cao and Zhang, 2011). It occurs after two or more different parties come together, but how it is utilized can be the decision of one of the collaborating entities (Larsson and Finkelstein, 1999). Synergy between supply chain collaboration members can yield greater benefits than the sum of the individual parties(Ansoff and McDonnell, 1988).

2.2.1 Factors Affecting Collaborative Advantage

Several factors influence the attainment of collaborative advantage. Effective collaboration requires trust, mutual respect, and open communication among partners. It also depends on the alignment of goals, shared knowledge and information, effective coordination mechanisms, and the ability to manage interdependencies and conflicts. Additionally, factors such as supply chain visibility, information technology capabilities, and supportive organizational structures contribute to collaborative advantage (Simatupang & Sridharan, 2002).

2.3 Theoretical Perspectives

Various theoretical perspectives can be applied to understanding the correlation between supply chain collaboration and collaborative advantage such as; uncertainty reduction theory, transaction cost economics, resource-based view, relational view, extended resource-based view, resource dependence theory, social exchange theory, social dilemma theory, trust-based rationalism, and learning and knowledge perspective (Cao & Zhang, 2013). These

theories provide insights into the mechanisms, benefits, and challenges of supply chain collaboration, emphasizing the importance of trust, information sharing, and process integration among supply chain partners (Cao & Zhang, 2013).

Theoretical views	TCE	SET	RBV
Managerial philosophy and focus	Minimize transaction costs	Build relationship	Create competitive advantages
Conceptual origins & grounding	Safeguard assets Economics	Focus on inputs Sociology	Resource utilisation and competitive advantages
Underlying assumptions	Bounded rationality & opportunistic behaviour, Individuals act opportunistically Need for uncertainty reduction, Risk neutrality	Moral obligations between actors Inherent reciprocity, Interdependence through socialization	Only firm's resources that are valuable, rare, inimitable and non-substitutable can generate sustained competitive advantage.
Governance Mechanisms	Contractual/legal Hierarchical	Trust, Relational norms Bilateral inputs required	Relationships between power and competitiveness.
Managerial Benefits & burdens	More partner control Greater internalized certainty Relational specifications in advance	Greater flexibility Interactive and adaptive, Higher efficiency	Differentiated competitive advantages
Application	Role of transaction costs, trust, asset specificity, performance	Mediating role of trust and commitment	Resources exploitation, sustained competitive advantage, performance

Table 2.4 Summaries of Selected Theories

2.3.1 Resource-Based View

The resource-based view suggests that collaboration can create unique resources and capabilities that were difficult to imitate, leading to sustained competitive advantage. Collaboration allows partners to pool their resources, share expertise, and leverage complementary capabilities to achieve superior performance (Lambert & Cooper, 2000).

RBV suggests collaborative efforts among supply chain members can enhance their collaborative advantage in terms of supply chain operations' speed, convenience, and reliability (Walker, David and Martha, 2000). Supply chain members sharing resources with SCC partners to improve their capabilities (Piboonrungroj, 2012). This thesis utilizes RBV theory, particularly in the framework of resource utilization within SC collaborative practices (Barney, 2012), to describe the impact of SCC on CA (Mei Cao and Zhang, 2011).

According to (Cao Mei and Zhang, 2013), firms have the potential to gain not only internal rents but also relational rents through collaboration. Relational rents refer to supernormal profits that were generated through joint contributions and cannot be achieved by either firm individually. These rents were made possible by combining and exchanging resources facilitated by relation-specific investments, knowledge-sharing, and effective governance mechanisms. The relational view (RV) complements the Resource-Based View (RBV) by emphasizing the creation of relational rents and the mutual benefits derived from collaboration.

The Resource-Based View (RBV) is a theoretical framework that emphasizes the strategic importance of unique resources and capabilities possessed by organizations for sustained competitive advantage (Barney, 1991). In the context of SCC, RBV suggests that in collaborative partnership resources shared among supply chain partners can contribute to creating a collaborative advantage.

2.3.2 Transaction Cost Economics

Transaction cost economics highlights the role of collaboration in minimizing transaction costs and increasing supply chain efficiency. Collaborative correlation s can help reduce uncertainties, minimize opportunistic behavior, and eliminate redundant activities, resulting in cost savings and improved performance (Narasimhan et al., 2006).

The drivers of transaction costs encompass factors such as uncertainty, asset specificity, and transaction frequency (Williamson, 2005). It has been understood long-term orientations between supply chain partners within a collaborative correlation is due to higher levels of asset specificity and environmental uncertainty (Lui, Steven S and Ngo, 2012). These

findings highlight the importance of involving transaction costs and related factors when assessing the dynamics of supply chain collaboration.

Within the realm of supply chain collaboration, transaction costs were commonly recognized as a mediator that influences collaborative correlation s. Some studies indirectly incorporate transaction costs by examining their antecedents (Piboonrungroj, 2012). TCE highlights the use of IOS and interfirm partnership to minimize transaction costs through specific asset investments, which in turn alleviate opportunistic behaviors. According to TCE, firms organize their cross-organizational activities to minimize production costs within and costs outside the firm in the marketplace (Cao Mei and Zhang, 2013).

TCE) focuses on analyzing the costs and benefits attached with different modes of transactions such as collaboration (Williamson, 1985). It explains the choice between market-based transactions and collaborative correlation s by considering the costs associated with transaction-specific investments, opportunism, and information asymmetry. In the context of supply chain collaboration, TCE provides understanding into the governance mechanisms and the economic rationale behind supply chain collaborative practices. It helps us understand the trade-offs between the costs and benefits of collaboration (Lai and Cheng, 2005).

2.3.3 Social Exchange Theory

Social exchange theory emphasizes the reciprocal correlation s and trust-building processes that occur in supply chain collaboration. It suggests that the exchange of resources, information, and support among partners creates a positive social environment that fosters collaboration and collaborative advantage (Simatupang & Sridharan, 2002).

Social Exchange Theory (SET) focuses on understanding the dynamics of social correlation s and the mutual exchange of resources and benefits among individuals or organizations (Blau, 1964). It examines how individuals or organizations engage in social exchanges based on expectations of reciprocity and the pursuit of self-interest. In the context of supply chain collaboration, SET helps us understand the interpersonal dynamics of trust, commitment, and reciprocity that underpin effective collaboration among SC members. It highlights the

importance of building and maintaining conducive social correlation s to promote successful collaboration (Dyer and Chu, 2000).

2.4 Empirical Studies on SCC and CA

Supply chain collaboration has attracted significant attention and research focus in the field of supply chain management in recent years (Soosay and P. Hyland, 2015). Organizations were recognize the significance of implementing SC-collaborative practices in their supply chains to achieve efficiency, responsiveness, and gain a competitive advantage (Nyaga, Whipple, and Lynch, 2010). SC-collaborative practices were driven by the objective of improving overall collaborative advantages. Consequently, studying SCC is essential for understanding how organizations can effectively collaborate with their partners for mutual benefits.

Empirical studies have investigated the association between SCC and CA in different industries and contexts. They have also highlighted the role of factors such as trust, information sharing, communication, and technology in facilitating collaborative advantage (Lambert & Cooper, 2000; Narasimhan et al., 2006; Simatupang & Sridharan, 2002).

References	Study/result
Chen & Paulraj (2004)	Examined the impact of SCC on operational performance and customer satisfaction. The findings indicated that supply chain collaboration positively influenced both operational performance and customer satisfaction. The study also identified trust and information sharing as critical factors in achieving collaborative advantage.
Frohlich & Westbrook (2001)	This study focused on the correlation between SCC and financial performance. The results showed that SCC positively influenced financial performance, including increased profitability and reduced costs. The study emphasized the importance of long-term collaborative partnerships for achieving financial benefits.

Huang& Li (2009)	This study investigated the correlation between SCC and innovation. The findings revealed a positive association between collaboration and innovation performance, indicating that firms that engage in collaborative practices were more likely to achieve higher levels of innovation. The study highlighted the role of knowledge sharing and joint problem-solving in facilitating innovation through collaboration.
Li, Ragu-Nathan & Rao (2006)	This study explored the impact of SCC on operational performance and customer satisfaction in the context of the automotive industry. The results demonstrated that collaborative practices positively influenced operational performance and customer satisfaction. The study highlighted the importance of information sharing, joint decision-making, and resource integration for achieving collaborative advantage.

Table 2.5 Empirical Studies Summary SCC and CA

These empirical studies provide empirical evidence supporting the positive correlation between SCC and CA. They highlight various dimensions of collaboration, such as trust, information sharing, joint decision-making, and resource integration, that contribute to improved operational, financial, and innovation performance. The findings emphasize the importance of building and maintaining collaborative correlation s to enhance competitiveness in the supply chain context.

2.5 Conceptual Framework

The principal constructs of the supply chain collaboration were derived from the theoretical background and further used to develop the theoretical, measurement and structural models of this thesis. The constructs include supply chain collaboration (SCC), Inter-organizational Systems(IOS) and Collaborative Advantage (CA). To address the research issues, three basic and important elements of SCC and its underlying structure were identified with the help of

the existing related literature (M. Cao and Zhang, 2011). Thus, the construct SCC included 3items, namely: Decision synchronization (SCCDS), Collaborative Communication (SCCCC) and Quality information sharing (SCCIS).

The latent construct Collaborative Advantage (CA) consisted of one item: Business synergy (CABS).

The latent construct CA, which represents collaborative advantage, consisted of four items: offering flexibility, process efficiency, innovation, and business synergy (Cao Mei and Zhang, 2013). These items capture the essential elements and outcomes of collaboration. In this study only the item Business synergy (CABS). The following picture shows the conceptual framework used in this study.

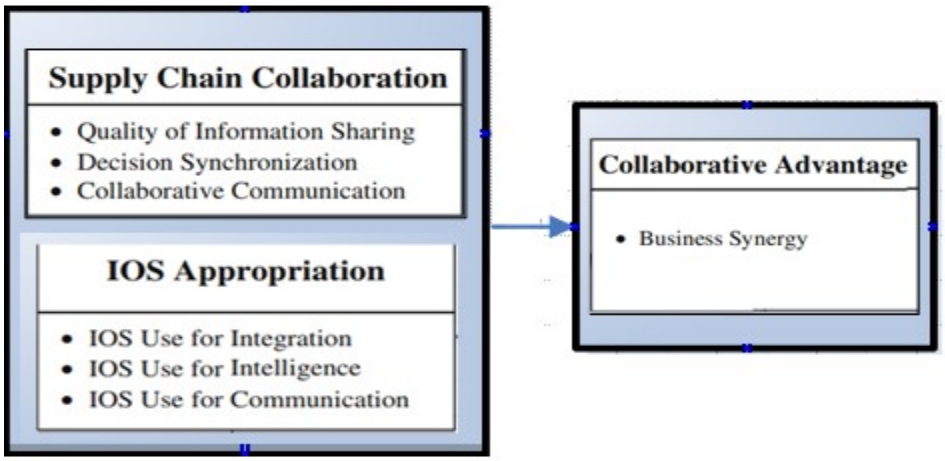


Figure 2.7 Theoretical model

2.5 Hypotheses Development

H0$_1$: SCCDS has no statistically significant effect on Business Synergy [CABS]

H0$_2$: SCCCC has no statistically significant effect on Business Synergy [CABS]

H0$_3$: SCCIS has no statistically significant effect on Business Synergy [CABS]

H0$_4$: IOSIG has no statistically significant effect on Business Synergy [CABS]

H0$_5$: IOSCO has no statistically significant effect on Business Synergy [CABS]

H06: IOSIN has no statistically significant effect on Business Synergy [CABS]

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Approach

In line with the research purpose an explanatory research approach was chosen. Explanatory research seeks to explain the correlation s between different factors or variables approach to establish causal correlations between constructs (Saunders et al., 2009). The research conducted in this thesis was deductive in nature. Based on existing knowledge and theories this thesis formulate general hypotheses, and then proceeds to collect and analyze empirical data to test and validate the hypotheses.

3.2 Research Design

The research design for this study adopted a quantitative approach to examine the effect of supply chain collaboration on collaborative advantage. A cross-sectional design was employed to collect data at a specific point in time, capturing the current state of collaboration and its impact on collaborative advantage. The study was conducted using a survey questionnaire to gather data from a sample of employees representing various branches.

3.3 Data Collection

The primary data for this research was collected through a structured survey questionnaire. The questionnaire was designed to capture relevant information related to IOS enabled supply chain collaboration, collaborative advantage, and their associated factors. The survey was administered to supply chain managers, executives and professionals with through knowledge and experience in supply chain collaboration from BESH GEBEYS HQ and other three branches located in Addis Ababa.

The data collection process involved the distribution of the survey questionnaire to targeted participants. The questionnaire was designed based on the conceptual framework and research objectives, incorporating validated scales and items from existing literature. The survey captured information on the extent of IOS uses for Integration, IOS uses for

communication, IOS uses for Intelligence, Supply chain collaborative practices Decision Synchronization, Supply chain collaborative practices Collaborative Communication, Supply chain collaborative practices Quality Information Sharing and collaborative advantage Business Synergy in BESH GEBEYA supply chain based on employee's perception. To ensure data quality, the questionnaire was pilot tested to assess its clarity and relevance.

3.3.1 Data Sources and Types

The study collected primary data through questioners form management staffs who were involved in the Besh Gebeya marketing and distribution network.

3.3.2 Data Collection Procedures

To validate our model using the collected data, a survey questionnaire derived from previous research studies was employed (Cao Mei and Zhang, 2013). The survey questionnaire utilized a five-point Likert scale, where respondents could indicate their level of agreement or disagreement with each statement. The scale ranged from 1 (strongly disagree) to 5 (strongly agree), allowing respondents to express their opinions and perceptions on the constructs being measured.

Multiple items were included for each of the constructs in order to capture different extent of the construct. This approach helps to ensure the reliability and validity of the measurement by considering various perspectives and minimizing the unexpected bias associated with single-item measurements. By using a survey questionnaire with compound items and using a Likert scale, the research aims to gather quantitative data this study assess the correlation s and hypotheses proposed in the research model statistically.

3.4 Sample Selection

The sample for the survey and interviews were selected using a combination of purposive and convenience sampling techniques. The participants were professionals and managers directly involved in supply chain management.

3.4.1 Unit of analysis

The main aim of this thesis was to explain the effects of SCC on Collaborative advantage of BESH GEBEYA based on the perception of employees, making employees as unit of analysis including all management and supervisor level employees of BESH GEBEYA working in the HQ and three BESH branches located in Addis Ababa namely Mexico, Cadisko and Hayate.

3.4.2 Population and Sample design

3.4.2.1 Sample size determination

The target population of the study was the BESH GEBEYA FINANCE, FMCG, HR/IT and OPERATION management employees.

No	Department	Managers	Supervisors	Total
1	FINANCE	2		2
2	FMCG	13	13	26
3	HR/IT	4	1	5
4	OPERATION	4	0	2
Grand Total				**37**

Table 3.1 Employee Table

3.4.2.2 Sampling procedure

The contexts of the study demanded limited, specialized, and specific population of interest that our primary target population was managers and supervisors who were directly or indirectly involved in the supply chain management and operation. A Google form questionnaire was designed and the corresponding link was shared in a telegram group created and 38 samples were collected through a web survey using a Google form questionnaire.

3.5 Variables and Measures

The study included several key variables, including IOS Use for Integration and Intelligence, IOS Use for Communication, IOS use and supply chain collaboration as independent, collaborative advantage as dependent variable taken from Cao et al (2013).

3.5.1 Variables Coding

	Construct / Variable	Code	Source
Independent Variables of [IOS-USE]			
1	IOS Use for Integration	[IOSIGIN]	Cao et al (2013)
2	IOS Use for Intelligence	[IOSIGIN]	Cao et al (2013)
3	IOS Use for Communication	[IOSCO]	Cao et al (2013)
Independent Variables of Supply Chain Collaboration [SCC]			
1	Quality of Information Sharing	[SCIS]	Cao et al (2013)
2	Decision Synchronization	[SCDS]	Cao et al (2013)
3	Collaborative Communication	[SCCC]	Cao et al (2013)
Dependent Variable of Collaborative Advantage [CA]			
1	Business Synergy	[CABS]	Cao et al (2013)

Table 3.2 Variables Coding

3.5.2 Measures

The survey questionnaire will include items that capture the respondents' perceptions on the selected variables. Collaborative advantage was measured using a multi-dimensional scale, capturing dimensions of Business Synergy using a scale adapted from Cao et al (2013). Supply Chain Collaboration was measured using a multi-dimensional scale, capturing dimensions such as Decision Synchronization, Collaborative Communication and Quality of Information Sharing. All measured using a scale adapted from Cao et al (2013). IOS Appropriation was measured using a multi-dimensional scale, capturing dimensions such as IOS Use for Integration and Intelligence and IOS Use for Communication. All measured using a scale from Cao et al (2013).

Predictor Variable measures			
IOS - USE	IOSIG	Our firm and the supply chain partners use IOSfor	
		IOSIG1	[joint forecasting, planning, and execution]
		IOSIG2	[order processing, invoicing and settling accounts]
		IOSIG3	[exchange of shipment and delivery information]
		IOSIG4	[managing warehouse stock and inventories]
	IOSCO	Our firm and supply chain partners use IOS for	
		IOSCO1	[conferencing]
		IOSCO2	[message services]
		IOSCO3	[frequent contacts]
		IOSCO4	[multiple channel communication]
	IOSIN	Our firm and supply chain partners use IOS for	
		IOSIN1	[understanding trends in sales and customer preferences]
		IOSIN2	[deriving inferences from past events]
		IOSIN3	[combining information from different sources to uncover trends and patterns]
		IOSIN4	[interpreting information depending upon various requirements]
SCC	SCCIS	Our firm and supply chain partners exchange:-	
		SCCIS1	[timely information]
		SCCIS2	[accurate information]
		SCCIS3	[complete information]
		SCCIS4	[confidential information]
	SCCDS	Our firm and supply chain partners:-	
		SCCDS1	[jointly plan on promotional events]
		SCCDS2	[jointly develop demand forecasts]
		SCCDS3	[jointly manage inventory]
		SCCDS4	[jointly plan on product assortment]
	SCCCC	Our firm and supply chain partners:-	
		SCCCC1	[have frequent contacts on a regular basis]
		SCCCC2	[have open and two-way communication]
		SCCCC3	[have informal communication]
		SCCCC4	[many different channels to communicate]
		SCCCC5	[influence each other's decisions through discussion rather than request]
Out Come variable measures			
CA	CABS	Our firm with supply chain partners have integrated:-	
		CABS1	[IT infrastructure and IT resources]
		CABS2	[knowledge bases and know-how]
		CABS3	[marketing efforts]
		CABS4	[production systems]

Table 3.3 Measurement instrument Table

3.6 Data Analysis Techniques

Quantitative data collected from the survey was analyzed using statistical techniques such as descriptive statistics such as means, frequencies, and percentages to summarize the demographic characteristics of the sample and the variables under study. Inferential statistical methods, such as correlation, variance, covariance, and regression analysis was conducted to examine the correlations between all variables dependent and independent including grouping variables.

3.6.1 Measurement model validity

Even if the study adopted well defined constructs with developed measurement instruments, it is customary to assess measurement model validity with respect to the study context.

3.6.1.1 Face Validity

The questionnaire were shared to experienced Supply chain specialists working in the organization for possible ambiguity, lack of clarity and appropriateness critical review. No feedbacks and no request for any amendments.

3.6.2 Validity and Reliability

To measure the reliability of the gathered data, Cronbach's alpha was applied. Cronbach's Alpha produced internal consistencies that exceeded the minimum value of 0.7 required for acceptable reliability, (Cronbach & Shapiro, 1982)

Construct	Sub-Construct	Item	Cronbach's if Item Deleted	Cronbach's Alpha
IOS- USE	IOSIG	IOSIG1	0.808	0.8195
		IOSIG2	0.736	
		IOSIG3	0.771	
		IOSIG4	0.771	
	IOSCO	IOSCO1	0.912	0.9004
		IOSCO2	0.840	
		IOSCO3	0.875	
		IOSCO4	0.856	
	IOSIN	IOSIN1	0.759	0.7918
		IOSIN2	0.687	
		IOSIN3	0.745	
		IOSIN4	0.765	
SCC	SCCIS	SCCIS1	0.786	0.8312

		SCCIS2	0.777	
		SCCIS3	0.767	
		SCCIS4	0.818	
	SCCDS	SCCDS1	0.797	0.8472
		SCCDS2	0.840	
		SCCDS3	0.794	
		SCCDS4	0.788	
	SCCCC	SCCCC1	0.749	0.7782
		SCCCC2	0.717	
		SCCCC3	0.740	
		SCCCC4	0.722	
		SCCCC5	0.761	
CA	CABS	CABS1	0.769	0.8227
		CABS2	0.758	
		CABS3	0.792	
		CABS4	0.785	

Table 3.4 Cronbach's Alpha

As clearly shown in the above reliability statistics table all the dimensions selected for the study were found to be high in their internal consistency.

3.7 Model and Estimation Techniques

The study proposed the following five regression models to measure the level of significant association between the dependent and independent variables. Models were presented as follows;

Model-1 $Y = \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + \varepsilon$

Where: Y = Business Synergy [CABS]

$\beta0$ = Constant — ε = the error

$\beta1$ = Regression coefficient for SCCDS — X1= Level of SCCDS

$\beta2$= Regression coefficient for SCCCC — X2= Level of SCCCC

B3 = Regression coefficient for SCCIS — X3= Level of SCCIS

B4= Regression coefficient for IOSIN — X4= Level of IOSIN

B5= Regression coefficient for IOSCO — X5= Level of IOSCO

B6= Regression coefficient for IOSIG — X6= Level of IOSIG

3.8 Ethical Considerations

Ethical considerations was upheld throughout the research process. Participants was provided with clear information about the purpose of the study, the nature of their involvement, and their rights as research subjects. Data collected was anonymized and treated with strict confidentiality. The research will adhere to ethical guidelines and regulations set by the academic institution and relevant research ethics boards. The study will adhere to principles of informed consent, voluntary participation, confidentiality, and data protection. Data was anonymized and securely stored to protect participants' confidentiality.

CHAPTER FOUR

4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

In this chapter, the data collected from respondents have been analyzed and interpreted. The chapter begins by presenting reliability test, background information of respondent under the demographic variables, followed by descriptive statistics, correlation analysis and finally multiple linear regression analysis. Data analysis, findings and result interpretation of the study presented and discussed in this chapter.

4.1 Data Processing

The questionnaire was made in five scales (Likert scale) ranging from one to five; where1 = [strongly disagree], 2 = [disagree], 3 = [neutral], 4 = [agree], 5 = [strongly agree] adopted from (Cao Mei and Zhang, 2013). A total of 38 questionnaires were collected for employees through web survey using Google form questioner. Managerial and supervisory level employees were selected.

Rating	Count	Percentage
Respondent	38	70.4%
Non- Respondent	16	29.6%
Total	54	100%

Table 4.1 Response rate table

Out of 54 target 38 questioners were collected 70.4% response rate and 29.6% non-response rate recorded.

4.2 Descriptive Analysis

4.2.1 Test of Outliers

In order to check the presence of extreme values in our data we use the Mahal. Distance maximum value from SPPS residuals Statistics result table. In this case we need a Chi-square table to get the critical value and compare it with the Mahal. Distance maximum value. If Mahal. Distance maximum value is greater than the critical value we conclude the existence of outliers in our data.

If the Mahalanobis maximum value is less than the critical P-value the result implies the existence of Multivariate Normality or else the result sows the presence of outliers. In the following table we can read the critical value from the critical Chi-Square value table given p-value alpha .05 and degree of freedom the number of our dependent variables i.e. 6 which equal to 12.59.

Table of critical Chi-Square values:

df	$p = 0.05$	$p = 0.01$	$p = 0.001$	df	$p = 0.05$	$p = 0.01$	$p = 0.001$
1	3.84	6.64	10.83	53	70.99	79.84	90.57
2	5.99	9.21	13.82	54	72.15	81.07	91.88
3	7.82	11.35	16.27	55	73.31	82.29	93.17
4	9.49	13.28	18.47	56	74.47	83.52	94.47
5	11.07	15.09	20.52	57	75.62	84.73	95.75
6	12.59	16.81	22.46	58	76.78	85.95	97.03
7	14.07	18.48	24.32	59	77.93	87.17	98.34
8	15.51	20.09	26.13	60	79.08	88.38	99.62
9	16.92	21.67	27.88	61	80.23	89.59	100.88
10	18.31	23.21	29.59	62	81.38	90.8	102.15
11	19.68	24.73	31.26	63	82.53	92.01	103.46
12	21.03	26.22	32.91	64	83.68	93.22	104.72
13	22.36	27.69	34.53	65	84.82	94.42	105.97
14	23.69	29.14	36.12	66	85.97	95.63	107.26
15	25	30.58	37.7	67	87.11	96.83	108.54
16	26.3	32	39.25	68	88.25	98.03	109.79
17	27.59	33.41	40.79	69	89.39	99.23	111.06
18	28.87	34.81	42.31	70	90.53	100.42	112.31
19	30.14	36.19	43.82	71	91.67	101.62	113.56
20	31.41	37.57	45.32	72	92.81	102.82	114.84
21	32.67	38.93	46.8	73	93.95	104.01	116.08
22	33.92	40.29	48.27	74	95.08	105.2	117.35
23	35.17	41.64	49.73	75	96.22	106.39	118.6
24	36.42	42.98	51.18	76	97.35	107.58	119.85
25	37.65	44.31	52.62	77	98.49	108.77	121.11

Table 4.2 critical Chi-Square value table

The following residuals Statistics table generated using SPSS statistical software (sample size 38) show that the Mahal. Distance maximum value is 19.133.

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Mahal. Distance	0.607	19.133	5.842	4.163	38
Cook's Distance	0.000	0.709	0.048	0.117	38
Centered Leverage Value	0.016	0.517	0.158	0.113	38

a. Dependent Variable: CABS

Table 4.3 Residuals Statistics

Residuals Statistics – Sample size 38

The SPSS maximum result of Mahalanobis distance 19.133 which is greater than the critical Chi-Square value 12.59. Higher maximum Mahalanobis distance value is attributed to the presence outlier. In this case we are required to identify the extreme values and remove them to get a smaller Mahalanobis distance value.

The Identified extreme values are presented bellow

Extreme Values		
Mahalanobis Distance	Case Number	Value
Highest	1	19.13297
	21	15.61146
	8	14.39134
	4	11.94534
	28	10.4139
Lowest	29	0.6066
	14	1.41434
	33	1.60153
	7	1.92468
	24	2.20004

Table 4.4 Extreme value table

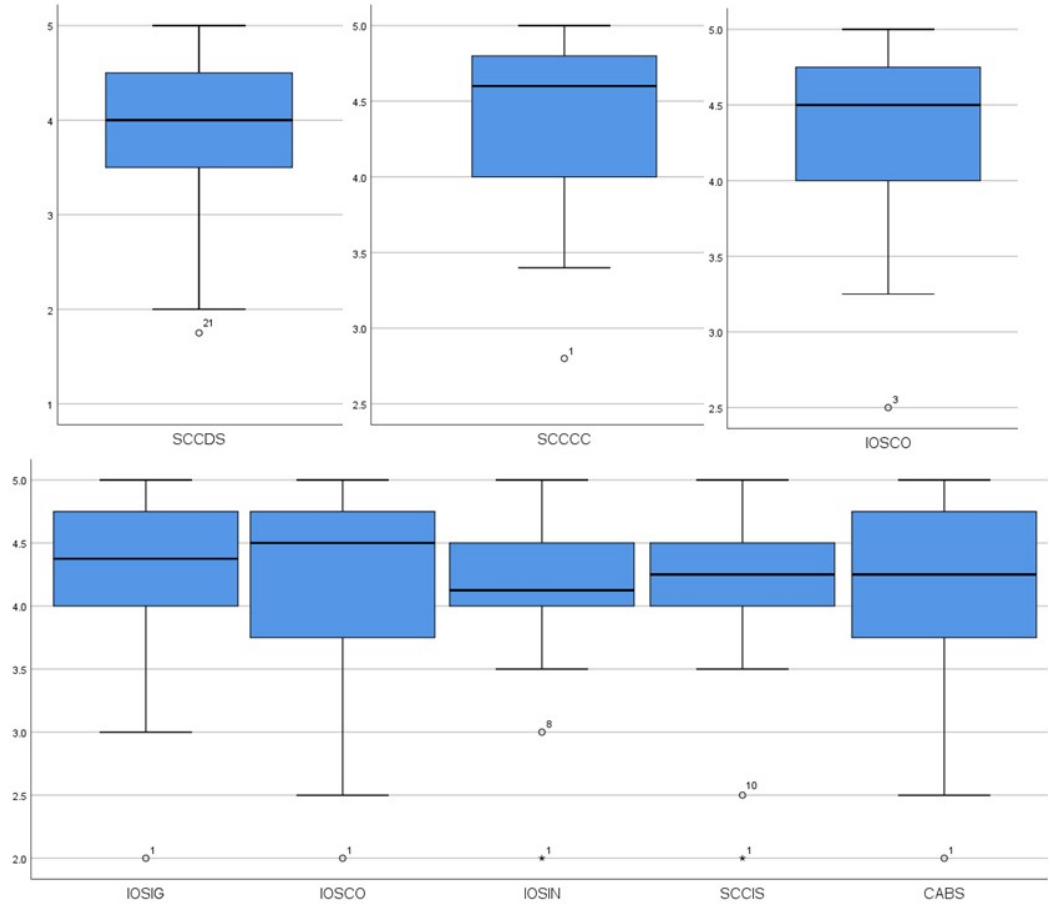


Figure 4.1 Outlaies box plot

In the box plot above the presence of asterisks indicate the presence of outliers. In order to reduce possible bias 1, 4,8,10, 21 and 29 six outlier observations were removed that the remaining 32 respondents' data were used for the survey analysis using SPSS 26.0.

After the identified outliers removed, the following residuals Statistics table generated using SPSS statistical software (sample size 32) show that the Mahal.

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Mahal. Distance	2.352	12.017	5.813	2.552	32
Cook's Distance	0.000	0.248	0.042	0.057	32
Centered Leverage Value	0.076	0.388	0.188	0.082	32
a. Dependent Variable: CABS					

Table 4.5 Residuals Statistics

The Mahalanobis maximum value 12.017 is less than the critical P-value 12.59 the result implies the existence of no outliers.

4.2.2. Demographic Description

The purpose of demographic analysis in this research is to describe the characteristics of the respondent. Research respondents were characterized in three groupings including; respondents work place classified as Branch and Head office, respondents work experience classified as under two years and over two years and finally respondents Department classified as HR/IT/Other and SC operation. Accordingly these characterizations were summarized and described in tables below: -

WORK_PLACE	Frequency	Percent	Valid Percent	Cumulative Percent
Head office	19	59.4	59.4	59.4
Branch Office	13	40.6	40.6	100.0
Total	32	100.0	100.0	
Under Two years	10	31.3	31.3	31.3
Over two years	22	68.8	68.8	100.0
Total	32	100.0	100.0	
HR/IT/Other	21	65.6	65.6	65.6
OPERATION-CATEGORY	11	34.4	34.4	100.0
Total	32	100.0	100.0	

Table 4.5 Demographic Statistics

The work place demography of respondents shows that 59.4% of respondents were from the head office and the rest 40.6% from branch office.

Figure 4.2: Respondents Work place demography

Based on work experience 31.3% were under two Years and the rest 68.8% were over two years.

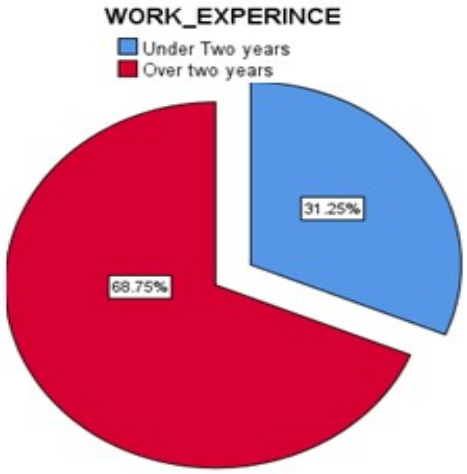


Figure 4.3: Respondents Work Experience demography

Based on their work function/department 34.4% were directly involved in the supply chain operation and the rest 65.6% were indirectly involved in the supply chain operation through human resource and finance.

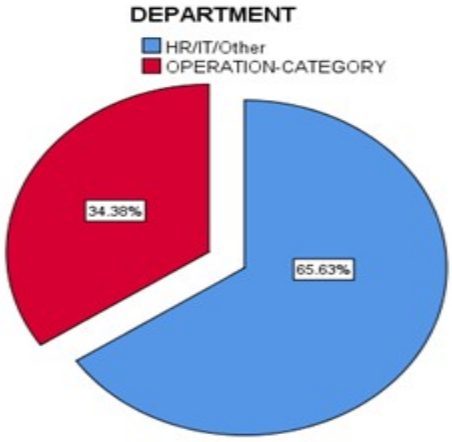


Figure 4.4: Respondents Department demography

4.2.3 Aggregated Variables

The research has identified six main constructs namely IOSIG, IOSCO, IOSIN, SCCIS, SCCDS, SCCC and CABS. IOS Use measurement Items include; IOS-Use for Integration [IOSIG], IOS-Use for Communication [IOSCO] and IOS-Use for Intelligence [IOSIN] predictor variables. Supply Chain Collaboration measurement Items include; Quality of Information Sharing [SCCIS], Decision Synchronization [SCCDS] and Collaborative Communication [SCCCC] as predictor variables and Collaborative Advantage Business Synergy as an outcome variable.

Descriptive Statistics					
Dependent Variable: CABS					
WORK_PLACE	WORK_EXPERINCE	DEPARTMENT	Mean	Std. Deviation	N
Head office	Under Two years	HR/IT/Other	3.2500	.00000	2
		OPERATION-CATEGORY	4.0625	.62500	4
		Total	3.7917	.64064	6
	Over two years	HR/IT/Other	3.8333	.30277	6
		OPERATION-CATEGORY	3.6786	.64087	7
		Total	3.7500	.50000	13
	Total	HR/IT/Other	3.6875	.37201	8
		OPERATION-CATEGORY	3.8182	.63335	11
		Total	3.7632	.53016	19
Branch Office	Under Two years	HR/IT/Other	4.9375	.12500	4
		Total	4.9375	.12500	4
	Over two years	HR/IT/Other	4.5556	.30046	9
		Total	4.5556	.30046	9
	Total	HR/IT/Other	4.6731	.31266	13
		Total	4.6731	.31266	13
Total	Under Two years	HR/IT/Other	4.3750	.87678	6
		OPERATION-CATEGORY	4.0625	.62500	4
		Total	4.2500	.76376	10
	Over two years	HR/IT/Other	4.2667	.46739	15
		OPERATION-CATEGORY	3.6786	.64087	7
		Total	4.0795	.58445	22
	Total	HR/IT/Other	4.2976	.58959	21
		OPERATION-CATEGORY	3.8182	.63335	11
		Total	4.1328	.63812	32

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
SCCDS	33	4.0682	.55997
SCCCC	33	4.4848	.43310
SCCIS	33	4.2803	.43192
IOSCO	33	4.4091	.53333
IOSIN	33	4.2273	.40197
IOSIG	33	4.4091	.44554
CABS	33	4.1439	.63131

Table 4.6 Aggregated Variables table

The SPSS result in the above table show that the all mean scores were greater than 4.0 of which Supply chain collaboration Collaborative Communication has the highest mean (4.5) which is followed by 4.4, 4.4, 4.3, 4.2 and 4.1 mean scores for IOS use for Integration, IOS use for Communication, IOS use for Intelligence, Supply chain collaboration Quality Information Sharing and Supply chain collaboration Decision Synchronization respectively. The Collaborative advantage Business synergy means score is equal 4.2 all rounded to one decimal place.

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
SCCDS	-.542	.409	-.495	.798
SCCCC	-.391	.409	-1.034	.798
SCCIS	-.160	.409	-.698	.798
IOSCO	-.684	.409	-.756	.798
IOSIN	.253	.409	-.627	.798
IOSIG	-.326	.409	-1.091	.798
CABS	-.578	.409	-.149	.798

Table 4.7 Skewness and Kurtosis

The SPSS statistic result in the above table showed the collected data were normally distributed since skewness and kurtosis value falls within the normality range +2 and -2.

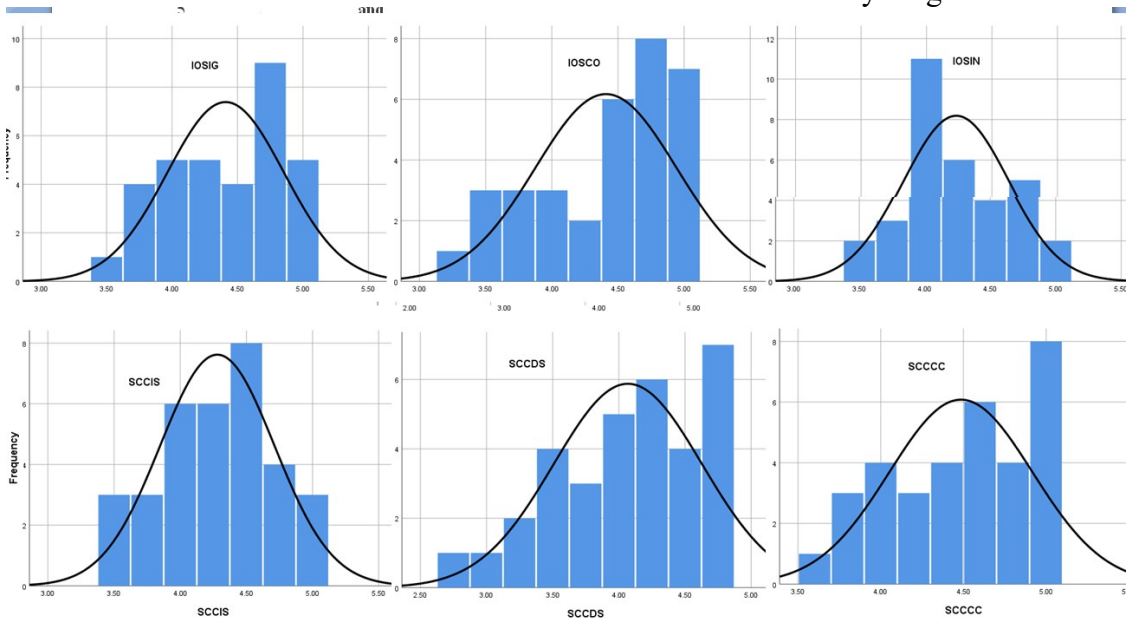


Figure 4.5:Data distribution

4.3 Multiple linear regressions Assumptions check

MLR is a statistical technique used to model the relationship between a dependent variable and two or more independent variables. To ensure the validity of the regression analysis, Multiple Linear Regression Assumptions need to be satisfied. The Multiple Linear Regression Assumptions includes; Test of Linearity, Independence, Normality, Homoscedasticity, and No multicollinearity.

4.3.1 Test of linearity

Test of Linearity require that the relationship between the dependent variable and the independent variables should be linear. This means that the change in the dependent variable is proportional to the change in the independent variables. Partial regression plot can be used to determine the direction of relation between the dependent variable and the independent variables individually. To check the assumption of linearity residual scatter plot analysis can be used. If there is a clear pattern or curvature in the scatter plot, it suggests a violation of the linearity assumption.

4.3.1.1 Residual scatter plot

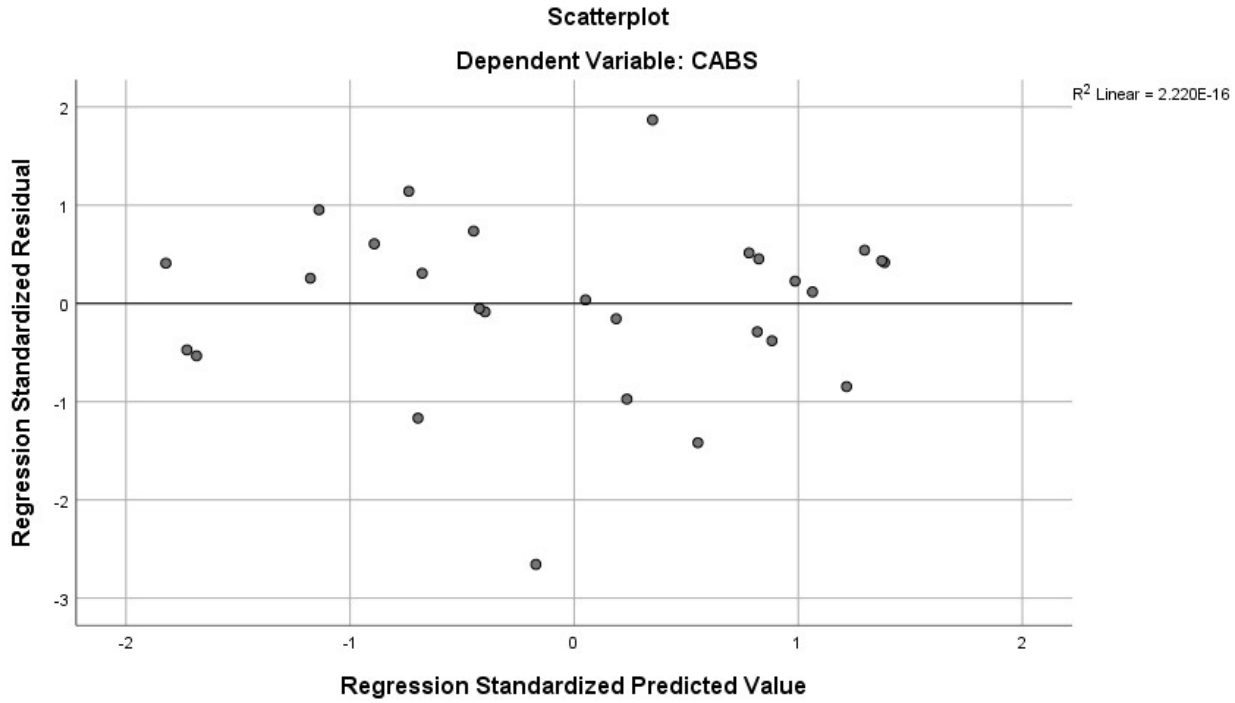


Figure 4.6: Dependent Variable CABS Scatterplot

The SPSS scatterplot output given above confirm that the linearity assumption is met as the scatterplot of standardize predicted values against the standardized residuals show a random scatter of points around the horizontal line (zero).

4.3.1.2 Simple Scatter plot CABS and SCCDS

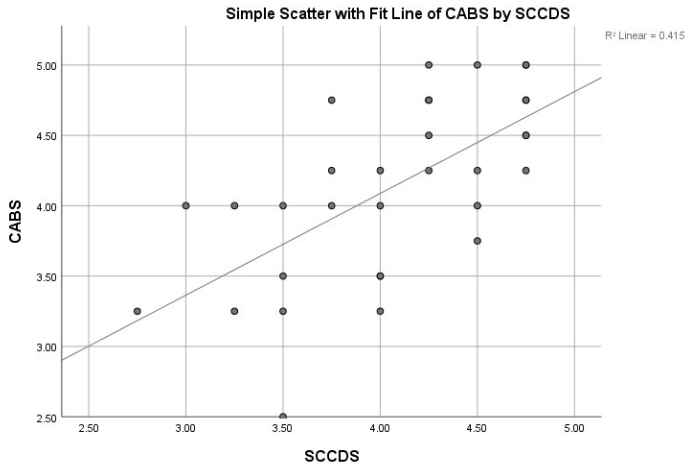


Figure 4.7: Simple Scatter plot CABS and SCCDS

Based on the partial regression plot above, we can see that the data distributions between independent variable SCCDS and the dependent variable CABS form relatively linear trend. The linear line is formed from the bottom left to the top right that the data confirm existence of a positive relationship between CABS and SCCDS which implies that as SCCDS increases CABS also increases.

4.3.1.3 Simple Scatter plot CABS and SCCCC

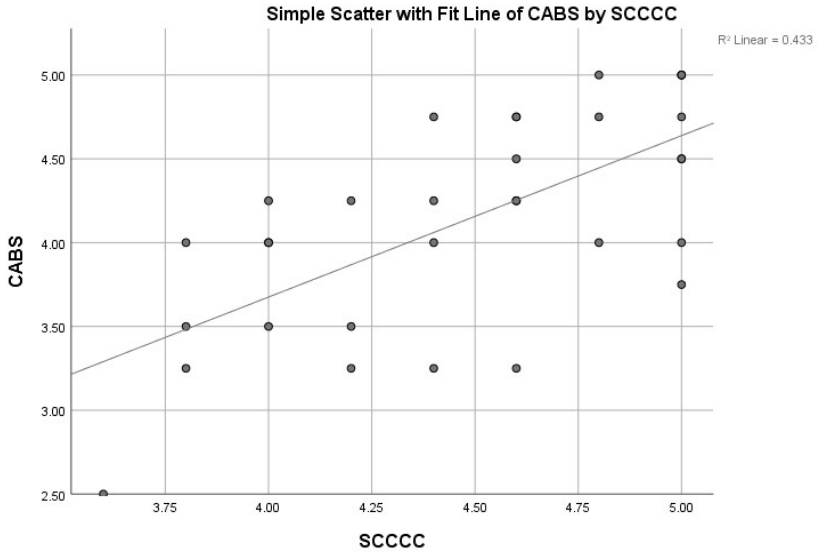


Figure 4.8: Simple Scatter plot CABS and SCCCC

Based on the partial regression plot above, we can see that the data distributions between independent variable SCCCC and the dependent variable CABS form relatively linear trend. The linear line is formed from the bottom left to the top right that a positive relationship exist between CABS and SCCCC which implies that CABS increases as SCCCC increases.

4.3.1.4 Simple Scatter plot CABS and SCCIS

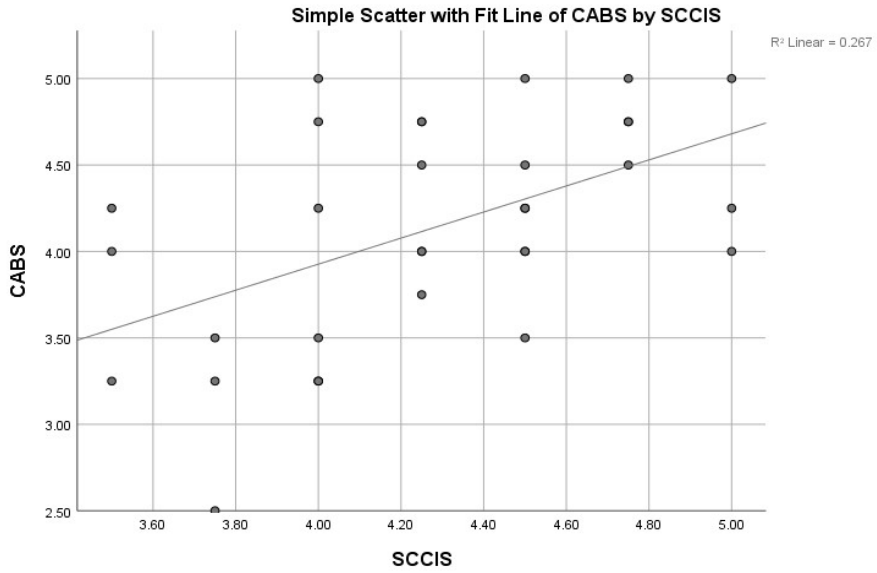


Figure 4.9: Simple Scatter plot CABS and SCCIS

Based on the partial regression plot above, we can see that the data distributions between independent variable SCCIS and the dependent variable CABS form relatively linear trend. The linear line is formed from the bottom left to the top right that a positive relationship exist between CABS and SCCIS which implies that CABS increases as SCCIS increases.

4.3.1.5 Simple Scatter plot CABS and IOSCO

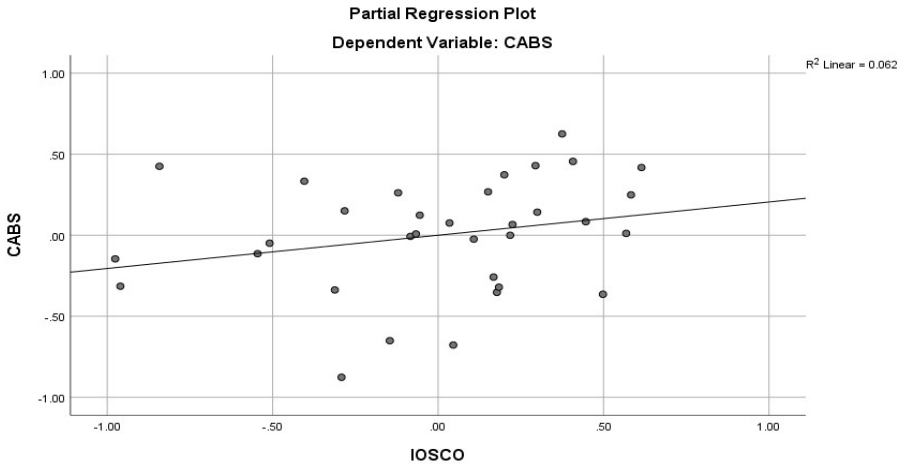


Figure 4.10: Simple Scatter plot CABS and IOSCO

Based on the partial regression plot above, we can see that the data distributions between independent variable IOSCO and the dependent variable CABS form relatively linear trend. The linear line is formed from the bottom left to the top right that a positive relationship exist between CABS and IOSCO which implies that CABS increases as IOSCO increases.

4.3.1.6 Simple Scatter plot CABS and IOSIN

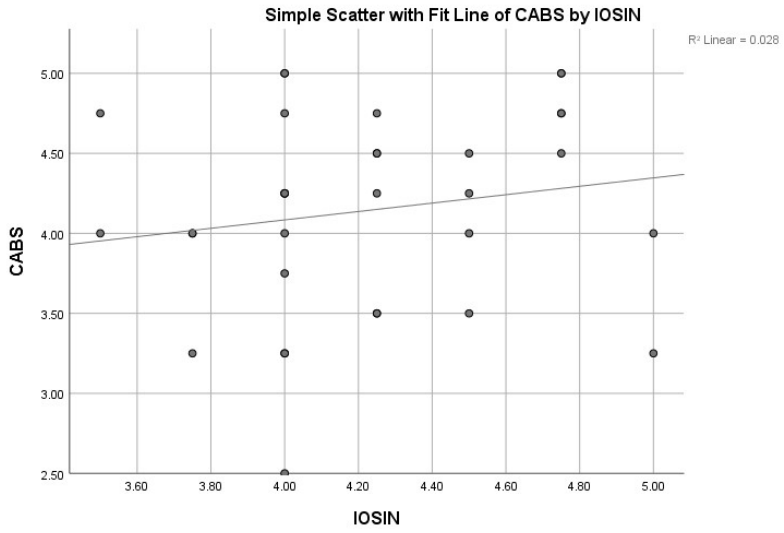
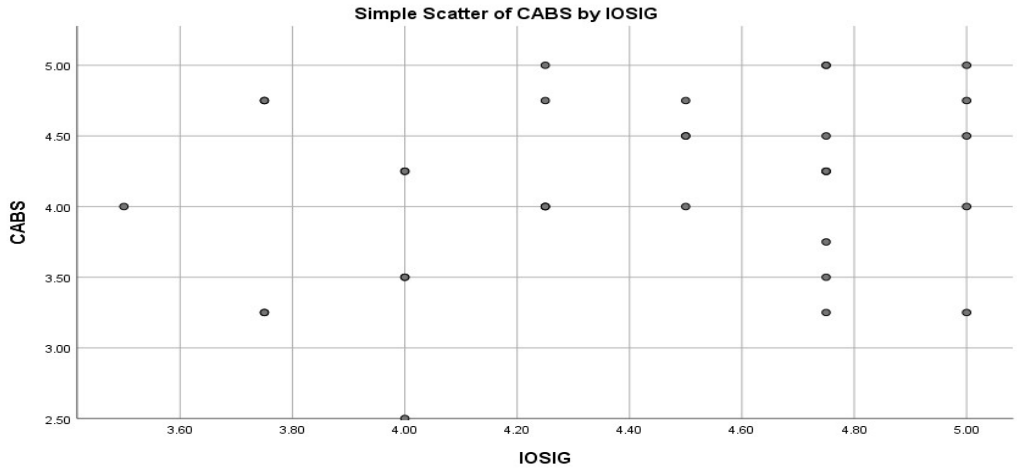


Figure 4.11: Simple Scatter plot CABS and IOSIS

Based on the partial regression plot above, we can see that the data distributions between independent variable IOSIN and the dependent variable CABS form relatively linear trend. The linear line is formed from the bottom left to the top right that a positive relationship exist between CABS and IOSIN which implies that CABS increases as IOSIN increases.

4.3.1.7 Simple Scatter plot CABS and IOSIG



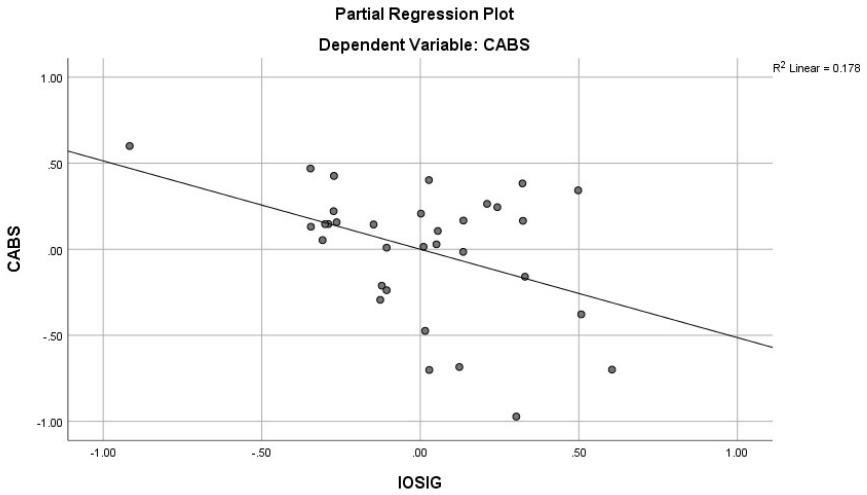


Figure 4.11: Simple Scatter/Partial Regression plot CABS and IOSIG

Based on the partial regression plot above, we can see that the data distributions between independent variable IOSIG and the dependent variable CABS form linear trend. The linear line is formed from the bottom right to the top left that a negative relationship exist between CABS and IOSIG which implies that CABS decreases as IOSIG increases.

Normal Q-Q plots helps to determine whether the data of the dependent variable and the independent variable distribution forms a linear line pattern or not.

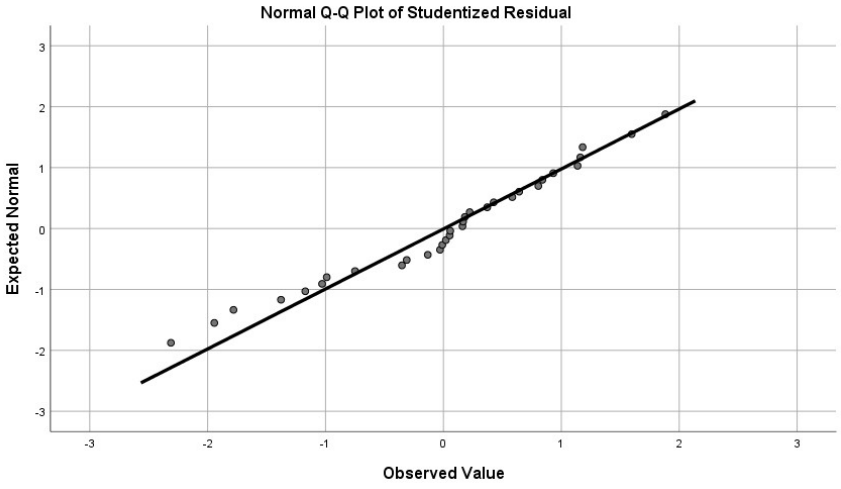


Figure 4.6 Normal Q-Q plot Studentized residual

Based on the normal Q-Q plot above, it is observed that the data distributions form positive linear trend as it is formed from the bottom left to the top right t. Based on the results we can conclude that the regression model has fulfilled the linearity assumption.

4.3.2 Test of Autocorrelation

Test of Independence require that the observations or data points used in the regression model should be independent of each other. It assumes that the values of the dependent variable for one observation do not influence the values of the dependent variable for other observations. This is basically the same as saying that we need our observations (or individual data points) to be independent from one another (or uncorrelated). If there is a correlation, then it is called an autocorrelation problem. The hypothesis for the autocorrelation test can be created as follows:

Ho: zero autocorrelation in the residuals

H1: residuals are positively autocorrelated

The Durbin-Watson statistic is used to test for the presence of autocorrelation (serial correlation) in the residuals of a regression model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.846[a]	.716	.635	.33301	2.03

a. Predictors: (Constant), SCCDS, SCCCC, SCCIS, IOSCO, IOSIN, IOSIG

b. Dependent Variable: CABS

Table 4.8 Durbin-Watson statistic-Calculated value

The value of the Durbin-Watson statistic 2.03 indicates no significant autocorrelation as the value is close to 2 but as the sample size used for this study is small, we need to get the critical value (Number of independent variables k = 6 and sample size n = 32) to compare the calculated Durbin-Watson value with the critical values to assess the presence of autocorrelation. To conclude whether there is autocorrelation; we compare the Durbin-Watson statistics with the Durbin-Watson critical value.

The following diagram helps to draw a conclusion, if the observed value of the test statistic is greater than the tabulated upper bound and less than four minus upper bound, then we accept the null hypothesis of non-autocorrelated errors.

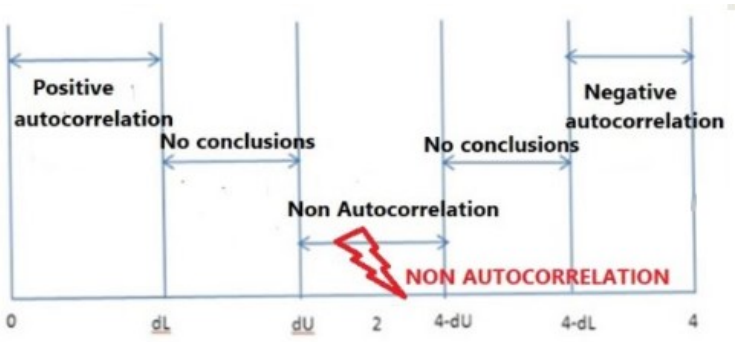


Figure 4.13 Durbin-Watson statistic no autocorrelation range 46

Based on the below table dL = 1.041 and dU = 1.909 were obtained.

Durbin-Watson Statistic: 5 Per Cent Significance Points of dL and dU

	k'*=1		k'=2		k'=3		k'=4		k'=5		k'=6	
n	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU
6	0.610	1.400	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7	0.700	1.356	0.467	1.896	-----	-----	-----	-----	-----	-----	-----	-----
8	0.763	1.332	0.559	1.777	0.367	2.287	-----	-----	-----	-----	-----	-----
9	0.824	1.320	0.629	1.699	0.455	2.128	0.296	2.588	-----	-----	-----	-----
10	0.879	1.320	0.697	1.641	0.525	2.016	0.376	2.414	0.243	2.822	-----	-----
11	0.927	1.324	0.758	1.604	0.595	1.928	0.444	2.283	0.315	2.645	0.203	3.004
12	0.971	1.331	0.812	1.579	0.658	1.864	0.512	2.177	0.380	2.506	0.268	2.832
13	1.010	1.340	0.861	1.562	0.715	1.816	0.574	2.094	0.444	2.390	0.328	2.692
14	1.045	1.350	0.905	1.551	0.767	1.779	0.632	2.030	0.505	2.296	0.389	2.572
15	1.077	1.361	0.946	1.543	0.814	1.750	0.685	1.977	0.562	2.220	0.447	2.471
16	1.106	1.371	0.982	1.539	0.857	1.728	0.734	1.935	0.615	2.157	0.502	2.388
17	1.133	1.381	1.015	1.536	0.897	1.710	0.779	1.900	0.664	2.104	0.554	2.318
18	1.158	1.391	1.046	1.535	0.933	1.696	0.820	1.872	0.710	2.060	0.603	2.258
19	1.180	1.401	1.074	1.536	0.967	1.685	0.859	1.848	0.752	2.023	0.649	2.206
20	1.201	1.411	1.100	1.537	0.998	1.676	0.894	1.828	0.792	1.991	0.691	2.162
21	1.221	1.420	1.125	1.538	1.026	1.669	0.927	1.812	0.829	1.964	0.731	2.124
22	1.239	1.429	1.147	1.541	1.053	1.664	0.958	1.797	0.863	1.940	0.769	2.090
23	1.257	1.437	1.168	1.543	1.078	1.660	0.986	1.785	0.895	1.920	0.804	2.061
24	1.273	1.446	1.188	1.546	1.101	1.656	1.013	1.775	0.925	1.902	0.837	2.035
25	1.288	1.454	1.206	1.550	1.123	1.654	1.038	1.767	0.953	1.886	0.868	2.013
26	1.302	1.461	1.224	1.553	1.143	1.652	1.062	1.759	0.979	1.873	0.897	1.992
27	1.316	1.469	1.240	1.556	1.162	1.651	1.084	1.753	1.004	1.861	0.925	1.974
28	1.328	1.476	1.255	1.560	1.181	1.650	1.104	1.747	1.028	1.850	0.951	1.959
29	1.341	1.483	1.270	1.563	1.198	1.650	1.124	1.743	1.050	1.841	0.975	1.944
30	1.352	1.489	1.284	1.567	1.214	1.650	1.143	1.739	1.071	1.833	0.998	1.931
31	1.363	1.496	1.297	1.570	1.229	1.650	1.160	1.735	1.090	1.825	1.020	1.920
32	1.373	1.502	1.309	1.574	1.244	1.650	1.177	1.732	1.109	1.819	1.041	1.909
33	1.383	1.508	1.321	1.577	1.258	1.651	1.193	1.730	1.127	1.813	1.061	1.900
34	1.393	1.514	1.333	1.580	1.271	1.652	1.208	1.728	1.144	1.808	1.079	1.891

Table 4.9 Durbin-Watson statistic-Critical value

We calculate the 4-dU and 4-dL values according to the table below.

dl	du	Durbin-Watson	4-du	4-dl
1.041	1.909	2.03	2.091	2.96

Table 4.10 Durbin-Watson statistics no autocorrelation range

The Durbin-Watson statistical value of 2.03 is in between 1.909 (dU) and 2.091 (4-dU). Based on the graph, it can be concluded that the regression equation has no autocorrelation Issue.

4.3.3 Test of the Normality Assumption

The normality test, one of the assumption tests in linear regression is required to check whether the residuals are normally distributed or not in order to get unbiased estimator. In this normality assumption test we test the residuals. The assumption required that the residuals are normally distributed. The hypothesis for the normality test can be created as follows:

Ho: Residuals are normally distributed

H1: Residuals are not normally distributed

For testing the hypothesis, we choose a test statistic which is effective for small samples, the Shapiro and Wilk proposed in 1965. Using Shapiro and Wilk we can see the p-value is compared with the previously set alpha of 0.05. The criteria for testing the hypothesis were: P-value > 0.05: Ho is accepted or else rejected (H1 is accepted).

The output of the Shapiro Wilk normality test based on the results of the analysis using SPSS can be seen in the tables below:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Studentized Residual	.142	32	.099	.968	32	.438

a. Lilliefors Significance Correction

Table 4.11 Shapiro-Wilk statistics

Based on the normality test results according to the table above the p-values 0.438 is greater than 0.05, so the null hypothesis is Accepted. Based on the hypothesis that has been created previously, the results of hypothesis testing indicate that the residuals are normally distributed so that the regression analysis assumption of normality has been fulfilled.

Histogram and normal Probability plot of regression standardized residual can also be used to see whether the data set is approximately normally distributed graphically or not. The data in the Normal Probability plot of regression standardized residual were plotted against a theoretical normal distribution in such a way that the points should form an approximate straight line. Departures from this straight line indicate departures from normality. The bellow presented fig show the data exhibit normality.

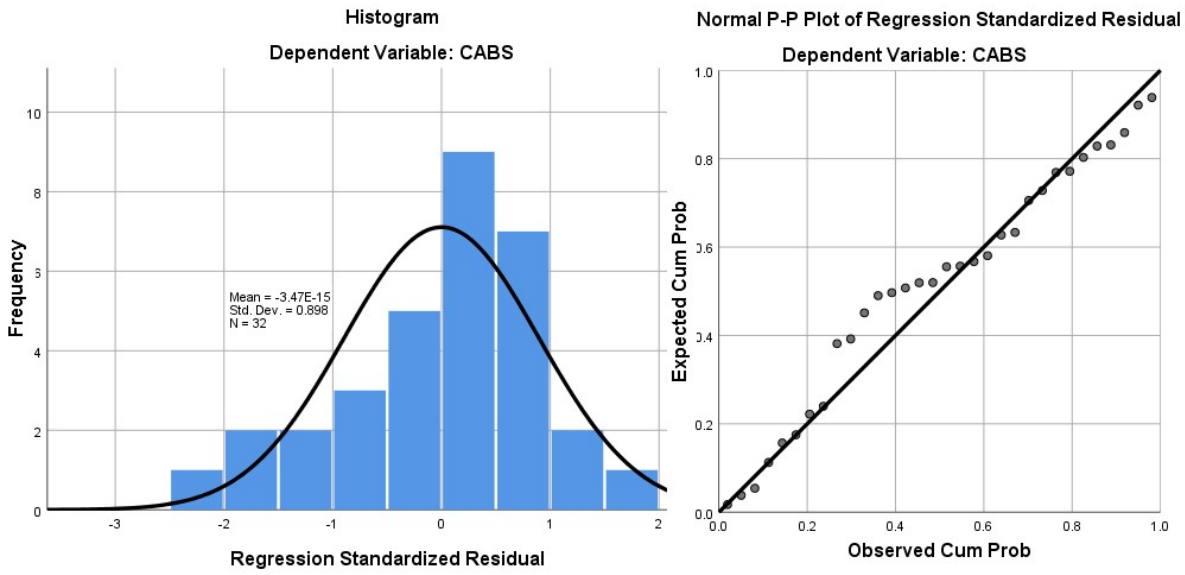


Figure 4.14 Histogram and normal p-p plot of regression standardized residual

4.3.4 Homoscedasticity Test

The Homoscedasticity test checks that the variance of the errors (residuals) should be constant across all levels of the independent variables. In other words, the spread of the residuals should be consistent along the range of the independent variables. To run a Multiple Linear Regression analysis, residuals should be normally distributed. This assumption is necessary to make valid statistical inferences and conduct hypothesis testing.

Residual plot analysis is used to check the assumption of homoscedasticity (constant variance of residuals) graphically. If the scatterplot of the standardized predicted values against the standardized residuals shows a random scatter of points, it indicates that the variance of the residuals is constant across all levels of the independent variables. The hypothesis for the heteroscedasticity test can be created as follows:

Ho: Residual variance is constant

H1: Residual variance is not constant (heteroscedasticity)

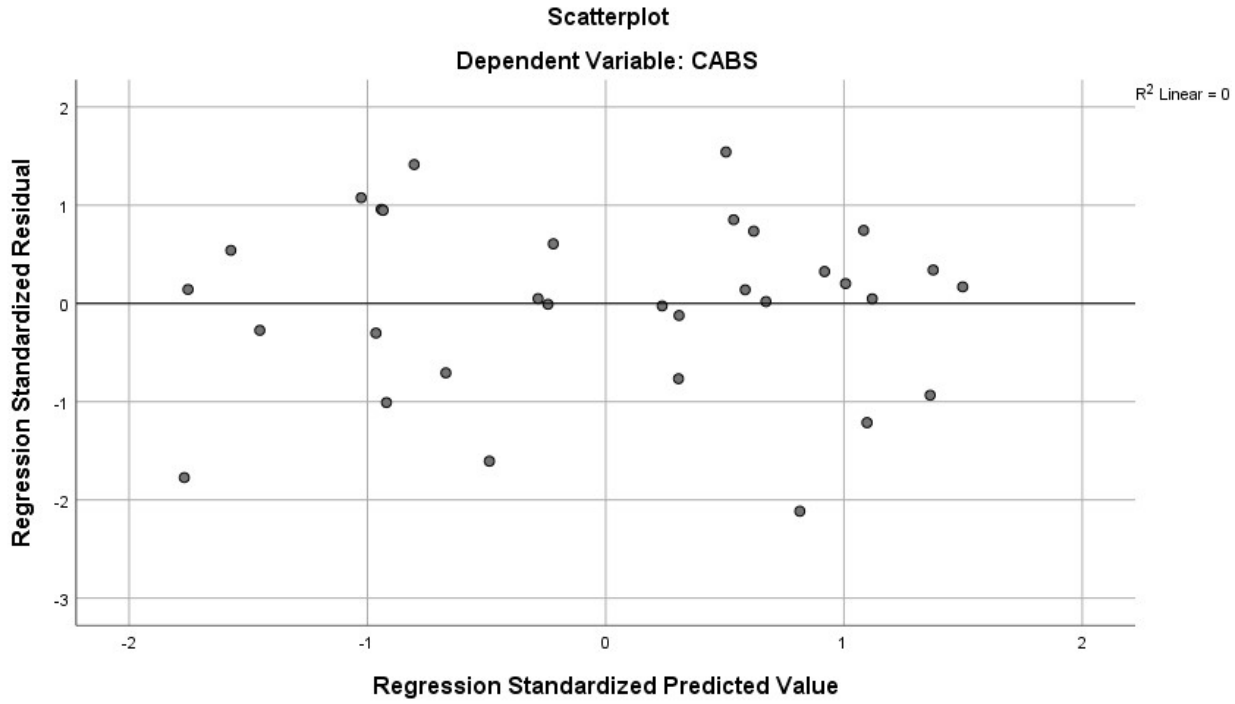


Figure 4.15 Residual Scatterplot

Based on the scatter plot outputs shown above, it appears that the spots were diffused and do not form a clear specific pattern that we can concluded the regression models don't exhibit heteroscedasticity problem.

To support our conclusion based on regression standardized residual scatter plot, Breusch-Pagan test can be used. The Breusch-Pagan test assesses the relationship between the squared residuals and the independent variables to check whether there is evidence of heteroscedasticity (non-constant variance of residuals) or not. If the p-value associated with the Chi-square test is greater than the chosen significance level (0.05), it suggests no evidence of heteroscedasticity otherwise it indicates evidence of heteroscedasticity.

Breusch-Pagan Test for Heteroskedasticity[a,b,c]		
Chi-Square	df	Sig.
.392	1	.531
a. Dependent variable: CABS		
b. Tests the null hypothesis that the variance of the errors does not depend on the values of the independent variables.		
c. Predicted values from design: Intercept + IOSIG + IOSCO + IOSIN + SCCIS + SCCDS + SCCCC		

Table 4.12 Breusch-Pagan Test for Heteroskedasticity statistics

Based on the heteroscedasticity test output given in the table above, the Sig. value .531 is greater than 0.05 that we accept the null hypothesis that residual variance is constant. This suggests that the assumption of homoscedasticity is met.

4.3.5 Multicollinearity Test

The objective of the no multicollinearity test is to determine whether there is a strong correlation or no correlation between the independent variables. Multicollinearity exists when there are strong linear relationships between the independent variables, which can cause problems in estimating the individual effects of the independent variables.

The hypothesis for the multicollinearity test can be created as follows:

Ho: There is no multicollinearity

H1: There is multicollinearity

The criterion for testing this requirement is to check the correlation results to be less than 0.7. The choice of correlation analysis technique depends on the data measurement scale used, sample size and population distribution. For a normally distributed population a parametric test such as Pearson Correlation can be used. According to Norman, "Parametric statistics can be used with Likert data, with small sample sizes with no fear of ''coming to the wrong conclusion''(Norman, 2010). Correlation coefficients range from -1 to 1, where values close to -1 indicate a strong negative correlation, values close to 1 indicate a strong positive correlation, and values close to 0 indicate little to no correlation.

Correlations							
		IOSIG	IOSCO	IOSIN	SCCIS	SCCDS	SCCCC
IOSIG	Pearson Correlation	1					
	Sig. (2-tailed)						
IOSCO	Pearson Correlation	.539**	1				
	Sig. (2-tailed)	.001					
IOSIN	Pearson Correlation	.490**	.273	1			
	Sig. (2-tailed)	.004	.130				
SCCIS	Pearson Correlation	.409*	.165	.184	1		
	Sig. (2-tailed)	.020	.368	.314			
SCCDS	Pearson Correlation	.447*	.252	.293	.489**	1	
	Sig. (2-tailed)	.010	.164	.103	.004		
SCCCC	Pearson Correlation	.413*	.411*	.164	.447*	.352*	1
	Sig. (2-tailed)	.019	.019	.370	.010	.049	
	N	32	32	32	32	32	32
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Table 4.13 Pearson Correlations

The highest correlation r=0.539 is less than 0.7 implies that the predictors are not too highly correlated. Based on the hypothesis that has been created previously the null hypothesis is accepted and It can be concluded that there is no multicollinearity.

4.4 Overall Significance of the model

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.877	6	1.480	9.875	.000[b]
	Residual	3.746	25	.150		
	Total	12.623	31			
a. Dependent Variable: CABS						
b. Predictors: (Constant), SCCIS, IOSCO, IOSIN, SCCDS, SCCCC, IOSIG						

Table 4.14 ANOVA

In the above table, we have the F value of 9.875 with a significant Sig. value .000 less than 0.01. This informs us that predictor variables SCCIS, IOSCO, IOSIN, SCCDS, SCCCC and IOSIG are significantly related to the dependent variable collaborative advantage Business synergy. Hence, the multiple regression models are statistically significant.

4.5 Model Summary

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.839[a]	.703	.632	.38708	2.035
a. Predictors: (Constant), SCCIS, IOSCO, IOSIN, SCCDS, SCCCC, IOSIG					
b. Dependent Variable: CABS					

Table 4.15 Model Summery

The Adjusted R Square value signifies that 63.2% of the changes in collaborative advantage Business synergy could be attributed to the combined effect of the predictor variables SCCCC, IOSININ, SCCDS, IOSCO and SCCIS. The remaining variation cannot be explained by the proposed model which means 36.8% of the variation can be explained by variables other than SCCCC, IOSININ, SCCDS, IOSCO and SCCIS.

4.6 Hypothesis Testing

Coefficients[a]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
SCCDS	.561	.149	.499	3.756	.001	.672	1.488
SCCCC	.700	.195	.478	3.592	.001	.669	1.495
SCCIS	.250	.199	.171	1.253	.222	.638	1.567
IOSCO	.207	.161	.175	1.288	.209	.647	1.547
IOSIN	.065	.197	.042	.332	.742	.748	1.337
IOSIG	-.515	.221	-.365	-2.333	.028	.484	2.064
a. Dependent Variable: CABS Source: Own survey (2023)							

Table 4.16 Model Coefficients

The study examines the effects of SCCDS, SCCCC, SCCIS, IOSCO, IOSIN, and IOSIG independent variables on the dependent variable Collaborative advantage-Business Synergy (CABS) and come up with a fitted model, CABS = 0.499 (SCCDS) + 0. 478 (SCCCC) + 0.171 (SCCIS) + 0.175 (IOSCO) + 0.042 (IOSIN) - 0.365 (IOSIG). This model provides insights into the relationship between the independent variables and the dependent variable. The analysis

reveals that SCCDS and SCCCC have statistically significant positive effect on CABS, with coefficients 0.499 and 0.478 respectively. IOS use for Integration has a statistically significant negative effect on CABS, with a coefficient of -0.365. The remaining independent variables namely SCCIS, IOSCO, and IOSIN have statistically insignificant negative effect on CABS, with coefficients 0.171, 0.175 and 0.042 respectively.

In conclusion, the study reveals the significant effects of IOS use for integration and intelligence, IOS use for communication, supply chain collaboration decision synchronization, and collaborative communication practice on collaborative advantage. These findings contribute to understanding the factors that influence collaborative advantage in the context of supply chain collaboration.

4.6.1 Effect of SCCDS on CABS of Bush Gebeya

H01: SCCDS has no statistically significant effect on Business Synergy [CABS] ($\alpha \leq 0.05$).

The table above shows that there is a statistically significant effect of Decision Synchronization on Business synergy, since (Beta= .499, t=3.756, sig. 0.001, $p<0.05$). Therefore, the null hypothesis is rejected and the alternative hypothesis that SCCDS has statistically significant effect on the dependent variable CABS is accepted, which indicates that Decision Synchronization has direct positive impact on collaborative advantage Business synergy of Besh Gebeya at ($\alpha \leq 0.05$).

The coefficient of 0.499 emphasizes that synchronized decision-making across the supply chain can lead to optimized production schedules, reducing the risk of overstocking or stock outs. This coefficient signifies the positive impact of synchronized decision-making within supply chain collaboration on CABS. For every unit increase in Supply Chain Collaboration Decision Synchronization, the predicted Collaborative Advantage-Business Synergy (CABS) is expected to increase by 0.499 units, all else being equal. In real-world scenarios, when different entities in a supply chain work together seamlessly to make coordinated decisions, it often leads to enhanced efficiency, reduced delays, and improved resource allocation.

4.6.2 Effect of SCCCC on CABS of Bush Gebeya

H01: SCCCC has no statistically significant effect on Business Synergy [CABS] ($\alpha \leq 0.05$).

The table above shows that there is a statistically significant effect of Collaborative Communication on Business synergy, since (Beta= .478, t=3.592, sig. 0.001, $p<0.05$).

Therefore, the null hypothesis is rejected and the alternative hypothesis that Collaborative Communication has statistically significant effect on the dependent variable CABS is accepted, which indicates that Collaborative Communication has direct positive impact on collaborative advantage Business synergy of Besh Gebeya at (α≤0.05).

Effective communication is a cornerstone of successful supply chain collaboration. The coefficient of 0.478 highlights that clear communication can help streamline order processing, share real-time sales data, and coordinate promotions or new product launches. For every unit increase in Supply Chain Collaboration Collaborative Communication, the predicted CABS is expected to increase by 0.478 units, holding other variables constant. This coefficient suggests that improved communication among stakeholders can significantly contribute to CABS. In practice, clear and open communication between partners fosters a deeper understanding of each other's needs and capabilities. This, in turn, can lead to quicker problem-solving, reduced misunderstandings, and the ability to capitalize on emerging opportunities.

4.6.3 Effect of SCCIS on CABS of Bush Gebeya

H01: SCCIS has no statistically significant effect on Business Synergy [CABS] (α≤ 0.05).

The table above shows that there is a statistically insignificant effect of Quality Information Sharing on Business synergy, since (Beta= .171, t=1.253, sig. 0.222, p>0.05). Therefore, the null hypothesis is accepted which indicates that Quality Information Sharing has direct positive statistically insignificant impact on collaborative advantage Business synergy of Besh Gebeya at (α≤0.05).

4.6.4 Effect of IOSCO on CABS of Bush Gebeya

H01: IOSCO has no statistically significant effect on Business Synergy [CABS] (α≤ 0.05).

The table above shows that there is a statistically insignificant effect of IOS use for communication on Business synergy, since (Beta= .175, t=1.288, sig. 0.209, p>0.05). Therefore, the null hypothesis is accepted which indicates that IOS use for communication has direct positive statistically insignificant impact on collaborative advantage Business synergy of Besh Gebeya at (α≤0.05).

Information and Communication Technologies (ICT) play a pivotal role in today's interconnected business landscape. This coefficient highlights the positive impact of ICT-

based communication on CABS. In practical terms, when partners use advanced communication tools, such as digital platforms or real-time data sharing, they can achieve greater visibility into the supply chain, leading to more accurate demand forecasting, quicker issue resolution, and better risk management.

4.6.5 Effect of IOSIN on CABS of Bush Gebeya

H01: IOSIN has no statistically significant effect on Business Synergy [CABS] ($\alpha \leq 0.05$).

The table above shows that there is a statistically insignificant effect of IOS use for communication on Business synergy, since (Beta= .042, t=.332, sig. 0.742, p>0.05). Therefore, the null hypothesis is accepted which indicates that IOS use for Intelligence has direct positive statistically insignificant impact on collaborative advantage Business synergy of Besh Gebeya at ($\alpha \leq 0.05$).

Leveraging ICT for intelligent decision-making suggests that technology-enhanced insights contribute to CABS. In the real world, when supply chain participants utilize data analytics, artificial intelligence, or machine learning to make smarter decisions, they can identify patterns, anticipate challenges, and capitalize on growth opportunities more effectively.

4.6.6 Effect of IOSIG on CABS of Bush Gebeya

H01: IOSIG has no statistically significant effect on Business Synergy [CABS] ($\alpha \leq 0.05$).

The table above shows that there is a statistically insignificant effect of IOS use for Integration on Business synergy, since (Beta= -.365, t= -2.333, sig. 0.028, p<0.05). Therefore, the null hypothesis is accepted which indicates that IOS use for Integration has direct negative statistically significant impact on collaborative advantage Business synergy of Besh Gebeya at ($\alpha \leq 0.05$).

The negative coefficient of -0.365 is a caution against a negative impact of using ICT for integration on CABS. For every unit increase in ICT use for Integration, the predicted CABS is expected to decrease by 0.365 units, assuming other variables remain constant. In practice, this might imply that poorly implemented integration of technology within the supply chain can lead to disruptions, inefficiencies, and reduced synergy. It underscores the importance of carefully planning and executing ICT integration efforts.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary of the Findings

The purpose of this study was to investigate the effects of supply chain collaboration and information and communication technology (ICT) utilization on Collaborative Advantage-Business Synergy (CABS) in the context of Besh Gebeya Fast-Moving Consumer Goods (FMCG) supply chain. The model examined the relationships between Supply Chain Collaboration Decision Synchronization (SCCDS), Supply Chain Collaboration Collaborative Communication (SCCCC), Supply Chain Collaboration Intelligence Sharing (SCCIS), ICT use for Communication (IOSCO), ICT use for Intelligence (IOSIN), and ICT use for Integration (IOSIG) with CABS.

The findings indicate that all dimensions of supply chain collaboration and ICT utilization significantly impact CABS in the Besh Gebeya FMCG SC. Among the dimensions of supply chain collaboration, Decision Synchronization and Collaborative Communication emerged as vital contributors to enhancing Collaborative Advantage-Business Synergy (CABS), whereas ICT integration has a negative influence on CABS. The finding shows that 62.3% of the changes in Business Synergy could be attributed to the combined effect of the predictor variables SCCDS, SCCCC, SCCIS, IOSCO, IOSIN, and IOSIG. The remaining 37.7% of the changes in collaborative advantage Business Synergy could be attributed to the combined effect of the predictor variables not included in this analysis.

The equation provides valuable insights into achieving collaborative advantage-business synergy for the context of Besh Gebeya FMCG supply chain. It underscores the need for efficient decision-making, effective communication, and strategic use of technology. Ultimately, the findings can help Besh Gebeya respond promptly to market dynamics, reduce wastage, and ensure products reach consumers when and where they are needed most, contributing to overall success in a competitive industry

5.2. Conclusion

In the Besh Gebeya FMCG SC, effective supply chain collaboration and strategic utilization of ICT can significantly shape Collaborative Advantage-Business Synergy. The analysis of the provided model reveals that:

Supply Chain Collaboration Factors: SCCDS, SCCCC, SCCIS

SCCDS (Supply Chain Collaboration Decision Synchronization): This factor represents the alignment of decision-making processes across the supply chain. A higher value of SCCDS is associated with an increase in CABS. This implies that when decisions are synchronized across different stages of the supply chain, it can lead to better collaboration and business synergy. In the FMCG industry, this might mean that decisions related to production, inventory management, and distribution is well-coordinated, leading to improved efficiency and responsiveness.

SCCCC (Supply Chain Collaboration Collaborative Communication): Higher collaborative communication enhances CABS. This suggests that open and effective communication between different stakeholders in the Besh Gebeya supply chain, such as manufacturers, distributors, and retailers, which lead to better business synergy. In the FMCG sector, transparent communication about demand forecasts, promotions, and inventory levels could lead to improved supply chain performance.

SCCIS (Supply Chain Collaboration Quality information sharing): Sharing Quality information and data among supply chain partners contributes positively to CABS. In the FMCG supply chain, sharing market insights, consumer trends, and demand information can lead to more informed decision-making, which is vital for achieving business synergy.

Inter-Organizational systems (IOS) use Factors: IOSCO, IOSIN, IOSIG

IOSCO (ICT use for Communication): Utilizing Inter-Organizational systems for communication has a positive impact on CABS. In the Besh Gebeya FMCG supply chain context, effective use of digital communication tools can improve the flow of information between different supply chain partners, reducing misunderstandings and delays.

IOSIN (Inter-Organizational systems use for Intelligence): Using Inter-Organizational systems for intelligence gathering has a smaller positive impact on CABS. This suggests that

using technology to gather market data, consumer feedback, and competitive insights can contribute to business synergy by enhancing decision-making processes.

IOSIG (ICT use for Integration): Here, the coefficient is negative. This implies that relying solely on technology for integration across the supply chain might have a diminishing effect on business synergy. Reliance on informal communication using social media technology for integration alone might lead to challenges if not supported by enterprise level technology integration policy. While ICT integration can streamline processes, this result suggests that improper implementation of Inter-Organizational systems and inefficient utilization of the ERP system available. With this regard Besh Gebeya need to evaluate its Inter-Organizational systems implementation strategy for integration.

Overall, in the Besh Gebeya FMCG supply chain, a higher predicted value of CABS implies better collaborative advantage and business synergy. The model underscores the importance of aligning decision-making, communication, and intelligence sharing while being mindful of the balance between technological integration and human collaboration.

5.3. Recommendation

In light of these findings, the following recommendations are put forth:

Enhance Collaboration Strategies: Organizations should prioritize improving collaboration practices, particularly decision synchronization and collaborative communication. These practices can foster better alignment of goals, faster decision-making, and stronger partnerships among supply chain stakeholders.

Strategic ICT Utilization: Utilize ICT for communication and intelligence sharing to facilitate transparent and timely information exchange. This can enable more informed decision-making and improved responsiveness within the supply chain.

Optimize ICT Integration: While technology integration offers vast potential, it's vital to approach it thoughtfully. Striking a balance between seamless integration and preserving the collaborative fabric is key. Organizations should assess the potential benefits against the risks of potential negative impacts on collaborative advantage.

Continued Research: The FMCG industry is dynamic, and the interplay between supply chain collaboration, ICT utilization, and collaborative advantage may evolve. Continued

research should explore these relationships in various contexts and identify best practices for achieving collaborative advantage.

By implementing these recommendations, organizations in the FMCG industry can harness the power of supply chain collaboration and ICT utilization to drive Collaborative Advantage-Business Synergy, ultimately enhancing competitiveness and operational excellence.

5.4. Future Research

This study provides a foundational understanding of how supply chain collaboration impacts Collaborative Advantage-Business Synergy (CABS) within the Besh Gebeya FMCG supply chain context. Future research could explore additional factors that might contribute to the collaborative advantage equation.

In conclusion, this study illuminates the intricate relationship between supply chain collaboration, technology integration, and Collaborative Advantage-Business Synergy (CABS) in the FMCG industry. By harnessing the insights gleaned from this research, stakeholders can chart a course toward enhanced collaboration and sustainable competitive advantage.

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APPENDIX

Measurement Items, Criteria, and Questionnaire

A: Acronyms Used for Coding Items in Sub-Constructs

IA IOS Appropriation

IOSIG IOS Use for Integration

IOSCO IOS Use for Communication

IOSIN IOS Use for Intelligence

SC Supply Chain Collaboration

SCIS Quality of Information Sharing

SCDS Decision Synchronization

SCCC Collaborative Communication

CA Collaborative Advantage

CABS Business Synergy

B: Measurement Items

1	IOSIG	Our firm and the supply chain partners use IOS (Inter organizational systems) for	
		IOSIG1	[joint forecasting, planning, and execution]
		IOSIG2	[order processing, invoicing and settling accounts]
		IOSIG3	[exchange of shipment and delivery information]
		IOSIG4	[managing warehouse stock and inventories]
2	IOSCO	Our firm and supply chain partners use IOS (Inter organizational systems) for	
		IOSCO1	[conferencing]
		IOSCO2	[message services]
		IOSCO3	[frequent contacts]
		IOSCO4	[multiple channel communication]
3	IOSIN	Our firm and supply chain partners use IOS (Inter organizational systems) for	
		IOSIN1	[understanding trends in sales and customer preferences]
		IOSIN2	[deriving inferences from past events]
		IOSIN3	[combining information from different sources to uncover trends and patterns]

		IOSIN4	[interpreting information depending upon various requirements]
4	SCCIS	Our firm and supply chain partners exchange:-	
		SCCIS1	[timely information]
		SCCIS2	[accurate information]
		SCCIS3	[complete information]
		SCCIS4	[confidential information]
5	SCCDS	Our firm and supply chain partners:-	
		SCCDS1	[jointly plan on promotional events]
		SCCDS2	[jointly develop demand forecasts]
		SCCDS3	[jointly manage inventory]
		SCCDS4	[jointly plan on product assortment]
6	SCCCC	Our firm and supply chain partners:-	
		SCCCC1	[have frequent contacts on a regular basis]
		SCCCC2	[have open and two-way communication]
		SCCCC3	[have informal communication]
		SCCCC4	[many different channels to communicate]
		SCCCC5	[influence each other's decisions through discussion rather than request]
1	CABS	Our firm with supply chain partners have integrated:-	
		CABS1	[IT infrastructure and IT resources]
		CABS2	[knowledge bases and know-how]
		CABS3	[marketing efforts]
		CABS4	[production systems]

C: Questioner of the Survey

About the IOS Use in Your Supply Chain

The following statements describe IOS use in your supply chain. Please select the appropriate number to indicate the extent to which you agree or disagree with each statement as applicable to your firm.

IOS USE FOR INTEGRATION

The extent of IOS use (e.g. EDI, ERP, MRP, CPFR, CRM, VMI, RFID) among supply chain partners for …

integrating business functions across firms (e.g. design, manufacturing, and marketing)	1	2	3	4	5	NA
joint forecasting, planning, and execution	1	2	3	4	5	NA
order processing, invoicing and settling accounts	1	2	3	4	5	NA
exchange of shipment and delivery information	1	2	3	4	5	NA
managing warehouse stock and inventories	1	2	3	4	5	NA

IOS USE FOR COMMUNICATION

The extent of IOS use (e.g. email, video conferencing, electronic bulletin board, Intranet) among supply chain partners for …

workflow coordination	1	2	3	4	5	NA
conferencing	1	2	3	4	5	NA
message services	1	2	3	4	5	NA
frequent contacts	1	2	3	4	5	NA
multiple channel communication	1	2	3	4	5	NA

IOS USE FOR INTELLIGENCE

The extent of IOS use (e.g. data mining/warehousing, OLAP, DSS, expert systems) among supply chain partners for …

understanding trends in sales and customer preferences	1	2	3	4	5	NA
deriving inferences from past events (process exceptions, patterns of demand shifts, what worked and what did not work)	1	2	3	4	5	NA
combining information from different sources to uncover trends and patterns	1	2	3	4	5	NA
interpreting information from different sources in multiple ways depending upon various requirements	1	2	3	4	5	NA

About Supply Chain Collaboration

The following statements describe your firm's long term partnership and collaboration with your supply chain partners. Please select the number to indicate the extent to which you agree or disagree with each statement as applicable to your firm.

QUALITY OF INFORMATION SHARING

Our firm and supply chain partners exchange …

relevant information	1	2	3	4	5	NA
timely information	1	2	3	4	5	NA
accurate information	1	2	3	4	5	NA
complete information	1	2	3	4	5	NA
confidential information	1	2	3	4	5	NA

DECISION SYNCHRONIZATION

Our firm and supply chain partners jointly …

plan on promotional events	1	2	3	4	5	NA
develop demand forecasts	1	2	3	4	5	NA
manage inventory	1	2	3	4	5	NA
plan on product assortment	1	2	3	4	5	NA
work out solutions	1	2	3	4	5	NA

COLLABORATIVE COMMUNICATION

Our firm and supply chain partners …

have frequent contacts on a regular basis	1	2	3	4	5	NA
have open and two-way communication	1	2	3	4	5	NA
have informal communication	1	2	3	4	5	NA
have many different channels to communicate	1	2	3	4	5	NA
influence each other's decisions through discussion rather than request	1	2	3	4	5	NA

About Collaborative Advantage

The following statements describe the strategic benefits gained over competitors in the marketplace through supply chain partnering. Please select the appropriate number to indicate the extent to which you agree or disagree with each statement as applicable to your firm.

BUSINESS SYNERGY

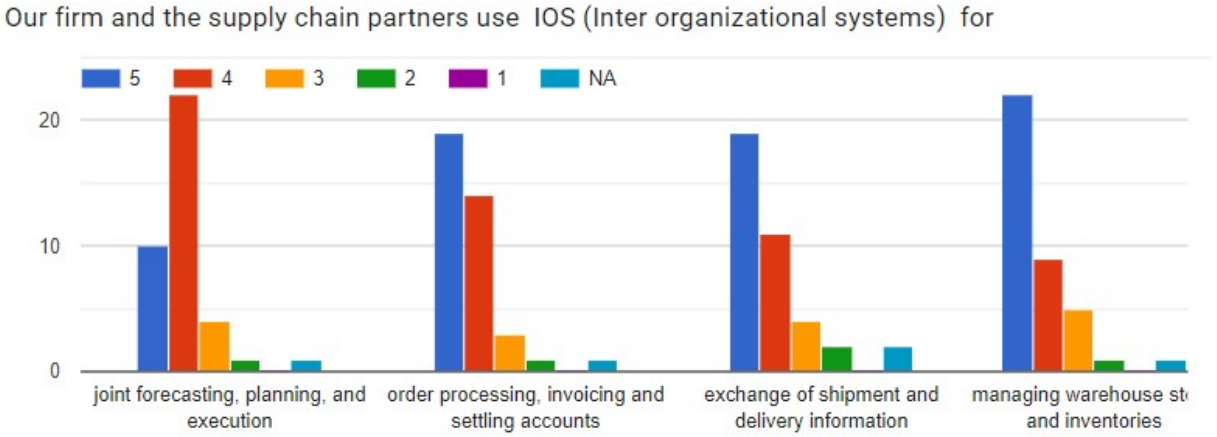
Our firm and supply chain partners have integrated …

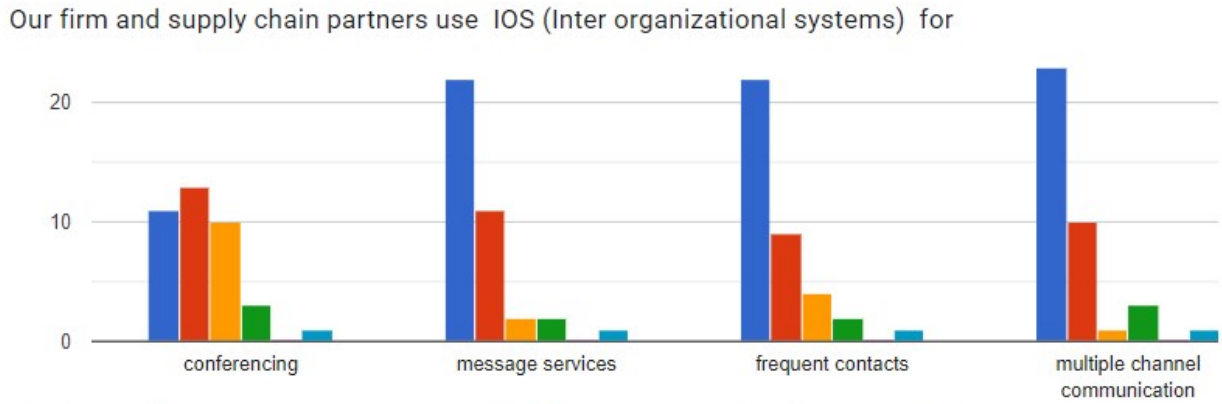
IT infrastructure and IT resources	1	2	3	4	5	NA
knowledge bases and know-how	1	2	3	4	5	NA
marketing efforts	1	2	3	4	5	NA
production systems	1	2	3	4	5	NA

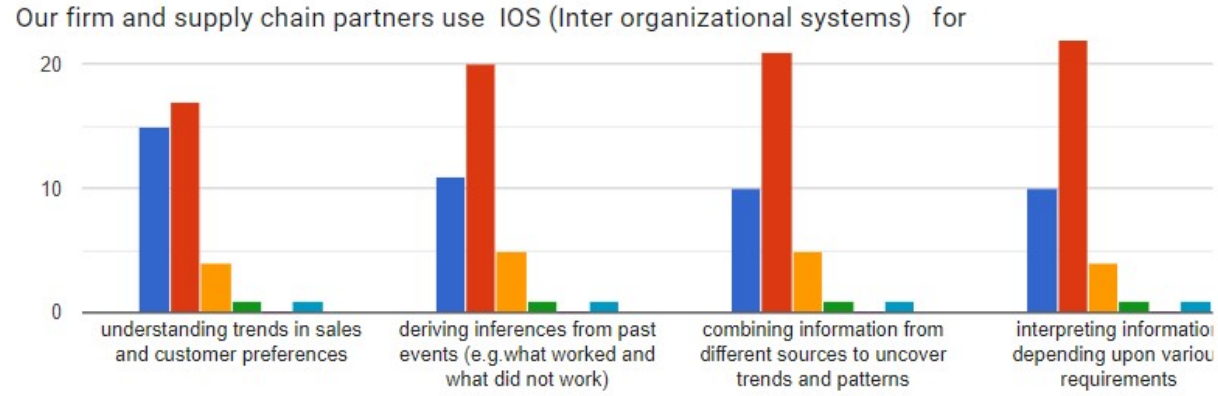
Google Form Mail Survey Questionnaire Link

https://docs.google.com/forms/d/e/1FAIpQLSdnIceVCnfnQYktH0vD-1scw8gH8Idpr33MYhuRFQROU2cIdQ/alreadyresponded?vc=0&c=0&w=1&flr=0

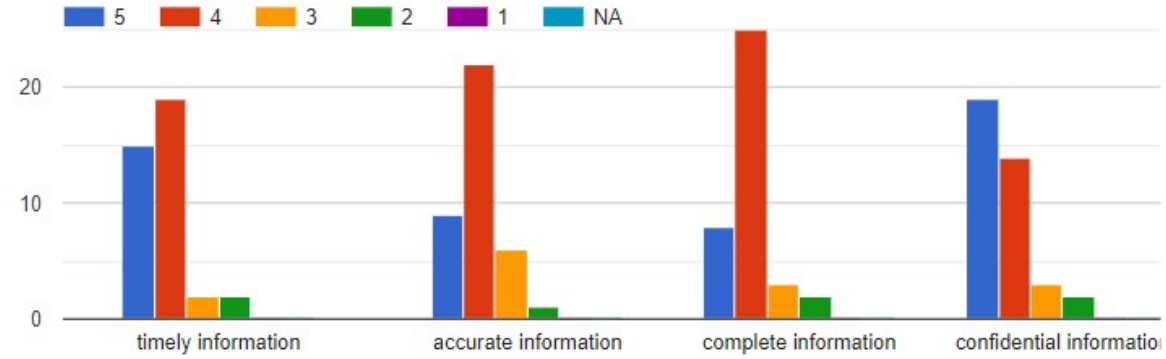
Google Descriptive Report



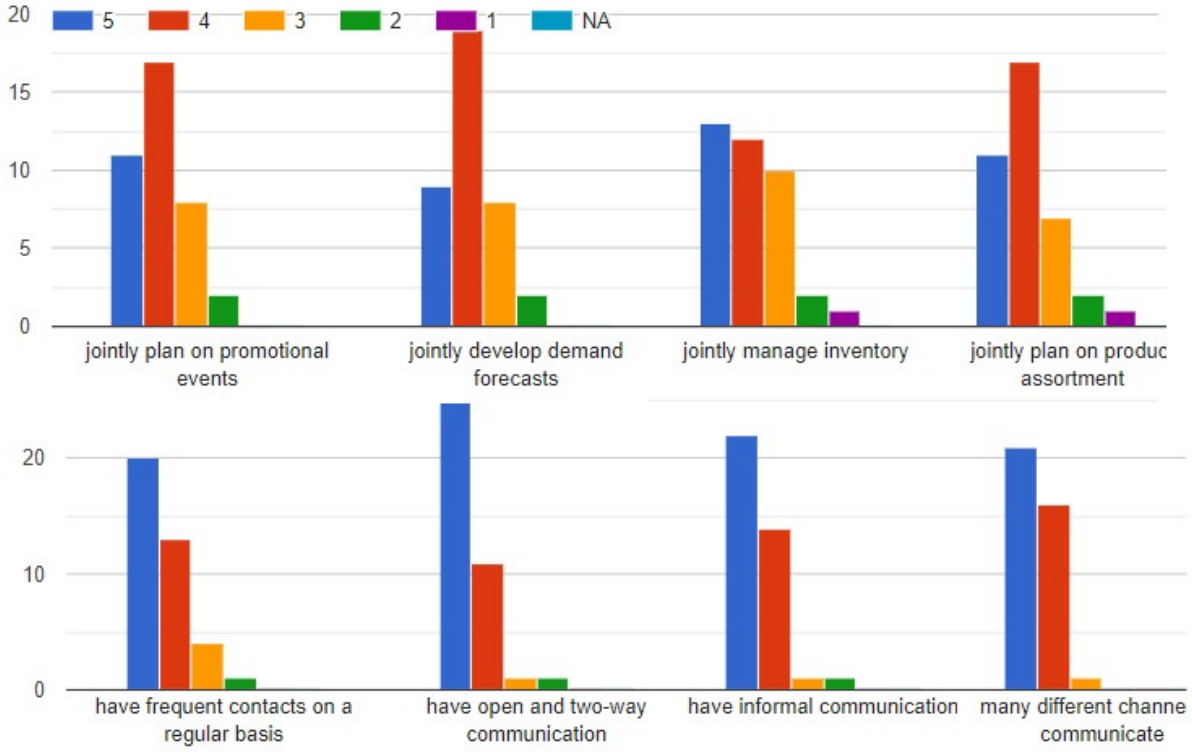


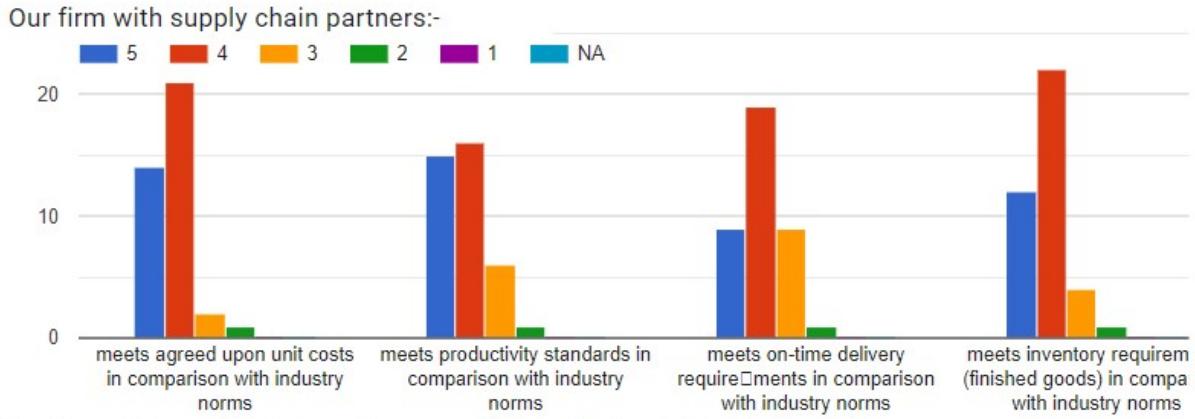


Our firm and supply chain partners exchange:-

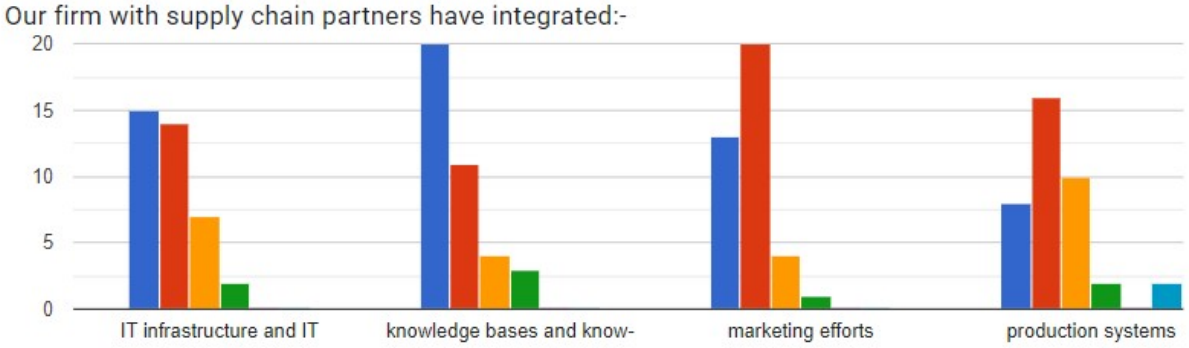


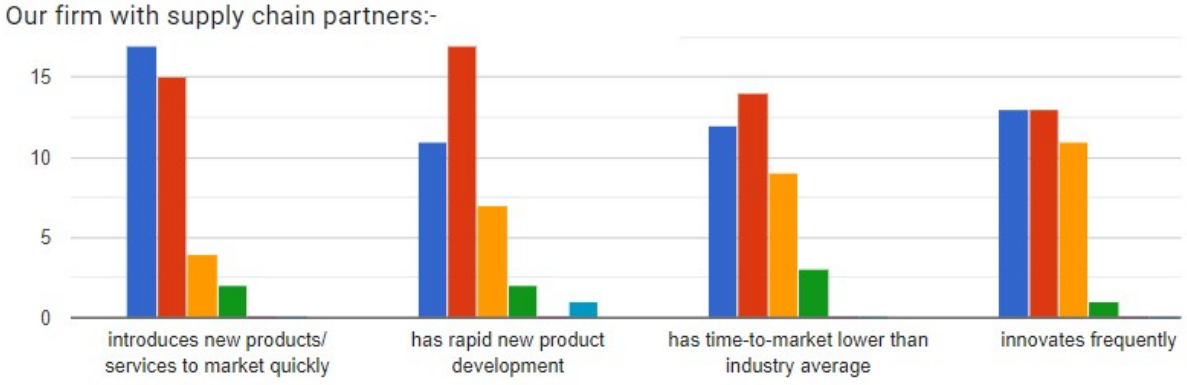
Our firm and supply chain partners:-




Our firm with supply chain partners:-
5
4
3
2
1
NA
20
10
0
meets agreed upon unit costs in comparison with industry norms
meets productivity standards in comparison with industry norms
meets on-time delivery require□ments in comparison with industry norms
meets inventory requirem (finished goods) in compa with industry norms


Our firm with supply chain partners:- offers a variety of products/ services
20
15
10
5
0
efficiently
with different features
meets customer volume requirements
efficiently


Our firm with supply chain partners have integrated:-
20
15
10
5
0
IT infrastructure and IT
knowledge bases and know-
marketing efforts
production systems


Our firm with supply chain partners:-
15
10
5
0
introduces new products/ services to market quickly
has rapid new product development
has time-to-market lower than industry average
innovates frequently