UNIVERSITY OF CAPE COAST

SUPPLY CHAIN TRANSPARENCY AND FIRM PERFORMANCE IN GHANA: THE ROLE OF INSTITUTIONAL QUALITY

PRINCE BRIGHT ATTATSI

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BY

PRINCE BRIGHT ATTATSI

Thesis submitted to the Department of Marketing and Supply Chain Management, School of Business, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Commerce degree in Procurement and Supply Chain Management.

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: …… Date: …….

Name: Prince Bright Attatsi

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of the thesis laid down by the University of Cape Coast.

Supervisor's Signature: …… Date: …….

Name: Dr. Edmond Yeboah Nyamah

ABSTRACT

This study investigates supply chain transparency (SCT) and firm performance in Ghana: the role of institutional quality, focusing on agri-food processing firms. The study relied on the positivists' research paradigm and employed the explanatory research design and the quantitative research approach. The research used a questionnaire to collect data from 320 out of the 396 sampled agri-food processing firms and analysed using Kendal`s coefficient of concordance and structural equation modelling. The results show that (1) there is a high degree of concordance of supply chain transparency practices among firms in the agri-food processing industry in Ghana, (2) SCT positively influences the performance of agri-food processing firms in Ghana, (3) Institutional quality positively influences the performance and (4) supply chain transparency of agri-food processing firms in Ghana, and (5) Institutional quality positively moderates the relationship between SCT and the performance of agri-food processing firms in Ghana. Therefore, the study recommends that the stakeholders of the agri-food processing sector continue to institute sound policies that inspire SCT and institutional quality to enhance firm performance. However, with the fifth hypothesis, such efforts will yield much more improved firm performance if policies are also implemented to improve the institutional quality. Additionally, the improvements in institutional quality on their own will positively impact SCT and firm performance per the third and fourth hypotheses. For the first hypothesis, the study recommends that managers diversify their attempts to create transparent supply chains by giving the needed attention to the other forms of transparency in addition to the highly held legal requirements.

KEYWORDS

Agri-food

Firm Performance

Ghana

Institutional Quality

Processing Firms

Supply Chain Transparency

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DEDICATION

To my sister, Evelyn A. Attatsi

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AGI	Association of Ghana Industries
DFID	Department of International Development
FP	Firm Performance
GEPA	Ghana Export Promotion Authority
GIPC	Ghana Investment Promotion Centre
GSS	Ghana Statistical Service
GDP	Gross Domestic Product
IQ	Institutional Quality
IBES	Integrated Business Establishment Survey
ITC	International Trade Centre
MIT	Massachusetts Institute of Technology
MASLOC	Microfinance and Small Loans Centre
MoTI	Ministry of Trade and Industry
SPS	Sanitary and Phyto-sanitary Standards
SPSS	Statistical Package for Social Sciences
SEM	Structural Equation Modelling
SCT	Supply Chain Transparency

CHAPTER ONE

INTRODUCTION

Supply chain transparency marks an improvement in regulatory compliance, supplier selection, communication, traceability, visibility, velocity, collaboration, and the general quality and efficiency in the performance of firms and industries in an economy (Kumar & Ganguly, 2020; Mohan, Buell & John, 2020; Ray, 2019; Sodhi & Tang, 2019; Kraft, Valdés & Zheng, 2018; International Trade Centre [ITC], 2016; Buell, Kim & Tsay, 2016; Kalkanci, Ang & Plambeck, 2016; Schooner, 2014). Although Ghana has undergone several initiatives and reforms, such as the enactment of the Public Procurement Act, 2003 (Act 663), the establishment of the Food and Drugs Authority, the Ghana Standards Authority, and the Registrar General's Department, over the last few years to ensure transparency among industry players and supply chains, supply chain transparency remains much lower in Ghana as compared to other regions across the world (ITC, 2016).

Following the works of ITC (2016); Nuertey (2015); and Ameyaw, Mensah and Osei-Tutu (2012); institutional quality will become an essential tool for achieving desired levels of supply chain efficiency and firm performance and supply chain transparency in Ghana if firms and various stakeholders in the country devote efforts to improving institutional quality in their various industries and sectors. This thesis contributes to the extant literature on supply chain transparency, institutional quality, and firm performance in Ghana. Practically, this study is essential for managers and firms as they coordinate efforts to improve supply chain transparency, institutional quality, and firm performance in Ghana.

Background of the Study

A key consequence of many African economies' failures to develop as expected is their unproductive manufacturing sector (Kanbur, Steenkamp, Rooney & Bhorat, 2017). Arguably, many African economies cannot produce basic goods of suitable quality at an affordable price and produce goods that successfully penetrate international markets (Wickramasinghe & Wickramasinghe, 2017; Naidoo & Ndikumana, 2020). Though many (if not all) African countries are blessed with good natural resources, the ability to add value to these resources to enable them to command prices and demand on the global front remains a puzzle (Elbra, 2013; Dwumfour & Ntow-Gyamfi, 2018). This is evidenced in the manufacturing sector's contribution to these countries' gross domestic product (GDP). For instance, according to a World Bank report, the manufacturing sector's contribution to Ghana's GDP rose sharply between 2012 and 2013 but kept falling steadily from 2013 to 2019 (World Bank, 2020).

This declining state of Ghana's manufacturing subsector raises many concerns among the stakeholders in the agri-food processing subsector (Ghana Statistical Service [GSS], 2015; 2018). The agri-food processing industry has 17,471 establishments (17%), accounts for 21% of employment by the subsector, and is responsible for 26% of total contributions to the economy's GDP by the subsector (GSS, 2018; GSS, 2020). However, the challenges of low patronage, regulatory quality, low production and quality remain substantial drawbacks for the agri-food processing industry for decades.

The International Trade Centre (2016); the GSS (2016; 2020); and the Ministry of Trade and Industry [MoTI] (2018) have all cited compliance with

market access requirements, especially Sanitary and Phyto-sanitary Standards (SPS), high cost of raw materials, bottlenecks in government administration responsible for regulation, control, application procedures and operation of public agencies, unofficial payments for public services, financing, and inadequate access to information, among others as the crucial challenges responsible for the declining performance of the Agri-food sector supply chains.

Supply chain translates to lower costs for firms to provide top-notch levels of customer service, helps in maximising productivity from resources expended or assets employed, and helps in optimising enterprise profits (Miyare, 2014; Greer & Purvis, 2016). Due to the complexity of supply chains, the system theory explained the principles common to all complex entities in a dynamic process and emphasised information flow towards transparency. According to the system theory, all tiers of a supply chain share information to coordinate task requirements and carry out organisational functions efficiently and effectively (Sarkis, Zhu & Lai, 2011). However, slight information imbalances create functional disorders in distrust and poor performance in the supply chain (Beulens, Broens, Folstar & Hofstede, 2005; Irland, 2007; Han & Dong, 2015; Bateman & Bonanni, 2019).

Supply chain transparency entails companies disclosing the names and details of their suppliers to enable tracing and tracking (visibility), information about the sustainability conditions at these suppliers, and the purchasing firms' purchasing practices, as well as requiring all nodes to disclose the provenance of their products, product testing results, certifications, and suppliers' compliance with labour-practice standards in their annual reports, websites,

and press releases. (Sodhi & Tang, 2019; Egels-Zandén, Hulthén & Wulff, 2015).

Undoubtedly, supply chain transparency is considered a critical global issue in modern supply chain management (Yakovleva, Sarkis & Sloan, 2012). Wognum, Bremmers, Trienekens, Van Der Vorst and Bloemhof (2011) and Trienekens, Wognum, Beulens and Van Der Vorst (2012) posited that quality, safety, and legal requirements were the main reasons for transparency efforts by firms. However, the past few years' desire for cooperative operational gains and ecologically and socially sound supply chains has taken new demands for supply chain transparency (Deimel, Frentrup & Theuvsen 2008; Arens, Deimel & Theuvsen 2011; Trienekens et al., 2012).

According to Bastian and Zentes (2013), supply chain transparency has moved beyond the "mere hygiene factor" label and could set the stage for cost, quality or flexibility advantages, sustainability, and ethical differentiation. Supportively, Llach, Marimon and Bernardo (2011) and Heras-Saizarbitoria and Boiral (2013) posited that supply chain transparency has led to positive performance outcomes and improved supplier-customer comprehension of standardised management procedures and practices.

Furthermore, Gardner et al. (2019) and Kraft et al. (2018) found that consumers will reward firms that ensure transparency in their operations and punish those that do not. For instance, Kraft et al. (2018) observed that consumers might be willing to pay 2% to 10% extra for products from companies providing more significant supply chain transparency. Also, Buell et al. (2017) noted that a growing segment of discerning consumers seeks information on product ingredients and materials, product origin, and

production conditions. These findings present a critical threat to firms as their performance and market share may no longer be determined by price and "product quality" alone. However, the ability of firms to disclose supply chain information significantly may depend on their governing environment.

Accordingly, the institutional theorists assert that the institutional environment strongly influences the development of formal structures in an organisation, often more profoundly than market pressures (North, 1990; Meyer, Rowan, Powell & DiMaggio, 1991; Scott, 2013). Hence the need to investigate not only the transparency of the agri-food supply chain but also the quality of institutions that govern the chain when trying to find the remedy to the low performance of agri-food processing firms in Ghana. The efficiency of institutions strongly bears on firms' competitiveness and growth within an economy (Easterly & Levine 1997; Acemoglu, Johnson & Robinson 2005).

However, in examining the relationship between supply chain transparency and firm performance in Ghana, the role played by institutional quality in the connection cannot be ignored because Bastian and Zentes (2013) and Ahmed and Omar (2019) argued that the benefits of supply chain transparency would depend on institutional quality. Also, Owoo and Lambon-Quayefio, (2015); ITC (2016); Sen (2017); Božić (2017); Sen and Sinha (2017); and Adesanya et al. (2020); explained that institutional quality had a complementary effect on firm performance. Furthermore, Nuertey (2015) argued that the extent to which supply chain transparency will contribute to Ghana's firm performance depends on institutional quality. Thus, institutional quality will positively moderate the relationship between supply chain transparency and firm performance in Ghana.

Supply chain transparency alone may not lead to the desired levels of firm performance unless there is a strong institutional quality (SN & Sen, 2017). This could explain why there are mixed findings on the relationship between supply chain transparency and firm performance in the extant literature. Accordingly, Božić (2017) averred that socially responsible national legal regimes are required to increase social transparency in global supply chains. In Ghana, International Trade Centre [ITC] (2016) and Ameyaw et al. (2012) argued that the extent to which firms will comply with regulations and ensure transparency to promote their performance depends on the quality of the institutions.

Theoretically, since supply chain transparency, institutional quality, and firm are observable social realities, they can be proxied and quantified as variables usable in research. This is because positivists believe that scientific research entails the examination of observable social reality and the production of law-like generalisations, as physical and natural scientists do (Saunders, Lewis & Thornhill, 2012). For this background, this current study examines the relationships between supply chain transparency, institutional quality and firm performance and how institutional quality influences the relationship between supply chain transparency and firm performance in Ghana.

Statement of the Problem

Following the works of Harbert (2020); Bateman and Bonanni, (2019); Kraft et al. (2018), Egels-Zandén et al. (2015); and Bastian and Zentes. (2013), consumers will patronise companies with more supply chain

transparency than those with less. In Ghana, the ITC (2016) found that firms' poor performance in the processing industry results from a lack of transparency. However, the report could not prove its evidence with empirical results. The demand deficiency for local agri-food products locally and in the international markets contributes to the declining rate of the sectors' contribution to Ghana's GDP in recent times (GSS 2020). This phenomenon translates into agri-food supply chain-related risks such as low demand for the farmers' raw materials, increasing post-harvest losses, inadequate infrastructure (storage), and low performance in agri-food supply chains in Ghana (Nyamah, Jiang, Feng & Nyamah, 2017).

The government and other stakeholders have also taken several initiatives to ensure the quality of the Ghanaian business environment's regulatory institutions. These initiatives include promoting the Ghana Standards Board to an authority, the food and drugs board to authority, the digitisation of the registrar general's department, and the amendment of the companies act to ensure transparency and improve processing firms' performance. Despite these efforts, the literature on the supply chain transparency practices and their degree of concordance among firms remain scarce. Also, even though efficient and effective supply chain transparency could result in higher performance of agri-food firms, supply chain transparency in Ghana remains much lower than in other countries such as Seychelles, Botswana, and Cape Verde (ITC, 2016; Nuertey,2015; and Ameyaw et al., 2012).

Furthermore, after an extensive literature review, the studies assessing the effect of the quality of the institutions on the performance of firms in

Ghana are highly limited (ITC, 2016; Nuertey, 2015; Ameyaw et al., 2012); a situation that could underestimate the potential of institutional quality in determining firm performance in the country. Again, since the outcry from the earlier researchers and institutions or stakeholders to improve transparency and institutional quality to enhance the firms' performance in Ghana, no study has examined the firms' transparency practices and their effect on their performance. Also, the degree of concordance of the supply chain transparency practices among the processing firms in Ghana remains missing in the extant literature.

Against these gaps, this study examines the relationship between supply chain transparency, institutional quality, and firm performance in Ghana, emphasising relationship, operational, social, ecological, and supplier performance as proxies for firm performance. These dimensions were selected as the most direct outcome variables for the concepts under consideration.

Purpose of the Study

The study's general purpose is to examine the effect of supply chain transparency on firm performance and how institutional quality influences the relationship between supply chain transparency and firm performance in Ghana.

Objectives of the Study

The study formulated the following specific objectives:

1. Examine the degree of concordance of supply chain transparency practices among the agri-food processing firms in Ghana.

2. Examine the effect of supply chain transparency on the performance of agri-food processing firms in Ghana.
3. Examine the effect of institutional quality on the performance of agri-food processing firms in Ghana.
4. Examine the effect of institutional quality on the supply chain transparency of agri-food processing firms in Ghana.
5. Assess the moderating role of institutional quality in the relationship between supply chain transparency and agri-food processing firms` performance.

Research Hypotheses

Based on the specific objectives, the study formulated the following research hypotheses to guide the study.

1. There is a high degree of concordance of supply transparency practices among the agri-food processing firms in Ghana.
2. Supply chain transparency has a significant positive effect on the performance of agri-food processing firms in Ghana.
3. Institutional quality has a significant positive effect on the performance of agri-food processing firms in Ghana.
4. Institutional quality has a significant positive effect on the supply chain transparency of agri-food processing firms in Ghana.
5. Institutional quality has a significant positive moderation effect on the relationship between supply chain transparency and the performance of agri-food processing firms in Ghana.

Significance of the Study

This current study is of practical use to the various industries in Ghana, specifically the agri-food processing industry. The results reflect the ground regarding transparency in their supply chain and how it influences their performance. Understanding or knowing the agri-food processing firm's supply chain transparency in Ghana has practical and theoretical significance. This study's insightful findings and recommendations practically guide or underline agri-food processing firms' principles to improve their supply chain systems and performance.

For contributions to the literature, the findings serve as a scientific basis for other researchers. The results of this study also provide relevant materials for students. It generally contributes to the academic knowledge base and is a foundation for future analyses. This research enhances the theories underpinning the study at a theoretical level.

Delimitation

A single study cannot cover an entire spectrum of a phenomenon, such as supply chain transparency, institutional quality, and firm performance. Hence, it is prudent to concentrate on an aspect of the phenomenon that is so pressing for society. Accordingly, the study is exclusive to Ghana in geographical terms. The study also considers only agri-food processing firms. In this study, agri-food processing firms considered include primary and secondary food agri-food processors. This is because some firms combined both stages. For example, a Kenkey producing firm may combine the preparation and frying of fish and meat, processing vegetables, and secondary

processing of dried corns into food (kenkey). This study did not consider firms in fermentation and distillation of alcohol, wines, beverages, and processing agri-food components into other materials. For example, processing palm oil residues into soap and other items

The research within the specified domain is ideal for conducting an in-depth and objective analysis of the problem void of prejudices or biases. The study should have ideally looked at all manufacturing firms in Ghana. But due to sampling issues, regulatory differences, operational differences, and common weighing bias, the study resorts to using only the agri-food processing firms. Finally, this study could not also cover all aspects of firm performance. However, the choices of the performance dimensions were strictly guided by relevance and relatedness to the concepts under study, justified by the empirical literature.

Limitations

This study acknowledged that though this study's results are relevant and valuable, there have been some limitations. However, these limitations have been adequately provided for in the study. Firstly, the use of structured questionnaires may discriminate against the knowledge of the population since they could share further knowledge on the topic if given a chance. This could limit the information gathered on the topic. Fortunately, adequate consultations with professionals, the population, and extant literature have nullified the effect of this limitation. The study provided for this effect by including all questions necessary to achieve the objectives of this study.

Also, this study used a simple random sampling technique to select the study respondents. This may leave some individuals with relevant information out of participation. The limitation has also been eliminated because this approach gives all population members an equal chance to participate.

Furthermore, the study uses confirmatory factor analysis to validate the constructs used to measure the study's variables. It is true to say that large sample sizes affect the correlation among variables. In factor analysis, a factorable matrix needs to include several sizable correlations. However, it is worth mentioning that the expected size depends, to some extent, on sample size when using other models than Structural Equation Modelling (SEM). Tabachnick, Fidell, and Ullman (2007) warned that larger sample sizes tend to produce smaller correlations, but if no correlation exceeds 0.30, the use of factor analysis is questionable because there is probably nothing to factor analyse. As a remedy, this study used the Partial Least Squared Structural Equation Modelling (PLS-SEM) to do the factor analysis, as recommended by Kock (2017) and Lowry and Gaskin (2014).

Finally, using subjective measures of constructs to gauge the variables could also present limitations to this study. However, natural scientists can quantify and measure an observable social reality based on the positivists' approach to scientific research. Thus, this study used reliability and validity measures to reduce these limitations, as explained in chapter three.

Definition of Terms

Supply chain transparency refers to "the degree to which a supply chain player has access to relevant and appropriate information about

products, processes, and flows of capital without loss, noise, delay, and distortion" (Bastian & Zentes, 2013). This study conceptualises supply chain transparency as "corporate disclosure of the names of the suppliers involved in producing the firm's products (visibility), information about sustainability conditions at these suppliers, and the buying firms' purchasing practices" (Egels-Zandén, Hulthén & Wulff, 2015).

Institutional quality in the context of this study refers to the institutions' functionality within an economic certain per the mandates establishing those institutions. It defines the efficiency and effectiveness with which the various institutions in the environment of agri-food processing firms carry out their functions as required by law.

According to Sunday (2015), *firm performance* emerges from the idea that a firm is the association of productive assets to achieve a common purpose. As used in this study, firm performance refers to the results or outcome of a firm's resource utilisations.

Organisation of the Study

The study is organised into five chapters. The first chapter deals with the study's introduction, which comprises the background, the problem of the study, objectives and research hypotheses, significance, delimitation, limitations, and organisation. Chapter two focuses on the literature review, including theoretical, conceptual, and empirical reviews. Chapter three covers the research methods employed for the study. It comprises a research paradigm, design, approach, sample and sampling procedure, instrument, and validity and reliability. It also contains the systematic procedures adopted to

gather and analyse the data (data processing tools and analytical techniques). Chapter four presents the results and discussion. The last chapter, chapter five, summarises the findings, conclusions, recommendations, and suggestions for further studies on the phenomenon.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This section reviews related literature on the topic under consideration, "supply chain transparency and firm performance in Ghana: the role of institutional quality." The fundamental purpose of reviewing the literature is to understand the present study's subject area and pinpoint research gaps to be filled by the current research (Lose, Nxopo, Maziriri & Madinga, 2016). This chapter presents an in-depth review of the related literature on the theories underpinning this study, the concepts, and the empirical works in the field of this study. The study extracted information from several electronic and print sources thought to be closely related to the topic and concepts under the study.

In reviewing literature in the study field, the study derived topics in this chapter from the study's objectives and grouped them under three main subheadings as theoretical review, conceptual review, and empirical review. The chapter finally presents the conceptual framework of the study. Specifically, this chapter looks at the system theory, the information theory, and the institutional theory. Finally, it presents the summary of the contents of the chapter.

Theoretical Review

A theoretical review explains the theories underpinning the study regarding the objectives. In essence, it reports on the philosophical view or propositions on each specific objective and directly or indirectly presents the variables for measuring the specific objectives. Specifically, this study

employed system theory, information theory, and institutional theory to help achieve the study's objectives.

System theory

Supply chain transparency has been given theoretical backing through the system theory. The system theory illustrates the fundamental principles that govern all multifaceted entities in a dynamic process, such as supply chain nodes. According to Ludwig von Bertalanffy (1969), given the interaction between a system's components, a system is often more than just the mere sum of its components. Bertalanffy (1969) averred that systems with equivalent components could still be different due to their components' different arrangements, often leading to different interactions between them. The theory emphasises the interaction among the system's components, which usually helps acquire new qualitative properties to evolve.

Miller (1978) clarifies that for a system to be regarded as a living system or a functional system, it should contain sub-systems, parts, boundaries, distributors, supporters, channels, associators, input, and output translators. Miller's proposition is like supply chains. In a supply chain where multiple parties (nodes) are engaged in satisfying the customers' needs, satisfaction is only realised when there is adequate interaction among the parties. Ahmed and Omar (2019) asserted that information flow, like blood circulation in any organism, is critical for enabling effective and efficient interaction among the sub-components in a system. Due to the demand-driven nature of Ghana's economy, the effectiveness of supply chains and firms' performance depends primarily on a feasibly smooth and transparent exchange of information between all nodes.

The system theory postulates that all systems, regardless of their exchange purposes, share certain fundamental organising principles and are bounded (Zeng & Pathak, 2003). All supply chain tiers manage daily operational synchronisation via exchanging information, enabling them to manage task requirements to perform organisational functions most efficiently and effectively (Sarkis, Zhu & Lai, 2011). The information must be shared in an understandable format with the supply chain members who will be directed or guided by it. Beulens, Broens, Folstar and Hofstede (2005) noted that the system function accurately when the medium for the information exchange is free of distorting hurdles, noise-generating nuances, and delaying operators to minimise or eliminate information loss during the transmission.

However, Han and Dong (2015) averred that slight information imbalances, such as forecasted operational sequences not falling in line with actual operational requirements, create functional disorders in distrust among supply chain members. Helou and Caddy (2006) noted that communication success is also contingent on the item being exchanged within the supply chain. Supply chains tend to become more complex as they evolve from the movement of only physical goods to the movement of goods, finance, and information or knowledge. It becomes more challenging to ensure that the correct information or knowledge is passed ‘up’ or ‘down’ the supply chain to ensure the exchange of the correct goods or services. According to Ahmed and Omar (2019), this complexity in information dissemination led to miscommunication and less transparency, influencing the study’s decision to adopt the second theory, information theory, to deal with the role of information and its transparency in value chain performance.

Information theory

Within any organisation, information dissemination is contingent upon the products and services it procures and produces, business principles and practices, operational processes and procedures, transaction types or everyday communications, individual intuitions or people's perceptions, and so on. The information theory holds that in any organisational system, the different components or functions work as a sender and a receiver engaged in sending and receiving output and input information simultaneously (Desouza, Chattaraj & Kraft, 2003). The information theory emphasises the importance, collection, quantification, processing, storage, medium, and dissemination of information (Nyquist, 1924; Hartley, 1942; Shannon, 1948).

Every organisation uses one or a combination of different mediums, and the more the number of mediums used, the more are the chances of getting different types of information (Desouza et al., 2003). Thus, the mediums used must be capable of carrying and delivering all the sender's assigned information to the receiver. The information associated with any component or function in an organisational system must be compatible with that component's or function's functionality, a concept referred to in information theory as symmetric mutual dependence and interaction in highly decentralised structures.

In any supply chain, buyers anticipate suppliers to be competent and responsive enough to act effectively and efficiently to the complex mix of their preferences and choices. However, if suppliers lack these capabilities and competencies, they will lose their significance and fall out of the network, creating asymmetries in the chain, which results in market failure. The

information theory highlighted the 'coordination' accompanied by the sharing of information to significantly facilitate the effective application of strategies involving information sharing at an inter-organisational and intra-organizational level (Hung, Ho, Jou & Tai, 2011). Thus, transmitting high-quality information is preferable to transferring a massive amount of information (Wang, Ye & Tan, 2014).

The appropriate integration and application of resources, particularly designed to aid in information flow, facilitates the flow of information. However, the sharing of information is not limited to members of the supply chain; it also involves the external environment as the system theory holds that firms do not operate in a vacuum (Bateman & Bonanni, 2019; Dörnhöfer, Schröder & Günthner, 2016). According to Rajan and Zingales (2003), strong institutional quality matters, especially when tempering interest group activities. That is, an economy's institutional quality might slow or speed up the performance of business entities. This means that even though efficient and effective information flow (transparency) can promote firm performance, such a phenomenon's effectiveness can also depend on the country's institutional structures. This influences the study's decision to adopt the third theory, institutional theory, to underpin the institutional environment's role in supply chain transparency and firm performance.

Institutional theory

Various literature that examined the importance of institutions in enhancing firm performance stems from the contributions of "Meyer and Rowan (1977), DiMaggio and Powell (1983), Zucker (1987), Meyer, Rowan, Powell, and DiMaggio (1991), North (1993) and Scott, (1995)". The

institutional theory argues that organisations operate within a social network such as culture, laws, and regulations, and their behaviours are not confined to a dyadic relationship (Meyer & Rowan, 1977; Scott, 1987; Iacobucci & Hopkins, 1992; Anderson, Håkansson & Johanson, 1994). This implies that a sizable portion of the motivating or compliance force underlying firm behaviour is social and rooted in institutions and interconnected organisational networks.

The institutional theory identifies and examines the forces that promote survival, performance, and legitimacy of corporate practices while acknowledging resource usefulness (Hirsch, 1975; Roy, 1997; Litan, Baumol & Schramm, 2008; Bruton, Ahlstrom & Li, 2010). According to DiMaggio and Powell (1983), Meyer and Rowan (1991), and Scott (2007), the institutional theory explains how groups and organisations can better secure their positions and legitimacy by conforming to the rules and norms of the institutional environment. Legitimacy connotes adopting sustainable practices seen by stakeholders as proper and appropriate, and rules refer to regulatory structures, governmental agencies, laws, courts, professions, scripts, and other societal and cultural practices that exert conformance pressures (DiMaggio & Powell, 1983; North, 1993).

The institutional environment's efficiency and effectiveness can explain the variations in firm performance, supply chain transparency adoption, and the net effect of supply chain transparency on firm performance per the institutionalists' propositions. The institutional theory has been used successfully in the supply chain fraternity. Notably, Shibin et al. (2020), Shou, Zheng and Zhu (2016), Grob and Benn (2014), Glover, Champion, Daniels,

and Dainty (2014), Lin and Sheu (2012), Liu, Ke, Wei, Gu and Chen (2010), and, Ball and Craig (2010) have all drawn on the institutional theory to examine various concepts and phenomena in supply chain management.

This current study draws on the institutional theory to examine the moderating role of institutional quality in the relationship between supply chain transparency and agri-food processing firms' performance in Ghana.

Relation of the theories to study

As discussed in the theoretical reviews in the preceding sections, the proponents of the information theory and numerous empirical studies emphasised that appropriate information exchange (supply chain transparency) will enhance firm performance, ceteris paribus. Similarly, the institutional theory holds that institutions in a firm's operating environment will influence its performance. Thus, the high-quality institutions will enhance firm performance while the poor quality will hinder the firms' progress.

However, from the system point of view, this study holds that the interaction of the institutions and the quality of information exchange will go a long way to enhance the contribution of supply chain transparency to firm performance. Thus, the study integrates the system theory, the information theory and the institutional theory to assess the moderating role of institutional quality in the relationship between supply chain transparency and firm performance. This is because the firms do not operate in a vacuum. They interact with other elements in their environment beyond their factory walls. Thus, the operation of the firms represents a system that needs appropriate information exchange among its separate components to function efficiently and effectively.

Conceptual Review

A conceptual review defines the act of bringing together some related concepts to explain or predict a specific event or give a broader understanding of the phenomenon of interest or the research problem. Conceptual review in quantitative research becomes necessary when the theories underpinning the study do not contain or bring out the variables directly to measure the study's objectives (Saunders et al., 2012). This section specifically looks at the concept of supply chain transparency, institutional quality, firm performance, and their related issues and applications.

Supply chain transparency

In today's dynamic and competitive business environment, all entities rely on information to facilitate their actions in nearly every aspect of their lives and daily operational synchronisations with their supply chain partners. However, to have a better world, that information would not only be accurate and plentiful, but it would enable each stakeholder to make decisions that reliably advance their interests (Fung, 2013). This is the idea of supply chain transparency. Beulens et al. (2005) defined supply chain transparency as "the extent to which all the supply chain's stakeholders have an appropriate shared understanding of, and access to, finance, product, and process-related information they request, without loss, noise, delay, and distortion".

Bastian and Zentes (2013) opined that supply chain transparency indicates the quality, availability, accuracy, accessibility, and actuality of supply chain data available to deserving supply chain stakeholders. This means that information should be shared with only important supply chain members such as customers, regulatory authorities, or shareholders in an

understandable, comprehensive, credible, and rapid manner (Beulens et al. 2005; Kalfagianni 2006; Pagell, Wu & Wassermann 2010; Wognum et al., 2011; Trienekens et al., 2012).

In the views of Kalfagianni (2006), supply chain transparency has both horizontal and vertical dimensions. The vertical supply chain transparency encompasses knowledge about all companies, inputs, and output flows in the supply chain (Wognum et al., 2011). The horizontal dimension refers to individual companies' circumstances, policies, and processes on supply chain tiers and information flow to firm-specific stakeholders (Wognum et al., 2011). Also, Abeyratne and Monfared (2016), Francisco and Swanson (2018), Chen, Zhang, and Zhou (2019), and Bai and Sarkis (2020), supply chain transparency comprises three dimensions; the range of transparency, product transparency (visibility and sustainability conditions) and participant transparency.

The range of transparency as the first dimension holds for a sufficient supply chain transparency; all companies and partner agents need to participate across the supply network. Supply chain transparency, especially beyond one tier in the supply chain network, is a critical business challenge. Thus, most companies have little or no information on their second and third-tier suppliers (Dou, Zhu & Sarkis 2018; Tachizawa & Wong 2014). Moreover, due to the lack of information transparency in the supply chain, customers cannot fully ascertain product or service characteristics such as food safety (Grimm, Hofstetter & Sarkis 2018; Kshetri 2018).

Product transparency refers to the tracking and traceability of products and their supply chains (Bai & Sarkis, 2020). This information would include

the origins of raw materials and would provide the context for users of a final product or service. Tracking product components instil greater confidence in consumers and other stakeholders that the products are genuine, high-quality, and that all required processes are followed strictly and ethically to produce it. This level of transparency inspires consumers and increases their trust in the product, dramatically driving their intentions to buy it (Kshetri, 2017). Tracking products entails analysing data about the product's processes and paths, which enables companies in a supply chain to determine whether the product was in the incorrect location, processed incorrectly, or was poorly managed in terms of timing (Koetsier, 2017).

Tracking product information has evolved into a critical tool for encouraging green consumption by helping consumers to understand better the product life cycle, the products themselves, and the sustainability implications of manufacturing processes. Tracking refers to ascertaining product details as they move downstream of the supply chain. The direct opposite of tracking is tracing. Tracing involves obtaining product details as they move upstream of the supply chain (Bozic & Bateman, 2018). Trackability and traceability comprise what is referred to as visibility in the supply chain (Bozic & Bateman, 2018). Visibility is most useful for the firms during recalls when any defect is detected.

Participant transparency is the last dimension of supply chain transparency. Bai and Sarkis (2020) noted many potential negative consequences of all partners' operations and supply chain conditions, such as production crises and disruptions, unethical and illegal practices, environmental burdens, end-of-life waste, forced labour, and poor conditions

in the factories. The recent past saw various incidents that had left supply chains with potential risk and the need to build resiliency (Fahimnia, Jabbarzadeh & Sarkis 2018). As a result, several supply chain operations and sustainability conditions must be tracked and traced, including legal, social, and environmental incidents.

According to Zhu, Song, Hazen, Lee and Cegielski (2018), a transparent supply chain relies heavily on product information moving upstream and downstream through the chain. Morgan, Richey and Autry (2015) define supply chain transparency as a firm's ability to proactively engage in communication with stakeholders to obtain visibility into upstream and downstream supply chain operations and ensure disclosures and sustainability practices at each supply chain member's end. As a result, the information obtained from such communication must be accurate, timely, consistent, comprehensive, and structured so that supply chain stakeholders can utilise it (Spekman, Kamauff & Myhr, 1998; Hazen, Boone, Ezell & Jones-Farmer, 2014).

Regardless of the angle from which one looks at supply chain transparency, it comprises the three dimensions: visibility, disclosures, and the sustainability conditions of the supply chain members. Hence, this study conceptualises supply chain transparency as a firm's ability to proactively engage in effective and efficient communication with stakeholders to obtain visibility into upstream and downstream supply chain operations and ensure disclosures and maximum sustainability practices at each supply chain member's end. This is because, in a value chain, the actions of every node

matters as performance is always measured by the collective action of the nodes in the chain collaborating to satisfy a demand.

Supply chain transparency practices

Egels-Zandén et al. (2015) have extensively highlighted the various supply chain transparency practices in their paper titled trade-offs in supply chain transparency: the case of Nudie Jeans Co. According to Egels-Zandén et al. (2015), transparency practices include supplier or factory audits, gender orientations, environmental sustainability permits and agreements, supplier transparency or compliance agreements, sustainability certifications, publication of supplier details, industry certifications, product and standard certification, tax registration and compliance, salaries and working condition reviews and publications, price regulations and publications, appropriate reverse logistic systems (traceability and track-ability enabled), and an effective and efficient information sharing system.

Bastain and Zantes (2013), Egels-Zandén and Hansson (2016), Zhu et al. (2018), Francisco and Swanson (2018), and Ahmed and Omar (2019) have all shared similar views on the concept of supply chain transparency practices. Evidently, these studies have all been conducted in different countries, signifying that supply chain transparency practices will not differ widely among firms irrespective of the geographical location. However, their adoption and use or relative importance may differ from firm to firm and industry to industry. This calls for the need to establish the importance of the supply chain transparency practices among firms in various industries. The available literature has not documented the degree of concordance of supply chain transparency practices to firms.

Institutional quality

According to Selznick (1949) and Hughes Everett (1939), institutions represent formal and informal laws, regulations, and standards. These laws, standards, and regulations define the codes of conduct, behaviour, and patterns that build the complex constructs that determine human relationships and influence companies' strategies and decision-making. North (1993) opined that these institutions represent the 'rules of the game' in an economy, while firms and entrepreneurs stand for the economy's players or business entities. In the views of Scott (1994) and Williamson (2008), businesses and their activities are defined by society's institutional framework. Organisations must adapt to the institutions' standards to obtain approval from society and institutions (DiMaggio & Powell, 1983).

According to Gani and Prasad (2006), institutional quality is the process by which governments are selected and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them. The Worldwide Governance Indicators define institutional quality as the measures of perceptions of the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development (World Bank, 2020). Several studies have assessed the role played by institutional quality to ensure a sound and functional business environment. In that context, some studies have focused on how the legal and regulatory environment provides a well-functioning business environment.

In the views of Baumol (1990), Williamson (2008), and Bylund and McCaffrey (2017), legal and regulatory systems providing central machinery to this end are essential components of supply chain environments because institutions set "the rules of the game" for everyday market exchange and its governance. Firms are rarely self-sufficient and hence, interact with other entities in their environments to acquire resources for survival, efficient and effective performance, and growth, as suggested by the system theory. Conditions of interdependence arise as firms rely on each other to produce and trade necessary resources in supply chains (Handfield, 1993). Maintaining orderly resource flows among supply chain partners becomes a primary organisational objective, a goal frequently termed the "stability motive" (Oliver 1991; Katz & Kahn 1978). Inevitably, operating environments are prone to uncertainties that challenge the stability motive (Weber & Mayer, 2014).

Dollar, Hallward-Driemier and Mengistae (2005) and Lu, Png and Tao (2013) noted that institutional quality is a crucial determinant of firm performance, among other numerous factors in developing countries. According to SN and Sen (2017), developing countries are characterised by high levels of corruption, a distortionary regulatory environment, and over-reach by local government officials in how they interact with firms' managers, and these factors contribute to weak firm performance in these countries. Dollar et al., (2005) added that if the government is highly bureaucratic and corrupt, the returns on potential investments will be low and uncertain, and one would not expect much accumulation and growth in these environments. Transaction costs incurred due to regulations, bureaucracy, and weak

institutions, in particular, reflect resources diverted from production and may significantly impact firms' performance (Qureshi & Te Velde, 2012).

North (1993), Schleifer and Vishny (1993), Bannash (1993), Kaufmann, Kraay and Zoido-Lobaton (1999), and Kaufmann and Kraay (2002) noticed that the absence of a stable structure facilitating business interactions, such as consistent, reliable rule of law, good-quality bureaucracy in government, limited governmental intervention, and robust governance infrastructure for overseeing private-sector development and property protection, results in significantly higher transaction costs. Institutional weaknesses caused by inconsistent enforcement of rules, ineffective legal frameworks, and government corruption always create sources of instability, impeding growth and innovation (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1998; Doh, Rodriguez, Uhlenbruck, Collins & Eden, 2003).

Firm performance

Many different constituencies can judge a firm's performance, resulting in different interpretations of successful performance. Sekoenya (2019) argued that each perspective of firm performance is unique. Firm performance can take many forms, from dealing with internal issues to dealing with stakeholders or handling external matters. Sunday (2015) argued that firm performance is founded on the notion that a firm is a voluntary association of productive assets, including human, physical, and capital resources, to achieve a common goal.

Those providing the assets will only commit them to the firm if they are satisfied with the value received in exchange for the assets compared to an opportunity cost or alternative uses. Consequently, the essence of performance

is the creation of value. Junaidu and Sunusi (2014) observed that if the value created by using the contributed assets is equal to or greater than the value expected by those contributing the assets, the assets will continue to flow to the firms, guaranteeing the existence or perpetual succession of the firms.

Firm performance is distinct from organisational effectiveness as a broader concept. Venkatraman and Ramanujan (2010) provided an illuminating illustration of three overlapping concentric circles, the largest of which represents organisational effectiveness. This broad domain of organisational effectiveness encompasses the medium circle, which represents business performance and the inner circle, which represents financial performance. Other aspects of an organisation's functions are covered by organisational effectiveness: the absence of internal strain and faults, participation in legitimate activities, resource acquisition, and achievement of stated goals (Cameron, 2016; Sufian & Chong, 2018). This study uses business performance, or firm performance, a subset of organisational effectiveness covering operational and financial outcomes.

There has been a lot of confusion about firm performance in the available literature. A significant source of confusion is antecedents of performance as performance indicators (Cameron, 2017). Combs, Crook and Shook (2017) argue that the operational performance described by Venkatraman and Ramanujan (2010) represents an antecedent of financial performance. The argument is valid and is demonstrated in some instances, such as production efficiency. According to Brown (2013), performance measures in organisations must focus on what makes, identify, and communicate the drivers of success, support organisations learning, and

provide a basis for assessment and reward. Other prominent researchers (Douglas, 2015; Drucker, 2014) believe that appropriate performance measures enable organisations to focus their efforts on achieving their strategic goals. They believe that the performance of a business is critical to its future well-being and prosperity.

Whyte (2013) argues that organisations have desired potentials in capacity, attraction, market share, and financial strength. Performance is the difference between those potentials and the levels attained through resource combination. Whyte added that the accumulation of human and capital assets significantly impacts an organisation's ability to introduce new products and compete in markets, thereby affecting performance. It expands the knowledge base necessary for the success and performance of the organisation.

O'mara (2013) posits that resource availability and volume can also help analyse an organisation's performance. According to O'mara, key indicators of an organisation's performance are its resources, including information, finances, employee skills, and organisational processes. In agreement, Robins (2014) suggested that resources can be divided into physical, human, information, and capital resources and that a firm's performance can increase only if other firms cannot replicate its resources. Robins added that while strong financial performance indicates a strong organisation, qualitative indicators such as management, supplier development, logistics effectiveness, and labour effectiveness complement the quantitative indicators to ensure that the firm achieves its focus and objectives.

Drucker (2014) argued that to perform, organisations should critically look at their customers and know how best they satisfy their needs. Drucker

added that organisations should continuously improve their services through innovations and a robust value chain. These assertions of Drucker are in line with that of Saani (2013), who averred that in performance assessment, an examination of an organisation's quality of services, flexibility, value chain optimisation, utilisation, and innovations are critical. As such, the current study considered agri-food processing firms` performance as a composite of relationship performance, operational performance, supplier performance, ecological performance, and social performance.

Costello (2013) noted that asymmetric information is detrimental to long-term business relationships and results in contracts with short durations; thus, enabling transparency in information flow can result in successful long-term relationships. Wu, Chuang, and Hsu (2014) added that a trustworthy supplier-buyer relationship characterised by social attributes such as power, reciprocity, and commitment is a prerequisite for developing long-term strategies for enhancing collaboration. Transparent alliances between buyers and suppliers are more successful in the long run due to increased visibility for responsiveness (Ellram & Krause, 2014).

Ramanathan and Gunasekaran (2014) argued that collaborative efforts that result in transparent information flow result in successful collaborative execution, which benefits future collaborations. Thus, quality relationships result from transparency, enabling organisations' attributes and efforts to increase transparency.

According to Green Jr, Zelbst, Meacham and Bhadauria (2012), reliable information systems improve operational performance through their capacity to enable information transparency. From a theoretical standpoint,

operational knowledge transfer considers the prevailing knowledge structures in organisations, thereby facilitating value creation through knowledge transfer (Modi & Mabert, 2007). Bastian and Zentes (2013) argued that increased supply chain transparency benefits operational performance. Industries having significant information flow operations rely on timely information dissemination and collection to remain competitive.

According to Najmi and Khan (2017), large corporations have met operational benchmarks such as supply chain effectiveness and information flow efficiency while maintaining reasonable cost reductions by refining supplier integration and internal operations. This means that proper supplier integration as part of supply chain management benefits operational firm performance in industries comprised of businesses that rely heavily on information flow (Ou, Liu, Hung & Yen, 2010). The reliability of information systems, the transfer of operational knowledge, and the timeliness of information flow through supplier integration are characteristics of a transparent supply chain network, which benefits operational performance.

Ahmed and Omar (2019) argued that improved supplier performance results from the value created by reliable information transfer activities. Supply process management is challenging for businesses operating in uncertain environments with a higher risk of supply chain disruption (Rampini, Sufi & Viswanathan, 2014). So an appropriate availability of precise information encompassing the performance plan of supply chain partners can mitigate these disruption risks. As a result, these efforts are concentrated on increasing supplier transparency to improve supplier performance.

Fernando and Saththasivam (2017) define environmental or ecological performance as an organisation's direct involvement with suppliers and customers to plan environmental management and solutions collaboratively, emphasising collaboration between a focal firm and its suppliers and customers. Suppliers and customers collaborate to reduce the environmental impact of manufacturing processes, products and product usage. Ecological collaboration entails exchanging technical information and a mutual willingness to learn about one another's operations to plan and establish environmental improvement objectives. Nonetheless, it involves collaboration to mitigate the environmental impact of supply chain material flows (Carter, Carter, Monczka & Scannell 2011).

Environmental collaboration entails understanding one another's environmental management responsibilities and capabilities. A review of the environmental literature reveals a strong correlation between green practices and corporate profitability in any organisation. Environmentally responsible firms generate more robust financial returns than the overall market (Aragón-Correa, Hurtado-Torres, Sharma & Garcia-Morales, 2008; Zhu, Geng & Lai, 2010; Lee, Kim & Choi, 2012; Estampe, Lamouri, Paris & Brahim-Djelloul, 2013).

According to Fernando and Saththasivam (2017), transparency and dialogue can enhance a business's prestige while promoting the organisation's standards. Social performance entails the management of social resources that benefit both the supply chain and the broader community (Dyllick & Hockerts, 2002; Sarkis et al., 2011). Social performance implies a business's capacity to be socially responsible for its community stakeholder relationships via its

programs, and enhances employees' social quality and equality without discrimination. The capability of firms to communicate and inform the public about business processes transparently contributes to the firm's social performance.

Social sustainability is a topic that receives scant attention in supply chain literature (Hutchins & Sutherland, 2008; Ashby, Leat & Hudson-Smith, 2012; Winter & Knemeyer, 2013). Corporate social responsibilities in the supply chain shed additional light on the scope of social sustainability practices in the supply chain (Hutchins & Sutherland, 2008; Ashby et al., 2012), even if some supply chain scholars dispute its applicability (Sarkis et al., 2011). As a result, social performance measurement can take community relations into account. One of the measures is to consider community relations via complaints (Eadie & Rafferty, 2014).

Sekoenya (2019) observed that defining and quantifying firm performance continues to challenge scholars due to its complexity. This study contributes to this effort by developing and testing a subjective performance scale that, in the words of Venkatraman and Ramanujam (2010), Fernando and Saththasivam (2017), and Ahmed and Omar (2019), covers the domain of business performance. This study's performance argument was founded on the system, information, and institutional theories, distinguishing between antecedents and outcomes of performance. Additionally, the assumptions of the theories provide a conceptual framework for defining performance indicators and dimensions (Aduda & Gitonga, 2018). Moreover, SN and Sen (2017), Fernando and Saththasivam (2017), Bateman and Bonanni (2019), and Ahmed and Omar (2019) have all pointed out that all non-financial

dimensions of firm performance will lead to financial performance, supporting the choice of measurements in this study.

Agri-food supply chain and performance

The ultimate goal of every supply chain is to deliver value at each value point (node) in the supply chain, the notion behind why many scholars refer to the supply chain as a "value chain" in recent supply chain literature. Activities of a given supply chain may be broadly classified into three; support services (infrastructure, technology, procurement and human resource management), product-related activities (inbound logistics, operations and service), and market-related activities (outbound logistics, marketing and sales). Supply chains are primarily concerned with customer benefits, the interrelated processes that create value, and the arising demand and funds flow. In this case, each node in the supply chain becomes a value point, obliged to add value to the supply chain's product to generate the maximum expected outcome or performance at the endpoint. Profitable supply chains generate revenue, improve performance, and satisfy every stakeholder.

Dyer and Singh (1998) and Barney (1991) argued that actors in a supply chain hope to enhance their overall competitive advantage by pooling their objectives, information, risks, resources, and knowledge, to operate subcomponents in a system. However, this pooling of resources, strategies and objectives must follow articulated principles provided by the information theory (Nyquist 1924; Hartley 1942; Shannon 1948). Indeed, an information imbalance in the supply chain will create functional disorders, resulting in market failure or dissatisfaction (Han & Dong, 2015; Ahmed & Omar, 2019).

As posited by the system theory, all the actors or nodes in the supply chain must ensure the desired value is realised at each value point in the chain since a deviation of any node ruins the entire supply chain's efficiency and effectiveness (Bertalanffy, 1969; Miller, 1978; Dörnhöfer et al., 2016; Ahmed & Omar, 2019; Bateman & Bonanni, 2019). However, information sharing is not limited to supply chain members; it also involves the external environment as the system theory holds that firms do not operate in a vacuum (Bateman & Bonanni, 2019; Dörnhöfer et al., 2016). According to Rajan and Zingales (2003), strong institutional quality matters, especially when tempering interest group's activities. That is, an economy's institutional quality might slow or speed up the performance of business entities.

Agri-food industry regulation institutions in Ghana

Firms are rarely self-sufficient and hence interact with other entities in their environments to acquire resources for survival, efficient and effective performance, and growth, as the system theory suggests. In Ghana, the Food and Drugs Authority, the Ghana Standards Authority, the Ministry of Food and Agriculture, the Environmental Protection Agency, occupational safety and hazard legislations, Ghana Export Promotions, Ministry of Trade and Industry, Ghana Revenue Authority, the Registrar General's Department, the 1992 Constitution, and other trade unions such as the association of Ghana industries, and other community values, principles, decrees and culture regulate the agri-food industry.

The Food and Drugs Authority [FDA] is charged by the Public Health Act 851, 2012, to regulate the manufacture, import, export, distribution, use, and advertisement of food, drugs, cosmetics, medical devices, and household

chemicals. The FDA is responsible for registering drugs, food, cosmetics, household chemical substances, medical devices, and premises or factory inspections to ensure that the right and legally viable products are made available to the consumers (Food and Drugs [Amendment] Act, 1996; Act 523). These duties also ensure transparency in the manufacturing of the various products through quality certifications, factory inspections, and the promotion of fair advertisement practices (FDA Annual Report, 2015).

Specifically, the FDA oversees food security and emergency preparedness, improved income growth, increased competitiveness and enhanced integration into domestic and international markets, sustainable land and environmental management, science and technology in food and agriculture development, and improved institutional coordination.

The Ghana Standards Authority [GSA] is a government agency that develops, publishes, and promotes national standards. The GSA fulfils these responsibilities through standardisation, metrology, and conformity assessment, including testing, inspection, and certification (Ghana Standards Authority Act, 1973). These activities ensure that the products and goods manufactured in Ghana are safe, credible, and of high quality, whether for domestic consumption or export. These activities increase market and firm transparency.

The Ministry of Food and Agriculture [MoFA] also serves as the Ghanaian government's lead agency and focal point, developing and implementing agricultural policies and strategies for coordinated national socio-economic growth and development plan. The Ministry's plans and programmes are developed, coordinated, and implemented using sector-wide

policy and strategy frameworks. MOFA facilitated the development of the Food and Agriculture Sector Development Policy II (FASDEP II) and the Medium-Term Agriculture Sector Investment Plan (METASIP 2010-15).

The Environmental Protection Agency was established formally in 1994 (Act 490) to ensure the environmentally sound and efficient use of renewable and non-renewable resources in national development. Similarly, the Ghana Labour Act, 2003 and the Factories, Offices, and Shops (Amendment) Act are the two primary acts that contain provisions governing occupational safety and hazards in Ghana. These laws address critical aspects of supply chain transparency, such as fair wages and working conditions, discussed in this study.

Additionally, Ghana Export Promotions and the Ministry of Trade and Industry are responsible for developing, facilitating, and promoting Ghanaian exports and ensuring efficient and effective trade practices among the Ghanaian populace. Similarly, the Ghana Revenue Authority and the Registrar General's Department regulate tax registration and compliance, business entity registration, and business entities' equitable and fair conduct, respectively. Finally, the 1992 Constitution of the Republic of Ghana is the country's supreme law and cannot be disregarded in this discussion. The constitution is the reference point for all laws, rules, regulations, decrees and traditions.

However, consumer preferences and behaviour also form part of institutions and shape the conduct of firms in any society. Aside from these, there are other international codes of conduct, such as the International Organization for Standardization (ISO).

Empirical Review

An empirical literature review concentrates on previous research results or findings that the researcher wants to study, compare, and cite to construct reliability, validity, correlations, and strength of the relationship between past study's constructs and the current one. An empirical literature review provides details of previous empirical studies (not theoretical analysis) conducted on the topic or concepts under investigation by other researchers and the findings. Here, the key issues are the problems focused upon, the methodology employed, and the key findings and conclusions. This section examines empirical works on supply chain transparency, institutional quality, and firm performance.

Supply chain transparency and firm performance

From the system theory and the information theory perspective, supply chain transparency will lead to higher performance of firms in the supply chain. This theoretical position motivated studies to reaffirm the theoretical stand.

Buell and Kalkanci (2021) examined 'how transparency into internal and external responsibility initiatives influences consumer choice.' The study used two field studies on manufacturers and retailers in the apparel and consumer packaged goods industries. They used a qualitative approach and experimental design. The results show that transparency into internal and external responsibility initiatives tends to dominate generic brand marketing in motivating consumer purchases. This supports the view that consumers consider companies' transparency efforts in their buying decision-making. This study did not look at the sustainability and financial dimensions of

performance. It limited its focus to customer purchases. Moreover, transparency was narrowly defined and conceptualised.

According to Kumar and Ganguly (2020), information transparency and supply chain coordination are essential factors in business-to-business (B2B) electronic procurement (e-procurement) external diffusion. The study polled 167 buyers from India's B2B e-procurement platform. The study tested multiple mediators using phantom models. With the external diffusion of e-procurement, the study's findings highlight the importance of information transparency and supply chain coordination. Moreover, the results show that information transparency improves supply chain coordination and thus firm performance.

This study, however, cannot be generalised because it failed to capture the net and direct effect of transparency on performance by examining absorptive capacities such as institutional quality. Also, the study narrowly defined transparency, using only information dissemination. Furthermore, the paper focused solely on financial performance, which is not a direct outcome of transparency initiatives in theory. Finally, the study also failed to control alternative explanatory variables responsible for the changes in the dependent variable.

Similarly, Mohan, Buell and John (2020) studied 'lifting the veil: the benefits of cost transparency.' The study primarily examines 'what happens when firms voluntarily disclose their variable costs explicitly and directly to customers.' The study used an experimental design. Participants interacted with a simulated fashion retailer website selling t-shirts in six experiments. The study demonstrates that disclosing the variable costs involved

in manufacturing a product increased consumers' attraction to the firm, increasing purchase interest. Additionally, cost transparency increased purchase interest more than operational or margin transparency. The effect persisted even when consumers despised variable costs, such as transportation costs, which were relatively high compared to costs that consumers find more palatable, such as those associated with raw materials.

Ahmed and Omar (2019) also assessed the drivers of supply chain transparency and its effects on the automotive industry's performance measures, focusing on developing countries. The study collected primary data via a questionnaire using a survey approach. The study surveyed 440 supply chain professionals working for automotive companies in Pakistan and received 218 valid responses, representing a response rate of 49.5 per cent. The research model was empirically validated using partial least squares structural equation modelling (PLS-SEM) via SmartPLS3.4.2, which identified the factors affecting supply chain transparency and their impact on four performance indicators (operations, supplier, relationship, and technical performance).

The findings indicate that supply chain transparency has a significant positive effect on the assessed dimensions of supply chain performance. Supply chain transparency has a significant impact on operational and relationship performance. Additionally, the study revealed that disintermediation, formulation, supply chain coordination, supplier integration, and trust significantly improved supply chain transparency. The study's significant limitation is that it could not control for alternative explanations for the dependent variable. Additionally, it could not use an

interactive term to capture the net effect of supply chain transparency on performance metrics.

Kraft, Valdés and Zheng (2018) also examined supply chain visibility and social responsibility by investigating consumers' behaviours and motives. The study used a qualitative approach and an experimental research design. According to the findings, consumers value increased transparency regarding a company's social responsibility practices in the upstream supply chain. This is especially true if consumers have a self-serving bias and use uncertainty to avoid paying for social responsibility. Additionally, the study discovered that highly prosocial consumers do not exhibit a high level of indirect reciprocity. While the findings of this study are significant, they are limited because they examined only one aspect of transparency (visibility); thus, they cannot be generalized to supply chain transparency.

Craig, Lim, Reczek and Tang (2017) conducted laboratory surveys in China, Europe, and the United States to examine customers' intention to purchase. They examine the situation in which product quality is high but social responsibility is low and the situation in which the scenario is reversed. They discover that, on average, female customers are willing to pay more for products manufactured by companies perceived to have a higher level of social responsibility. However, laboratory experiments determined consumer intent, not through actual purchases. Customers' intent to purchase may not accurately predict subsequent purchasing behaviour (Chandon et al., 2005). As a result, field studies are necessary to ascertain actual consumer purchasing behaviour rather than intent (Gupta & Zeithaml, 2006).

Similarly, Buell, Kim and Tsay (2017) conducted laboratory experiments in food service settings to find the value of reciprocal operational transparency. The study revealed that the introduction of reciprocal operational transparency contributed to a 22.2% increase in customer-reported quality and reduced throughput times by 19.2%. The result further indicated that customers who observed employees performing labour demonstrated a greater perception of effort, a greater appreciation for that effort, and a higher value for the service.

Reciprocally, employees who also observed the customers felt their work was more appreciated and meaningful, which resulted in increased job satisfaction and willingness to exert effort. Additionally, it demonstrated that transparency, which involves visually revealing operating processes to consumers and beneficiaries to producers, creates a positive feedback loop in which both parties benefit. This finding is consistent with the international success of Ding Tai Fung, a renowned Chinese restaurant where patrons can observe the process of making dumplings through a glass-enclosed kitchen (Hwarng & Yuan 2016).

Kalkanci, Ang and Plambeck (2016) examined the strategic disclosure of social and environmental impacts in a supply chain using an experimental approach. The researchers designed two consumer choice experiments to ascertain consumer reaction to disclosures based on their modelling assumptions. The experiments were conducted online, with participants drawn from a national sample administered by Survey Sampling International in the United States. Each participant viewed images, prices, and technical specifications for a laptop manufactured by HP (Firm 1) and a comparable

laptop manufactured by Dell (Firm 2). Participants were presented with various scenarios regarding firms' environmental and social disclosures. The results indicate that while voluntary disclosure of these impacts can increase a firm's market share, mandatory disclosure reduces a firm's expected market share gains from learning about and disclosing these impacts. However, this study has some limitations, most notably assessing only disclosures, which is just a component of supply chain transparency.

Also, Egels-Zandén, Hulthén and Wulff (2015) explored the trade-offs in supply chain transparency using Nudie Jeans Co's case. The study used the qualitative approach and a case study design. The study, among other things, concluded that the Nudie case indicates that some aspects of transparency lead to counterproductive impacts. This mixed finding raises many questions, such as using a multi-company approach to compare the results or views, more objective measures of the variables, and so on. This study's result is basically limited on the grounds of representation and industry.

More closely, Bastain and Zantes (2013) examined supply chain transparency as a key prerequisite for sustainable agri-food supply chain management. In an empirical sample of 131 supply chains with lead firms in German-speaking countries, the study used partial least squares regression to analyse the data obtained from the procurement departments. The study discovered that supply chain transparency significantly impacts four key performance dimensions: social, ecological, operational, and long-term relationship success. Thus, supply chain transparency has demonstrated to be a necessary condition or a fundamental indicator of good management in sustainable supply chain management of agri-food supply chains.

Though this study passed most of the validity and generalisability tests, it fails to clarify the unit of analysis. It appears the study used macro-level analysis (country level) as its unit of analysis. This scope looks broad, especially as more industry-specific factors are primarily responsible for firm performance than general country characteristics. For instance, the study controlled for the country-level element (developed or developing). However, some industries in developing countries have more favourable terms of operation and may perform better than those in developed countries. Economic conditions differ widely among countries irrespective of the fact that they speak the same language. These limitations are reflected in operational performance results, making it the lowest affected by supply chain transparency.

In Ghana, Ameyaw, Mensah and Osei-Tutu (2012) studied improving transparency in public procurement in Ghana. The study examines procurement professionals' perceptions of corruption in the procurement process, focusing on practising quantity surveyors, and identifies which stages are particularly prone to corruption. The study employed a survey research design and selected 34 respondents using a purposive sampling technique. The data were analyzed using descriptive statistics, a relative importance index, and a one-sample t-test.

The study confirmed widespread perceptions of corruption in Ghana's public procurement system. It also revealed that Ghana's public procurement law is contributing significantly to the fight against corruption. Additionally, the study discovered that corruption is more prevalent during the procurement process's tender evaluation stage. However, the study did not comment on

transparency, as the study's title suggested. The concept of transparency using corruption and delays in the procurement processes was not adequately coined. Also, using a sample size of 34 in a quantitative study defeated the study's generalisability.

Generally, it can be observed from the empirical works discussed above that each study has some level of variations methodologically, conceptually, and geographically. There exist different contexts and other characteristics; environmental, managerial, economic, and socio-cultural, among others, between firms, industries, and even nations; hence, these findings cannot be relied upon for decision-making regarding all firms and economies. Moreover, none of the studies employed absorptive capacities such as institutional quality to capture the net effect of supply chain transparency on firm performance. To the researcher's knowledge, no study has looked at supply chain transparency and firm performance in Ghana on geographical and industry terms at the time of conducting this study.

Institutional quality and firm performance

Although the role of institutions, defined as 'the rules of the game in a society,' on economic performance and growth has long been acknowledged, empirical studies that examine the firm performance and institutional quality nexus have lagged and are limited in the supply chain management field and the behavioural science because of data deficiencies. This section examines some empirical works on the institutional quality-firm performance nexus.

Ahmed, Najmi and Khan (2019) examined the impact of institutional pressures and green supply chain management practices on firm performance. The study sampled 101 supply chain management professionals and managers

from ISO 14001-certified firms in supply chain management and operations. The study used both a quantitative approach and a descriptive research design. Questionnaires were used to collect data and analysed using structural equation modelling. The result indicated that institutional pressure has a relatively insignificant negative effect on economic performance, whereas all other constructs contribute significantly to environmental performance improvement.

Even though the study is grounded theoretically, the conceptualisation of the term "institutional pressure" was quite problematic. The study failed to define institutional pressure properly and differentiate it from the roles of the institutions. Also, the study pools its data from an industry with sub-specialised activities subjected to varying institutional environments, among others. Unfortunately, these drawbacks were not provided for in the study.

Bhaumik, Dimova, Kumbhakar and Sun (2018) analysed the impact of institutions on firm performance. The study compiles data from a cross-section survey of 1625 firms in nine developing countries. The result demonstrates significant intra- and intercountry variation in the impact of institutions on firm performance as measured by productivity. Additionally, the relative effect on performance and factor inputs varies by country, implying that imposing the same institution in different countries can have a markedly different effect on labour's share of output and income distribution.

SN and Sen (2017) analysed whether institutional quality matters for firm performance in India. The data were collected via stratified random sampling with replacements from 9281 business owners and top managers in face-to-face interviews and questionnaires. Institutional variables' effect on

firms' performance was determined using regression analysis while accounting for the influence of firm, industry, and worker characteristics. The findings indicate that bureaucratic corruption negatively affects firm productivity, whereas other institutional variables appear to have less effect on firm performance.

Lafontaine, Perrigot and Wilson (2017) assessed how the quality of the institutional environment affects the cost of using equity-based organizational forms. The study sampled 712 hotels from 64 countries on six continents. The data were analyzed using a multinomial logit (MNL) model, which revealed that regulatory concerns and institutional quality affect the behaviour of service sector firms.

Similarly, Vanacker, Zahra and Holmes (2020) analysed the effect of corporate entrepreneurship and institutions on firm financial performance. The study surveyed 10,063 businesses in 31 countries. The study employed a quantitative approach and relied on secondary data. While internal corporate entrepreneurship correlates positively with firm performance in countries with less stringent intellectual property protection and less stringent employee protection, external corporate entrepreneurship negatively correlated with firm performance in countries with less stringent corporate entrepreneurship protection and more stringent employee protection.

In Ghana, though few studies, such as ITC (2016), Nuertey (2015) and Ameyaw et al. (2012), identified institutional quality as a challenge facing firm performance and the implementation of the public procurement law 2003 (Act 663), they did not empirically or objectively examine the effect of institutional quality on firm performance. However, Nyamah et al. (2017), in

assessing the empirical impact of risk on agri-food supply chain performance, examined the effect of policy/regulations and political-related issues on the performance of the agri-food supply chain in Ghana. They concluded that policy/regulations and political-related issues (institutional issues) insignificantly affect the agri-food supply chain's performance in Ghana.

It must be acknowledged that Nyamah et al. focused on understanding the relationship between the major risk sources and measuring the risk/disruption impact on agri-food supply chain performance in Ghana. Thus, the institutional issues were conceptualised as a source of risk. This could be responsible for the insignificant effect of the institutions on the agri-food supply chain performance. No other study has looked at institutional quality and firm performance in Ghana on geographical and industry terms to the research's knowledge.

Institutional quality and supply chain transparency

Villena and Dhanorkar (2020) argued that suppliers without climate change incentives are more vulnerable to coercive and mimetic pressures, whereas those with climate change incentives are more receptive to normative pressure regarding how much carbon transparency they exhibit. They examined how institutional pressures and managerial incentives influence carbon transparency in global supply chains. The study indicated that the availability of climate change boosts firms' vulnerability to institutional pressure while an improved regulatory quality facilitates increment in levels of transparency. This means that the extent to which supply chain transparency limits incumbents' opposition will depend on institutional quality structures

that are put in place to ensure healthy competition among firms. Thus, the effectiveness of supply chain transparency will depend on institutional quality.

Also, Ahmed and Omar (2019), Bastain and Zantes (2013), Heras-Saizarbitoria and Boiral (2012), Trienekens et al. (2012), and Prajogo, Huo and Han (2012) have all argued that transparency can be improved in the supply chain with the proper implementation of standards and availability of quality institutions which increases the common understanding of how business is expected to be managed. Greer and Purvis (2016) added that various acts, legislation, and standards had been developed to improve the transparency in the supply chain to keep the supply chain members from deviating from their actual operational objectives.

Supply chain transparency, institutional quality and firm performance

Limited empirical works support the stance that strong institutional quality and supply chain transparency are necessary to attain high levels of firm performance. Supply chain transparency alone may not lead to the desired levels of firm performance unless there is a strong institutional quality (SN & Sen, 2017). This could explain the mixed findings on the relationship between supply chain transparency and firm performance.

Božić (2017) argued that socially responsible national legal regimes and the diffusion of technological innovations are necessary to increase social transparency in global supply chains. Božić evaluated social transparency in global apparel supply chains using Haute Couture as a case study. The study used an adaptive survey to assess external and internal transparency and the influence of legal and political complexity and supply chain communication on supply chain transparency. The quantitative analysis demonstrates that

external transparency increases with brand size due to supply chain transparency legislation. Additionally, the qualitative analysis indicates that information asymmetry and the absence of standardized auditing systems negatively affect external and internal transparency.

In Ghana, ITC (2016), Nuertey (2015), and Ameyaw et al. (2012) argued that the extent to which firms will comply with regulations and ensure transparency to promote their performance depends on the quality of the institutions. However, they did not empirically examine their propositions about the roles of institutional quality and supply chain transparency on firm performance.

Gaps in the Extant Literature

The theoretical, conceptual, and empirical review generally indicates supply chain transparency and institutional quality are necessary for firm performance. However, these relationships have not been empirically examined considering the geographical and industrial factors in the current study setting.

The literature review explains that institutional quality moderates the relationship between supply chain transparency and firm performance. This is because the extent to which supply chain transparency generates maximum benefits depends on the institutional quality of the firms' environment in the supply chain (Ahmed & Omar, 2019). Furthermore, there is little indication that supply chain transparency will enhance firm performance if measures are not put in place to improve the state of institutional quality (Villena & Dhanorkar, 2020; Ahmed & Omar, 2019; Greer & Purvis, 2016; Bastain &

Zantes, 2013; Heras-Saizarbitoria & Boiral 2012; Trienekens et al., 2012; Prajogo, Huo & Han, 2012; Ameyaw et al., 2012).

The studies by Ahmed and Omar (2019) and Bastain and Zantes (2013) come close to this current study. However, no interaction terms of institutional quality were included in the estimated models. Also, they were conducted in different economies with different institutional environments. Furthermore, the current study controls for other variables that were not employed in the earlier studies. Finally, this study uses a broad measure to capture institutional quality at the firm level. Moreover, even though the supply chain transparency practices have long been identified in the existing literature, their perceived importance to firms or their degree of concordance in this study`s setting remains missing in the available literature.

Conceptual Framework

The study's conceptual framework is designed based on the ideas obtained from the arguments of the system theory, the information theory, the institutional theory, and the findings of various empirical studies relevant to this study. The conceptual framework's need arises because the variables measuring the specific objectives are not flowing directly from the research theories. Hence the study reviewed concepts and used them as proxies to measure the variables in the objectives. The framework contains three main variables: supply chain transparency, institutional quality and firm performance, and control variables, as shown in Figure 1. The main variables are measured by various dimensions in the rectangular boxes.

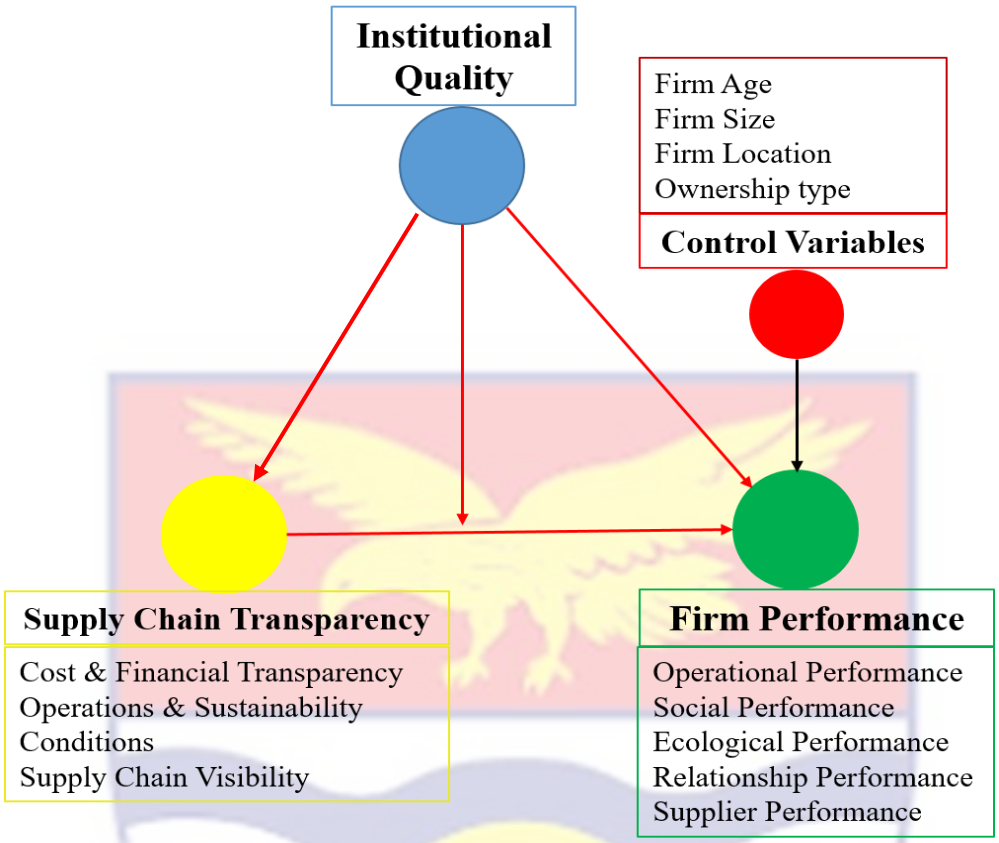

Figure 1: Conceptual Framework of the study

Source: Author's Construct, Attatsi (2021)

The dependent variable (firm performance) was proxied with five dimensions; operational performance, social performance, ecological performance, relationship performance, and supplier performance. Supply chain transparency has been proxied by cost and financial transparency, operations and sustainability conditions and supply chain visibility. Only the institutional quality was measured directly using indicators, as contained in the questionnaire of this study. However, for simplicity of the framework, the control variables have been put into the box under the heading "control variables," but that does not represent dimensions. Each of the controls has been treated separately as a variable.

Chapter Summary

This chapter began by introducing the theories adapted and used in the study. It then presented the conceptual views of relevant concepts used in this study and explained the independent variables' effect on the dependent variable. Of course, the literature suggests that there are numerous studies on supply chain transparency and firm performance, but little literature (if not none at all) exists on how institutional quality moderates the relationship between supply chain transparency and firm performance.

To fill this gap in the literature, this study examines the supply chain transparency practices of the agri-food processing firms in Ghana, assesses the relationship between supply chain transparency, institutional quality, and firm performance, and finally, examines the moderating effect of institutional quality on the relationship between supply chain transparency and firm performance. Eventually, the chapter developed a conceptual framework based on the concepts reviewed and proxied to measure the variables in this study's objectives and provided the empirical justification for the study.

CHAPTER THREE

RESEARCH METHODS

Introduction

Several extant literature hinted that supply chain transparency could set the stage for healthy competition, sustainable performance, product and service quality, customer loyalty, and global brand recognition. In Ghana, several empirical works, including those of Adesanyo et al. (2020); GSS (2019); MoTI (2017); and ITC (2016), have all cited improved transparency and institutional quality to be the solution to the challenges facing the manufacturing subsector in Ghana. However, no study has since examined the firms' transparency practices, the effect of transparency on their performance, and how the institutional quality can moderate transparency's effect on their performance. Therefore, the study examined the effect of supply chain transparency on agrifood processing firms' performance and how institutional quality influences the effect of supply chain transparency on firm performance.

This chapter discussed the various scientific procedures employed to achieve the objectives of this study. Specifically, this chapter presents a detailed discussion on the paradigm, design, approach, sources and measurement of variables, justifications, the instruments' validity, and data processing and analysis methods".

Research Paradigm

As Kuhn (1970) explains, a research paradigm refers to the set of common beliefs and agreements shared between scientists about how

problems should be understood and addressed. Hallebone and Priest (2008) opined that a research paradigm reflects scientific research philosophy and the most appropriate scientific approach to the research task's phenomenon, context, and focus. This study is in line with the positivists` research paradigm. Saunders et al. (2012) averred that the positivist approach to scientific research involves researching an observable social reality and making law-like generalizations like physical and natural scientists. In the positivist view, observable social reality implies that it can be measured and quantified into variables. Hence, the positivism paradigm of research involves collecting data on the variables, analysing data using statistical tests of significance, and testing hypotheses to make generalizations.

According to Hallebone and Priest (2008), the positivists' approach to research produces generalisable findings that are usually reported quantitatively and possibly make predictions about general phenomena. Johnson, Onwuegbuzie and Turner (2007) also noted that it gives room to generalize research findings when replicated on different populations and subpopulations. Cohen, Manion and Morrison (2007) explain that positivists use parsimony precision to study many people or variables, saving time simultaneously. The use of quantitative data also paves a way to further scientific research by providing fair information accessible to researchers and aiding them in making scientific assumptions (Johnson, 2014). The use of mathematics to represent and analyse features of social reality is consistent with the positivist epistemology, and a particular feature can be isolated and conceptualized as a variable.

Furthermore, the positivists' approach is known for its reliability advantage. Reliability maintains consistency, dependence, and replicability in data collection. Cohen et al. (2007) noted that a reliable instrument for a piece of research would yield similar data from similar respondents over time, assuring validity. Validity is a pervasive area in positivism; the methods' vigilant use retains it. Consequently, careful selection of samples using the appropriate techniques, appropriate instrumentation, and statistical data treatments improves the validity (Cohen et al., 2007).

This study employed the positivists' research paradigm because this study involved collecting data on supply chain transparency, institutional quality, and firm performance, and analysis of the data to establish relationships by using the statistical test of significance, and finally rejecting or failing to reject hypotheses to prove whether institutions quality play a role in the relationship between supply chain transparency and firm performance in Ghana.

Research Design

Research designs represent the types of inquiry within qualitative, quantitative, and mixed methods that provide specific direction for research design procedures (Creswell, 2014). According to Denzin and Lincoln (2011), research design defines inquiry strategies. A research design represents the major methodological thrust of the study (Cormack, 1996). The research questions, the aim, and the study's objectives thus influence the selection of the research design (Brink, 1999). As noted in Burns and Grove (2001), the purpose of the research design is to achieve greater control of the study and

improve the study's validity by examining the research problem. In deciding which research design to use, the researcher must consider several factors, including the research's focus, the unit of analysis, and the time dimension (Bless & Higson-Smith, 1995).

Saunders et al. (2012) describe three research designs: exploratory, descriptive, and explanatory. This study used the explanatory research design. Explanatory research is empirical research that aims to establish causal relationships between variables and explain the current state of a phenomenon (Saunders et al., 2012). The explanatory research design places a greater emphasis on examining a situation to understand the relationships between variables. The study employed an explanatory research design to shed light on the relationship between supply chain transparency, institutional quality, and the performance of agri-food processing firms in Ghana.

Research Approach

The research approach illustrates the objectives and procedures and ranges from broad hypotheses to detailed data collection, analysis, and interpretation (Crotty, 1998). According to Cresswell (2007), effectively highlighting the research approach increases the validity of social research. Thus, Creswell (2014) identified three primary research approaches: quantitative, qualitative, and mixed. According to Saunders et al. (2012), the positivist paradigm employs a quantitative research approach; consequently, this study used a quantitative research approach. Creswell (2014) posited that quantitative research examines relationships between variables to test

objective theories. These variables can then be measured using instruments to analyze numbered (quantitative) data using statistical procedures.

According to Crotty (1998; 2020) and Creswell (2014), quantitative researchers usually deduce assumptions (hypotheses), derive models based on the set of assumptions, build in protections against bias, control for alternative explanations, and finally generalize and replicate findings. That is, quantitative researchers seek to find causal explanations that are useful for predictions. The quantitative approach was suitable for this study because it derived hypotheses from theories and built models around them. The study also controlled for bias in the model and included other variables to control alternative explanations for firm performance. Because the quantitative approach to research uses statistical analysis, the study analyzed the data using descriptive and inferential statistics.

Study Area

The study was conducted in Ghana. Ghana is a country along the Gulf of Guinea and the Atlantic Ocean in West Africa's subregion. Spanning a land mass of 238,535 km2 (92,099 sq. ml), Ghana borders the Ivory Coast in the west, Burkina Faso in the north, Togo in the east, the Gulf of Guinea, and the Atlantic Ocean in the south. Ghana is an average natural resource-rich country with agricultural produce, industrial minerals, hydrocarbons, and precious metals. It is an emerging designated digital economy with mixed economy hybridisation and an emerging market with 8.7% GDP growth in 2012. Ghana is classified as a middle-income country. Ghana has three major sectors of the economy; agriculture, industry, and service. Despite the average natural

resource enriched status, the economy's services sector remains the highest contributor to GDP due to high import activities.

According to GSS (2020), Services remain the largest sector. Its share of GDP increased from 46.3 per cent in 2018 to 47.2 per cent in 2019. The sector's GDP growth rate increased from 2.7 per cent in 2018 to 7.6 per cent in 2019 and contributed 2.8 percentage points (43.4%) to the 2019 annual growth rate of 6.5%. The industry sector contributed 2.4 percentage points (37.5%) to the 2019 annual GDP growth rate, though its share of GDP at basic prices increased by 0.2%, from 34.0% in 2018 to 34.2% in 2019. The main driver of 2019 GDP growth was the Mining and Quarrying subsector, with a growth rate of 12.6% and a contribution to the growth of 2.0 percentage points (31.2%).

The agriculture sector grew by 4.6 per cent in 2019 compared to a growth rate of 4.8 per cent in 2018. However, its share of GDP declined from 19.7 per cent in 2018 to 18.5 per cent in 2019. Crops are the third-largest activity in Ghana, with a share of 13.8 per cent of GDP and contributed 0.7 per cent to 2019 annual GDP growth. The integrated business establishment survey by the GSS (2018) noted that the declining contribution of the agriculture and the industrial sector resulted from the declining performance of the manufacturing subsector. The GSS (2018) cited funding, administrative bottlenecks, institutional quality, and transparency as significant forces behind the industry's declining performance. According to Transparency International's Corruption Perception Index of 2018, Ghana was ranked 78th out of 180 countries, with a score of 41 on a scale where a 0–9 score means

highly corrupt, and a 90–100 score means very clean. This was based on perceived levels of public sector corruption.

Overview of the agri-food supply chain in Ghana

Ghana sits in the agro-ecological zone of Sub-Saharan Africa geographically, making agriculture the country's most dominant and ancient economic activity. However, due to perishability and market access challenges, processing of the agricultural products has become very significant to the country's growth, development and sustainability. Historically, processing agricultural products and perishable commodities into food (food Industry) and other products are ancient. The origin of the agri-food industry dates back to the Neolithic agriculture and settlement, which includes manufacturing flour and meal from cereal, distillation, drying and smoking of meat and fish, cheese making, and fermentation to make beverages.

The availability of other support services such as finance, logistics, and technical expertise backed the prosperity of the country's agri-food value chain to grow beyond the country's borders for substantial economic gains such as the creation of sustainable jobs, growth of GDP, and elimination of poverty (ITC, 2021; GEPA, 2020; MoTI, 2018). These speculated prospects of the agri-food industry attracted several companies, including Blue Skies, Casa De Ropa, Tonggu Fruits, Ekumfi Fresh, Unilever Ghana, FanMilk Ghana, and other small-scale entrepreneurs and traders, that process the agricultural food products for both the international and the local market daily.

According to Allen, Heinrigs and Heo (2018), Allen, Maestre and Gelli (2019), GSS (2018) and ITC (2021), approximately 60% of the total jobs are in the food economy (about 40% is in agriculture and 20% in food

processing, food marketing and food stalls and restaurants) in Ghana. The share of food processing in the total manufacturing jobs in Ghana is approximately 40% (Department of International Development [DFID], 2018). The DFID (2018) contended that urbanisation and Ghana's closeness to large economies such as Nigeria are responsible for the brightest prospect of the agri-food industry in Ghana since the urban population depends on purchased food and changes diets with high demand for processed food.

Ghana's agri-food supply chain comprises input suppliers, producers, wholesalers, processors, distributors and retailers, exporters and importers (Nyamah et al., 2017). These actors come together to undertake daily operational synchronisation, ensuring they collectively deliver the best value at each value point (node). The supply chain synchronisation begins when the input suppliers provide the inputs to the producers. However, most of these inputs are not manufactured locally but imported (DFID, 2018). The government and players primarily sell the inputs to the producers at subsidised prices or as trade credits (Nyamah et al., 2017).

Usually, the producers convert the inputs into outputs or produce and sell to the wholesalers, who sell to the processors, exporters and retailers. However, the changing business model has seen processors buying directly from the producers. Some processors even go the extra mile to partner with producers to invest in the production process and monitor it for economical and quality reasons. Figure 2 presents the agri-food supply chain in Ghana. The designed arrows in Figure 2 depict the supply chain's primary flows, while the dotted arrows represent the current and emerging business models.

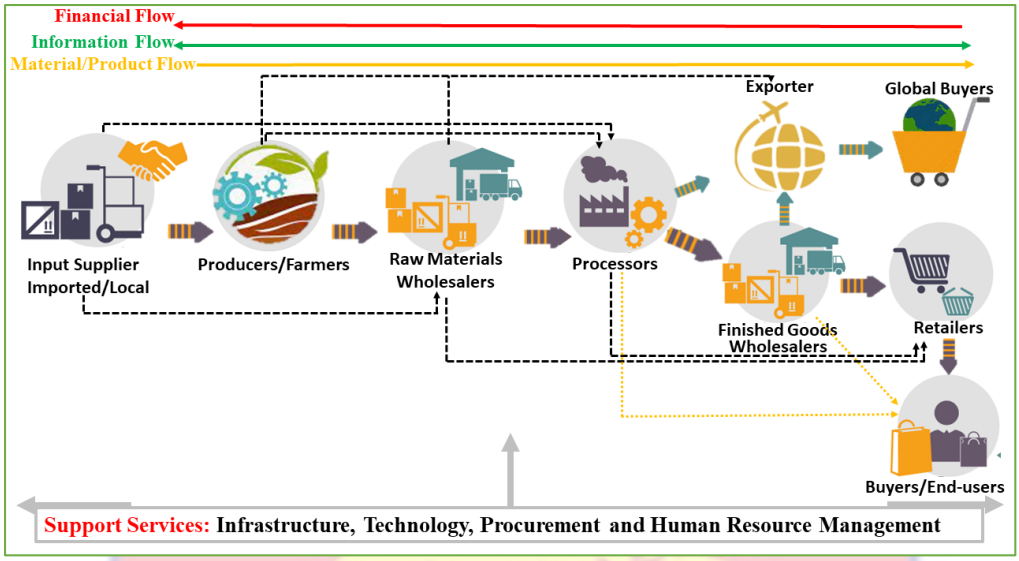

Figure 2: Schematic Representation of Agri-food Supply Chain in Ghana
Source: Author's Construct, Attatsi (2021)

Study Population

According to Issahaku, Ustarz, and Domanban (2013), the study population is the sum of all members, elements, or cases a researcher wishes to conclude. Borg and Gall (1989) also averred that it refers to all members of a real or hypothetical set of people, events, or objects that a researcher wishes to generalize the study results. Consequently, Orodho (2008) noted that specifying the population targeted for the study is crucial as it helps researchers decide on sampling and resources to use.

The population of this study is agrifood processing firms in Ghana. The agrifood processing or manufacturing firms are a component of the manufacturing subsector of Ghana's industrial sector. According to the GSS (2020), food processing or manufacturing is the major contributor among 23 activities under the manufacturing subsector. The GSS (2018) provides the distribution of the Manufacturing subsector's trading accounts, covering the subsector's twenty-three activities. It shows that the revenue from the

Manufacture of food products (GH¢12.3 billion), the largest contributor to the subsector's total revenue, was almost four times that of the second-largest contributor, the Manufacture of basic metals (GH¢3.8 billion). This is closely followed by the Manufacture of beverages (GH₵ 3.6 billion). The Manufacture of other transport equipment (GH₵8.2 million) generated the least revenue within the subsector.

According to the Ghana Enterprise Survey by the GSS (2015), GSS (2018), there are 17,471 firms classified in the Manufacture of food products under the Manufacturing subsector in Ghana. These firms employ 58,110 persons (21.4%) of total employment by the subsector, and these earned GH¢235.8 million (19.8 %) of wages and salaries paid in cash and in-kind, making it the highest in the subsector. This study is firm-level research and considers the population is 17471 firms. The study used only the agri-food processing/manufacturing firm to avoid sampling and weighing bias. Also, the agri-food processing firms have a standardised institutional environment, which is essential for this study since it assesses institutional quality.

Sample and Sampling Procedure

According to Cohen, Manion and Morrison (2011), it is impractical to investigate all members of a target population, especially in cases where the target population is extremely large; hence drawing a sample from this population of interest is the most appropriate. However, the study results can serve as a basis for inferences about the entire population if it genuinely represents the population (Cohen et al., 2011). White (2015) defines a sample as a portion of the population of interest selected to partake in the study. That

is, a sample is a subset of a population. The sample has properties that represent the whole population.

In this study, the sample was selected in two stages. The first of which was the listing of all agri-food processing firms in Ghana. The second sampling stage involved using a simple random sampling technique to select the respondents. The number of respondents was estimated using the Yamane (1967) sample size determination formula given as:

$$n = \frac{N}{1 + N(e^2)}$$

Where n is the sample size, e = error level; thus, e = 1 – confidence level, and N is the target group's estimated total population. Assuming 0.95 confidence level, e = 0.05. Thus, a sample size of 391 was calculated based on a population frame of 17,471 firms, as discussed in the earlier section.

The study's sample size is in line with the propositions of Ary et al. (2010) and Cohen et al. (2014). Cohen et al. (2014) noted that the sample size does not necessarily need to be large, but how it represents the population matters most. Any statement about the sample should hold for the population (Mugenda & Mugenda, 2003). This emphasized respondents with relevant information or data about the phenomenon under study. Furthermore, Krejci and Morgan (2013) noted that a sample of approximately 400 respondents is enough to represent or a good representation for a population of 10,000 and above.

Data Collection Instrument

The study employed a questionnaire as the primary data collection tool. The use of questionnaires enabled the study to obtain more accurate

information for answering the research questions and deciding whether to reject or retain the research hypotheses. Osuala (2001) opined that questionnaires permit wider coverage for a minimum expense both in monetary terms and effort-wise. The researcher designed the questionnaire based on the research objectives and the insights from the theories and the literature in chapter two as a guiding light.

This study used a structured questionnaire as the respondents did not need extensive writing to bore them. The structured questionnaire makes the administration, coding, and analysis more manageable and less stressful. Additionally, it allowed for a much more rapid data collection from a relatively large literate population. It was cost-effective, simple to construct, consistent, and uniform to maintain the study's focus. The questionnaire also allows the respondents anonymity, making it easy to volunteer information without fear of victimisation (Kelly, 2016).

That notwithstanding, Best and Kahn (2012) cautioned that the questionnaire is restricted to a literate population and does not allow for additional data collection. However, in this study, all respondents to the questionnaire were literate and capable of reading and comprehending the questionnaire's items. Besides, where the respondents encountered challenges with some technical terms or words, the researcher used interviews to help the respondents do the right thing in answering the questions. Here, the researcher explains some of the terms that seem unfamiliar to the respondents to understand and enable them to select appropriate answers.

The questionnaire for this study used a five-point Likert scale to measure the scale items. The questions in the instrument (see Appendix)

contain a continuum of possible responses with five options. Each option has a numerical score that enables the data to be quantified and analysed per quantitative research requirements. The questionnaire is divided into five sections. Section A contains details on the background characteristics. Sections B, C, D, and E, cover supply chain transparency practices, supply chain transparency dimensions, institutional quality, and firm performance, respectively.

In principle, the data collection instrument's validity is a major concern in scientific social research. An instrument's validity refers to how accurately it collects the respondents' responses as intended by the research to tackle the study's specific objectives. Gravetter and Forzano (2010) noted that validity refers to the instrument's ability to accurately capture the data needed to answer the questions it was designed to answer. The validity of an instrument comes in two types: face and content. This study checked both face and content validity and reliability of the questionnaire. The researcher's peers, colleague students, and some known players or scholars in the procurement and supply chain fraternity checked the instrument's face validity. On the other hand, content validity was determined by the assigned supervisor's expert judgment and other procurement and supply chain management professionals.

The study modified and deleted materials deemed inaccurate or violating the respondents' confidentiality. The assigned supervisor and a few members of the procurement and supply chain management fraternity scrutinize ‘unclear, biased, and defective items’ further to determine whether they are members of the assigned subsets. Aside from these measures, the study employed confirmatory factor analysis to check the validity further.

Data Collection Procedures

Data for this study were collected via self-administered questionnaires and over the internet using a Google form questionnaire. With the self-administered approach, the researcher booked appointments with the firms by discussing the study's aims and objectives and their roles in making it successful. The researcher travelled to the firms per the appointments and delivered the printed questionnaires to the designated respondents. In some instances, the researcher waits behind for the completed questionnaire. Otherwise, the researcher leaves and returns for the completed questionnaire another day when they are ready. However, some firms scanned the completed copy and mailed it to the researcher.

The form's link was given to the respondents via electronic mail or WhatsApp regarding using the Google forms. The respondents use the link to access and complete the questionnaire online at their own convenient time. It took two months (9th July to 10th September 2021) for the respondents to complete the questionnaire. This method was the most suitable, time-effective, efficiency, and cost-effective.

Sources of Data

This study employed primary data. The primary data were collected through a field survey in the various agri-food processing firms. Furthermore, the primary data dealt with information collected directly from the designated respondents of the firms. The key representatives of the firms provide the data. These representatives include procurement/Supply chain officer/manager,

product/production manager, store manager, quality assurance manager, and any senior executive available.

Data Processing Tools

The study used Statistical Package for Social Sciences (SPSS), version 26, Microsoft Excel 365, and SmartPLS version 3.4.3 for the data processing. The selection and use of these data processing tools solely depend on their availability, appropriateness per statistical relevance and analysis, and the researcher's flexibility with them.

Data Analysis and Analytical Techniques

To begin with the analysis, the researcher audited the primary data gathered from the field to eliminate possible errors that respondents may have made. The study encoded the data to translate responses to questions into specific categories. The encoding helps to organize and reduce research data into manageable summaries. The data analysis was analysed using both descriptive and inferential statistics. The choice of a particular statistical technique was solely incumbent on the data and the specific objective the study wanted to achieve from that data set. The selection of a particular descriptive statistic relies on its suitability and validity per statistical relevance. Descriptive statistics used in this study were frequencies, percentages, mean and standard deviation.

The study employed inferential statistics such as the t-test, regression, and correlation to examine the relationship between the dependent and independent variables and estimate the independent variables' effect on the

dependent variables. Where applicable, the study presented the findings in tables and charts.

Specifically, the study used descriptive statistics such as frequency tables to present the issues relating to supply chain transparency practices as required in objective one of this study. The items identified as supply chain transparency practices were ranked using Kendall's coefficient of concordance (W). The degree of agreement in the rankings was measured. W ranges from 0 to 1. In deriving the coefficient of concordance (W), let 'T' represent the sum of ranks for each practice being ranked, where 'Var' denotes variance and 'n' indicates the number of practices. The variance obtained from the sum of ranks is given by:

$$Var_T = \frac{\sum T^2 - \frac{(\sum T)^2}{n}}{n} \quad \ldots\ldots(1)$$

The maximum variance of T is given by:

$$M^2 x \frac{(n^2-1)}{12} \quad \ldots\ldots(2)$$

where M is the number of respondents. The formula for Kendall's coefficient of concordance W is given by:

$$w = \frac{\sum T - \frac{(\sum T)^2}{n}}{m^2 x \frac{(n^2-1)}{12}} \quad \ldots\ldots(3)$$

Simplifying equation (3) will result in the computational formula for W as:

$$W = \frac{12\left[\sum T^2 - \frac{(\sum T)^2}{n}\right]}{mn^2(n^2-1)} \quad \ldots\ldots(4)$$

From a random utility theory perspective, respondents are assumed to optimise their utility for their represented firms. As such, the firms' supply

chain transparency practices can be explained by the respondents' responses. This was done using the SPSS.

Partial Least Squares Structural Equation Modelling (PLS-SEM) was applied through SmartPLS 3.3.3. This helps in assessing the cause and effect relationships between the independent variables on the dependent variables.

Control Variables

A control variable is a variable that influences the relationship between an independent variable and a dependent variable. It either undercast or overcast the total effect. Allison (1999) observed that determining how an effect on a dependent variable is associated with a particular independent variable occurs due to the relationship between that independent variable and other independent variables (control variables) is a fundamental problem in regression analysis. In this study, firm performance (dependent variable) is known in the existing literature to have several explanatory variables.

The empirical evidence from studies in Sub-Saharan Africa, and Ghana, to be precise, confirms that younger, smaller firms grow faster and perform better than older firms (McPherson 1996; Mead & Liedholm 1998; Nichter & Goldmark 2009; Andam & Asante 2018). Besides firm age and size, several other variables have been empirically proven to affect firms' growth and performance in developing countries. Nichter and Goldmark (2009) found a firm location, age, informality, and access to finance as determinants of performance. Most existing literature on Sub-Saharan Africa

shows these trends primarily consist of empirical evidence from Eastern and Southern Africa.

In West Africa, Sleuwaegen and Goedhuys (2002) confirmed this finding using data from Cote D'Ivoire. However, Teal (1999); Obeng, Robson, and Haugh (2014); Andam and Asante (2018) found larger firms in Ghana experience faster growth and better performance than smaller firms. This inconclusiveness in the extant literature made it a prerequisite to controlling these variables when dealing with firm performance in scientific research. As such, this study controlled for Firm size, Age, Location, and Ownership type.

Validity and Reliability

The study used the following analytical validity and reliability checks to ensure the robustness of the results. This study examined Common Method Bias (CMB) using the variance inflationary factor (VIF) in Partial Least Square-Structural Equation Modelling (PLS-SEM). Kock (2017) and Lowry and Gaskin (2014) noted that in PLS-SEM, a VIF greater than 3.3 indicates pathological collinearity and indicates that a common method bias may contaminate the model. Hence, in PLS-SEM, if all VIFs resulting from a full collinearity test are equal to or lower than 3.3, the model can be considered free of common method bias and contaminated if all VIFs are greater than 3.3.

Content Validity was examined through cross-loadings and is a depiction of Confirmatory Factor Analysis (CFA). The study also assessed convergent validity using the average variance extracted (AVE). The discriminant validity was examined using the Heterotrait-Monotrait ratio of correlations (HTMT). The model's predictive relevance was measured using

Goodness of Fit (GoF) in PLS-SEM, as Tenenhaus, Vinzi, Chatelin and Lauro (2005) and Ringle, Wende and Becker (2015) suggested.

Variable and Measurement

This study's variables were measured using entirely new constructs and developed by the researcher based on the concepts and theories reviewed. Others were adopted and modified from existing research works in the field. Aside from those variables presented in Table 1, other demographic variables are used in this study. These are the firm's age, location, size, and ownership type. Age has been found to have a relationship with firm performance; hence, firms of a higher age are more likely to invest and perform better (Andam & Asante, 2018). Therefore, this study hypothesized that a firm's age positively relates to its performance. This variable (AGE) is specified as the firm's age in years at the time of this study.

Firm size affects its performance. As the firm size increases, expenditure, monitoring, and relationship, among others, also increase. Higher relationships and transactions tend to expose the firm ability to disseminate information effectively and comply with rules and regulations. However, available literature holds that larger firms have more advantages in acquiring finances, a good labour force, and other assets that help increase their productivity. Therefore, firm size is expected to have a positive effect on performance. This variable firm size is specified as the firm's number of employees.

Also, a firm's location has also been proven to be a predictor of firm performance. The firm's location affects the ability to obtain resources,

marketing, tax, and financing implications. Location in this study is specified as rural and urban, based on settlement classifications. This variable is specified as a dummy variable that takes a value of 1 if the respondent is in an urban area and 0 if the respondent is located in a rural area.

Furthermore, it is believed that the ownership type of a firm can influence its performance. Ownership type is specified as a publicly owned company, privately-owned company, a partnership, and sole proprietorship. This variable is specified as a dummy variable. The details of the other variables and their measurement are presented in Table 1. Table 1 contains the variables, measurement, the instrument, and the empirical justification for the measurements and the variables.

Table 1: *Variables and their Measurement*

Variable	Measurement	Data source	Empirical Justification
Firm Performance	Social performance Relationship Performance Operational Performance Supplier Performance Ecological Performance	Questionnaire	Bastain and Zentes, (2013); Ahmed and Omar, (2017); Kraft, Valdés, and Zheng, (2018); and, Mohan, Buell, and John, (2019).
Institutional Quality	Constructs will be adopted and modified from SN and Sen (2017).	Questionnaire	SN and Sen, (2017).
Supply Chain Transparency	Cost and financial transparency Operation and sustainability conditions Supply chain visibility	Questionnaire	Bozic, (2017); and, Mohan, Buell, and John, (2019).

Source: Field Survey, Attatsi (2021)

Priori Expectations

Table 2 depicts the independent variables' expected signs or direction of effect based on the conceptual, theoretical and empirical literature examined in chapter 2.

Table 2: *A Priori Expected Signs of the Independent Variables*

	Signs/Relationships	
Variable	Model 1	Model 2
Supply Chain Transparency->Firm Performance	+	+
Institutional Quality->Firm Performance	+	+
Institutional Quality->Supply Chain Transparency	+	+
Supply Chain Transparency * Institutional Quality		+

Source: Field Survey, Attatsi (2021)

Table 2 shows that supply chain transparency will positively affect firm performance in models 1 and 2. In addition, institutional quality is also expected to positively influence firm performance and supply chain transparency in models 1 and 2. Finally, institutional quality will positively affect the relationship between supply chain transparency and firm performance in model 2. Models 1 and 3 represent hypotheses 2 to 5 as contained in chapter one.

Ethical Considerations

This research requires that ethical consideration plays a vital role in achieving the study's objectives. The issue of ethics is an important consideration in research that involves human subjects. It refers to the appropriate behaviour relative to society's norms (Best & Kahn, 2012). The researcher, research subjects, and clients were protected from any adverse consequences of the study by following laid down rules and procedures of ethics in research. The study considered ethical considerations such as the

right to privacy, voluntary participation, participant safety, anonymity and confidentiality, deception, scientific misconduct, and data management.

The researcher first submitted a copy of the proposal for this study and the self-designed instrument to the assigned supervisor for review to gather data from the sampled individuals. This was done to ensure that the research participants, the university community, and the country were protected. The researcher observed academic honesty, plagiarism and acknowledgement of copyrighted materials prescribed by the University of Cape Coast.

The respondents' consent was sought individually using the questionnaire (See Appendix). Respondents were informed of the research's purpose and objectives. The instructions and questions were made clear, and where necessary, clarifications were made. The privacy and consent of respondents were also negotiated and respected in the study. All these were done to ensure and secure the consent of the respondents.

The researcher administered the questionnaires after ensuring the respondents comprehended the content. As a result, respondents were fully informed before the research and treated fairly throughout. Respondents were encouraged to express themselves freely and objectively and exercise their right to choose whether or not to participate. Additionally, they could withdraw their consent at any time and without consequence. The respondents were assured that their data would be used exclusively for research purposes and not shared with third parties.

Data management

This research is a firm-level study involving agrifood processing firms across the country. Data collected during this thesis includes data gathered from the survey. This means the study potentially generates numeric and text-based data. These data were in Extensible Markup Language (.xml) and Comma Separated Values (.csv) for databases, spreadsheets, and printed copies of filled questionnaires. These file types are made non-proprietary, ensuring ease and reuse flexibility.

All variables used a conventional naming standard. File names were included in the modification name (in shortened form), a summary of the file's content, and the date last modified (in the YYYY/MM/DD). For example, SCTCoded_Data_ON_20210917. The document versions were named sequentially (with filenames ending in v1, v2, etc.). An example is the following: SCTCoded_Data_ON_20200917_v1. For data to be interoperable, the data were saved in non-proprietary software formats accessible to others (open file formats). Examples include XML and CSV for databases and spreadsheets and TXT for text. For data to be potentially reused, all data files included a description of the creator of the data (researcher), how the data were collected, the codebook used, issues affecting data quality (if any), and other pertinent background information which allows the content to be easily understood by others. All files containing spreadsheets included column names that are easily interpreted, even though they were defined in a codebook.

To ensure proper documentation, the researcher, in data analysis using software, create logs and syntax files to ensure that the steps leading to the results are documented and saved. No identifying information of

participants was included in the data files. Metadata also included the thesis topic, the principal investigator's name, and the supervisor's name. This study has anticipated storage space to be approximately 2GB. The data is stored for five years locally, with a permanent copy held in the University's research works depository.

This study used the 3-2-1 backup rule for data storage and backup. This means that the principal investigator created three copies of all data files, stored on two different types of media, with one copy kept in an off-site location such as a removable disk (USB), fixed (such as a hard drive on a laptop) and networked (such as cloud-based servers). The files, both sensitive and non-sensitive, were encrypted. However, this study does not involve any sensitive data. Thus, this study made the analysed data available once the thesis was complete.

Chapter Summary

The effect of supply chain transparency on agrifood processing firms' performance and the moderating role of institutional quality on the effect of supply chain transparency on firm performance requires some systematic procedures. This chapter examined the systematic procedures used to accomplish the study's objectives. It discussed the research paradigm, research design, the research approach, the study area, sample and sampling procedures, data collection instruments, data collection methods, data processing tools and analytical framework, variable description, measurement, and justification.

The study used the quantitative research approach and adopted the explanatory research design to explain the causal relationships among the variables. Because this study employed the quantitative approach, questionnaires were used to solicit primary data from the field. The data were entered into the Structural Equation Model (SEM) for analysis.

It is important to mention that the study employed a structured questionnaire, which does not give room for the respondents to give extra views on the topic. However, this does not adversely affect the study results because the items presented in the questionnaire were the results of an extensive literature review and expert judgments. Also, the questionnaire discriminates against the illiterate population. Again, this does not affect the work's quality because the data was obtained from a literate population.

It is essential to mention that the study used 391 out of the 17471 agrifood processing firms in Ghana.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

Supply chain transparency and institutional quality are gaining recognition in today`s interconnected global business landscape due to several factors ranging from consumer complexity to technological advancement and climate change. This study assesses the supply chain transparency and firm performance in Ghana, emphasising the role of institutional quality in the agri-food processing subsector. The results obtained from the empirical analysis are presented and discussed in this chapter. The study was guided by the positivists' research paradigm and employed the explanatory research design and the quantitative research approach. As the quantitative research approach demanded, the study used descriptive and inferential statistics to analyse the research objectives.

The chapter first presents descriptive statistics on the background characteristics constructs to explain the nature of the data used in this study, followed by data quality tests. The data quality tests helped check for multicollinearity issues and common method biases. The chapter then analysed and discussed the various models based on the study's objectives. The findings were discussed in light of the existing literature, concepts, and theories underpinning this study. Finally, the chapter presents a sensitivity analysis of the models.

It is prudent to report that responses gathered were less than the sample size calculated at the end of data collection. The calculated sample was 396, but this study obtained 377 (95%) responses and used 320 (81%) after screening the data for incompleteness. This is appropriate because Dillman (2011), Millar and Dillman (2011), Morton, Bandara, Robinson and Carr (2012), and Af Wåhlberg and Poom (2015) have all posited that a response rate of above 60 per cent for a mixed or general survey is appropriate for empirical analysis.

Descriptive Statistics

This section presents descriptive statistics of all the variables used in this study. Variables and constructs that can be measured using the same descriptive statistics were grouped in the same table but with different subheadings. The application of a particular descriptive statistic was solely based on its suitability and validity per statistical relevance. However, the groupings are to enhance the beauty of the presentation by reducing the number of tables. Table 3 presents the descriptive statistics on background characteristics in the research instrument. The respondents' background characteristics are presented in frequencies because they are categorical variables. Best and Kahn (2012) and Sekoenya (2019) argued that categorical data is best visualised in frequencies for descriptive statistics.

As shown in Table 3, the respondents' position in their firm is the first variable under the background characteristics. One hundred fifty-five owners/managers took part in the study, constituting 48.4% of the total number of respondents. This was followed by procurement/supply chain

officers/managers (58), quality assurance managers (48), product/production managers (30) and store managers (29), constituting 18.1%, 15%, 9.4%, and 9.1%, respectively.

Table 3: *Background Characteristics of Respondents*

Variables/Constructs	Frequency	Percent (%)
Respondent's Position		
Procurement/Supply Chain Officer/Manager	58	18.1
Product/Production Manager	30	9.4
Store Manager	29	9.1
Quality Assurance Manager	48	15.0
Owner/Manager	155	48.4
Total	**320**	**100.0**
Firm Size		
Micro Scale Enterprise (1-5 employees)	155	48.4
Small Scale Enterprise (6-30 employees)	68	21.3
Medium Scale Enterprise (31-100 employees)	69	21.6
Large Scale Enterprise (over 100 employees)	28	8.8
Total	**320**	**100.0**
Firm Age		
Less than 6 year	106	33.1
6 to 10 year	136	42.5
Over 10 years	78	24.4
Total	**320**	**100.0**
Firm location		
Urban	262	81.9
Rural	58	18.1
Total	**320**	**100.0**
Firm Ownership Type		
Private Company	117	36.6
Public Company	48	15.0
Partnership	18	5.6
Sole Proprietorship	137	42.8
Total	**320**	**100.0**
Undertaken Supply Chain Transparency		
Yes	320	100.0

Total	**320**	**100.0**

Source: Field Survey, Attatsi (2021)

The result indicated that most respondents (48%) were owners/managers, implying more micro-scale firms than other larger firms in Ghana. This is not surprising because the GSS obtained similar results in the Ghana Enterprise Survey in 2018. Traditionally, the top decision-makers of these firms are either the owner or the manager.

On the size of the firms, the results showed a somewhat predictable trend. Most of the respondents were Micro-Scale Enterprises 155, representing 48.4% of the total responses). The rest are Medium Scale Enterprises (69), Small Scale Enterprise (68) and Large-Scale Enterprises (28), representing 21.6%, 21.3% and 8.8%, respectively. This result confirms the earlier result on the position of respondents and the proposition that MSEs are more and always have their owners or managers as top decision-makers.

Also, Table 3 shows that most of the firms (136) that participated in the study were between six to ten years old, representing 42.5%, while 106 firms, representing 33.1%, were less than six years old at the time of this study. Lastly, 78 firms which accounted for 24.4%, were older than ten. This distribution shows that the participating firms have been in existence for some years and are familiar with the business landscape and the issues covered by this study.

Table 5 also indicated that 262 (81.9%) firms participating in the survey are in the urban areas in Ghana, while 58 (18.1) are in the rural areas. This conforms to the agriculture landscape order in Ghana, where the producers of the raw materials are in the rural areas while the processors are in the urban centres.

Finally, Table 3 shows that most of the firms, 137, representing (42.8%), are sole proprietorship businesses. Private companies were 117 (36.6%), public companies were 48 (15%), and partnerships were 18 (5.6%). However, all the 320 (100%) firms surveyed indicated that they have undertaken or are practising supply chain transparency in their supply chains.

Data Diagnostic Tests

Though the first objective, which requires descriptive analysis, does not share the same data as the last three objectives, this study thought it wise to present a validity test or diagnostic test on the data before analysing the specific objectives in chapter one. This section presents diagnostic tests such as factor analysis, common method or common variance bias (CVB), multicollinearity and discriminant validity.

Factor analysis

According to Tabachnick, Fidell and Ullman (2007), factor analysis is a statistical technique applied to a single set of variables when the researcher is interested in discovering which variables in the set form coherent subsets relatively independent of one another. Gaskin (2012) argued that variables that correlate with one another but are largely independent of other subsets of variables are combined into factors in factor analysis. Thus, factor analysis determines the number, validity or adequacy of constructs or indicators to measure a particular variable. This study employed the repeated indicator approach (RIA) in SmartPLS to validate the factors.

The RIA advocated that a factor analysis supports the reflective constructs or first-order variables and the formative order variables in a given

study (Gaskin, 2012). This was even imperative for this study because some of the variables used in the model have their dimensions used in measuring them. RIA requires that the factor analysis comes in two folds: reflective factor analysis and formative factor analysis (Hair, Sarstedt & Ringle, 2019). Hair, Risher, Sarstedt and Ringle (2019) argued that "the first step in reflective measurement model assessment involves examining the indicator loadings". "Formative measurement models are evaluated based on convergent validity, indicator collinearity, statistical significance, and relevance of the indicator weights" (Hair et al., 2017).

This section first presents reflective factor analysis using the outer loadings of the reflective constructs and their t-values. The straight acceptance criterion holds that all the reflective constructs' outer loadings are 0.70 or above, but literature holds that in instances where deleting constructs with the loading of 0.40 and above does not improve the model, keeping them is ideal as long as their t-values are higher than 1.96 (Lowry & Gaskin, 2014; Kock, 2012; 2015; 2017). It is, however, important to note here that, whilst the formative factor analysis used the outer weights, the reflective factor analysis used the outer loadings. This is based on the recommendations of Lowry and Gaskin (2014), Henseler et al. (2015), Kock (2012; 2015; 2017) and Hair et al. (2017). The results of the outer loading and their t-values are presented in Figures 3 and 4, respectively.

As contained in Figure 3, all the outer loadings of the reflective constructs are greater than 0.5 except the fifth indicator of the social performance construct (FPsp5), which is 0.495. However, deleting does not improve the overall contribution of the social performance construct to the

firm performance variable. Surprisingly, all the factor loadings, including the FPsp5, proved significant when the significance test was presented in Figure 4, to confirm the indicator's relevance. Lowry and Gaskin (2014) argued that when deleting an indicator that falls below the threshold does not improve the construct`s contribution to the variable, it can be maintained as long as it is significant after a t-test.

Also, Wong (2016) argued that "in a loading relevance test, problematic indicators should be deleted only if their removal from the PLS model increases the average variance extracted (AVE) and the composite reliability of their constructs over the 0.5 thresholds". So, this result looks at the adequacy of the various items in the questionnaire to measure the various dimensions of the variables. Figures 3 and 4 present the qualified indicators that are good to measure the variables in this study.

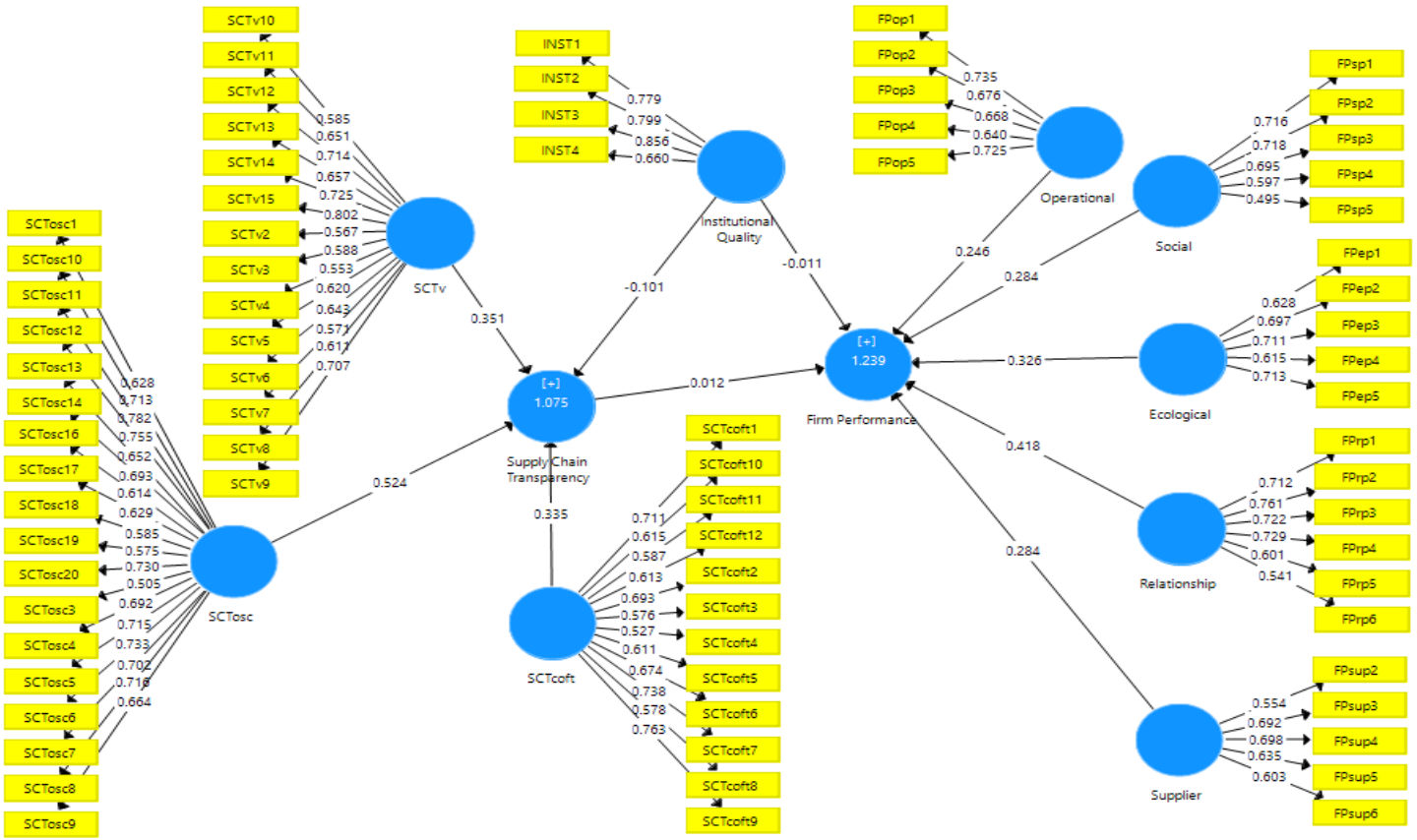

Figure 3: Factor Loadings for the First Order or Reflective Constructs

Source: Field survey, Attatsi (2021)

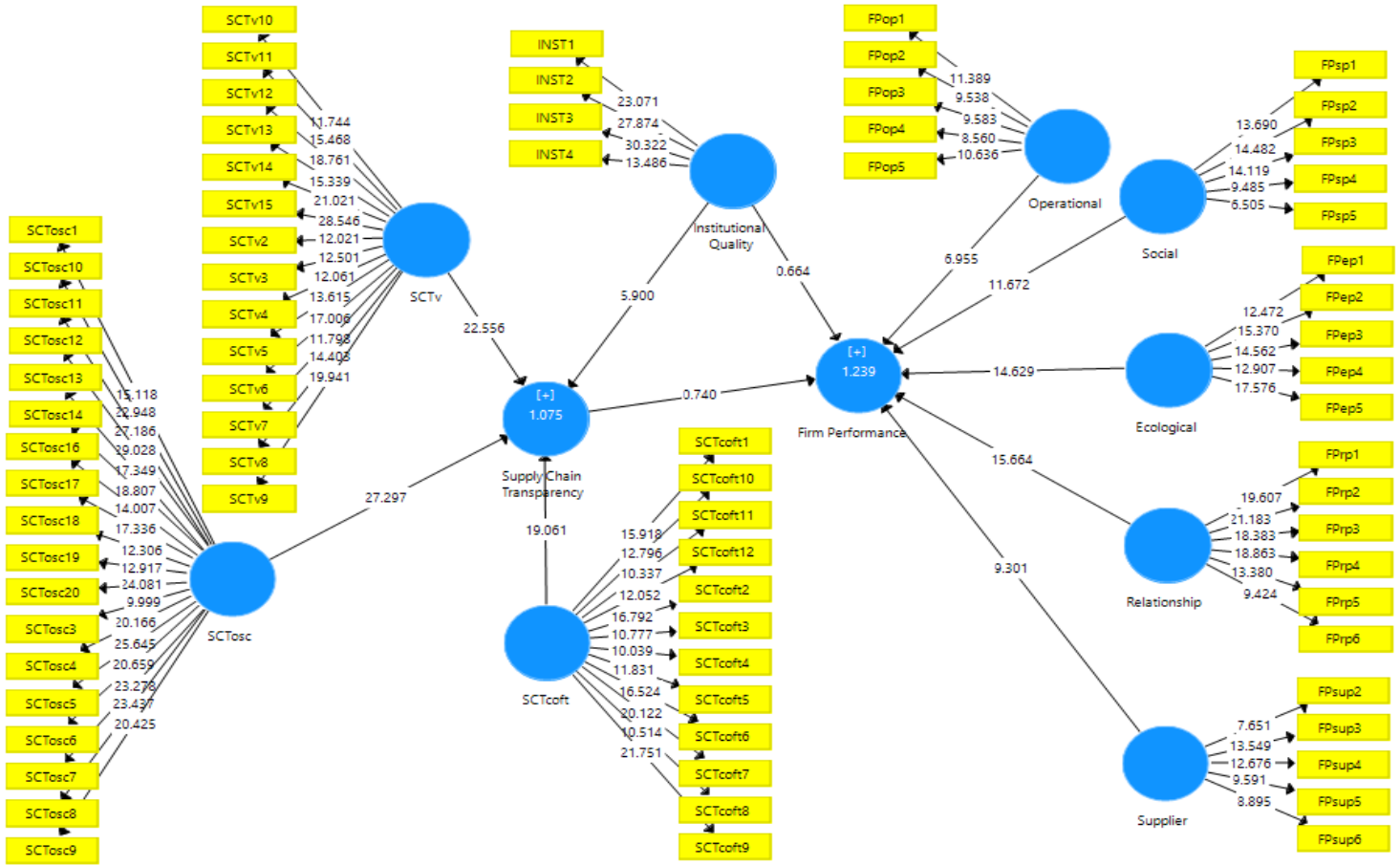

Figure 4: T-values for the First Order or Reflective Constructs

Source: Field survey, Attatsi (2021)

Internal consistency, reliability and convergent validity

This section presents further validation support for the generated factors measuring the variables as presented in the preceding section. This section examines the formative constructs' internal consistency reliability and convergent validity (formative factor analysis). According to Wong (2016), "composite reliability rather than Cronbach's alpha is suitable to evaluate the measurement model's internal consistency reliability in PLS-SEM because Cronbach`s alpha is sensitive to the number of items and turn to generate severe underestimation". To that end, this study focused on the composite reliability of the constructs. Nunnally and Bernstein (1994), Bagozzi and Yi (1988), Hair et al. (2013), Lowry and Gaskin (2014), Henseler et al. (2015), Ringle, Wende and Becker (2015), Kock (2012; 2015; 2017), and Hair et al., (2017) suggested that a threshold level of 0.60 or higher is required to demonstrate satisfactory composite reliability but not exceeding 0.95 level.

According to Wong (2016) and Ringle et al. (2019), convergent validity explains the indicator's variance. Fornell and Larcker (1981) opined that the AVE could provide evidence for convergent validity. Bagozzi and Yi (1988) suggest an AVE threshold level of 0.5 as evidence of convergent validity. Lowry and Gaskin (2014), Henseler, Ringle and Sarstedt (2015), Hair, Hult, Ringle, Sarstedt and Thiele (2017), Hair, Sarstedt, Ringle and Gudergan (2017), and Liengaard et al. (2020) noted that the AVE and the Fornell Larcker criterion are the strictest measures of convergent validity. They hold that the AVE has a minimum threshold of 0.5, and the diagonal of the Fornell Larcker criterion, which are the square roots of the AVE, must be greater than all other correlations in the Fornell Larcker criterion table.

Table 4 shows that all the AVE are above 0.5, and the composite reliability coefficients are above 0.6 and less than 0.95. Therefore, the measures of the formative constructs have high levels of internal consistency, reliability and convergent validity.

Table 4: *Internal Consistency, Reliability and Convergent Ralidity*

Constructs	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Ecological	0.806	0.808	0.806	0.673
Institutional Quality	0.857	0.865	0.858	0.705
Operational	0.820	0.821	0.819	0.681
Relationship	0.830	0.845	0.837	0.537
SCTcoft	0.893	0.898	0.894	0.716
SCTosc	0.936	0.940	0.937	0.741
SCTv	0.908	0.912	0.908	0.639
Social	0.785	0.793	0.782	0.547
Supplier	0.763	0.778	0.774	0.624

Source: Field Survey, Attatsi (2021)

Note: Ecological denotes Ecological performance; Operational denotes Operational performance; Relationship denotes Relationship performance; Social denotes Social performance; Supplier denotes Supplier performance; SCTv represents visibility dimension of Supply Chain Transparency; SCTosc represents Operations and Sustainability Conditions at the purchasing firm as a dimension of Supply Chain Transparency; SCTcoft represents Cost and Other Financial Transparency as a dimension of Supply Chain Transparency.

Discriminant validity

According to Gaskin, Godfrey and Vance (2018), discriminant validity measures the distinctiveness of the constructs or tests whether concepts or measurements that are not supposed to be related are actually unrelated. This study employed the Fornell-Larcker criterion (1981) to measure the discriminant validity of the formative constructs. It posits that to establish the discriminant validity, the square root of the AVE of each latent variable (thus, the diagonal values of the Fornell-Larcker criterion) should be larger than the latent variable correlations. Table 5 demonstrates unequivocally that discriminant validity is met in this study.

Table 5: *Fornell Larcker Criterion for the Formative Constructs*

	Ecological	Institutional Quality	Operational	Relationship	SCTcoft	SCTosc	SCTv	Social	Supplier
Ecological	0.820								
Institutional Quality	0.082	0.840							
Operational	0.308	-0.140	0.825						
Relationship	0.478	-0.033	0.275	0.733					
SCTcoft	0.042	0.798	-0.143	-0.046	0.846				
SCTosc	0.032	0.823	-0.196	-0.086	0.810	0.861			
SCTv	0.054	0.726	-0.221	-0.047	0.700	0.813	0.799		
Social	0.430	0.042	0.381	0.422	-0.020	-0.043	-0.023	0.740	
Supplier	0.389	0.001	0.117	0.626	0.045	0.036	0.071	0.196	0.790

Source: Field Survey, Attatsi (2021)

Note: Ecological denotes Ecological performance; Operational denotes Operational performance; Relationship denotes Relationship performance; Social denotes Social performance; Supplier denotes Supplier performance; SCTv represents visibility dimension of Supply Chain Transparency; SCTosc represents Operations and Sustainability Conditions at the purchasing firm as a dimension of Supply Chain Transparency; SCTcoft represents Cost and Other Financial Transparency as a dimension of Supply Chain Transparency

Multicollinearity and common method bias (CMB) test

According to Best and Kahn (2012), multicollinearity among the variables inflates the standard errors and makes some variables statistically insignificant while they should be otherwise significant. This study uses the variance inflationary factor (VIF) to measure multicollinearity.

Common method bias in analysis occurred when all the dependent or independent constructs were gauged or measured through the common survey instrument (Podsakoff, MacKenzie, Lee & Podsakoff, 2003; Najmi, Raza & Qazi, 2018). Tourangeau, Rips and Rasinski (2000) have speculated that because the cognitive effort required to generate an optimal answer to a long series of questions on a wide range of topics is often substantial, respondents cope with these demands by seeking easier ways to generate their answers. Krosnick (1999) argued that when the difficulty of the task of generating an optimal answer is high, and a respondent's ability, natural predisposition, or motivation to dissipate the required amount of cognitive effort is low, that respondents may act or attempt to complete the questionnaire by being less thorough in question comprehension, memory retrieval, judgment, and response selection.

Though the most common approach to testing the presence of multicollinearity and CMB has been Herman`s Single Factor Test, this study adopted the inner VIF as recommended by Kock (2017) and Lowry and Gaskin (2014). Kock (2017) argued that in using PLS-SEM, the occurrence of an inner VIF greater than 3.3 indicates pathological collinearity and that the model may be contaminated by common method bias. However, as shown in

Table 6, all VIFs obtained from the full collinearity test are equal to or less than 3.3, indicating that the model is free of common method bias.

Table 6: *Multicollinearity and Common Method Bias (CMB) Test*

	Firm Performance	Supply Chain Transparency
Ecological Performance	1.505	
Institutional Quality	3.099	3.036
Operational Performance	1.277	
Relationship Performance	2.085	
SCTcoft		3.150
SCTosc		3.122
SCTv		3.057
Social Performance	1.455	
Supplier Performance	1.768	
Supply Chain Transparency	3.191	

Source: Field Survey, Attatsi (2021)

Note: SCTv represents the visibility dimension of Supply Chain Transparency; SCTosc represents Operations and Sustainability Conditions at the purchasing firm as a dimension of Supply Chain Transparency; SCTcoft represents Cost and Other Financial Transparency as a dimension of Supply Chain Transparency.

Analysis based on Specific Objectives

This section presents the results and interpretations regarding the study's specific objectives. As indicated earlier, the study employed descriptive and inferential statistical tools to analyse the data. The various statistical tools were used after the study was satisfied with the previous section's various diagnostic tests. The first subsection employed Kendal`s coefficient of concordance to analyse the first objective and structured equation modelling for the rest of the four objectives.

Degree of concordance of supply chain transparency practices

The first specific objective of this study sought to examine the degree of concordance of supply chain transparency practices among agri-food processing firms in Ghana. Based on the literature review, this study identified

thirteen supply chain transparency practices as; supplier audits/factory audits, gender orientations, environmental sustainability permits/agreements, supplier transparency/compliance agreements, sustainability certifications, publication of supplier details, industry certifications, product/standard certification, tax registration and compliance, salaries and working condition reviews and publications, price regulations and publications, appropriate reverse logistic systems (traceability and track-ability enabled), an effective and efficient information sharing system. The respondents were asked to rank these practices based on their importance and usage.

As noted in chapter three, Kendal`s coefficient of concordance (W) was used to analyse this objective. Marozzi (2014), Corder and Foreman (2009), Legendre (2005), and Kendall and Smith (1939) argued that while tests using the standard Pearson correlation coefficient assume normally distributed values and compare two sequences of outcomes at a time, Kendall's W makes no assumptions regarding the nature of the probability distribution and can handle any number of distinct outcomes. Legendre (2005) posits that a W of 0.7 is a good level of agreement in the ranking.

Table 7 shows that product/standard certification is the most common and important supply chain transparency practice among the firms surveyed. This was followed by tax registration and compliance, industry certifications, price regulations and publications, an effective and efficient information sharing system, and salaries and working condition reviews and publications as the top six transparency practices. The overall concordance of the ranking is 0.807, significant at a p-value less than 0.001 and a Chi-Square value of 3098.916.

Table 7: *Degree of Concordance of Supply Chain Transparency Practices among Agri-food Processing Firms in Ghana*

Supply Chain Transparency Practices	Mean	Std. Dev	Min	Max	Mean Rank
Product/standard certification	1.62	.486	1	2	1st
Tax registration and compliance	2.03	.801	1	3	2nd
Industry certifications	2.78	1.509	1	6	3rd
Price regulations and publications	4.07	.820	3	11	4th
Effective and Efficient information sharing system	5.97	1.750	1	13	5th
Salaries and working condition reviews and publications	6.89	1.765	4	12	6th
Sustainability certifications	8.05	2.172	4	13	7th
Appropriate reverse logistic systems (traceability and track-ability enabled)	8.13	1.942	5	13	8th
Environmental sustainability permits/agreements	8.14	2.253	4	13	9th
Gender orientations	9.33	1.565	4	12	10th
Supplier transparency/compliance agreements	10.91	2.077	5	13	11th
Supplier audits/factory audits	11.36	1.838	6	13	12th
Publication of supplier details	11.72	1.230	4	13	13th
Test Statistics of the Model					
Number of observations	320				
Kendall's W[a]	.807				
Chi-Square	3098.916				
Difference (df)	12				
Asymptotic Significance	.000				

Source: Field Survey, Attatsi (2021)

Model 1: The relationship among institutional quality, supply chain transparency, and agri-food processing firms' performance in Ghana.

The second to the fourth specific objective of this study sought to examine the effect of supply chain transparency on firm performance, institutional quality on firm performance, and institutional quality supply chain transparency in Ghana. Kock (2017) opined that the association level among distinct variables could be linear or causal. However, the test level of association's appropriateness depends on the characteristics of the data and the pair of variables in question. This study used the test of linear association to check the effect of supply chain transparency on the performance as required by this objective. Statistical test of relationship requires that the constructs measuring the variables measured on a continuous scale (Gogtay & Thatte, 2017), and the data must be free of contamination. The previous diagnostic test conducted on the data satisfies all these conditions optimally.

According to Cohen (1988), the size or magnitude of the association or linear relationship ranges from zero to one, and the direction can be positive or negative. Cohen (1988) categorises correlation coefficients as; r = .10 to .29 as very weak, r = .30 to .49 as weak, r = .50 to .69 as Moderate, and r = .7 to .99 as large or strong, whilst a coefficient of zero (r = 0) indicates that there is no linear relationship between the variables. Wong (2016) averred that in SmartPLS, the relationships between constructs could be determined by examining their path coefficients and related t-statistics via bootstrapping. A major part of structural model evaluation is the assessment of the coefficient of determination (R^2). Hair et al. (2013) postulated that the threshold value of

0.25, 0.5 and 0.7 are often used to describe a weak, moderate, and strong coefficient of determination.

As mentioned earlier, this section tests the effect of supply chain transparency on performance. Thus, the study coined a universal null hypothesis for all the objectives. For example, the null hypothesis for objective two is H0: There is no statistically significant effect of supply chain transparency on firm performance. That is, H0: r = 0. The alternative hypothesis holds that: Ha: There is a statistically significant effect of supply chain transparency on firm performance. That is, H1: r≠0. The null hypothesis is tested at a significant level of 0.05 and represents the rule under which the null hypothesis is rejected or failed to be rejected. The null hypothesis will be rejected if the result shows a significant level of relationship between the variables below 0.05. However, if a significance level of more than 0.05 is obtained for the relationship between the variables, the null hypothesis will fail to be rejected.

It is imperative to mention that this section of the analysis used the formative variables (generated from the factor analysis) to estimate the models. The results of model 1 assessing the effects of supply chain transparency and institutional quality on firm performance and institutional quality on supply chain transparency are presented in Figure 5 and Table 8. However, the values in Figure 5 are not the total specific effects of each independent variable on the dependents but the combined effects, except institutional quality on supply chain transparency. Table 8 summarised the total specific direct and indirect effects of the various independent variables on the dependents.

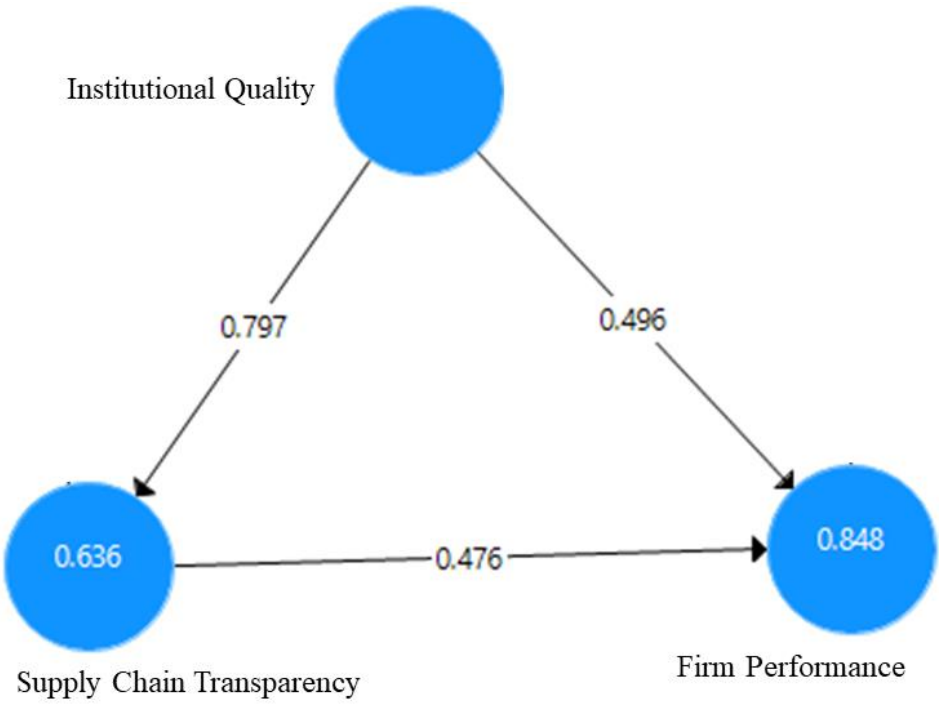

Figure 5: Path coefficients of the Model 1

Source: Field survey, Attatsi (2021)

Figure 5 shows that institutional quality positively influences supply chain transparency (having a path coefficient of 0.797), accounting for 63.6% of its total variations (R-Square [R^2] =0.636). Also, supply chain transparency and institutional quality are positively associated with firm performance (having path coefficients of 0.476 and 0.496, respectively) and collectively explained 84.8% of the total variation in firm performance (R^2 =0.848).

Table 8: *Total Specific Direct and Indirect Effects of the Model 1*

	Original Sample(O)	Sample Mean(M)	Std. Dev. (STDEV)	T values	P Values
IQ -> FP	0.875	0.875	0.012	71.317	0.000
IQ -> SCT	0.797	0.796	0.019	42.077	0.000
SCT -> FP	0.476	0.476	0.036	13.335	0.000
Total Specific Indirect Effect					
IQ -> SCT -> FP	0.380	0.379	0.030	12.808	0.000

Source: Field survey, Attatsi (2021)

Note: IQ denotes Institutional Quality, FP denotes Firm Performance, and SCT represents Supply Chain Transparency.

Effect of supply chain transparency on agri-food processing firm's performance in Ghana

From Table 8, supply chain transparency has a direct significant positive effect on firm performance (coefficient= 0.476; t=13.335, p=0.000). Thus, a unit increase in supply chain transparency will lead to a 47.6% increase in firm performance, ceteris paribus. This is because when there is transparency, the business environment becomes more informed as appropriate information is available to all appropriate units and stakeholders. This result is significant because the corresponding t-value is greater than 1.96; thus, 13.335, and the p-value of 0.000, is below 0.05. Also, the corresponding standard deviation of 0.036 in Table 8 shows little variation in the computation, evidenced in the similarity between the Original Sample [O] (0.476) and the Sample Mean [M] (0.476) coefficients. Since the result is significant, this study rejects the null hypothesis that supply chain transparency has no significant effect on firm performance.

Effect of institutional quality on the performance of agri-food processing firms in Ghana.

The third objective of this study is to examine the effect of institutional quality on the performance of agri-food processing firms. The null hypothesis for this objective is stated as H0: There is statistically no significant effect of institutional quality on firm performance. That is, H0: r = 0. The results in Table 8 depict that institutional quality has a significant positive effect on firm performance, pulling a coefficient of 0.875, with a p-value of 0.000 and a t-value of 71.317. This means that a unit increase in institutional quality will lead to an 87.5% increase in agri-food processing

firms' performance in Ghana, ceteris paribus. This is because the institutions define the markets' rules and serve as the centre pole around which the firms operate. The relatively small standard deviation of the result (0.012) shows that there are few variations (errors) in the computation of the variables, as evidenced in the similarity between the Original Sample [O] (0.875) and the Sample Mean [M] (0.875) coefficients in Table 8. Since the result is significant, this study rejects the null hypothesis that institutional quality has no significant effect on firm performance.

Effect of institutional quality on supply chain transparency in Ghana

Table 4 further presents the link between institutional quality and supply chain transparency in Ghana. The null hypothesis for this objective is H0: There is statistically no significant effect of institutional quality on supply chain transparency in Ghana. That is, H0: r = 0. The result in Table 8 depicts that institutional quality has a significant positive effect on supply chain transparency, showing a positive coefficient of 0.797, with a p-value of 0.000 and a t-value of 42.077. Thus, a unit increase in institutional quality will lead to a 79.7% increase in supply chain transparency among the agri-food processing firms in Ghana, ceteris paribus. This result pulled a standard deviation of 0.019, indicating little variations in the computations as evidenced in closed similarities between the corresponding Original Sample [O] (0.797) and the Sample Mean [M] (0.796) coefficients in Table 8.

Finally, Table 8 presents the specific total indirect effect of institutional quality on firm performance. The result shows that institutional quality has a significant indirect effect on performance through supply chain

transparency, evidenced in a coefficient of 0.380, with a p-value of 0.000 and a t-value of 12.808.

Model 2: The moderating role of institutional quality in the relationship between supply chain transparency and agri-food processing firms` performance.

This section presents the model assessing the moderating role of institutional quality in the relationship between supply chain transparency and firm performance in Ghana. The null hypothesis for this model is H0: There is statistically no significant effect of institutional quality on the relationship between supply chain transparency and firm performance. That is, H0: r = 0. The result is presented in Figure 6, which shows that institutional quality positively moderates the relationship between supply chain transparency and firm performance, evidenced in a moderation path coefficient of 0.051.

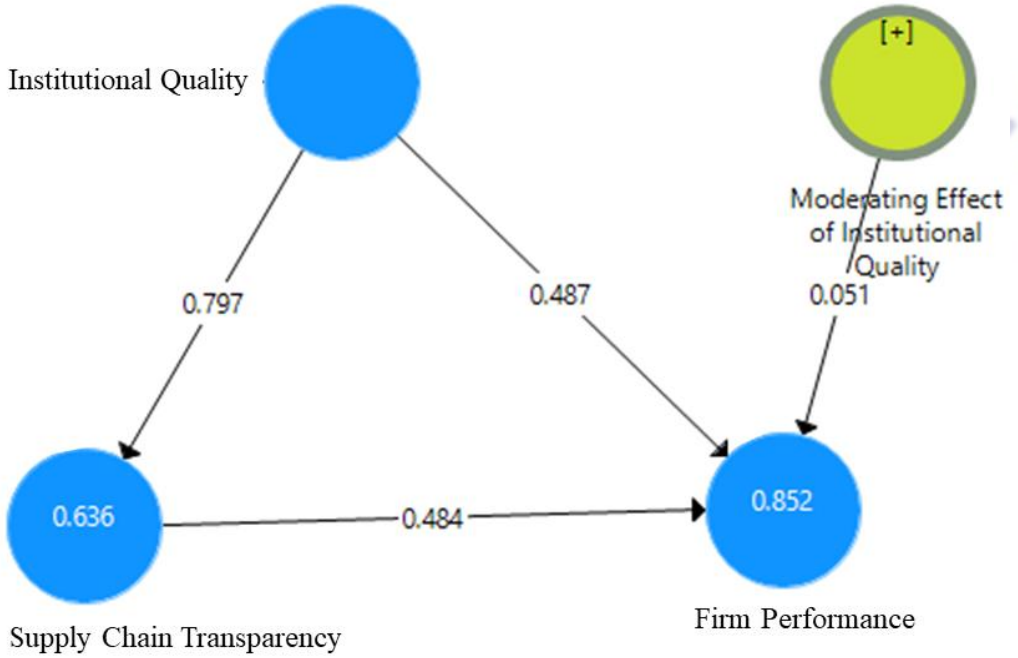

Figure 6: Moderating Effect of Institutional Quality on the Relationship between Supply Chain Transparency and Firm Performance (Model 2)

Source: Field survey, Attatsi (2021)

Also, it is evidenced in Figure 6 that the coefficient of determination of the firm performance has increased from 0.848 to 0.852, and the relationship between supply chain transparency and firm performance has also improved from 0.476 to 0.484. This implies that institutional quality matters to strengthen the effect of supply chain transparency on firm performance. However, the relationship between institutional quality and supply chain transparency has remained the same as in model 1. The detailed results for moderating the role of institutional quality in the relationship between supply chain transparency and firm performance are presented in Table 9.

Table 9: *Total Specific Direct and Indirect Effect of the Model 2*

	Original Sample (O)	Sample Mean (M)	Std. Dev (STDEV)	T Statistics (|O/STDEV|)	P Values
IQ -> FP	0.873	0.873	0.013	68.32	0.000
IQ -> SCT	0.797	0.797	0.019	41.034	0.000
Moderating Effect IQ -> FP	0.051	0.051	0.021	2.448	0.015
SCT -> FP	0.484	0.484	0.036	13.575	0.000
Total Specific Indirect Effect					
IQ -> SCT -> FP	0.386	0.386	0.033	11.8339	0.000

Source: Field survey, Attatsi (2021)

Note: IQ denotes Institutional Quality, FP denotes Firm Performance, and SCT represents Supply Chain Transparency.

Table 9 depicts the coefficient of the moderation as 0.051 (the same as shown in Figure 6) with a p-value of 0.015 and a t-value of 2.448. Thus, the result is significant; hence there is a statistically significant positive effect of institutional quality on the relationship between supply chain transparency and firm performance, confirming that institutional quality improves the effect of supply chain transparency on firm performance in Ghana. Furthermore, it is evidenced in Table 9 that all the p-values are less than 0.05 and t-values are

greater than 1.96, indicating that all other relationships among the variables in Model 2 remain significant. It is also notable that the total indirect effect of institutional quality on firm performance through supply chain transparency has increased after the moderation.

Predictive relevance and model fitness test

Table 10 presents the predictive relevance test of the model. Wong (2016) opined that "an assessment of Stone-Geisser's predictive relevance (Q^2) is important because it checks if the data points of indicators in the measurement model of endogenous construct can be predicted accurately". As shown in Table 10, the model has a high predictive ability for all endogenous variables because their Q^2 values are greater than zero. Chin (1998) suggests that the models demonstrate good predictive relevance when their Q^2 values are larger than zero.

Table 10: *Predictive Relevance (Q^2) of the Models*

	SSO	SSE	Q^2 (=1-SSE/SSO)
Firm performance (Model 1)	320	49.977	0.844
Firm Performance (Model 2)	320	50.889	0.841
Supply Chain Transparency (Models 1&2)	320	117.48	0.633

Source: Field survey, Attatsi (2021)

The overall model fitness is presented in Table 11. As contained in Table 11, the models are fit for purpose because it meets the quality criteria for PLS-SEM model estimation. For Standardized Root Mean Square Residual (SRMR) and Normed Fit Index (NFI) or Bentler and Bonett Index values, a threshold of SRMR < 0.08 and NFI > 0.90 is accepted for good for purpose model (Hair et al. 2017; Dijkstra & Henseler 2015; Henseler et al., 2014). Thus, from Table 11, both the SRMR and the NIF have met the decision criteria.

Table 11: *Overall Model Fitness Summary Statistics*

	Saturated Model	Estimated Model
SRMR	0.000	0.001
NFI	1.000	1.000

Source: Field survey, Attatsi (2021)

Robustness and Sensitivity Tests

A robustness check helps detect and report any contamination in a model. Though this study has presented some model evaluation reports to ensure the fitness of the models used in this study, it is still necessary to conduct further checks to support dynamism in discussing the results obtained from the models directed at the objectives of this study. Thus, this section presents the control or exogenous variables that may hold alternative explanations for the independent variable. These variables include firm age, location, size, and ownership type, as discussed in chapters two and three.

Control variables for the models assessing the separate effects of supply chain transparency and institutional quality on firm performance in Ghana.

All the models estimated in this study contain firm performance as a dependent variable. As expected, all the control variables have varying degrees of effect on the endogenous variable. However, all the effects are very minimal and insignificant. From Table 12, firm ownership and firm age have less than one per cent effect, 0.007 and 0.002 respectively, on firm performance. This means that a unit change in these variables will lead to less than one per cent change in firm performance. For firm location and size, they have 3.6% and 2.6%, respectively, on performance. This means that a percentage of firm location and size will lead to a 3.6% and 2.6% increase in

firm performance. Since these effects of the exogenous variables are insignificant, the high effect of the independent variables on the dependent variable in the models is not due to the influence of exogenous variables.

Table 12: *Full Model Report with Control Variables*

	Original Sample (O)	Sample Mean (M)	Std Dev (STDEV)	T Statistics (|O/STDEV|)	P Values
Firm OType -> FP	-0.007	-0.008	0.032	0.202	0.840
Firm Age -> FP	0.002	0.002	0.025	0.082	0.934
FirmLoc -> FP	0.036	0.036	0.024	1.508	0.132
Firm Size -> FP	0.026	0.025	0.037	0.706	0.480
IQ -> FP	0.496	0.498	0.037	13.251	0.000
IQ -> SCT	0.797	0.797	0.02	40.772	0.000
SCT -> FP	0.476	0.474	0.038	12.436	0.000

Source: Field survey, Attatsi (2021)

Note: IQ denotes Institutional Quality, FP denotes Firm Performance, and SCT represents Supply Chain Transparency.

The significance of the model fitness test for the model in Table 12 is presented in Table 13, showing that the model is significant because the SRMR is less than 0.08 and NFI is greater than 0.90.

Table 13: *Model Fit Summary for the Model Assessing Control Variables*

	Saturated Model	Estimated Model
SRMR	0.000	0.007
NFI	1.000	0.999

Source: Field survey, Attatsi (2021)

Overall sensitivity analysis

The final robustness test presents a sensitivity analysis of the model's F-Square (F2) statistics. Wong (2016) and Gaskin (2014) argued that the F^2 test assesses the effect of a specific exogenous construct on the endogenous construct if it is deleted from the model. Cohan (1988) pointed out that F^2 values of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large

effect sizes. From Table 14, it can be concluded that, in general, exogenous (control) variables have an insignificant F^2 effect on the endogenous variable or have no effect at all, as the F^2 values are less than 0.02, well below what Cohan (1988) defined as a small effect (0.02).

Table 14: *F-Square Statistics of the Full Model*

	FP	SCT
Firm Age	0.000	
Firm Location	0.007	
Firm Ownership Type	0.000	
Firm Size	0.001	
IQ	0.594	1.746
SCT	0.548	

Source: Field survey, Attatsi (2021)

Note: IQ denotes Institutional Quality, FP denotes Firm Performance, and SCT represents Supply Chain Transparency.

However, the F^2 statistics of institutional quality (IQ) and supply chain transparency (SCT) on firm performance (FP) are all well above 0.5, indicating that they have a significant effect size in the model. Thus, Table 14 confirmed no exogeneity in the models presented in this study. The significant effects of the independent variables on the dependent variable are not coming from outside the model, nor are they unexplained by the model.

Discussion of Results

This section discusses the results regarding the theories, concepts, and the general extant literature reviewed in chapter two of this study. It is essential to mention that the study's objectives, as outlined in chapter one, serve as the guiding light for this section. Thus, this section derived its headings following the objectives in chapter one of this study.

The degree of concordance of supply chain transparency practices among the agrifood processing firms in Ghana

The first specific objective of this study was to assess the degree of concordance of supply chain transparency practices among the agrifood processing firms in Ghana. As presented in Table 7, the results show a high degree of concordance (0.807) of supply chain transparency practices among agrifood processing firms in Ghana. The high degree of concordance of 0.807 indicates a high agreement on the ranking of supply chain transparency practices. The result demonstrates that product/standard certification, tax registration and compliance, industry certifications, price regulations and publications, and effective and efficient information sharing system are the most common supply chain transparency practices among the agrifood processing firms in Ghana.

A critical observation of these practices in the Ghanaian context shows that they are regulatory or legal requirements. For instance, every product must get the standards certification before reaching the market, and even advertisements must be verified and approved before getting aired (Standards Authority Act, 1973; Food and Drugs Law, 1992 [PNDC 305B]). Above all, the Companies Act 1963 (Act 179), as amended by the Companies

Act 2019 (Act 992), stipulates that all firms must register and obtain a certificate of incorporation before undertaking any business activity in Ghana.

This means that Ghana's commonly observed supply chain transparency practices are in response to legal requirements. This result was consistent with the findings of Wognum et al. (2011) and Trienekens et al. (2012), who found that quality, safety, and legal requirements were the primary reasons for firms' efforts to be transparent in their operations. They indicated that institutional requirements push firms to incorporate transparency practices into their supply chains to avoid fines, name and shame, force closures, and market share loss. The findings of Wu et al. (2017), Winter and Knemeyer (2013), and Oglethorpe and Heron (2010) also support the results of this study. They argued that heightened concern from consumers and policymakers for the environment had put firms under more pressure to incorporate more supply chain transparency practices in their operations to enable them to achieve a sustainable supply chain.

Furthermore, the result shows that salaries and working condition reviews and publications, sustainability certifications, appropriate reverse logistic systems (traceability and track-ability enabled), environmental sustainability permits/agreements, gender orientations, supplier transparency/compliance agreements, supplier audits/factory audits, and publication of supplier details were the remaining supply chain transparency practices ranked, respectively. These eight practices look more like voluntary disclosures than regulatory requirements except for salaries and working conditions and environmental sustainability permits or agreements. For example, the Ghana Labour Act 2003 (Act 651) explicitly provided acceptable

working conditions and salary regulations. Thus, Part III of the (Act 651 contains issues "on the protection of employment (rights and duties of employers and workers, contract of employment, grounds for termination, etc.), while Part IX looks at protection of remuneration (equal pay for equal work, prohibited or permitted deductions, paid public holidays, etc.)".

However, it is not entirely surprising that environmental sustainability permits sit at the ninth position because the data's demographics show that most firms were micro-enterprises. These micro-enterprises usually produce from their residents, which in one way or the other, might have been certified for other purposes. Otherwise, the environmental protection agency (EPA) is legally mandated to clamp down on firms operating without environmental permits as required by the Environment Protection Agency Act, 1994 (Act 490). However, according to Egels-Zandén et al. (2015), despite Madsen's (2009) assertion that supply chain transparency is about "declaring the truth," in practice, it is far from doing so. Instead, it is focused on declaring a particular perspective that serves the interests of specific actors. Thus, the ability of a given actor to enforce its interest shapes the level of transparency in that regard.

Finally, the findings show less regard for voluntary transparency initiatives or practices in Ghana since all voluntary practices have been ranked less important.

Effect of supply chain transparency on the performance of agri-food processing firms in Ghana.

The study's second hypothesis holds that supply chain transparency positively influences agrifood processing firms' performance in Ghana. The

results strongly supported this hypothesis. This is because greater supply chain transparency tends to undermine the power of the monopolists, who most often hoard information for their benefit, thereby making other firms visible in the supply chain. Also, the availability of information reduces the risk of market failure, an anomaly caused mainly by information asymmetry, and this is the main argument of the information theory by Nyquist (1924), Hartley (1942) and Shannon (1948).

This finding also aligns with Buell and Kalkanci's (2021) results, which explained that transparency into internal and external responsibility initiatives tends to dominate generic brand marketing in motivating consumer purchases, supporting the view that consumers take companies' responsibility efforts into account in their decision making. This is because the world is moving quickly toward an information era where productive units rely heavily on information sharing to achieve their daily operational goals.

This result is also consistent with the findings of Kumar and Ganguly (2020), Mohan, Buell, and John (2020), Ahmed and Omar (2019), Kraft et al. (2018), Craig et al. (2017), Buell et al. (2017), Kalkanci et al. (2016), Egels-Zandén et al. (2015) and Bastain and Zantes (2013). This indicates that consumers may soon not value the prices of commodities they purchase but instead focus on the transparency of the supply chain that produces such commodities is relevant in Ghana. Thus, companies that wish to stay relevant and competitive need to take transparency as seriously as their competitive resources or strategies.

Effect of institutional quality on the performance of agri-food processing firms in Ghana.

The third hypothesis of this study showing the effect of institutional quality on the performance of agri-food processing firms in Ghana is also supported. The results indicated that institutional quality had a significant positive effect on the performance of agri-food processing firms in Ghana. This is in line with the institutional theory put forth by Meyer and Rowan (1977), DiMaggio and Powell (1983), Zucker (1987), Meyer, Rowan, Powell and DiMaggio (1991), North (1990) and Scott (1995). Meyer and Rowan (1977), North (1990) and Scott (1995) explained that legal origins, the rules themselves as well as the quality of their enforcement shape the behaviour and performance of firms in any given society.

The finding is also in agreement with the results of Vanacker et al. (2020), Bhaumik et al. (2018), SN and Sen (2017), and Lafontaine et al. (2017). However, this finding refutes the results of Ahmed et al. (2019), who found that institutional pressure has an insignificant negative impact on the economic performance of firms. Their result or finding could be because of their weak conceptualisation and definition of the institutional pressure variable.

Effect of institutional quality on supply chain transparency of agri-food processing firms in Ghana.

The fourth hypothesis assessed the effect of institutional quality on supply chain transparency in Ghana among the agrifood processing firms. The results depict significant support for the fourth hypothesis, indicating that institutional quality had a significant positive effect on the supply chain

transparency of agri-food processing firms in Ghana. This is because a substantial portion of supply chain transparency practices forms part of regulatory requirements, determining the legality, survival, growth and market share of firms, irrespective of their age, location, size and ownership structure, especially in Ghana. This assertion is evidenced in the result of the first objective of this study, where all the most highly held supply chain transparency practices among the agrifood processing firms in Ghana are regulatory requirements.

This finding resonates with the position of the institutional theory, which holds that institutions set the rules and define the modes of operation of businesses (Scott, 2013; Nuertey, 2015; Sen, 2017; Božić, 2017; Sen & Sinha, 2017; Adesanya et al., 2020). In furtherance to that, Greer and Purvis (2016) argued that various acts, legislation, and standards have been developed to increase supply chain transparency and prevent supply chain members from deviating from their actual operational objectives.

Empirically, this finding is in line with Villena and Dhanorkar (2020), who averred that climate change or adverse consequences of a firm's operations increases its vulnerability to institutional pressure, whereas improved regulatory quality increases transparency among firms. The result also corroborates with the findings of Ahmed and Omar (2019), Greer and Purvis (2016), Bastain and Zantes (2013), Heras-Saizarbitoria and Boiral (2012), Trienekens et al. (2012), and Prajogo, Huo, and Han (2012), who opined that supply chain transparency could be improved through the proper implementation of standards and the availability of quality institutions, which fosters a shared understanding of how businesses should be managed.

The moderating role of institutional quality in the relationship between supply chain transparency and agri-food processing firms` performance

Finally, the fourth hypothesis that institutional quality positively moderates the relationship between supply chain transparency and the performance of agri-food processing firms in Ghana is also supported. Results from model 3 in Figure 10 explain a fascinating phenomenon. The interaction term between supply chain transparency and institutional quality had a positive coefficient of 0.051, significant at 1%. The introduction of the interaction term causes the supply chain transparency variable to attain a coefficient of 0.484 compared to a coefficient of 0.476 in Figure 8. However, the coefficient of institutional quality gained a lower coefficient in Figure 10 than a relatively higher coefficient in Figure 8. This means that the interaction term reveals the true nature of institutional quality in Ghana.

Although the weak nature of institutional quality in Ghana may impede firm performance (ITC, 2016; GSS, 2020; MoTI, 2020), it compliments supply chain transparency to improve agri-food processing firms' performance. The net effect of supply chain transparency on firm performance can be estimated from the partial differential of firm performance to supply chain transparency. This explains that supply chain transparency in isolation may not highly improve firm performance in Ghana unless strong institutional quality structures are put in place.

This finding resonates with the position of the institutional theorists who posits that the survival, performance, and legitimacy of corporate practices largely depends on the quality of the institutional environment within which they operate while acknowledging resource usefulness (Hirsch, 1975;

Roy, 1997; Scott, 2008; Litan, Baumol & Schramm, 2008; Bruton, Ahlstrom & Li, 2010). However, the resourcefulness of the firms measured in terms of size (number of employees), location, age (number of years in operation-experience) and the type of ownership failed to significantly influence the variations in the performance of the agri-food processing firms in Ghana.

Empirically, this study supports the findings of Božić (2017). Also, the finding of this study confirms the propositions of ITC (2016), Nuertey (2015) and Ameyaw et al. (2012), who argued that the extent to which firms will comply with regulations and ensure transparency to promote their performance depends on the quality of the institutions within the Ghanaian economy.

Chapter Summary

This chapter began by presenting a descriptive analysis of the demographic variables. The descriptive statistics revealed that most of the firms that participated in this are Micro Scale Enterprises located in the country's urban areas and owned by private individuals in a partnership or private company agreements. They have six to ten years of experience and were mainly represented by their managers/owners in the survey. The chapter further presents a diagnostic statistic to test the validity and fitness of the data used in this study. The diagnostic test revealed that the data were fit and valid for the analysis. The chapter then presented the formal analysis of the data per the specific research objectives. The analysis showed adequate support for all the research hypotheses in this study. The analysis were accompanied by robustness and sensitivity tests.

Finally, the chapter discussed the results from the analysis per the empirical and theoretical literature underpinning this study. The discussion showed support for the theories and most of the empirical studies.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Supply chain transparency has become very significant, critical, and often considered a strategic investment and an emerging global supply chain management trend to help solve several challenges, especially amid globalisation, rapid technology growth, and increasing consumer complexity. Extant literature has documented the roles of supply chain transparency in boosting the performance of firms, the ultimate of which is to maximise upstream (shareholders) and downstream (customer and other stakeholders) values. However, the quality of the institutional environment within which the supply chain operates significantly influences supply chain transparency gains in complementing firm performance.

Thus, this study assessed supply chain transparency and performance of agri-food processing firms in Ghana, emphasising the moderating power of institutional quality in the relationship between supply chain transparency and firm performance. Accordingly, this concluding chapter presents the summary of the research, findings, conclusions, and recommendations and suggests areas for further research based on the calculated limitations of this current study.

Summary of the Research

The performance of Agrifood processing firms and agri-food supply chain have been argued to be falling short of its expectations in the available literature despite the heavy investment from stakeholders and Ghana's relative

advantageous location in the agro-ecological zone of the Sub-Saharan African region. Literature suggests the various forms of factors that could help stir up the performance of the firms and their supply chain as a whole. However, the first chapter of this study emphasised the absorptive capacity of institutional quality in the influence of supply chain transparency on the performance of agri-food processing firms in Ghana. This is because the higher levels of investment in the agri-food processing industry and the relative agricultural environment are not contributing much to the performance of the agri-food processing firms due to a weak institutional environment in Ghana.

The literature review provided the supporting theories and the empirical justification for the relationship between the supply chain transparency, institutional quality and agri-food processing firms' performance. Specifically, the system, information, and institutional theories provided adequate justification for the relationship among the variables in this study. The empirical review shows an inconclusiveness in the findings on the relationship between supply chain transparency and firm performance, coupled with inadequate empirical works on the moderating power of institutional quality in that relationship. This is because the effect of supply chain transparency and institutional quality on firm performance has primarily been investigated in prior research efforts. The literature review also pointed out lapses in conceptualising and measuring the variables, especially the supply chain transparency.

However, this current study interacted supply chain transparency with institutional quality to hypothesised that institutional quality moderates the influence of supply chain transparency on firm performance in Ghana.

Specifically, the study formulates five hypotheses; (1) There is a high degree of concordance of supply transparency practices among the agrifood processing firms in Ghana, (2) Supply chain transparency positively influences the performance of agri-food processing firms in Ghana, (3) Institutional quality positively influences the performance of agri-food processing firms in Ghana, (4) Institutional quality positively influences the supply chain transparency of agri-food processing firms in Ghana, and (5) Institutional quality positively influences the relationship between supply chain transparency and the performance of agri-food processing firms in Ghana.

This study relied on the positivist research paradigm and employed the explanatory research design with a quantitative research approach as required by the positivist paradigm. The study used a cross-sectional survey approach to gather data from a sample of 396 out of 17471 agri-food processing firms in Ghana. The study applied simple random sampling techniques and employed Yamane`s 1967 sample size determination formula. The study used SPSS, version 26, Microsoft Excel 365, and SmartPLS, version 3.3, to process the data, while structural equation modelling and Kendal's coefficient of concordance were used to analyse the data. The study controlled for some firm characteristics that may hold alternative explanations for the performance of the firms to capture the net effect of the independent variables.

Summary of Findings

This study produced some perceptive and noteworthy results that have great implications for the agri-food processing industry and the

manufacturing subsector. Table 15 summarises these results regarding the research hypothesis outlined in chapter one of this study.

Table 15: *Summary of Hypotheses and Research Findings*

No.	Hypotheses	Decision
1	There is a high degree of concordance of supply transparency practices among the agrifood processing firms in Ghana	Supported
2	Supply chain transparency has a significant positive effect on the performance of agri-food processing firms in Ghana	Supported
3	Institutional quality has a significant positive effect on the performance of agri-food processing firms in Ghana	Supported
4	Institutional quality has a significant positive effect on the supply chain transparency of agri-food processing firms in Ghana	Supported
5	Institutional quality has a significant positive moderation effect on the relationship between supply chain transparency and the performance of agri-food processing firms in Ghana.	Supported

Source: Field survey, Attatsi (2021)

The result of the first hypothesis provided strong evidence that there is a high degree of concordance of supply transparency practices among the agrifood processing firms in Ghana. This means that the agri-food processing firms implement some common supply chain transparency practices in their supply chains, as identified in the results in the previous chapter. This led to the support of the first hypothesis. However, the results show that legal or regulatory requirements are the most commonly applied transparency practices. For the second objective, the study found supply chain transparency to influence agri-food processing firms' performance in Ghana significantly. This supports the second hypothesis that supply chain transparency positively affects the performance of agri-food processing firms in Ghana. That signifies that implementing appropriate supply chain transparency practices is required to boost the performance of agri-food processing firms in Ghana.

Furthermore, the results of the third hypothesis indicated that institutional quality positively affects the performance of agri-food processing firms in Ghana. This supports the acceptance of the third hypothesis. This means that increasing the quality of the institutions in the Ghanaian business environment will help spur up the performance of firms. Also, high institutional quality will enhance supply chain transparency, in line with the finding of the fourth hypothesis.

Furthermore, the interaction of supply chain transparency with institutional quality indicated that supply chain transparency would contribute more to firm performance in the environment where quality institutions are available. This provided sufficient justification to accept the fifth hypothesis that institutional quality positively moderates the relationship between supply chain transparency and the performance of agri-food processing firms in Ghana. This is because introducing the interactive term of supply chain transparency and institutional quality in the model causes the supply chain transparency variable to attain a higher coefficient than the direct effect in objective two. Moreso, the interaction itself was positive and significant.

Finally, the study controlled for firm characteristics (age, size, location and ownership type) to ascertain their level of influence on performance as an added evidence and a robustness check. However, the coefficients of the interaction terms of all the control variables were positive but not significant. This means that, specifically, the firm-level characteristics do not matter for firm performance in Ghana, especially when there is robust institutional quality. This means that firms, irrespective of their characteristics,

would perform better in the presence of strong institutional quality and transparency in their operations.

Conclusions

Based on the findings of this study, it concludes on the first objective that there is a high degree of concordance of supply chain transparency practices among the agri-food processing firms in Ghana. Also, improvements in supply chain transparency are required to enhance firm performance in Ghana. So, supply chain transparency efforts will yield more significant results in the agri-food processing industry. More so, improvements in institutional quality in Ghana will improve the supply chain transparency and performance of agri-food processing firms in Ghana. Finally, the study concludes that stronger institutional quality will be required to enhance the effect of supply chain transparency on the performance of agri-food processing firms in Ghana.

Recommendations

For the first objective, this study recommends that managers diversify their attempts to create transparent supply chains by giving the needed attention to the other forms of transparency or transparency practices in addition to the highly held legal requirements. This will show their concerns for environmental and general sustainability rather than seeking legitimacy in the eyes of the law. Since the coefficient of concordance is high, all the firms are on a similar level; hence substantial investment is needed to educate the

managers and stakeholders on the need to take other transparency practices seriously if they must build a resilient and sustainable supply chain.

Concerning the second objective, this study recommends that managers of the Ghanaian economy and, specifically, the agri-food processing industry stakeholders continue to institute sound policies that inspire supply chain transparency to enhance firm performance in Ghana. However, for the fifth objective, such efforts will yield much more effective and efficient firm performance if policies are implemented to improve the quality of institutions regulating the business environment. Thus, supply chain transparency can better enhance firm performance by improving the efficiency and effectiveness of the regulatory institutions charged with oversight responsibilities to ensure the soundness of the industrial sector. For instance, when the FDA, GSA, GRA, and the registrar general perform their duties well, the business environment will be more attractive and welcoming to the businesses to thrive well in their endeavours.

The enhancement in the institutional quality will also mean that governments will formulate and promote sound policies that will permit and promote private sector development. Thus, sound policies will enable the institutions to play their roles well, and the incumbent and powerful industry payers will abide by laws. Similarly, the incumbent will respect policies aimed at equal resource allocation, ensuring adequate information sharing, and tempering their opposition to competition, which will help businesses perform better in their respective rights.

Finally, the improvements in institutional quality will also positively impact the supply chain transparency and firm performance in Ghana, per the findings of the third and fourth objectives.

Suggestions for Future Research

This current study focused on agri-food processing firms whose products and processes are different from other industries, such as wood processing, beverages and distillation, metal fabrication, and mining. Therefore this study suggests that future research looks at the effect of supply chain transparency on firm performance, emphasising the moderating role of institutional quality in other industries since the results showed that transparency and institutional quality improve firm performance in the agrifood sector. Also, institutions vary across these industries in Ghana.

REFERENCES

Abeyratne, S. A., & Monfared, R. P. (2016). Blockchain ready manufacturing supply chain using distributed ledger. *International Journal of Research in Engineering and Technology*, *5*(9), 1-10.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of economic growth*, *1*, 385-472.

Adesanya, A., Yang, B., Iqdara, F. W. B., & Yang, Y. (2020). Improving sustainability performance through supplier relationship management in the tobacco industry. *Supply Chain Management: An International Journal*, *25*(4), 413–426.

Aduda, J., & Gitonga, J. (2011). The relationship between credit risk management and profitability among the commercial banks in Kenya. *Journal of Modern Accounting and Auditing*, *7*(9), 934.

Aduda, J., & Gitonga, J. (2018). The relationship between credit risk management and profitability among the commercial banks in Kenya. *Journal of Modern Accounting and Auditing*, *14*(1), 934-946.

Af Wåhlberg, A. E., & Poom, L. (2015). An empirical test of nonresponse bias in internet surveys. *Basic and Applied Social Psychology*, *37*(6), 336–347.

Aggarwal, R. K., & Jorion, P. (2012). Is there a cost to transparency? *Financial Analysts Journal*, *68* (2), 108–123.

Ahmed, W., & Omar, M. (2019). Drivers of supply chain transparency and its effects on performance measures in the automotive industry: Case of

a developing country. *International Journal of services and operations management*, *33*(2), 159-186.

Ahmed, W., Najmi, A., & Khan, F. (2020). Examining the impact of institutional pressures and green supply chain management practices on firm performance. *Management of Environmental Quality: An International Journal*.

Allen, S., Maestre, M., & Gelli, A. (2019). Food value chains for nutrition. *Agriculture for Improved Nutrition: Seizing the Momentum*, 27.

Allen, T., Heinrigs, P., & Heo, I. (2018). Agriculture, food and jobs in West Africa.

Ameyaw, C., Mensah, S., & Osei-Tutu, E. (2012). Public procurement in Ghana: the implementation challenges to the public procurement law 2003 (Act 663). *International Journal of Construction supply chain management*, *2*(2), 55-65.

Andam, K. S., & Asante, S. (2018). *Firm employment, exit, and growth in the food processing sector: Evidence from Ghana* (Vol. 1755). Intl Food Policy Res Inst.

Anderson, J. C., Håkansson, H., & Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of marketing*, *58*(4), 1-15.

Aragón-Correa, J. A., Hurtado-Torres, N., Sharma, S., & García-Morales, V. J. (2008). Environmental strategy and performance in small firms: A resource-based perspective. *Journal of environmental management*, *86*(1), 88-103.

Arens, L., Deimel, M., & Theuvsen, L. (2011). Transparency in meat production: consumer perceptions at the point of sale. *Journal of Agricultural Science and Technology B, 1*(8), 40-51.

Ashby, A., Leat, M., & Hudson-Smith, M. (2012). Making connections: a review of supply chain management and sustainability literature. *Supply Chain Management: An International Journal*.

Bai, C., & Sarkis, J. (2020). A supply chain transparency and sustainability technology appraisal model for blockchain technology. *International Journal of Production Research*, *58*(7), 2142-2162.

Ball, A., & Craig, R. (2010). Using neo-institutionalism to advance social and environmental accounting. *Critical Perspectives on Accounting*, *21*(4), 283-293.

Bannasch, H. G. (1993). East Germany. *Small Firms and Entrepreneurship: An East-West Perspective*, 182.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Bastian, J., & Zentes, J. (2013). Supply chain transparency as a key prerequisite for sustainable agrifood supply chain management. *The International Review of Retail, Distribution and Consumer Research*, *23*(5), 553-570.

Bateman, A., & Bonanni, L. (2019). What supply chain transparency really means. *Harvard Business Review*, *20*, 2–8.

Baumol, W. J. (1990). Quality changes and productivity measurement: Hedonics and an alternative. *Journal of Accounting, Auditing & Finance*, *5*(1), 105-117.

Baumol, W. J., Litan, R. E., & Schramm, C. J. (2007). *Good capitalism, bad capitalism, and the economics of growth and prosperity*. Yale University Press.

Bertalanffy, L. V. (1969). General system theory: Foundations, development, applications.

Best, J. W., & Kahn, J. V. (2012). Research in Education (12th ed.). London: Allyn and Bacon

Beulens, A. J., Broens, D. F., Folstar, P., & Hofstede, G. J. (2005). Food safety and transparency in food chains and networks Relationships and challenges. *Food control*, *16*(6), 481-486.

Bhaumik, S. K., Dimova, R., Kumbhakar, S. C., & Sun, K. (2018). Is tinkering with institutional quality a panacea for firm performance? Insights from a semiparametric approach to modeling firm performance. *Review of Development Economics*, *22*(1), 1-22.

Bless, C., & Higson-Smith, C. (1995). Fundamentals of social research methods, an African perspective. Kenwyn: Juta & Co. *Inc. 164p*.

Božić, D. (2017). *From haute couture to fast-fashion: Evaluating social transparency in global apparel supply chains* (Doctoral dissertation, Massachusetts Institute of Technology).

Bozic, D., & Bateman, A. H. (2018). Evaluating social transparency in global fashion supply chains. In *Eco-friendly and Fair* (pp. 165-173). Routledge.

Brink, M. (1999). Development, growth and dry matter partitioning in bambara groundnut (Vigna subterranea) as influenced by photoperiod and shading. *The Journal of Agricultural Science*, *133*(2), 159-166.

Brown, T. J. (2013). *Performance: Strategic manager* (3rd ed.). Chicago: St. Louis Press.

Bruton, G. D., Ahlstrom, D., & Li, H. L. (2010). Institutional theory and entrepreneurship: where are we now and where do we need to move in the future? *Entrepreneurship theory and practice*, *34*(3), 421– 440.

Buell, R. W., & Choi, M. (2019). Improving customer compatibility with operational transparency. *Harvard Business School Technology & Operations Mgt. Unit Working Paper*, (20-013).

Buell, R. W., & Kalkanci, B. (2021). How transparency into internal and external responsibility initiatives influences consumer choice. *Management Science*, *67*(2), 932-950.

Buell, R. W., Kim, T., & Tsay, C. J. (2016). Creating reciprocal value through operational transparency. *Management Science*, *63*(6), 1673-1695.

Buell, R. W., Kim, T., & Tsay, C. J. (2017). Creating reciprocal value through operational transparency. *Management Science*, *63*(6), 1673–1695.

Buell, R. W., Porter, E., & Norton, M. I. (2019). Surfacing the submerged state: Operational transparency increases trust in and engagement with government. *Harvard Business School Marketing Unit Working Paper*, (14-034), 14-034.

Burke, J. (2015). Bangladesh garment workers suffer poor conditions two years after reform vows. *The Guardian [online]*, *22*.

Burns, N., & Grove, S. (2001). Selecting a research Design 4* ed. *The Practice of science*.

Butler, S. (2016). Bangladesh fashion factory safety work severely behind schedule. *The Guardian*.

Bylund, P. L., & McCaffrey, M. (2017). A theory of entrepreneurship and institutional uncertainty. *Journal of Business Venturing*, *32*(5), 461-475.

Cameron, K. (2016). A study of organisational effectiveness and its predictors. *Management Science*, *62*(1), 87-112.

Carter, C. R., & Easton, P. L. (2011). Sustainable supply chain management: evolution and future directions. *International journal of physical distribution & logistics management*.

Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. *International journal of physical distribution & logistics management*.

Chen, S., Zhang, Q., & Zhou, Y. P. (2019). Impact of supply chain transparency on sustainability under NGO scrutiny. *Production and Operations Management*, *28*(12), 3002-3022.

Chin, W. W. (1998). Commentary: Issues and opinion on structural equation modeling. *MIS Quarterly*, vii–xvi

Cohen, J. (1988). The analysis of variance and covariance. *Statistical Power Analysis for the Behavioural Sciences*.

Cho, S. H., Fang, X., Tayur, S., & Xu, Y. (2019). Combating child labor: Incentives and information disclosure in global supply chains. *Manufacturing & Service Operations Management*.

Cohen, L., Manion, L., & Morrison, K. (2007). Observation. *Research methods in education*, *6*, 396-412.

Cohen, L., Manion, L., & Morrison, K. (2011). Planning educational research. *Research methods in education. New York: Routledge Editors*.

Combs, J. G., Crook, T. R., & Shook, C. L. (2017). The dimension of organisational performance and its implications for strategic management research. In D. J. Ketchen & D. D. Bergh (Eds.), *Research methodology in strategy and management* (pp. 259-286). San Diego: Elsevier.

Companies Act 1963 (Act 179), *Ghana Publishing Company Limited*

Companies Act 2019 (Act 992), *Ghana Publishing Company Limited*

Corder, G. W., & Foreman, D. I. (2009). Nonparametric statistics: an introduction. *Nonparametric statistics for non-statisticians: a step-by-step approach. Hoboken: Wiley*.

Costello, A. M. (2013). Mitigating incentive conflicts in inter-firm relationships: Evidence from long-term supply contracts. *Journal of Accounting and Economics*, *56*(1), 19-39.

Craig, N. Lim, W.S., Reczek, R. Tang, C.S. 2017. *The value of disclosing materials and labor costs*. Survey Report. UCLA Anderson School.

Creswell, J. W. (2014). *A concise introduction to mixed methods research*. SAGE publications.

Crotty, M. (2020). *The foundations of social research: Meaning and perspective in the research process*. Routledge.

Crotty, M., (1998), *The Foundations of Social Research: Meaning and Perspective in the Research Process*, Allen and Unwin

Čuš-Babič, N., Rebolj, D., Nekrep-Perc, M., & Podbreznik, P. (2014). Supply-chain transparency within industrialised construction projects. *Computers in Industry*, *65*(2), 345-353.

Deimel, M., Frentrup, M., & Theuvsen, L. (2008). Transparency in food supply chains: empirical results from German pig and dairy production.

Desouza, K. C., Chattaraj, A., & Kraft, G. (2003). Supply chain perspectives to knowledge management: research propositions. *Journal of knowledge Management*. *7*(3), 129–138.

DFID (2018). *Creating economic opportunities for the agri-food sector in Ghana: Learning Journey on Changing Food Systems*. Accra Ghana.

Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS Quarterly*, *39*(2), 297–316.

Dillman, D. A. (2011). *Mail and Internet surveys: The tailored design method--2007 Update with new Internet, visual, and mixed-mode guide*. John Wiley & Sons.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organisational fields. *American Sociological Review*, *48*(2), 147–160.

Doh, J. P., Rodriguez, P., Uhlenbruck, K., Collins, J., & Eden, L. (2003). Coping with corruption in foreign markets. *Academy of Management Perspectives*, *17*(3), 114-127.

Dörnhöfer, M., Schröder, F., & Günthner, W. A. (2016). Logistics performance measurement system for the automotive industry. *Logistics Research*, *9*(1), 1-26.

Dou, Y., Zhu, Q., & Sarkis, J. (2018). Green multi-tier supply chain management: An enabler investigation. *Journal of Purchasing and Supply Management*, *24*(2), 95-107.

Douglas, N. K. (2015). *Internal control and its contributions to organisational efficiency and effectiveness: A case study of ECOBANK Ghana Limited*. Unpublished master's thesis, Kwame Nkrumah University of Science and Technology, Kumasi

Drucker, P. E. (2014). *The emerging theories of performance* (3rd ed.). New York: University Press.

Dwumfour, R. A., & Ntow-Gyamfi, M. (2018). Natural resources, financial development and institutional quality in Africa: is there a resource curse?. *Resources Policy*, *59*, 411-426.

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of management review*, *23*(4), 660-679.

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business strategy and the environment*, *11*(2), 130-141.

Eadie, R., & Rafferty, S. (2014). Do corporate social responsibility clauses work? A contractor perspective. *International Journal of Procurement Management*, *7*(1), 19-34.

Easterly, W., & Levine, R. (1997). Africa's growth tragedy: policies and ethnic divisions. *The quarterly journal of economics*, *112*(4), 1203-1250.

Egels-Zandén, N., & Hansson, N. (2016). Supply chain transparency as a consumer or corporate tool: The case of Nudie Jeans Co. *Journal of Consumer Policy*, *39*(4), 377-395.

Egels-Zandén, N., Hulthén, K., & Wulff, G. (2015). Trade-offs in supply chain transparency: the case of Nudie Jeans Co. *Journal of Cleaner Production*, *107*, 95-104.

Elbra, A. D. (2013). The forgotten resource curse: South Africa's poor experience with mineral extraction. *Resources Policy*, *38*(4), 549-557.

Environment Protection Agency Act, 1994 (Act 490), *Ghana Publishing Company Limited*

Estampe, D., Lamouri, S., Paris, J. L., & Brahim-Djelloul, S. (2013). A framework for analysing supply chain performance evaluation models. *International Journal of Production Economics*, *142*(2), 247-258.

Everett, R. V. (1939). Building local teachers' associations. *Peabody Journal of Education*, *17*(2), 93–99.

Fahimnia, B., Jabbarzadeh, A., & Sarkis, J. (2018). Greening versus resilience: A supply chain design perspective. *Transportation Research Part E: Logistics and Transportation Review*, *119*, 129-148.

Fernando, Y., & Saththasivam, G. (2017). Green supply chain agility in EMS ISO 14001 manufacturing firms: empirical justification of social and environmental performance as an organisational outcome. *International Journal of Procurement Management*, *10*(1), 51-69.

Food and Drugs Law, 1992 [PNDC 305B]), *Ghana Publishing Company Limited*

Francisco, K., & Swanson, D. (2018). The supply chain has no clothes: Technology adoption of blockchain for supply chain transparency. *Logistics*, *2*(1), 2.

Fung, A. (2013). Infotopia: Unleashing the democratic power of transparency. *Politics & Society*, *41*(2), 183-212.

Gani, A., & Prasad, B. C. (2006). *Institutional Quality and Trade in Pacific Island Countries* (No. 20). ARTNet Working Paper Series.

Gardner, T. A., Benzie, M., Börner, J., Dawkins, E., Fick, S., Garrett, R., ... & Mardas, N. (2019). Transparency and sustainability in global commodity supply chains. *World Development*, *121*, 163-177.

Gaskin, J. (2012). Confirmatory factor analysis. Gaskination's StatWiki. *Retrieved May*, *18*, 2014.

Gaskin, J., Godfrey, S., & Vance, A. (2018). Successful system use: It's not just who you are, but what you do. *AIS Transactions on Human-Computer Interaction*, *10*(2), 57–81

Ghana Export Promotion Authority [GEPA] (2018). *Report on analysis of non-traditional export statistics*

Ghana Labour Act 2003 (Act 651). *Ghana Publishing Company Limited*

Ghana Statistical Service [GSS] (2015). *Ghana Enterprise Survey*. Accra: Ghana Statistical Service.

Ghana Statistical Service [GSS] (2016). *Summary Report: Integrated Business Establishment Survey*. Accra: Ghana Statistical Service.

Ghana Statistical Service [GSS] (2018). *Summary report: integrated business establishment survey*.

Ghana Statistical Service [GSS] (2020). *Rebased 2013-2019 AnnualGross Domestic Product*. Accra: Ghana Statistical Service.

Glover, J. L., Champion, D., Daniels, K. J., & Dainty, A. J. (2014). An Institutional Theory perspective on sustainable practices across the dairy supply chain. *International Journal of Production Economics*, *152*, 102-111.

Gravetter, F. J., & Forzano, L. B. (2010). Research methods for the behavioral sciences (Gravetter). *Belmont: Cengage Learning*.

Green, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*.

Greer, B. T., & Purvis, J. G. (2016). Corporate supply chain transparency: California's seminal attempt to discourage forced labour. *The International Journal of Human Rights*, *20*(1), 55-77.

Grimm, J. H., Hofstetter, J. S., & Sarkis, J. (2018). Interrelationships amongst factors for sub-supplier corporate sustainability standards compliance: an exploratory field study. *Journal of Cleaner Production*, *203*, 240-259.

Grob, S., & Benn, S. (2014). Conceptualising the adoption of sustainable procurement: an institutional theory perspective. *Australasian Journal of Environmental Management*, *21*(1), 11-21.

Gupta, S., & Zeithaml, V. (2006). Customer metrics and their impact on financial performance. *Marketing science*, *25*(6), 718-739.

Hair, J. F., Jr, Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced issues in partial least squares structural equation modeling*. saGe publications.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). *When to use and how to report the results of PLS-SEM*. *European business review*.

Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, *53*(4), 566–584.

Hallebone, E., & Priest, J. (2008). *Business and management research: paradigms and practices*. Macmillan International Higher Education.

Han, G., & Dong, M. (2015). Trust-embedded coordination in supply chain information sharing. *International journal of production research*, *53*(18), 5624-5639.

Handfield, R. B. (1993). A resource dependence perspective of just-in-time purchasing. *Journal of Operations Management*, *11*(3), 289-311.

Harbert, T. (2020). Supply chain transparency, explained.

Hartley, R. V. (1928). Transmission of information 1. *Bell System Technical Journal*, *7*(3), 535–563.

Hartley, R. V. (1942). A more symmetrical Fourier analysis applied to transmission problems. *Proceedings of the IRE*, *30*(3), 144-150.

Hazen, B. T., Boone, C. A., Ezell, J. D., & Jones-Farmer, L. A. (2014). Data quality for data science, predictive analytics, and big data in supply chain management: An introduction to the problem and suggestions for research and applications. *International Journal of Production Economics*, *154*, 72-80.

Helou, M. M., & Caddy, I. N. (2006). Definition problems and a general systems theory perspective in supply chain management. *Problems and Perspectives in Management*, (4, Iss. 4), 77-83.

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organisational Research Methods, 17* (2), 182–209.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

Heras-Saizarbitoria, I., & Boiral, O. (2012). Is ISO 9001 really effective for the global supply chain management?: a preliminary exploratory analysis on customer-suppliers relationships in China. *Is ISO 9001 really effective for the global supply chain management?: a preliminary exploratory analysis on customer-suppliers relationships in China*, 29-41.

Heras-Saizarbitoria, I., & Boiral, O. (2013). ISO 9001 and ISO 14001: towards a research agenda on management system standards. *International Journal of Management Reviews*, *15*(1), 47-65.

Hirsch, P. M. (1975). Organizational effectiveness and the institutional environment. *Administrative science quarterly*, 327–344.

Hughes, Everett C. (1939). "Institutions." Pp. 281-330 in *An Outline of the Principles of Sociology*, Robert E. Park, ed. New York: Barnes & Noble.

Hung, W. H., Ho, C. F., Jou, J. J., & Tai, Y. M. (2011). Sharing information strategically in a supply chain: antecedents, content and impact. *International Journal of Logistics: Research and Applications*, *14*(2), 111-133.

Hutchins, M. J., & Sutherland, J. W. (2008). An exploration of measures of social sustainability and their application to supply chain decisions. *Journal of cleaner production*, *16*(15), 1688-1698.

Hwarng, B., & Yuan, X. (2016). Din Tai Fung: The art of the dumpling. *National University of Singapore Business School Case W*, *16198*.

Iacobucci, D., & Hopkins, N. (1992). Modeling dyadic interactions and networks in marketing. *Journal of marketing research*, *29*(1), 5-17.

International Trade Centre (2021). *SME Competitiveness Outlook 2021: Empowering the Green Recovery*

International Trade Centre [ITC] (2016). *SME Competitiveness in Ghana: Alliances for Action.* ITC, Geneva.

Irland, L. C. (2007). Developing markets for certified wood products: greening the supply chain for construction materials. *Journal of Industrial Ecology*, *11*(1), 201-216.

Irland, L. C. (2017). Singing waters: Unplanned conservation on four Northern Maine Rivers. *Appalachia*, *68*(2), 11.

Johnson, B. (2014). Ethical issues in shadowing research. *Qualitative Research in Organizations and Management: An International Journal*.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), 112-133.

Junaidu, M. K. & Sunusi G. (2014). Impact of working capital management on the profitability of Quoted Nigerian cements companies. *International Journal of Advanced studies in Business Strategies and Management*, *2*(1), 126-138

Kalfagianni, A. (2006). Transparency in the food chain: policies and politics.

Kalkanci, B., Ang, E., & Plambeck, E. L. (2016). Strategic disclosure of social and environmental impacts in a supply chain. In *Environmentally responsible supply chains* (pp. 223-239). Springer, Cham.

Kanbur, R., Steenkamp, F., Rooney, C., & Bhorat, H. (2017). Sub-Saharan Africa's Manufacturing Sector: Building Complexity.

Katz, D., & Kahn, R. L. (1978). Organizations and the system concept. *Classics of organization theory*, *80*, 480.

Kaufmann, D., & Kraay, A. (2002). Governance indicators, aid allocation and Millennium Challenge Account. *Aid Allocation and Millennium Challenge Account (December 2002)*.

Kaufmann, D., Kraay, A., & Zoido-Lobatón, P. (1999). *Aggregating governance indicators* (Vol. 2195). world Bank publications.

Kelly, A. P. (2016). *Social research methods*. London: University of London.

Kendall, M. G., & Smith, B. B. (1939). The problem of m rankings. *The annals of mathematical statistics*, *10*(3), 275-287.

Kock, N. (2012). WarpPLS 5.0 user manual.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (Ijec)*, *11*(4), 1–10.

Kock, N. (2017). Common method bias: a full collinearity assessment method for PLS-SEM. In *Partial least squares path modeling* (pp. 245-257). Springer, Cham.

Koetsier, J. (2017). Blockchain beyond bitcoin: how blockchain will transform business in 3–5 years. *Mobile economist*.

Kraft, T., Valdés, L., & Zheng, Y. (2018). Supply chain visibility and social responsibility: Investigating consumers' behaviours and motives. *Manufacturing & Service Operations Management*, *20*(4), 617-636.

Krause, D., & Ellram, L. M. (2014). The effects of the economic downturn on interdependent buyer–supplier relationships. *Journal of Business Logistics*, *35*(3), 191-212.

Krosnick, J. A. (1999). Survey research. *Annual review of psychology*, *50*(1), 537-567.

Kshetri, N. (2018). 1 Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management*, *39*, 80-89.

Kuhn, T. S. (1970). Logic of discovery or psychology of research. I. Lakatos and A. Musgrave, eds. Criticism and the Growth of Knowledge. Cambridge University Press, Cambridge, UK, 1–23.

Kumar, N., & Ganguly, K. K. (2020). External diffusion of B2B e-procurement and firm financial performance: role of information transparency and supply chain coordination. *Journal of Enterprise Information Management*.

Lafontaine, F., Perrigot, R., & Wilson, N. E. (2017). The quality of institutions and organizational form decisions: Evidence from within the firm. *Journal of Economics & Management Strategy*, *26*(2), 375-402.

Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. *Industrial marketing management*, *29*(1), 65–83.

Lamming, R. C., Caldwell, N. D., Harrison, D. A., & Phillips, W. (2002). Transparency in supply relationships: concept and practice. *IEEE Engineering Management Review*, *30*(3), 70-70.

Lee, S. M., Kim, S. T., & Choi, D. (2012). Green supply chain management and organizational performance. *Industrial Management & Data Systems*.

Lee, Y. J., & Bateman, A. H. (2019). Corporate supply chain disclosures and factors determining the disclosure approaches: A palm oil case study.

Legendre, P. (2005). Species associations: the Kendall coefficient of concordance revisited. *Journal of agricultural, biological, and environmental statistics*, *10*(2), 226-245.

Lin, R. J., & Sheu, C. (2012). Why do firms adopt/implement green practices?–an institutional theory perspective. *Procedia-Social and Behavioral Sciences*, *57*, 533-540.

Linich, D. (2014). The path to supply chain transparency. *A practical guide to defining, understanding, and building supply chain transparency in a global economy*.

LiPuma, J. A., Newbert, S. L., & Doh, J. P. (2013). The effect of institutional quality on firm export performance in emerging economies: a contingency model of firm age and size. *Small Business Economics*, *40*(4), 817-841.

Litan, R., Baumol, W., & Schramm, C. J. (2008). Good capitalism, bad capitalism, and the economics of growth and prosperity.

Liu, H., Ke, W., Wei, K. K., Gu, J., & Chen, H. (2010). The role of institutional pressures and organizational culture in the firm's intention to adopt internet-enabled supply chain management systems. *Journal of Operations Management*, *28*(5), 372-384.

Llach, J., Marimon, F., & Bernardo, M. (2011). ISO 9001 diffusion analysis according to activity sectors. *Industrial Management & Data Systems*.

Lose, T., Nxopo, Z., Maziriri, E., & Madinga, W. (2016). Navigating the role of business incubators: A review on the current literature on business incubation in South Africa. *Acta Universitatis Danubius. Œconomica*, *12*(5).

Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE transactions on professional communication*, *57*(2), 123-146.

Madsen, P. (2009). Dynamic transparency, prudential justice, and corporate transformation: Becoming socially responsible in the internet age. *Journal of Business Ethics*, *90*(4), 639-648.

Marozzi, M. (2014). Construction, dimension reduction and uncertainty analysis of an index of trust in public institutions. *Quality & Quantity*, *48*(2), 939-953.

McPherson, M. A. (1996). Growth of micro and small enterprises in southern Africa. *Journal of development economics*, *48*(2), 253-277.

Mead, D. C., & Liedholm, C. (1998). The dynamics of micro and small enterprises in developing countries. *World development*, *26*(1), 61-74.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business Logistics*, *22*(2), 1–25.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American journal of sociology*, *83*(2), 340-363.

Meyer, J. W., Rowan, B., Powell, W. W., & DiMaggio, P. J. (1991). The new institutionalism in organizational analysis. *The new institutionalism in organizational analysis*, 41-62.

Millar, M. M., & Dillman, D. A. (2011). Improving response to web and mixed-mode surveys. *Public opinion quarterly*, *75*(2), 249-269.

Miller, A. (1978). *Conceptual systems theory: A critical review*. Genetic Psychology Monographs.

Ministry of Trade and Industry (MoTI) (2018). *Integrated Business Establishment Survey (IBES) Phase II*: *Comprehensive Sectoral Report*. Accra: Ministry of Trade and Industry.

Miyare, S. (2014). *Supply chain management practices and profitability of Kenolkobil Limited* (Doctoral dissertation, University of Nairobi).

Modi, S. B., & Mabert, V. A. (2007). Supplier development: Improving supplier performance through knowledge transfer. *Journal of operations management*, *25*(1), 42-64.

Mohan, B., Buell, R. W., & John, L. K. (2019). Lifting the veil: the benefits of cost transparency. *Harvard Business School NOM Unit Working Paper*, (15-017), 15-017.

Mol, A. P. (2015). Transparency and value chain sustainability. *Journal of Cleaner Production*, *107*, 154-161.

Monczka, R. M., Carter, P. L., Scannell, T. V., & Carter, J. R. (2011). Innovation sourcing: Contributing to company competitiveness. *CAPS Research. CAPS Research. Retrieved January*, *9*, 2013.

Morgan, T. R., Richey Jr, R. G., & Ellinger, A. E. (2018). Supplier transparency: scale development and validation. *The International Journal of Logistics Management*.

Morgan, T. R., Richey, R. G., & Autry, C. W. (2015). The evolution of supply chain transparency: a scale development. In *Decision Sciences Institute 2015 Annual Conference* (pp. 21-24).

Morton, S. M., Bandara, D. K., Robinson, E. M., & Carr, P. E. A. (2012). In the 21st Century, what is an acceptable response rate? *Australian and New Zealand Journal of Public Health*, *36*(2), 106–108.

Naidoo, K., & Ndikumana, L. (2020). *Unit labor costs and manufacturing sector performance in Africa* (No. 2020-10). Working Paper.

Najmi, A., & Khan, A. A. (2017). Does supply chain involvement improve the new product development performance? A partial least square-structural equation modelling approach. *International Journal of Advanced Operations Management*, *9*(2), 122-141.

Najmi, A., Raza, S. A., & Qazi, W. (2018). Does statistics anxiety affect students' performance in higher education? The role of students' commitment, self-concept and adaptability. *International Journal of Management in Education*, *12*(2), 95-113.

Nichter, S., & Goldmark, L. (2009). Small firm growth in developing countries. *World development*, *37*(9), 1453-1464.

North, D. C. (1990). A transaction cost theory of politics. *Journal of Theoretical Politics*, *2*(4), 355–367.

North, D. C. (1993). Institutions and credible commitment. *Journal of Institutional and Theoretical Economics (Jite)/Zeitschrift Für Die Gesamte Staatswissenschaft*, 11–23.

Nuertey, D. (2015). *Sustainable supply chain management for Cocoa in Ghana* (Doctoral dissertation, Kwame Nkrumah University of Science and Technology).

Nyamah, E. Y., Jiang, Y., Feng, Y., & Enchill, E. (2017). *Agri-food supply chain performance: An empirical impact of risk*. Management Decision.

Nyquist, H. (1924). Certain factors affecting telegraph speed. *Transactions of the American Institute of Electrical Engineers*, *43*, 412-422.

O'mara, C. (2013). Performance measurement and strategic change. *Strategic Management Journal*, *17*(1), 178-182.

Obeng, B. A., Robson, P., & Haugh, H. (2014). Strategic entrepreneurship and small firm growth in Ghana. *International Small Business Journal*, *32*(5), 501-524.

Oglethorpe, D., & Heron, G. (2010). Sensible operational choices for the climate change agenda. *The International Journal of Logistics Management*.

Oliver, C. (1991). Strategic responses to institutional processes. *Academy of management review*, *16*(1), 145-179.

Osuala, E. C. (2001). *Introduction to research methods*. Onitsha African FEP publishers.

Ou, C. S., Liu, F. C., Hung, Y. C., & Yen, D. C. (2010). A structural model of supply chain management on firm performance. *International Journal of Operations & Production Management*.

OWOO, N. S., & LAMBON-QUAYEFIO, M. P. (2015). Industries without Smokestacks: The Agro-Processing Industry in Ghana-Evolution, Public Policy and Contribution to the Ghanaian Economy. *A UNU-Wider Project*.

Pagell, M., Wu, Z., & Wasserman, M. E. (2010). Thinking differently about purchasing portfolios: an assessment of sustainable sourcing. *Journal of supply chain management*, *46*(1), 57-73.

Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (2005). Supplier integration into new product development: coordinating product, process and

supply chain design. *Journal of operations management*, *23*(3-4), 371-388.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, *88*(5), 879.

Porta, R. L., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of political economy*, *106*(6), 1113-1155.

Prajogo, D., & Olhager, J. (2012). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics*, *135*(1), 514-522.

Prajogo, D., Huo, B., & Han, Z. (2012). The effects of different aspects of ISO 9000 implementation on key supply chain management practices and operational performance. *Supply Chain Management: An International Journal*.

Rajan, R. G., & Zingales, L. (2003). The great reversals: the politics of financial development in the twentieth century. *Journal of financial economics*, *69*(1), 5–50.

Ramanathan, U., & Gunasekaran, A. (2014). Supply chain collaboration: Impact of success in long-term partnerships. *International Journal of Production Economics*, *147*, 252-259.

Rampini, A. A., Sufi, A., & Viswanathan, S. (2014). Dynamic risk management. *Journal of Financial Economics*, *111*(2), 271-296.

Ravichandran, T., Lertwongsatien, C., & Lertwongsatien, C. (2005). Effect of information systems resources and capabilities on firm performance: A resource-based perspective. *Journal of management information systems*, *21*(4), 237-276.

Ray, S. G. (2019). *Submitted on May 10, 2019 in Partial Fulfillment of the Requirements for the Degree of Master of Applied Science in Supply Chain Management* (Doctoral dissertation, MASSACHUSETTS INSTITUTE OF TECHNOLOGY).

Ringle, C. M., Wende, S., & Becker, J. M. (2015). SmartPLS 3. *Boenningstedt: SmartPLS GmbH*, http://www.smartpls.com.

Robins, S. P. (2014). *Essentials of organisation behaviour* (7th ed.). New Jersey: Prentice Hall Inc.

Roy, W. (1997). *Socializing capital: The rise of the large industrial corporation in America*. Princeton, NJ: Princeton University Press.

Saani, A-J. (2013). Influence of compensation and supervision on private basic school teachers work performance in Ashaiman Municipality. *International Journal of Business and Social Science*, *4*(17) [Special Issue], 64-69.

Saeed Qureshi, M., & Te Velde, D. W. (2013). State-business relations, investment climate reform and firm productivity in sub-Saharan Africa. *Journal of International Development*, *25*(7), 912-935.

Saha, S., & Sen, N. (2017). A study on inventory model with negative exponential demand and probabilistic deterioration under backlogging. *Uncertain Supply Chain Management*, *5*(2), 77-88.

Sala-i-Martin, X., & Subramanian, A. (2013). Addressing the natural resource curse: An illustration from Nigeria. *Journal of African Economies*, *22*(4), 570-615.

Sarkis, J., Zhu, Q., & Lai, K. H. (2011). An organizational theoretic review of green supply chain management literature. *International journal of production economics*, *130*(1), 1-15.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6 ed.). utg. Pearson.

Scott, W. R. (1987). The adolescence of institutional theory. *Administrative science quarterly*, 493-511.

Scott, W. R. (1995). *Institutions and organizations* (Vol. 2). Thousand Oaks, CA: Sage.

Scott, W. R. (2008). Approaching adulthood: the maturing of institutional theory. *Theory and society*, *37* (5), 427–442.

Scott, W. R. (2013). *Institutions and organizations: Ideas, interests, and identities*. Sage publications.

Sekoenya, D. (2019). *Credit risk management, pricing strategies and performance of micro and small enterprises in the Cape Coast Metropolis* (Doctoral dissertation, University of Cape Coast).

Selznick, P. (1949). TVA and the Grassroots: A Study of Politics and Organization. Berkeley*: University of California Press*.

Sen, K. (2017). Does Institutional Quality Matter for Firm Performance? Evidence from India. *South Asia Economic Journal*, *18*(2), 184-213.

Sen, K., & Sinha, C. (2017). The location choice of US foreign direct investment: how do institutions matter?. *Journal of Institutional Economics*, *13*(2), 401-420.

Shannon, C. (1953). The lattice theory of information. *Transactions of the IRE Professional Group on Information Theory*, *1*(1), 105–107.

Shannon, C. E. (1948). A mathematical theory of communication. *The Bell system technical journal*, *27*(3), 379-423.

Shibin, K. T., Dubey, R., Gunasekaran, A., Hazen, B., Roubaud, D., Gupta, S., & Foropon, C. (2020). Examining sustainable supply chain management of SMEs using resource based view and institutional theory. *Annals of Operations Research*, *290*(1), 301-326.

Shleifer, A., & Vishny, R. W. (1993). Corruption. *The quarterly journal of economics*, *108*(3), 599-617.

Shou, Z., Zheng, X. V., & Zhu, W. (2016). Contract ineffectiveness in emerging markets: An institutional theory perspective. *Journal of Operations Management*, *46*, 38-54.

Sleuwaegen, L., & Goedhuys, M. (2002). Growth of firms in developing countries, evidence from Cote d'Ivoire. *Journal of development Economics*, *68*(1), 117-135.

SN, R. R., & Sen, K. (2017). Does institutional quality matter for firm performance? Evidence from India. *South Asia Economic Journal*, *18*(2), 184–213.

Sodhi, M. S., & Tang, C. S. (2019). Research opportunities in supply chain transparency. *Production and Operations Management*, *28*(12), 2946-2959.

Spekman, R. E., Kamauff, J. W., & Myhr, N. (1998). An empirical investigation into supply chain management: a perspective on partnerships. *Supply Chain Management: An International Journal*.

Standards Authority Act, 1973, *Ghana Publishing Company Limited*

Sufian, F., & Chong, R. R. (2018). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance, 14(2), 91-112.*

Sunday, K. J. (2015). Effective working capital management in small and medium scale enterprises (SMEs). *International Journal of Business and Management, 6*(9), 271-279.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5, pp. 481-498). Boston, MA: Pearson.

Tachizawa, E. M., & Wong, C. Y. (2014). Towards a theory of multi-tier sustainable supply chains: a systematic literature review. *Supply Chain Management: An International Journal*.

Teal, F. (1999). Why can Mauritius export manufactures and Ghana not?. *World Economy, 22*.

Tourangeau, R., Rips, L. J., & Rasinski, K. (2000). The psychology of survey response.

Trienekens, J. H., Wognum, P. M., Beulens, A. J., & van der Vorst, J. G. (2012). Transparency in complex dynamic food supply chains. *Advanced Engineering Informatics*, *26*(1), 55-65.

Vanacker, T., Zahra, S. A., & Holmes, R. M. (2021). Corporate entrepreneurship, country institutions and firm financial performance. *Journal of World Business*, *56*(3), 101162.

Venkatraman, N., & Ramanujam, V. (2010). Measurement of business economic performance: an examination of method convergent. *Journal of Management, 36*(1), 109-122.

Verhoef, P. C. (2003). Understanding the effect of customer relationship management efforts on customer retention and customer share development. *Journal of Marketing*, *67*(4), 30–45.

Villena, V. H., & Dhanorkar, S. (2020). How institutional pressures and managerial incentives elicit carbon transparency in global supply chains. *Journal of Operations Management*, *66*(6), 697-734.

Wang, Z., Ye, F., & Tan, K. H. (2014). Effects of managerial ties and trust on supply chain information sharing and supplier opportunism. *International journal of production Research*, *52*(23), 7046-7061.

Weber, L., & Mayer, K. (2014). Transaction cost economics and the cognitive perspective: Investigating the sources and governance of interpretive uncertainty. *Academy of Management Review*, *39*(3), 344-363.

White, C. J. (2015). *Research: A practical guide* (2nd ed.). Pretoria: Ithuthuko Investments Publishing

Wickramasinghe, G. L. D., & Wickramasinghe, V. (2017). Implementation of lean production practices and manufacturing performance: the role of lean duration. *Journal of Manufacturing Technology Management*.

Williamson, O. E. (2008). Outsourcing: Transaction cost economics and supply chain management. *Journal of Supply Chain Management*, *44*(2), 5–16.

Winter, M., & Knemeyer, A. M. (2013). Exploring the integration of sustainability and supply chain management: Current state and opportunities for future inquiry. *International Journal of Physical Distribution & Logistics Management*.

Wognum, P. M., H. Bremmers, J. H. Trienekens, J. G. A. J. Van Der Vorst, and J. M. Bloemhof, (2011). "Systems for Sustainability and Transparency of food Supply Chains – Current Status and Challenges." *Advanced Engineering Informatics* 25 (1): 65–76.

Wong, K. K. K. (2016). Mediation analysis, categorical moderation analysis, and higher-order constructs modeling in Partial Least Squares Structural Equation Modeling (PLS-SEM): A B2B Example using SmartPLS. *Marketing Bulletin*, *26*(1), 1-22.

Wong, W. P., & Tang, C. F. (2018). The major determinants of logistic performance in a global perspective: evidence from panel data analysis.

World Bank (2020). *World development indicators*. World Bank. https://databank.worldbank.org/ source/world-development-indicators#

Wu, J. Z., Santoso, C. H., & Roan, J. (2017). Key factors for truly sustainable supply chain management: An investigation of the coal industry in Indonesia. *The International Journal of Logistics Management*.

Wu, L., Chuang, C. H., & Hsu, C. H. (2014). Information sharing and collaborative behaviors in enabling supply chain performance: A social exchange perspective. *International Journal of Production Economics*, *148*, 122-132.

Yakovleva, N., Sarkis, J., & Sloan, T. (2012). Sustainable benchmarking of supply chains: the case of the food industry. *International journal of production research*, *50*(5), 1297-1317.

Yamane, T. (1967). *Statistics: An introductory analysis*. New York, Herper and Row. (No. HA29 Y2 1967).

Zeng, A. Z., & Pathak, B. K. (2003). Achieving information integration in supply chain management through B2B e-hubs: concepts and analyses. *Industrial Management & Data Systems*.

Zhu, Q., Geng, Y., & Lai, K. H. (2010). Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. *Journal of Environmental Management*, *91*(6), 1324-1331.

Zhu, S., Song, J., Hazen, B. T., Lee, K., & Cegielski, C. (2018). How supply chain analytics enables operational supply chain transparency: An organisational information processing theory perspective. *International Journal of Physical Distribution & Logistics Management*.

Zucker, L. G. (1987). Institutional theories of organization. *Annual review of sociology*, *13*(1), 443– 464.

APPENDIX

QUESTIONNAIRE

University of Cape Coast
College of Humanities & Legal Studies
School of Business
Dept. of Mkt & Supply Chain Mgt

Supply Chain Transparency and Firm Performance in Ghana: The Role of Institutional Quality

Hello respondent,

This questionnaire seeks to gather information on ***Supply Chain Transparency and Firm Performance in Ghana: The Role of Institutional Quality.*** You are kindly requested to respond to all applicable questions and provide responses reflecting the ground's situation with utmost good faith. The information required here is purely for academic purposes. Hence, the ultimate privacy and confidentiality of the information provided as a respondent are highly assured and respected.

Consent

"I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any question I have asked to have been answered to my satisfaction. I consent voluntarily to participate as a respondent in this study and understand that I have the right to withdraw from the study at any time without any penalty or consequences".

Yes ☐ No ☐

Thank you for your participation.

Prince Bright Attatsi
(SB/PST/19/0001)

SECTION A

Personal and Firm Information. Please tick the most appropriate section.

1. Kindly indicate your position
   - Procurement/Supply chain officer/manager
   - Product/Production manager
   - Store manager
   - Quality Assurance Manager
   - Others, please specify…….

2. What is the size of your firm?
   - Micro Scale Enterprise (1-5 employees)
   - Small Scale Enterprise (6-30 employees)
   - Medium Scale Enterprise (31-100 employees)
   - Large Scale Enterprise (Over 100 employees)
3. How old is your firm?
   - Less than 6 years
   - 6 to 10 years
   - Over 10 years
4. How would you describe the location of your firm?
   - Urban
   - Rural
5. Kindly indicate your firm's ownership type
   - Private company
   - Public Company
   - Partnership
   - Sole Proprietorship
6. Does your firm undertake supply chain transparency practices (current or past)?
   - Yes
   - No

SECTION B (Supply Chain Transparency Practices)

This section seeks data on the supply chain transparency practices used in your organisation to ensure transparency in your supply chain. You are required to rank the practices provided per their usage in your firm from 1 to 13.

Transparency Practices/Initiatives	Rank
Supplier audits/factory audits	
Gender orientations	
Environmental sustainability permits/agreements	
Supplier transparency/compliance agreements	
Sustainability certifications	
Publication of supplier details	
Industry certifications	
Product/standard certification	
Tax registration and compliance	
Salaries and working condition reviews and publications	
Price regulations and publications	
Appropriate reverse logistic systems (tracing and tracking enabled)	
Effective and Efficient information sharing system	

SECTION C (Supply Chain Transparency Dimensions)

This section seeks to gather responses on the state of supply chain transparency of your Organisation. Kindly use the five-point Likert scale to indicate your level of agreement with the statements in each area.

The scale is 1-Disagree, 2-Least Agree, 3-Fairly Agree, 4-Much Agree, and 5-Strongly Agree. Tick [√] as applicable.

Supply chain Visibility (ability to trace and track products in the supply chain)

No	Statements	1	2	3	4	5
1	We are very familiar with the individual upstream supply chain processes and their members					
2	We have mechanisms in place to trace materials the upstream of our supply chain					
3	Our suppliers have mechanisms in place to enable us to gain insight into their operations					
4	Production, cultivation, or farming methods and production processes of our suppliers are visible and verifiable					
5	We ensure and verify sustainability conditions in our suppliers' environment					
6	Our suppliers can track their parts and components as they move in the supply chain					
7	We can identify all our suppliers					
8	Our company have a publicly available list of its suppliers					
9	We can identify all tiers in our suppliers' network or our supply chain					
10	We provide mechanisms in our products that allow us to know their current location in the supply chain					
11	We provide mechanisms in our products that allow us to know where they are going and when they will get there in the supply chain					
12	We have mechanisms in place to enable our customers to have access to information on our suppliers of parts and components in our products					
13	We provide sufficient information on our production processes for our customers and put mechanisms in place for them to verify it					
14	We have mechanisms in place for our customers to verify our sustainability conditions in our environment					
15	We have mechanisms in place for our customers to trace our products to the upstream of the supply chain					

Operations and Sustainability Conditions in the Firm

No	Statements	1	2	3	4	5
1	We ensure that our suppliers in our supply chain					

	adhere to industry standards					
2	We source from only regulated and certified suppliers					
3	We buy only conflict-free supplies (non-conflict materials or minerals)					
4	We ensure that our suppliers have mechanisms in place to monitor and ensure that our suppliers maintain general sustainability in their operating environment					
5	We always ensure that our operations conform to the industry standards					
6	We have obtained the relevant licenses and certifications to operate in our industry					
7	We adhere to the quality standards of our industry					
8	We ensure that our production processes and outputs conform to international standards					
9	We have mechanisms in place reduce the negative impacts of our operations on the environment					
10	We provide incentives for users of our products to ensure environmental sustainability in their downstream					
11	We provide sufficient information on use, possible adverse effects, handling and disposal of our products					
12	We provide effective reverse logistics for our products and unused parts in our products					
13	We have mechanisms in place to enable our customers to have access to information on our suppliers of parts and components in our products					
14	We provide sufficient information on our production processes for our customers and put mechanisms in place for them to verify it					
15	We always provide details on ingredients, parts, and components of our products					
16	We provide compensation both in cash and kind to parties negatively affected by our operations					
17	Our products have been certified with social labels					
18	Our code of conduct is available to the general public					
19	Our suppliers' code of conduct is available to the public					
20	We have copies of the codes of conduct of our suppliers					

Cost and other Financial Transparency

No	Statements	1	2	3	4	5
1	Our suppliers declare cost information on materials supplied to us					
2	Our suppliers provide details on their cost and profitability in their annual reports and other channels as applicable in their industries					
3	We publish the cost components of our products on our website and other reports as applicable					
4	We publish the prices of our products on our website and other bulletins for the public					
5	We report on our profitability to the public					
6	We regulate the prices of our products in our distribution channels					
7	We always have our accounts audited					
8	We report on noncompliance (any deviation from the Code of Conduct or equivalent set of rules) in our audited accounts to the public					
9	Our suppliers always have their accounts audited					
10	Our suppliers report on noncompliance in their audited accounts to the public					
11	Companies in our downstream have their accounts audited and published to the public					
12	Companies in our downstream report on noncompliance in their audited accounts					

SECTION D (Institutional Quality)

This section seeks to collect responses to your view of the institutions' quality of operations in your business environment.

Kindly use the five-point Likert scale as 1-Disagree, 2-Least Agree, 3-Fairly Agree, 4-Much Agree, and 5-Strongly Agree. Tick [√] as applicable.

No	Statements	1	2	3	4	5
1	The number of direct regulatory institutions in our operating environment adequate					
2	The percentage of time we spend dealing with regulations or regulatory agencies is appropriate					
3	The direct regulatory agencies visit and inspect our operations as prescribed in their code of conduct					
4	The auxiliary regulatory agents such as tax officials visit our firm and carry out their duties as required by law					
5	In inspections or visits, the regulatory agents request					

	or expect a gift or informal payment from us					
6	When our firm does business with the government, at least 10% per cent of the contract value is typically paid in informal payments or gifts to secure the contract.					
7	On average, we spend at least 10% per cent of our total yearly profit to pay to public officials in informal payments or gifts					
8	On application for business registration or renewals, the officials always request or expect an informal gift or payment					
9	On application for operating licenses other than business registration, the officials always expect or request an informal gift or payment					
10	In other exercises such as scheduled inspections by public authorities, we are always requested or expected to pay for the expenses of the agents or authorities					

SECTION E (Firm Performance)

This section looks at firm performance in the context of supply chain transparency. Kindly use the five-point Likert scale provided to indicate your level of agreement with the statements in each area.

The scale is 1-Disagree, 2-Least Agree, 3-Fairly Agree, 4-Much Agree, and 5-Strongly Agree. Tick [√] as applicable.

Operational Performance

No	Statements	1	2	3	4	5
1	Our products are available in the right amounts at the right time					
2	We have an adaptable and flexible supply chain that responds to actual needs					
3	Our supply chain readily adapts to changing market requirements or customer preferences					
4	The acquisition price of the supplies are very reasonable					
5	We have a very economical process and coordination costs					
6	Our total costs of acquiring supplies from our suppliers are very reasonable					
7	"Our compliance with quality requirements other than ecological and social compliance is satisfactory"					

8	The product safety of our company is highly commendable					

Social Performance

No	Statements	1	2	3	4	5
1	We avoid the use of exploitative forced and child labour					
2	We always ensure the payment of fair and adequate wages for all workers in the supply chain					
3	"We always advocate for the avoidance of all forms of labour discrimination in the supply chain					
4	We advocate for the freedom of association and protection of rights to organize and to bargain collectively for all workers in the supply chain					
5	We ensure that farming and production conditions throughout the supply chain do not endanger the health of workers or residents in the area					
6	We ensure the improvement of the social environment in regions of origin, farming areas, and production sites (e.g., educational system, health care, and food supply for the local population)					
7	We ensure the avoidance of non-compliant business practices throughout the supply chain (e.g., bribery, intimidation and price agreements)					
8	We always ensure Fairtrade with all participants in the supply chain and avoid one-sided dependencies or insolvencies in the chain					
9	We always ensure the fair treatment of animals					
10	We work hard to avoid the occurrence of scandals relating to social injustices in the supply chain of this product (at our suppliers and further down the supply chain					

Ecological Performance

No	Statements	1	2	3	4	5
1	We ensure the conservation of the environment in the region of origin/in the agricultural area and production sites					
2	We always ensure the Wildlife conservation/protection of biological diversity in our supply chain					
3	We always advocate for the avoidance of all forms of labour discrimination in the supply chain					

4	"We always advocate for the conservation of natural resources and ecosystems in the supply chain"					
5	We ensure water protection for consumption and pollution					
6	We ensure the avoidance of greenhouse gas emissions in the supply chain					
7	We ensure the avoidance of other polluting emissions in the supply chain					
8	We always ensure the avoidance of harmful substances and processes in the supply chain					
9	We always ensure the use of environmentally friendly transportation systems in the supply chain					
10	We work hard to avoid waste or encourage the recycling of waste					
11	We work hard to avoid the occurrence of environmental scandals in the supply chain at our suppliers and further down the supply chain					

Relationship Performance

No	Statements	1	2	3	4	5
1	The sourcing projects lead to an ongoing increase in the valuable know-how at the involved companies in the supply chain					
2	The sourcing project leads to a significant increase in the innovation capacity of the involved companies					
3	The sourcing projects lead to long-term positive effects concerning the performance of our supply chain					
4	We have a stable business relationship with the suppliers in our supply chain					
5	All players in our supply chain are delighted with the business relationship					
6	A long-term relationship with the suppliers is guaranteed					

Supplier Performance

No	Statements	1	2	3	4	5
1	Our suppliers always strive to supply us with quality products					
2	Our suppliers always ensure timely delivery					
3	Our suppliers always deliver products devoid of in-transit damages					
4	Our suppliers always supply us with products at the					

	best prices available in the market					
5	Our suppliers are very responsive to requests for changes					
6	Our suppliers are always ready to offer service support or technical assistance					
7	Our suppliers provide advanced product technology					
8	Our suppliers provide advanced process technology					
9	Our suppliers provide cost reductions options					
10	Our suppliers support product cycle time reductions					
11	Our suppliers provide transport cost reductions					

End of Survey
Thank You