

**AN EVALUATION OF BARRIERS TO INFORMATION SHARING BETWEEN
LUSAKA BASED LOGISTICS-SUPPLY CHAIN COMPANIES AND
REGULATORY AUTHORITIES IN ZAMBIA.**

BY

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Requirements for the Award of Master of Operations, Projects, and Supply Chain
Management.**

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DECLARATION

I, **Jeff Mwape** do hereby declare that this work is my original work achieved through personal reading and research. The work has never been submitted to the University of Zambia or any other universities. All sources of data used and literature on related works previously done by others, used in the production of this dissertation have been duly acknowledged. If any omission has been, made, it is not by choice but by error.

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APPROVAL

The dissertation by **Jeff Mwape** approved as a fulfillment of the requirements for the award of the degree of Master of Science in Operations, Projects and Supply Chain Management

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ABSTRACT

Supply chains globally are the main mechanism through which economies create value. Therefore, creating efficiencies in logistics-supply chain operations is the key to unlocking value that can increase welfare of economic agents. Information sharing amongst participants in supply chains is a recognized strategy for generating economic benefits through reduction in uncertainties, speeding up operations, eliminating bottlenecks, and improving resource allocation decisions. Past studies focused largely on information sharing between private sector operators with collaborations between the private sector logistics-supply chain companies and regulatory authorities who are relevant to their daily operations infrequently investigated. The purpose of this study was to delineate areas of possible collaboration between regulatory bodies and logistics-supply chain companies as well as to understand barriers and inhibitors to information sharing in Zambia using mixed methods research. Data was, collected by self-administered questionnaire interviews from a convenience sample of 88 respondents (55 from logistics-supply chain companies and 33 from regulatory authorities). The data was, analyzed by correlational design using the Statistical Package for Social Sciences (SPSS). Findings of the study were that there was significant scope for collaborative information sharing between logistics-supply chain companies and relevant regulatory authorities in Zambia. However, inhibitors of information sharing were mainly legal/policy framework. Various barriers that could be, surmounted included political influence and lack of best practice examples. Recommendations of the study included policy level discussions involving logistics-supply chain companies and regulatory authorities to create a broad model with supportive laws and policies for collaborative information sharing.

Key Words: Information Sharing Barriers/Inhibitors, Logistics-Supply Chain Operations, Supply Chain Collaborative Regulation

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LIST OF ACRONYMS

CIPS	Chartered Institute of Purchasing and Supply
DFID	Department for International Development
EFT	Electronic Fund Transfer
ETS	Electronic tax systems, payment and/or filling
GDP	Gross Domestic Product
GRZ	Government of the Republic of Zambia
ICTs	Information's and Communications Technologies
IS	Information Sharing
IMF	International Monetary Fund
IPCSA	International Port Community Systems Association
LEA	Law Enforcement Agency
LSC	Logistics and Supply Chain Companies
MIS	Management Information Systems
MoTC	Ministry of Transport and Communication
OECD	Organization of Economic Cooperation Development
POS	Point of Sale
RBs	Regulatory Bodies
RDA	Road Development Agency
RTGS	Real Time Gross Settlement
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences

TPINS	Tax Payers Identification Number
VAT	Value Added Tax
ZIPS	Zambia Institute of Purchasing and Supply
ZP	Zambia Police
ZRA	Zambia Revenue Authority

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

This research study intends to illuminate the scope for benefits of a well-coordinated information sharing framework between the supply chain companies and regulatory authorities in Zambia. The issues around information sharing in modern supply chains are an area of increasing scholarly interest as organizations globally seek for ways to harness efficiencies and mechanisms to increase effectiveness of operations for competitive advantage (Ambe & Badenhorst-Weiss, 2011). In this chapter of the dissertation, the background to the study is, laid out by considering advances in information communication technologies that have provided convenient platforms for information sharing amongst supply chain partners in various contexts globally. The chapter provides a brief overview of the theoretical underpinnings for the study as well as a few of the past empirical research studies that have focused on the key issues that arise in relation to information sharing amongst supply chain partners in general, and cases involving regulatory bodies and logistics-supply chain companies. The chapter also provides the statement of the problem as well as research objectives/hypotheses. It is no surprise that the business landscape is rapidly becoming more global due to improvements in communications, and this is impacting the way supply chain is, managed (Cagliano, et al., 2006). No area has been more affected by the trends in the global business environment than the supply chain (Bhalla, 2013; Christopher, 2016). It is notable that most manufacturing, distribution, sourcing of materials, invoicing and

returns have been, significantly impacted by the increased integration of a global customer and supplier base and many companies find existing technologies and processes and technology are not flexible enough for this new business environment (Adewole, 2005).

Zambia lies in the heart of Africa as a landlocked country with an area of 752,617Km² and a population of over 17 million people and as such depends mostly on cost effective road and railway transport for both import and export as well as for transit traffic to other neighboring countries (Sardanis, 2014). It is worth mentioning that Zambia has the potential of attracting more transit traffic and becoming a regional distribution center for all kinds and types of goods and commodities a well-functioning transport infrastructure network is put in place and if the physical and non-physical barriers to trade and transport are removed as much as possible. Although several studies have been carried out both in Zambia and the SADC region under various initiatives, these studies have not presented an integrated approach of the supply chain governing major imports, exports, and transit (Ncube, et al., 2015). Neither a thorough assessment of the quality of information sharing procedures for shipping to, from or through Zambia. Although Zambia has seen a removal of most quantitative restrictions on import, export and local trade, it has still not succeeded in implementing adequate measures to mitigate the barriers to information sharing on trade, investments and production (Arndt & Roberts, 2018). The Zambian road transport industry is developing but is facing the high costs of the non-physical barriers along the road, long waiting times at borders, excessive controls and checking procedures, underdeveloped facilities along the road for trucks and drivers, etc. (Sardanis, 2014; Arndt & Roberts, 2018).

The modern business world and economy is, described as the new economy or knowledge economy (Powell & Snellman, 2004). The concept of the knowledge economy was designed to acknowledge the central role that information or knowledge is playing in the creation of value particularly as enabled by rapid evolution in Information Communication Technologies (ICTs) over recent decades (Cress, et al., 2006; Mourtzis, 2011). The ongoing transformation of the global economy has also been given many names: a “*postindustrial society, an information society, an innovation economy, a knowledge economy, a network economy, a digital economy, a weightless economy, and an e-economy*” (Lotfi, et al., 2013). These terms all have their merits in emphasizing the different aspects of the structural change but also susceptible to misunderstanding (Pohjola, 2002b, 134). Globalization, technology and new economy are creating waves of change and uncertainty which are known as the third wave (Cress, et al., 2006). The source of power for this wave, which arises from ideas, is information and knowledge as well as processes harnessing such information and its dissemination to decision makers at different levels (Mbindi, 2018; Cress, et al., 2006). In other words, the strategy in the knowledge economy is to use information as a resource for the creation of value and solution of business problems.

In the knowledge economy, efficiency-driven growth is dependent on the quantity, quality, and accessibility of the information available, rather than the means of production (Powell & Snellman, 2004). Scholars observe that like supply chain management, “*the new economy*” depends on the information and communication technologies (ICT) to achieve organizational effectiveness (Kembro, et al., 2014). The knowledge management systems in the new economic structure emphasize how firms can enhance competitive

advantage through more effective utilization of their knowledge assets (Eris & Saatcioglu, 2007). Knowledge management (KM) is the process of creating, sharing, using and managing the knowledge and information of an organization (Powell & Snellman, 2004). It refers to a multidisciplinary approach to achieving organizational objectives by making the best use of knowledge and sources of knowledge as well as information to improve efficiency of operations in the value creation (Cooper, et al., 2016).

Scholars in Purchasing and Logistics management have identified sources of value in the information economy as, for instance, logistics and supply chain efficiencies arising from collaborative partnerships including information sharing which cut costs linked with uncertainty amongst organizations in a given value chain (Bergqvist & Pruth, 2006; Cagliano, et al., 2006). Supply chains and logistics represent core features and processes in relation to commerce in the global economy particularly with the emergence of global sourcing (Cagliano, et al., 2006; Kim & Chai, 2017). While supply chains are systems of organizations, people, activities, information, and resources involved in moving a product or service from suppliers to customers, logistics represent management of the flow of things between the point of origin and the point of consumption to meet requirements of customers or corporations (Christopher, 2016; Jonsson, 2008). Efficiency in managing supply chains and logistics processes is a key objective for both public and private sector operations as it is typically expected to translate into benefits for economic agents and the economy as a collective (Mbindi, 2018; Eris & Saatcioglu, 2007). Information sharing is a key strategy for fostering efficiency in supply chains and logistics operations information sharing between and amongst players in a system (Lotfi, Mukhtar, Sahran,

& Zadeh, 2013). It is, defined as the extent to which crucial and/or proprietary information in a supply chain is, made available to other members (Agarwal & Shankar, 2003). The taxonomy of knowledge sharing identifies tactical low-level operational information and/or the strategic information levels meeting competitive needs of the agents in the supply chain. Alternative nomenclature proposed by Seidmann & Sundararajan (1998), identifies four types of information shared namely order information, operational information, strategic information, and competitive information. Yet other scholars prefer to discuss the concept of information sharing in a supply chain in terms of type of information, implementation processes of information sharing, quality of information shared, nature of technology used for information sharing as well as the benefits derived (Bergqvist & Pruth, 2006; Christopher, 2016; Cooper, et al., 2016; Cress, et al., 2006; Eris & Saatcioglu, 2007).

Information sharing has the potential to offer substantial benefits to supply chain members at several levels as they seek to actualize the strategy of supply chain integration (Christopher, 2016). Information sharing improves coordination among supply chain members that leads to high levels of supply chain integration (Cagliano, et al., 2006). Information sharing influences the supply chain performance in terms of total cost and service level (Zhao & Xie, 2002). Information sharing among supply chain members can reduce different kinds of uncertainties related to demand, product and technology that add costs to supply chain processes (Cagliano, et al., 2006). The information sharing facilitates enhanced efficiency and effectiveness of supply chain as it inherits certain advantages. These advantages include better coordination between different departments, better coordination between supply chain members and better control of the supply chain

processes, reduced product design time, shorter production lead-time and stable outputs with consistent quality (Cooper, et al., 2016; Khurana, et al., 2011).

Empirical research findings in this regard are generally consistent from a theoretical perspective, with the Resource Based View (RBV), transaction cost theory, contingency theory, resource dependency theory and relational governance theories such as the relational view and social exchange theory (Barney, Ketchen & Wright, 2011; Kembro, Selviaridis and Näslund, 2014). These theoretical views and applications have been helpful in addressing myriad questions in empirical research relating to reasons for sharing, what information to share with whom, how to share as well as pre-requisites, drivers and barriers to information sharing in supply chains and logistics operations (Kembro, et al., 2014). Thus it has become a virtual truism that information sharing in logistics and supply chain operations can unlock benefits for commercial entities that translate into competitive advantage (Cress, et al., 2006). However, in practice, there may be barriers and inhibiting factors that prevent organizations from fully unlocking these benefits (Eris & Saatcioglu, 2007).

From a managerial perspective, past empirical studies highlight the importance of understanding and considering the supply chain context when deciding and embarking on information sharing initiatives (Adewole, 2005). By adapting information sharing structures and governance mechanisms to the context of the transaction and the business relationship, companies and organizations in general may benefit from information sharing as empirical studies have shown (Eris & Saatcioglu, 2007; Jonsson, 2008; Kembro, et al., 2014; Lotfi, et al., 2013; Mbindi, 2018). Examples of benefits that are expected to accrue from information sharing in logistics operations and supply chains as

found by past research include reduced transaction costs, improved cooperation and secured external resources while avoiding unfavorable dependencies and opportunistic behavior (Fabbe-Costes & Jahre, 2007; Lee & Whang, 2000; Patnayakuni, 2006; Seidmann & Sundararajan, 1998; Tan, et al., 2010; Cagliano, et al., 2006). Supply chain or logistics interactions that involve public and private sector collaborations are not exempt from the potential information sharing benefits (Bergqvist & Pruth, 2006; Randall, 2013). These benefits are critical particularly in the case of developing or lower middle-income countries such as Zambia that are grappling with a variety of challenges such as strained fiscal space, underdeveloped private sector, resource and qualitative challenges in public service delivery and over dependence on mining as the mainstay of the economy (AFRODAD, 2016; Brückner & Ciccone, 2010). Thus it has been consistently argued that generating benefits deriving from information resources is not only a must in many private sector supply chain operations but also in the public sector which will help deliver socio-economic development in countries such as Zambia (Weerakkody, et al., 2007; Bergqvist & Pruth, 2006).

Given the benefits outlined above, empirical studies focusing on barriers to information sharing in logistics and supply chain operations in general and public-private sector information sharing cases in logistics and supply chain operations in particular are relevant to the Sub-Saharan Africa context as well as for the purposes of the present study (Mbindi, 2018; Khurana, et al., 2011). In this regard, scholars have invariably identified inadequate investments in Information Communication Technology infrastructure as one of the barriers to the strategy (Cress, et al., 2006; Agarwal & Shankar, 2003). Other scholars have attempted to identify, classify as well as rank the barriers to information

sharing in logistics and supply chain operations. According to the empirical literature, the factors that are likely to act as barriers to information sharing in logistics and supply chain operations are classified as managerial, financial, organizational, technological, individual as well as social-cultural barriers (Khurana, et al., 2011).

The global evolution of information sharing as a supply chain and logistics management strategy bears close resemblance with the development and approval of information communication technologies by private and public sector operations (Pham, et al., 2019). Developed and mature markets globally such as the United States, Europe and South Asia, have adopted not only the necessary technologies but also the strategies at a faster rate than those in Sub-Saharan Africa (Christopher, 2016). This pattern entails that empirical research on supply chain/logistics information sharing in developing countries has been very limited as a consequence. This pattern is more pronounced in what some scholars have recently described as collaborative regulation (Aigbogun et al, 2018). Collaborative regulation for improved supply chain resilience is defined as the coordinated, consistent, and strategic activities that includes: effective, as well as regular coordination and interactions; knowledge and information sharing, verification, and periodical monitoring, as well as enforcement of collaborative approaches to policy and regulatory control mechanisms via coercive force of isomorphism (Ambe & Badenhorst-Weiss, 2011). Whenever regulatory bodies enter into cooperative, coordinated and joint working relationship with private sector supply chain actors for a common good; it is referred to as collaborative regulation (Zhao, 2016). Thus, in supply chain management, collaborative regulation involves the joint ability to respond to supply chain disruptions with supply chain actors through collaborative planning (Christopher & Peck, 2004) and

information- and intelligence-sharing (Jüttner & Maklan, 2011) to coordinate the immediate response (Scholten et al. 2014; Chowdhury & Quaddus, 2016). In other words based on the above definition, knowledge and information sharing in regulatory-private sector supply chain & logistics relationships is only one aspect of the collaborative regulation concept. In the empirical literature, According to Delloite (2012), supply chain regulation involves robust policies as well as monitoring mechanisms that guarantees adherence to proper supply chain procedures and processes. Likewise, in line with Zhao (2016), recent technological strides are placing demands for transformation in regulatory approaches. Hence, regulatory authorities worldwide are becoming more alert to the changing paradigm(Aigbogun et al, 2018). As noted empirical literature in this area globally, regionally let alone the Zambian context is limited.

However, some recent studies explore aspects of information sharing in collaborative regulation cases of supply chains and logistics operations including Aigbogun et al (2018) who explore the impact of regulatory dependence on the resilience of some supply chains, Herrigel and Kristensen (2014) who argue for information sharing and collaborative relationships between regulators and supply chain actors as well as some relatively earlier studies such as Olesen et al (2017) focusing on information sharing in the context of port authorities. The pattern in the literature is therefore overall that there has been less empirical focus on information sharing in collaborative relationships between regulators and supply chain /logistics actors.

The Zambian economy has undergone several phases of reform since the country became an independent state in 1964 from its Northern Rhodesia times as part of the British colonies in Africa (Brückner & Ciccone, 2010). In 1969, the then United National

Independence Party (UNIP) led government of the new republic introduced reforms that involved nationalization of key industries in the country (Rakner, 2003). This led to the growth of Zambia's public sector with the socialist ideologies of UNIP government contributing to a bloated public service (Mulikita, 2007). Mounting public debt and poor performance of the economy came to a head in the late 1980s leading to the UNIP being toppled from power in the 1991 general elections.

The incoming Movement for Multiparty Democracy government subsequently adopted economic reforms that saw the privatization of the economy and implementation of a World Bank/International Monetary Fund (IMF) sponsored Structural Adjustment Programme (SAP) (Rakner, 2003). The reforms involved the sale of most of the parastatals that contributed to a bloated public sector wage bill and encouraged Foreign Direct Investment (FDI) inflows to bolster the private sector and promote a private sector driven mixed economic system (Mulikita, 2007). Consequently, privately owned businesses began to take up greater space in key sectors of the economy from manufacturing and mining to transportation and financial services provision (AFRODAD, 2016). However, the public sector remained relatively bloated and populated by a variety of regulatory agencies whose operations and interface with the private sector may continue to have unexploited synergies (Bergqvist & Pruth, 2006).

As the country, in line with global trends, has experienced advancements in Information Communication Technologies (ICTs), the parameters for potential exploitation of public-private collaboration synergies through information sharing in supply chain and logistics operations have arguably improved (Weerakkody, et al., 2007). For example, while private sector entities operating in the country have long embraced strategies for

information sharing in their supply chains and logistics operations, the Zambian public sector including regulatory agencies have not been as open to adopting these strategies, particularly in their interface with private sector entities (Mulikita, 2007). In 2016, the Zambian government through Government Gazette No. 836 of 2016, established the Smart Zambia initiative. The initiative was, intended to promote implementation and adoption of e-governance in Zambian government operations. which is a concept defined as the *“application of information and communication technology for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between government to citizens(G2C), government to business(G2B), government to government(G2G) , government to employees(G2E) as well as back-office processes and interactions within the entire government framework”* (Saugata & Masud, 2007, p. 1).

Several examples of information sharing between regulatory authorities and logistics-supply chain companies from different regions in the world are available if Zambia is to take a similar route to enhance its competitiveness. The examples are, represented by what are, described as networks or community systems. According to the International Port Community Systems Association (IPCSA), a Port Community system for example is: a neutral and open electronic platform enabling intelligent and secure exchange of information between public and private stakeholders to improve the competitive position of the sea and air ports' communities. A Port Community system optimizes, manages, and automates port and logistics processes through a single submission of data and connecting transport and logistics chains (IPCSA, 2011). IPCSA was established in 2011 to Influence public policy at the international level, principally by lobbying, to promote

the adoption of e-logistics as the key element in the development of international maritime, shipping and logistics sectors. Its membership initially comprised European port authorities before it expanded to other continents. The main thrust of the initiative was on the harnessing of real-time data in IT-based Port Community Systems. Benefits that are, expected to accrue from these systems include decreased costs of information access, decreased communication costs for shipping companies, extra income for government, correct taxation, prevention of smuggling, prevention of illegal income, i.e., bribery, decreasing foreign dependency on port and logistics software, increased competitiveness, increased information quality, increased operational performance, and, safe paperless document exchange procedures (Saglam, et al., 2020; Saada, et al., 2019; Kembro & Selviaridis, 2015). These benefits are of interest to regulatory bodies but may not be, fully exploited in countries such as Zambia.

1.2 Statement of the Problem

Information sharing between logistics-supply chain companies has the potential to unlock significant benefits for parties involved (Cagliano, et al., 2006; Cooper, et al., 2016; Cress, et al., 2006). In recent years, scholars have explored information sharing between logistics-supply chain companies and regulatory authorities such as tax and regulatory authorities (Hoyt & Huq, 2000; Singh, et al., 2018; Silvestre, et al., 2018) There is currently no information sharing between Logistics companies and regulatory authorities such as Zambia Revenue Authority (ZRA), Road Development Agency (RDA) and Ministry of Home Affairs. This has led to increased delays in border clearances, queries at weigh bridges/ toll gates and police checkpoints. This in turn results in reduced truck turnaround time and increased operating costs. There is therefore need to identify and

evaluate the barriers to effective information sharing between private sector logistics-supply chain companies and regulatory authorities in Zambia's public sector. The current study addressed the problem using a mixed methods research design.

1.3 Research Aim

The aim of the study was to evaluate the barriers and inhibitors to collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia that are a deterrent to attainment of efficiency in the management of logistics-supply chain operations.

1.4 Research Objectives

The study adopted the following specific research objectives.

1. To establish the scope for data sharing between logistics-supply chain companies and regulatory authorities in Zambia.
2. To evaluate inhibitors of information sharing between logistics-supply chain companies and regulatory authorities in Zambia.
3. To evaluate barriers to data sharing between logistics-supply chain companies and regulatory authorities in Zambia.

1.5 Research Questions/Hypotheses

1.5.1 General Research Question

The general question that the dissertation explored was about the hard(inhibitors) and soft(barriers) that could explain the scope for collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia.

1.5.2 Research Question

1. What is the scope for data sharing between logistics-supply chains and regulatory authorities in Zambia?
2. How strong are inhibitors to information sharing between logistics-supply chains and regulatory authorities in Zambia?
3. How critical are different barriers to data sharing between logistics-supply chain and regulatory authorities in Zambia?

1.5.3 Hypotheses

Hypothesis 1

Null Hypothesis: There is no scope for information sharing between logistics- supply chain companies and regulatory authorities in Zambia

Alternate Hypothesis: There is sufficient scope for information sharing between logistics- supply chain companies and regulatory authorities in Zambia

Hypothesis 2

Null Hypothesis: There are no inhibitors for information sharing between supply chain and regulatory authorities in Zambia

Alternate Hypothesis: There are strong inhibitors to information sharing between supply chain and regulatory authorities in Zambia

Hypothesis 3

Null Hypothesis: There are no barriers to information sharing between supply chain and regulatory authorities in Zambia

Alternate Hypothesis: There are strong barriers to information sharing between supply chain and regulatory authorities in Zambia.

1.6 Scope of the Study

Information sharing between public and private sector partners is a broad subject that requires a scope for what areas an empirical study of this nature will cover. The current

study therefore focused on private sector logistics companies based in the Lusaka city area. In terms of public sector agencies, the study considered those performing a regulatory role that has an impact on the operations of logistics companies in Zambia. Relevant bodies in this regard include the Zambia Revenue Authority (ZRA), the Road Development Agency (RDA) the Zambia Police (ZP) and the Road Transport and Safety Agency (RTSA). Further, the study only focused on common areas or areas of mutual interest between the identified partners. Specifically, the study focused on key sections in partner organizations that can be engaged for data sharing, types of data to be shared among the partners and how data shared by the partners should be handled in defining the scope for data sharing. These areas were pertinent to the subsequent evaluation of barriers to data sharing between the economic agents.

1.7 Delimitation of the Study

The study was designed to evaluate barriers to information sharing between logistics-supply chain companies and regulatory authorities in Zambia that are a deterrent to attainment of efficiency in the management of logistics and supply chain operations. To achieve this objective, the study focused on the scope for collaborative information sharing between private sector logistics-supply chain companies and regulatory bodies that influence their day-to-day operations. In focusing on regulatory bodies that affect the day-to-day operations of private sector logistics-supply chain companies, the position taken was that these were the most likely to have a bearing on the scope for operational efficiency through their interactions in areas such as clearing goods, processing transit certificates, clearing physical traffic etc. The focus on logistics-supply chain companies was since they are most likely to be affected by their interaction with regulatory agencies

that oversee their various operations. Lusaka based logistics/supply chain companies were selected for ease of access in data collection. Also, the selection of Lusaka city as the study area was since all regulatory agencies in Zambia have their head offices in the city. Managers of participant private and organizations in the study were the focus primarily because they were, expected to be informed participants on the subject matter. These were also important as regards the study because the data required was both quantitative and qualitative, the former to draw on their experiences to identify barriers and inhibitors to information sharing between logistics/supply chain companies and regulatory companies.

1.8 Significance of the Study

As noted, Information sharing among partners in supply chains is, commonly considered a key factor to enhance performance among logistic firms. By addressing the research questions above, the current study was of significance on several levels. The findings are helpful in identifying but also understanding the barriers (soft factors) and inhibitors (hard factors) to information sharing between logistics-supply chain companies and regulatory authorities. Thus, the information from the study is of value to policymakers in both Zambia's public and private sectors. Further, the study provides a basis for future research and is a valuable addition to the existing body of knowledge on the subject.

1.9 Limitations of the Study

The present study had several limitations that can be, highlighted. The study, though guided by past research, was exploratory in nature and therefore adopted a broad approach to the issues relating to information sharing in regulated logistics-supply chain operations in Zambia. More useful information may have been, obtained by looking at specific

operations such as transportation only. Secondly, the study relied on data obtained from self-administered questionnaire interviews. More information may have been, obtained by focus-group discussions or expert interviews with a few industry respondents. Further, the study was, conducted in Lusaka city only whereas a countrywide focus could have provided a better basis for policy recommendations.

1.10 Organization of the Rest of the Report

In Chapter 1 of this dissertation, the research topic has been introduced by presenting its background, problem statement, study objectives and research questions. The scope and significance of the study have also been described. The chapter following the present presents the literature review. The second chapter offers an overview of the theoretical and empirical literature relevant to the study on information sharing and supply chain/logistics operations. The chapter further presents a critique of the literature, operational definitions of key terms as well as the conceptual framework for the study.

A detailed theoretical and Conceptual Framework in C describes the main theories behind information sharing in supply chains. It also provides the underlying logic for the present study. The chapter also provides operational definitions for the key terms used in the study. The research methodology chapter describes the research design, study site/population, sampling methods, sample size, data collection procedures, data analysis as well as ethical issues in the study. This is followed by analysis and presentation of findings. The chapter presents and summarizes the data that were collected. The chapter uses tables, graphs, and charts as well as for this purpose. A detailed discussion of research findings is presented in Chapter Six. The chapter considers the findings of the study in the context of theory as well as the contributions of related past studies. The final

chapter of the dissertation briefly reiterates the key findings of the study and provides policy recommendations for management of logistics companies and regulatory authorities relevant to the sector. as well as directions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In the first chapter, the research topic and focus of the study were, introduced. The significance and scope of the study was, also outlined. In this second chapter, the literature reviewed for the study is, provided and discussed. The chapter also presents a critique of the empirical literature and develops the conceptual framework for the study. The chapter discusses information sharing in logistics-supply chains and barriers/inhibitors to information sharing. It begins with relevant theories and models related to information sharing/ or its significance, in supply chains. Models of supply chains are used to explore the significance of information sharing strategies. Extant empirical literature, from general to specific, will show that although studies have observed increasing dependence of contemporary supply chains on the intervention of regulatory functions, limited empirical evidence exists on the practical role of collaborative regulation on supply chain information sharing and operational outcomes. The literature will also show that less scholarly attention has been, paid to collaborative regulation but will also seek to draw lessons from the few cases that have provided illumination on this area from different continental and country contexts to illustrate what is, done as well as the barriers and inhibitors to information sharing faced.

2.2 Theories of Information and Information Sharing

2.2.1 Agency Theory

An agency relationship is one in which there is a contractual relationship (explicit or implicit) whereby a principal engages an agent to act on behalf of the principal. The roots of agency theory are in economics, arguably going back to Adam Smith's (1776) discussion about the separation of firm ownership and management. This same theme is, expressed by Berle and Means (1932), who were concerned with corporate ownership being, separated from corporate control. The literature in agency theory has been, focused on several fields including finance, accounting, organizational theory, marketing and even government. In the travel agency application of the theory, scholars have considered the different objectives of the participants in the value chain and the role of the agent as an intermediary with a burden of trust in scenarios with potential conflict of interest (Ambe & Badenhorst-Weiss, 2011).

2.2.2 Transaction Cost Theory

Transaction costs may be, defined as those "costs associated with the transfer and exchange of goods and services across the organizational boundary" (Jones & Butler, 1988). They define such costs as those related to the negotiation, monitoring and enforcement involved in the transfer of goods and services. Oviatt (1988) includes negotiating, monitoring, harmonizing, and enforcing of contracts as components of transaction costs. Such costs may accrue at either the input side (procurement) of an organization or at the output side (sales). Coase (1937) formalizes the concept of transaction costs as being a major determinant in organizational theory. Two types of transaction costs are, identified: (1) the costs associated with obtaining the prices or

market for a particular good, and (2) the costs associated with preparing for, negotiating, and concluding transactions. The transaction cost approach is a very mainstream approach to the “make or buy” decisions that economic agents continue to ponder today in the year 2000 just as much as in the past.

2.2.3 Theory of Asymmetric Information

The absence of perfect information in the tourism industry is one of the persuasive theories that scholars have used to explain the role of travel agencies. According to the theory of asymmetric information, it is normally hard for economic agents to flawlessly distinguish between potentially bad and good offers or packages. This leads to problems as suppliers are normally more knowledgeable about what they offer than the consumers. Derived from Professor George Akerlof’s seminal paper on markets with uncertainty on quality of products or transactions and their attendant behavioral problems for economic agents (Akerlof, 1970). Regulatory authorities must step in to assuage these problems by providing a signaling role in the supply chains and logistics-operations which helps promote collaboration.

2.3 Models of Supply Chains

The continuous flow model for supply chains offers stability in high demand situations that vary very little. Manufacturers that produce the same goods repeatedly with very little fluctuation can benefit from the continuous flow model and it is very ideal for commodity manufacturing and is one of the most traditional supply chain models (Christopher, 2016).

2.3.1 Fast Chain Model

The fast chain model is mostly ideal for manufacturers that manufacture products that are trendy with short life cycles. It works well with a business that must change their products frequently and that needs to get them out fast before the trend ends. It is a flexible model (Lotfi, et al., 2013). Fast chain models prioritize speed and therefore can only be, established in environments with real-time information to enable rapid-response decision making and ensure smooth flows of operations with minimal lead time (Cagliano, et al., 2006).

2.3.2 Agile Model

An agile supply chain is a system of product distribution concerned with doing things quickly, saving costs, being responsive to market demands maintaining flexibility and keeping productivity high. The model is primarily a method of supply chain management that is ideal for businesses that deal in specialty order items. It is a model that focuses on the ability of the supply chain to amp, up in some cases but also be solid when there is not much movement happening (Christopher, 2016). Similar to the Fast Chain, the Agile model requires an operational environment including interface with regulatory authorities, that promotes speed and efficiency with minimal transaction costs to ensure competitiveness (Kembro & Selviaridis, 2015).

2.3.3 Flexible Model

Flexible supply chains mean that a company can easily adjust the production levels, raw materials purchases, and transport capacity to maximize profits. The flexible model gives businesses the freedom to meet high demand peaks and manage long periods of low volume movement. It can be, switched on and off easily (Bergqvist & Pruth, 2006). This

model is also able to thrive in situations where information relating to demand and supply flows without significant bottlenecks (Cress, et al., 2006).

2.3.4 Efficiency Supply Chain Models

The efficiency supply chain models include the efficient chain model, the fast chain model and the continuous flow model. All the three of these models put efficiency first and are, geared towards certain industries like paper industries, cement industries and even budget fashion industries. A supply chain model example in this group is a commodity manufacturer that is making low-cost clothing and they are fighting for customers; the market is flooded with similar manufactured products all selling to the same type of customers. consumers may not realize the unique value of a certain product but all they look out for is the cost and as such, an efficient focused supply chain model will help the producer have materials they will need when they need them to stay in competition and create the volume that will keep costs down there by appealing to the consumer base. These models are based on an end-to-end efficiency. Efficiency models can bring about powerful benefits but can also bring about a few downfalls that include excessive inventory which may not be the most cost-effective models in all cases (Bergqvist & Pruth, 2006).

2.3.5 Responsive Supply Chains

The responsive supply chain models include the agile model, the custom configured model and the flexible model these models are ideal for on demand situations these models offer flexibility for industries that provide custom order products. The idea behind responsive supply chains is that they respond on demand (Adewole, 2005). The responsive models have powerful benefits but have a few downsides which include the

ability of human prediction on trends which as well as the trained or untrained staff can make critical costly errors with these models. From the outside look it can be difficult to define which supply chain model is been, used because they all have similar goals which include

- Keeping costs down
- reduction of risk
- satisfying the end user
- enhancing productivity

The most productive supply has taken the basic models and hybridized them to meet their specific needs. They have incorporated state of the art technology and human relationships to create a model that works especially well for them. By intergrading the best of both worlds' giants like McDonalds, Uniliver and Amazon have been able to create the completely integrated supply chains that have elevated their business to a whole new level of success every supply chain should be efficient and responsive to deliver the best in support, improve productivity and meet customer's demands (Eris & Saatcioglu, 2007).

2.4 Empirical Literature Review -General Contributions on Information Sharing

Aldrich and Pfeffer (1976) argued that organizations are not able to generate all their resources internally, and therefore, they must go into transactions, and form collaborations with elements in their external environments. A major stakeholder in the external environment that has been rather limited attention in the supply chain resilience literature is collaborative regulation, which is, coordinated by governmental regulatory controls. In supply chain management, the impact of external environment on business

organizations has been, extensively studied (Chen, 2007; González-Benito et al. 2010; Yunus, 2012; Yunus & Tadisina, 2016). The proposition that organizations form collaborative relationships with the external environment to respond to uncertainties and increasing global competition has been, supported by numerous studies, such as that of Handfield and Nichols (1999), Lummus and Vokurka (1999), Mentzer et al. (2000), Ambe and Badenhorst-Weiss (2011), and Yunus (2012). According to Delloite (2012), supply chain regulation involves robust policies as well as monitoring mechanisms that guarantees adherence to proper supply chain procedures and processes. Likewise, in line with Zhao (2016), recent technological strides are placing demands on evolution in regulatory approaches. Hence, regulatory authorities worldwide are becoming more alert to the changing paradigm.

For example, Jackson (1997) in his research on Academic regulation in UK higher education argues that regulation is a critical concept which is far more wide-ranging in scope and substance than the notion of quality assurance which it is identified with. Also, in the Oil and Gas industry, the findings of a study by Sabel, Herrigel and Kristensen (2014) points to the fact that the emergent task of collaborative regulation under uncertainties, necessitates its joint working relationship with individual organizations' systematic efforts to improve their resilience. In addition, in the telecoms industry, a report by the International Telecommunications Union (ITU), reveals that there is an overwhelming agreement by stakeholders that there is a pressing need for regulatory authorities to form collaborative relationships with industry actors especially as it concerns the present day (ITU News, 2016). As a result, organizations are required, to identify their vulnerabilities, as well as capabilities in order to ensure that the measures

required to enhance resilience of supply operations are put in place accordingly (Sabel & Zeitlin, 2008; Sabel & Williams, 2011; Sabel, et al. 2014).

Peck (2005) in his research on the drivers of supply chain vulnerability, argues that it is when the supply chain ought to be in the established steady state that it is most vulnerable, since that is when it is most inclined to external pressures. He notes that this is when the optimization of control limits is needed, to reduce the level of vulnerabilities that results. Saifudin et al. (2016) argues that the halal regulatory authority (JAKIM) in Malaysia aptly typifies this capability by forging joint working relationship via halal control points. Authors (Bowersox, et al., 2002; Sarkis, 2003; Aruoma, 2006; Vachonb & Klassen, 2006; Carter & Rogers, 2008; Green Jr, Zelbst, Meacham, & Bhadauria, 2012), assert that the aim of the emergent regulation paradigm in supply chain, is to facilitate the building and maintenance of internal behavioural features that facilitate relational exchange (Esper et al., 2010), thus protecting the integrity of the product and the process and hence the interest of the ultimate consumer. With regards to the pharmaceutical supply chain, regulation aims to protect the ultimate consumer's health, increase economic viability, harmonize and integrate well-being, and engender fair trade within and between supply chain partners (Sperber, 2005a; Aruoma, 2006; Eyinda, 2009).

However, recent developments of uncertainties leading to supply chain disruptions (Starr, et al. 2003; Peck, 2005; Sheffi & Rice, 2005; Kunreuther, 2006; Pickett, 2006; Pettit, 2008; Pettit et al. 2010,)) have placed a challenge before regulatory authorities to advance methods of exerting controls in a way to proactively collaborate in managing supply disruptions across global supply chain networks (Burger & Warner, 2012). Hence, calls have been made for innovative approaches such as collaboration between supply chain

actors and regulatory authorities (Cannella & Ciancimino, 2010; Cao & Zhang, 201). This has led researchers (e.g, Zacharia, Nix, & Lusch, 2011; Burger & Warner, 2012; Fiorino & Bhan, 2014) to propose the collaborative input of regulatory authorities. Consequently, the findings of the 2013 World Economic Forum's supply chain risk survey (World Economic Forum, 2013) has revealed that there is a need for the improvement of international and interagency compatibility of resilience standards and programmes via the collaboration of regulatory authorities with supply chain actors for optimum integration of supply chains.

Also, according to Burger and Warner (2012), as well as Heckmann, Comes, and Nickel (2015), when disruptions are relatively small, supply chain members are normally well able to adjust to large disturbances, however, solutions are often ill-coordinated and incite calls for collaborative regulation as the solution of last resort. Since regulatory authorities control essential infrastructure that functions as key logistical nodes in the supply chain process flow, their collaborative involvement with supply chain actors would prevent core organizations essential to the supply chain's survival from collapsing, thus enhancing the resilience of the supply chain. In order to achieve these, it has been suggested that regulatory authorities enhance collaborative supply chain regulations across businesses and government. This can be achieved via appropriate data and information sharing, improved supply chain visibility and communication, as well as joint planning activities (Heckmann, et al., 2015; Ali et al., 2017). This calls for more involvement of the regulatory authorities as a major stakeholder in forming better collaborations with supply chain actors.

Authors; Rankin et al. (1999), Ponomarov and Holcomb (2009), Preston et al. (2012), Burger and Warner (2012), and Deloitte (2012), all argued that the rising complexity of regulatory requirements and increased repercussions of non-compliance are making supply chains more dependent than ever on legal and regulatory functions. Thus, in keeping with such reasoning, they maintained that although some level of supply chain disruption is unavoidable, collaborative regulation helps to ensure an organization is doing everything it can to minimize its exposure to severe supply disruptions, including comprehensive business continuity plans to prevent or recover from critical disruptions. As reported in ITU (2016), the success of collaborative regulation has been, recorded in Egypt's Telecoms industry in which the National Telecoms Regulatory Authority (NTRA).which defines the concept as effective and regular coordination and interactions; sharing of knowledge, experience, and resources; exploration of synergies; identification of possible regulatory overlaps; and development of means of collaborative approaches to policy and regulations.

The review of authors' views on regulatory functions in supply chain disruption management reveal its importance in consideration as a mediator in supply chain resilience relationships. Burger and Warner (2012) assert that lately, regulatory authorities have been, increasingly challenged to understand and collaborate in the management of supply disruptions across global supply chains networks. This is in keeping with Rankin et al. (1999), Ponomarov & Holcomb (2009), and Preston et al. (2012), who believe that national legislation via regulatory control, provides the necessary legal foundation for procurement procedures, contract enforcements, financial authority, staff accountability and other critical aspects of supply chain management.

Recognizing the nature of global disruptions, means there are too many economic, security and political issues to take a one system/mono-system approach to supply chain disruption management. As noted by Preston et al. (2012), the logistics emergency teams supporting United Nation's joint logistic cluster are a practical example of companies teaming up with government and regulatory authorities to reduce supply chain disruptions, and hence improve supply chain resilience.

Furthermore, Burger and Warner (2012) also note that regulatory authorities, control essential infrastructure that functions as key logistical nodes in supply systems flow and may prevent core companies essential to the supply chains survival from collapsing. This makes regulatory authorities, lead actors in supply chains. The implications of this is that the greatest capability possessed by the regulatory authority is visibility, this is because they regulate, monitor, and control all the supply chain actors and activities, hence they possess broader range of visibility compared to individual supply chain actors. If they convert this capability to collaborative regulation, then the supply chain stands a lot to gain, thus contributing to its resilience.

In the Sub-Sahara African context, empirical research studies are sparse but also focus on the changing landscape for regulatory authorities whose operations have a direct impact on supply chains and logistics management. However, several studies have considered the question of information sharing in supply chains in the context of various African countries.

Asamoah et al(2016) conduct a study on the effects of Supply Chain Integration (SCI) on Supply Chain Performance (SCP) and Information Sharing using firms in Ghana. Their considers relationships but explores manufacturing and service firms belonging to one

giant supply chain in Ghana. Their study applies structural equation modelling to explore the relationships. The results of the study confirmed positive associations between the variables with information sharing having a positive moderating effect on the relationship between integration and performance. However, this study did not consider barriers and inhibiting factors for information sharing in the context of regulatory agencies and supply chain/logistics firms.

Mashiloane et al (2018) examine the relationship between supply chain dynamism, information sharing and inter-organizational relationships and supply chain performance in the manufacturing sector in South Africa. There was a gap in literature on the linkage between supply chain dynamism, information sharing and inter-organizational relationships and supply chain performance in the South African manufacturing sector.

Empirical data was, collected from a purposive sample of 340 supply management professionals recruited from 31 manufacturing firms based in Gauteng Province. Data were, analyzed using structural equation modelling, which involved a confirmatory factor analysis and hypotheses tests. The results indicate a significant positive relationship between supply chain dynamism and both information sharing and inter-organizational relationships; between information sharing and both inter-organizational relationships and supply chain performance; and between inter-organizational relationships and supply chain performance.

According to a study done by M'muthuiba (2013) on information sharing among humanitarian organizations in Kenya, the study examined the extent of information sharing and establishing factors affecting information sharing among humanitarian organizations in Kenya. A factor analysis was applied to determine the relative

importance of each of the factor with respect to information sharing. The study determined that majority of the organizations do have an information governance policy and guidelines in place and that most organizations have a defined data or information sharing strategy, with majority of them often or always using electronic mail, website / online portal and meetings as a means of information dissemination. Sharing of information to a greater extent occurs mostly upon request.

The researcher recommended that organizations should ensure that appropriate information governance, policy and guidelines are developed to provide a framework to bring together all of the requirements, standards and best practice that apply to the handling of information. Organizations are also recommended to collaborate and partner with established networks or groups to promote organizational information sharing and that there is need for organizations to ensure that Information and data accessible to them is easily available to other humanitarian actors through establishing well-defined communication strategy and dissemination methods and data or information sharing strategies. This study centered on non-governmental organizations only and does not show what is happening in the government institutions thus need to assess the strategies put in place to encourage data sharing among public institutions in Kenya. From the forgoing review of empirical literature it is evident that the area of collaborative information sharing in supply chains between regulators and private sector firms is one requiring more scholarly attention Zambia as a transit country provides an ideal set up for such a study.

Pooe et al (2015) examine the influence of information sharing, supplier trust and supplier synergy on supplier performance in SMEs. A quantitative research design was adopted

in which a survey questionnaire was administered to a sample of 309 owners and managers of SMEs based in southern Gauteng, South Africa. A confirmatory factor analysis was undertaken to assess the properties of the measurement scale. Hypotheses were tested using the path modelling technique.

The study found that information sharing exerted a moderate positive and significant influence on supplier trust and a weak but significant influence on supplier synergy. Supplier synergy had a strong positive and significant influence on supplier performance. However, the influence of supplier trust on supplier performance was weak and insignificant. The study provides a useful framework for analysing the interplay between information sharing, supplier trust, supplier synergy and supplier performance in SMEs. This study also does not focus on collaborative public-private sector information sharing

2.5 Lessons Learned on Information Sharing

2.5.1 Global Perspective

Tapping efficiencies from information sharing in supply chains is experiential as much as it is conceptual (Agarwal & Shankar, 2003). It is also contextual as its actualization as well as benefits depend on the social, economic, technological, organizational, legal, and commercial framework in which it can occur (Ambe & Badenhorst-Weiss, 2011; Bergqvist & Pruth, 2006). It is also from such scrutiny that best-practice principles can also be, codified. Thus, a detailed review of the studies included in this chapter that provide a global (out of Africa for this study), was the logical starting point for such as inquiry involving past studies reviewed for this project. Studies conducted in Europe also

provide the definition of collaborative information sharing, which was the subject of the present study.

They also set the parameters for the concept. Factors such as trust in the partnerships implied provide the basis for establishing the scope and possibilities for information sharing. Above all, authors; Rankin et al. (1999), Ponomarov and Holcomb (2009), Preston et al. (2012), Burger and Warner (2012), and Deloitte (2012), all argued that the rising complexity of regulatory requirements and increased repercussions of non-compliance are making supply chains more dependent than ever on legal and regulatory functions in Europe. Notably, World Bank studies have revealed that a weak regulatory framework has been the root of the challenges that countries have faced in the transport and logistics service industry. For example, in Greece, multiple administrative agencies that do not interact with each other has created duplication of regulations and resulted in overregulation (WB, 2013). On the other hand, in the East Africa Community, due to insufficient regulatory oversight, low-skilled operators easily enter the industry with the lack of professionalism, quality, and efficiency of their services (Arnold, et al., 2011).

The World Bank studies observe that it is rare that licensing requirements for logistics service operators are published in one place. For instance, regulations on trucking business licenses under a ministry of transport, regulations for a bonded warehouse license for the same operator still must comply with customs regulations. Even for warehousing, the operator is subject to follow a fire regulation monitored by a fire department. Furthermore, licensing requirements for foreign operators are often stricter than those for domestic operators.

The regulations for foreign operators are, stipulated by foreign direct investment laws, which are often prepared by a ministry of commerce. There is no “*one stop shop*,” such as a ministry of logistics to handle relevant information and harness/share efficiencies with private logistics-supply chain operations. Some countries have state regulation while others have self-regulation models for aspects such as logistics operations.

Digital technologies have a potential to significantly alter the way in which administrative, logistics, ship, terminal and port operations function together, in at least five areas (Table 1). These areas include the administrative procedures related to a shipment where for instance technologies such as distributed ledger technologies (DLT) could help to make processes in the maritime logistics chain smoother. A second area of deployment for new technologies is overall supply chain oversight and control, i.e. by providing visibility via storage systems such as cloud-based platforms, and hardware and software that allow cargo tracking and real-time status updates.

The Organization for Economic Co-operation and Development (OECD)’s International Transport Forum report for 2018 finds that lack of industry standards for data sharing can act as a hurdle to establishing common platforms for information sharing and collaboration. They recommend that public authorities should support the creation of open standards in maritime logistics to develop a configuration that is useful to all players in the supply chain. In this context it is important to clarify what should be standardized, whether standardization should be publicly or industry-driven, and how the implementation of standards will be organized.

Reducing unpredictability for port operators means a more efficient use of public infrastructure. This, in turn, benefits the environmental performance of the sector.

Although ports of the same region often compete, combined efforts to providing digital solutions for stakeholder coordination could generate efficiencies from which all participating ports benefit. Governments should thus support ports' efforts to better coordinate public and private maritime stakeholders through information platforms. In addition, government agencies, maritime stakeholders and the port communities need to intensify their collaboration in implementing single entry points for administrative services, so-called Single Windows.

2.5.2 Asia

2.5.2.1 Japan

The view that collaborative regulation involves the joint ability to respond to supply chain disruptions with supply chain actors through collaborative planning is evident in studies that were conducted in Asia (Christopher & Peck, 2004) and information- and intelligence-sharing (Jüttner & Maklan, 2011) to coordinate the immediate response (Scholten et al. 2014; Chowdhury & Quaddus, 2016) provided the most important lesson. However, such collaboration would not only have to be, initiated from somewhere but also be, explored in detail at the planning and operational phases to ensure it is useful in eliminating operational bottlenecks and generating cost savings for the parties involved and society at large (Bergqvist & Pruth, 2006).

Studies reviewed suggest that information sharing is not only a necessity for operational efficiency but also for improving the competitiveness of the entire economy. In the case of Japan, the key state authority in relation to logistics-supply chain operations is the Ministry of Land, Infrastructure, Transport and Tourism (Christopher, 2016). Its

recognition of the need for information sharing in regulated logistics-supply chain operations increased after the earthquake of 2011. The crisis also highlighted vulnerabilities in logistics-supply chain operations arising from increased globalization of supply chains. In efforts to counter the challenges faced during the crisis by improving the sharing of information in logistics-supply chains. Experts found that there was natural tension between those who purchase such things as energy and supplies—the procurement arm—and those charged with avoiding losses—the risk management function. The two departments do not necessarily share the same priorities in and across organizations. Ideally, ownership of supply chain management would reside in various departments, with the responsibility for making the appropriate decisions ultimately residing with senior management. According to David Mounts, WG '04, the CEO of Winston-Salem, N.C.-based Inmar Corp, that does not happen as often as it should. The crisis also stressed the importance of strategic partnerships in logistics-supply chain operations based on overviews of processes that could be, assisted or facilitated by regulatory bodies. This further was, argued to be an imperative to attaining agility, flexibility, and responsiveness in logistics-supply chain operations. Tools such as cloud computing have been, identified as having potential to create the real-time visibility that many links in the global supply chain currently lack.

2.5.2.2 Malaysia

Logistics-supply chain operations in Malaysia are, affected by regulatory requirements enshrined in legal systems and procedures. The regulatory framework on logistic industries such as the Companies Act 1967 and the Commercial Vehicles Licensing Board Act 1987 is comprehensive. Also, the Digital Free Trade Zone (“DFTZ”) was,

launched in 2017 to facilitate seamless cross-border trade and enable local businesses to export their goods with a priority for e-commerce. By virtue of these Acts, logistics providers shall generally obtain the approval from the relevant bodies like Royal Malaysian Customs (RMC) and Road Transport Department. The rapid growth of e-commerce also sees the innovations in logistics industries by way of fulfilment hubs and online businesses. However, there are ongoing challenges faced by logistics providers.

Lessons for example, are that logistics players experience difficulties with customs clearance due to lack of standard procedures practiced by the customs officer at different ports and the huge delays resulted from the ever-changing customs orders and procedures without prior notification. Hence, the logistics providers are advised to always check the procedures and stay updated with any changes.

In a study of pharmaceuticals supply chains in Malaysia, Aigbogun et al (2018) focused on the halal regulatory authority (JAKIM) which enters joint working relationships with supply chain actors, and thus facilitates the integration of operations between supply chain partners by developing a cohesive team with a shared set of goals and compatible philosophies. Thus, the study demonstrated that trust and shared value or conversely security concerns/misunderstandings are barriers to collaborative information sharing likely to affect information sharing. Collaborative innovation of information sharing systems was, noted to be critical in overcoming barriers.

2.5.3 North America

2.5.3.1 Canada

In Canada, Transport Canada is the department that has the responsibility and authority to propose and enforce laws and regulations to ensure safe, secure, efficient, and clean transportation. In other words, the department is, tasked with actualizing the sustainability and competitiveness agenda in this sector (Christopher, 2016). As a department, Transport Canada is responsible for administering acts and regulations, and for implementing government-wide regulatory initiatives relevant to much of the logistics-supply chain operations sector. They conduct an Administrative Burden Baseline initiative which requires departments and agencies to: 1) establish a baseline count of federal regulatory requirements that impose administrative burden on business, and 2) annually update and report publicly on the count of baseline requirements. The key lesson from Canada is the need for information sharing amongst regulatory agencies as a prerequisite to information sharing with private sector logistics-supply chain operations to create a harmonized regulatory environment that optimizes processes.

2.5.3.2 United States of America

Recent developments of uncertainties leading to supply chain disruptions have led researchers to ask questions about how the desired state can be actualized (Starr, et al. 2003; Peck, 2005; Sheffi & Rice, 2005; Kunreuther, 2006; Pickett, 2006; Pettit, 2008; Pettit et al. 2010,)), have placed a challenge before regulatory authorities to advance methods of exerting controls in a way to proactively collaborate in managing supply disruptions across global supply chain networks (Burger & Warner, 2012). Hence, calls have been, made for innovative approaches such as collaboration between supply chain

actors and regulatory authorities (Cannella & Ciancimino, 2010; Cao & Zhang, 2011). This has led researchers (e.g, Zacharia, Nix, & Lusch, 2011; Burger & Warner, 2012; Fiorino & Bhan, 2014) to propose the collaborative input of regulatory authorities. Consequently, the findings of the 2013 World Economic Forum's supply chain risk survey (World Economic Forum, 2013) has, revealed that there is a need for the improvement of international and interagency compatibility of resilience standards and programmes via the collaboration of regulatory authorities with supply chain actors for optimum integration of supply chains.

In the case of the United States of America, various government agencies are involved in the development and enforcement of transportation regulations at state and federal levels (Kembro, et al., 2014). The Federal Motor Carrier Safety Administration (FMCSA), an agency in the United States Department of Transportation, develops and enforces data-driven regulations that balance motor carrier (truck and bus companies) safety with efficiency. FMCSA harnesses safety information systems to focus on higher-risk carriers in enforcing the safety regulations. It also targets educational messages to carriers, commercial drivers, and the public; and partners with stakeholders including federal, state, and local enforcement agencies, the motor carrier industry, safety groups, and organized labor to reduce bus and truck-related crashes (Christopher, 2016).

The Federal Highway Administration (FHWA) is an agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). The mission of the Federal Maritime Commission (FMC) is to *“ensure a competitive and reliable*

international ocean transportation supply system that supports the U.S. economy and protects the public from unfair and deceptive practices.” (Mbindi, 2018).

The FMC achieves these goals by reviewing and monitoring agreements among ocean common carriers and marine terminal operators (MTOs) serving the U.S.-foreign ocean-borne trades to ensure that they do not cause substantial increases in transportation costs or decreases in transportation services. The FMC also maintains and reviews confidentially filed service contracts and Non-Vessel-Operating Common Carrier (NVOCC) Service Arrangements to guard against detrimental effects to shipping. The Federal Railroad Administration’s mission is to enable the safe, reliable, and efficient movement of people and goods. FRA exercises its responsibilities for regulating the safety of the nation's railroad system and development of intercity passenger rail through legislative rules; non-legislative rules (‘interpretive rules and policy statements), and management and procedural Rules (Jonsson, 2008).

The Maritime Administration (MARAD) is the agency within the U.S. Department of Transportation that deals with waterborne transportation. Its programs promote the use of waterborne transportation and its seamless integration with other segments of the transportation system, and the viability of the U.S. merchant marine. MARAD works in many areas involving ships and shipping, shipbuilding, port operations, vessel operations, national security, environment, and safety (Khurana, et al., 2011). The Federal Aviation Administration (FAA) is the US governmental body with powers to regulate all aspects of civil aviation in the US and in its surrounding international waters. Its powers include the construction and operation of airports, air traffic management, the certification of

personnel and aircraft, and the protection of U.S. assets during the launch or re-entry of commercial space vehicles (Bergqvist & Pruth, 2006).

The US logistics-supply chain sector is, therefore affected by problems relating to information sharing (Cress, et al., 2006). Businesses face significant compliance regulations imposed by federal, state, and local authorities that adversely affect efficiency (Fabbe-Costes & Jahre, 2007). While the industry understands and supports many of the benefits of technology-enabled solutions to some of these problems such as information sharing, experts observed that some questions remain as to how they will pay for it and who will help implement the improvements (Mbindi, 2018). Nevertheless, despite security concerns ranking high, US port authorities have considered models for information sharing to improve operations. The Maritime Operations Information Sharing Analysis project (MOISA) was a descriptive, ethnographic exploration of the complex daily operational information sharing environment (ISE) of the Puget Sound security and safety community (PSSSC). MOISA¹ revealed fundamental information with profound actionable implications for the security and safety of our country. The MOISA (2016) report found that the Puget Sound maritime safety and security community is composed of a robust, mature, and diverse set of stakeholders with representation of organizations across the FSLTIPP. The Puget Sound area is unique in its large and diverse geographical area and international border that mandates a close partnership with Canada for management of the area's shared waterways. While in some cases, especially those involving specific incidents, the U.S. Coast Guard provides central operational leadership, on a day-to-day basis the community is not centrally managed; its practices are diverse and generally decentralized.

2.5.4 Europe

2.5.4.1 Italy

Italy as a key part of the European Union also provides important lessons on regulated logistics-supply chain operations (Ferrari & Merk, 2015). Italy currently has 24 main ports, each managed by a Port Authority. The current port system derives from the reform law voted in 1994. Prior to that reform, Italian ports were, ruled by public entities entitled to directly operate within and outside the port boundaries. At that time Italian ports resembled the typical “public port” model as depicted in the World Bank report (World Bank, 2001). In that model, ports are entirely publicly managed and private operators are only few exemptions: all the port infrastructure and services are, provided by the public authorities.

The Italian port system is facing several critical problems (Ferrari & Merk, 2015). Apart from the industrial flows, decreased due to the structural economic crisis affecting the country, other freight flows’ patterns are driven by several global carriers that select ports to rationalize their shipping network (Ferrari et al., 2013) and by forwarders and logistics providers wishing to operate in efficient transport node (Meersman et al., 2009). This trend sharpens some of the structural problems, in particular: the average small size of the Italian seaports; the inefficiency of port hinterland connectivity, and modernization issues. The connectivity issue is mainly related to the impossibility for each PA to control and plan anything outside the port boundaries widely accepted that the main competitive factor for port operators stands in an efficient supply chain (Christopher, 2016).

To overcome the lack of coordination among port players and port and transport services the port system should move towards production functions even more capital intensive, investing in new technologies (Ferrari & Merk, 2015). Extended Intelligent Transport Systems (ITS) or Information and Communication Technology (ICT) platforms are some of the essential gaps that several ports are currently trying to cope with. In this regard the cooperation under the “UirNet project” is making available a common web platform to all the main port actors in order to share the essential information on cargo flows. An example of this service is the pioneering project introduced in the port of Genoa, called “E-port”. This system allows all the port operators to access all the information related to a specific cargo, operator or ship and - once completed - also data on flows in real-time. Despite the recent development in ITS and ICT provision, efficient administrative procedures, already settled in several European ports, such as the “pre-clearing” activity, have difficulties getting implemented in Italian ports. This controversial issue is basically due to the co-existence of several authorities, with their own administrative and information system, within the port. This situation should be, solved through the unification of the control and information systems – the so-called “one-stop-shop” – of the different authorities and the experimentation with a simplification of the administrative procedures thanks to an easier coordination of the several public bodies involved.

2.5.4.2 England

In England, realization that collection of operational data is highly dependent on advanced IT solutions informed the evolution of the system for information sharing between regulators such as port authorities and logistics-supply chain companies

(Christopher, 2016). Since the middle of the 1990s Global Navigation Satellite Systems (GNSS), effectively Global Positioning Systems (GPS), were installed in English ports. Generally, GPS enables position detection and tracking of movable objects such as containers, vessels, vehicles, and equipment. For vessels, GPS has become the primary aid to navigation in and outside the port area. In port operations, real-time data on the position and status of objects becomes increasingly important to improve the visibility and to efficiently plan and coordinate activities involving multiple actors. The retrieved positioning data does not only allow to locate objects, but is also essential for forecasting (e.g., route prediction, arrival times) and for achieving contextual data about the individual object by combining positioning data with other data sources and points of interest. Given this functionality, the implementation of innovative concepts like synchro modality and slow-steaming as well as measures to avoid and handle disturbances became hugely benefit from considering operational circumstances (Ambe & Badenhorst-Weiss, 2011).

Due to cybersecurity threats (e.g., GPS jamming), the General Lighthouse Authorities of the United Kingdom and Ireland have trailed enhanced Loran (eLoran) in the Port of Dover (UK) as an independent backup to GPS. eLoran has evolved from Loran-C, which is a hyperbolic, low-frequency radio navigation system using fixed ground stations transmitting radio signals to determine the position of vessels, referred to as local positioning system (LPS). Their results indicate that a comparable accuracy can be achieved with eLoran. Electronic data interchange was, also incorporated involving a paperless and standardized communication as a prerequisite for efficient port operations being carried out by multiple stakeholders, but also for improving supply chain

integration, coordination, and performance. Major ports have adopted electronic data interchange (EDI) technologies to enable a paperless communication between those stakeholders based on international EDI standards like UN/ EDIFACT. Despite this enhanced usage of ICTs for information sharing in port regulation, experts find that special workshops are required to establish a good collaboration and to train end users among the key stakeholders on the resources.

2.5.5 Africa and Regional Perspective

2.5.5.1 Nigeria

The logistics and supply chain sector is one of the fastest growing industries in Nigeria, though still in its nascent stage. As at 2018 the value of Nigeria's logistics sector was estimated to be 250 billion Naira (\$696 million US Dollars), a rise of 50 billion Naira (\$140 million US Dollars) from 2017 figures. This was according to the 2018 Logistics and Supply Chain Industry report as reported by Vanguard. A huge infrastructure deficit and anti-business government policies, poor road network, unstable electricity, multiple taxation, etc. has led to the sector not being able to achieve its full potential, with local stakeholders unable to meet financial obligations, transferring costs and charges to end-users thus making them uncompetitive, and making room for foreign owned operators with the financial capabilities to absorb higher levels of business risk to enter into the market, entrenched corruption, and others being additional factors (Mbindi, 2018).

According to industry experts, infrastructure is critical to any logistics and supply chain development objective. The health of available infrastructures and level of integration between them directly impacts logistics access, cycle-time, reliability and cost.

Maintaining a competitive logistics and supply chain ecosystem requires a constant and strategic upgrade of regional infrastructure-mix. It also demands high performing government institutions, financing, and industry skills. Logistics can therefore be attributed to be the main indicator of economic advancement expressed boldly in trade facilitation and business competitiveness. Unfortunately, there are obvious regional and national deficits in Nigeria's logistics infrastructure which hinders its trade competitiveness negatively.

A representative of a major stakeholder in the Nigerian logistics and supply chain sector, Red Star Express, a courier and logistics company has said that there is almost a total lack of infrastructure at the level needed to fast track the development of the economy adding that with a 40% deficit in infrastructure availability, the quest for development begins with a wholistic and focused approach focusing on non-conventional areas, as we first have to overcome that deficit within the sector to compete globally. Nigeria being an import-centric country with a huge potential for growth requires a renewed focus on infrastructural development. Given the vast nature of the sector and the sub-sectors contained within, local and foreign operators require pooled resources to engage government to provide and improve the overall infrastructure network in Nigeria, as this is the foundation upon which all businesses rest and can thrive. A country without good modern transportation systems and the infrastructure that supports it will remain underdeveloped. Nigeria requires a national logistics strategy focused on the following areas: transportation and distribution industry, transport and distribution workforce, road infrastructure, road congestion, road conditions, interstate highway access, vehicle taxes and fees, railroad access, water port access air cargo access, etc. to ensure innovation

within the infrastructure development cycle of logistics and supply chain (Kim & Chai, 2017).

A survey carried out by a leading stakeholder in Nigeria's Organized Private Sector (OPS), the Lagos Chamber of Commerce and Industry, LCCI, showed that the Nigerian economy lost an estimated annual revenue of N3.46trillion due to poor infrastructure, poor implementation, and corruption at the ports, of which N2.5trillion are corporate earnings losses across the various sectors of the economy. According to the report, profit margins of corporate entities using some of the country's key infrastructure, namely the Apapa port, have gradually dwindled as logistics cost has increased significantly. In Nigeria, there are several local and foreign private sector companies operating in the logistics industry; Red Star Express (a franchisee/fulfilment partner to FedEx Express), United Parcel Service (UPS), DHL, etc. The Government of Nigeria regulator, the Nigerian Postal Service (NPS), regulates the activities of stakeholders and also operates the Nigerian Post Office (NiPOST), a courier delivery service which competes with the private sector courier operators. To aid the growth of the sector it is expected that Nigeria's bilateral and free trade agreements with various countries, along with its involvement in initiatives such as ECOWAS and AGOA are expected to improve trade substantially. With the African Continental Free Trade Agreement, Nigeria now has free access to the entire African market thereby improving the trade between the neighboring countries and impacting the logistics sector in the future. There was however limited information sharing strategy between logistics-supply chain companies and regulatory authorities.

2.5.5.2 South Africa

The South African Government views the country's ports and terminals as key engines for economic growth (Ambe & Badenhorst-Weiss, 2011). South Africa is situated on one of the busiest international sea routes, critical to international maritime transportation, and its geographical location presents a huge opportunity for investing in a diversified maritime market. Transnet National Ports Authority (TNPA) which is one of five operating divisions of SOE Transnet is responsible for the safe, effective and economically efficient functioning of the national ports system, encompassing eight commercial seaports, which it manages in a 'landlord' capacity.

As noted from the review of related studies with a regional perspective, empirical research studies are scant but also focus on the changing landscape for regulatory authorities whose operations have a direct impact on supply chains and logistics management. Asamoah et al(2016) confirmed positive associations between information sharing and supply chain performance. Mashiloane et al (2018) examined the relationship between supply chain dynamism, information sharing and inter-organizational relationships and supply chain performance in the manufacturing sector in South Africa. The results indicated a significant positive relationship between supply chain dynamism and both information sharing and inter-organizational relationships; between information sharing and both inter-organizational relationships and supply chain performance; and between inter-organizational relationships and supply chain performance.

However, more must be, done by South African regulatory authorities to improve operations to international best practice standards.

2.5.5.3 Kenya

In Kenya as in most Sub-Saharan African countries, logistics and supply chain companies are confronted by a multitude of pressures that raise new legal issues and spur an ever greater need for legal advice that is dynamic and global in its perspective. And in striving to optimize their competitive advantage, transportation and logistics players face escalating liability and insurance risks, tightening regulatory structures, diverse international legal regimes, and heightened demand for innovative finances (Christopher, 2016). According to Kenya's Ministry of Transport, Infrastructure, Housing & Urban Development (2018), the improvement of logistics performance is an important policy objective. Great focus should be put on the performance of customs, trade related infrastructure, inland, and transit logistics service provision, air and sea port efficiency, and the utilization of information technology for timely trade in goods at low costs. Industry demands logistics solutions that can cope with the pressures put on them by governments, the public, competitors, customers and the supply chain itself. There should be options for users to choose between modes, operators and routes.

M'muthuiba (2013) focused on information sharing among humanitarian organizations in Kenya, the study examined the extent of information sharing and establishing factors affecting information sharing among humanitarian organizations in Kenya. The study determined that majority of the organizations do have an information governance policy and guidelines in place and that most organizations have a defined data or information sharing strategy, with majority of them often or always using electronic mail, website / online portal and meetings as a means of information dissemination. Sharing of information to a greater extent occurs mostly upon request. This pointed at possible

barriers to information sharing. Poore et al (2015) examine the influence of information sharing, supplier trust and supplier synergy on supplier performance in SMEs.

The study found that information sharing exerted a moderate positive and significant influence on supplier trust and a weak but significant influence on supplier synergy. Supplier synergy had a strong positive and significant influence on supplier performance. However, the influence of supplier trust on supplier performance was weak and insignificant. The study provides a useful framework for analysing the interplay between information sharing, supplier trust, supplier synergy and supplier performance in SMEs. Thus, the lessons learned from this cohort of studies are that opportunities for collaborative information sharing in Africa are present but need to be, investigated further to establish what can be done.

2.6 Zambian Experience

Making sure that supply chains complies with many government regulations is part of every business plan. regulatory authorities are responsible for policy, regulation, and standard setting. relevant regulatory bodies in Zambia include the Zambia revenue authority which is a body corporate and an agency of government under the direction of the minister of finance. Whose core objective is to collect revenue among other objectives it comprises of various division such as domestic taxes division that deals with local taxes as well as customs division that facilitates international trade via imports and exports at various points of entries in the country. In the past the international trade agenda was predominantly concerned with customs tariffs and non-tariff barriers but at present, with declining customs duties, increasing volumes of trade and sophistication of supply chain management as manifested by the advent of global production structures. In international

operations, supply chain management suffers inefficiencies of conflict of trade procedures with commercial practices, backlogs at inspection facilities, uncertainty of whether goods will be, physically inspected or delayed.

Information sharing thus should aim at simplifying and harmonizing of international trade procedures (WTO, 2003) Trade procedures include both customs procedures which are facilitated by the Zambia revenue authority as well as technical regulations concerning issues such as health safety and the environment (Messerlin and Zarrouk, 2000) for some practitioners the term also includes procedures applicable to making payments for example via a commercial bank (Swepro, 2003) it is argued that information sharing in trade facilitation eases the burden of complying with regulatory controls despite increased political pressure.

The concept of trade facilitation is nothing new, common concepts and concerns around the globe that affect our country (Zambia) include excessive documentation, lack of automation, use of information technology, inadequate procedures and operating practices and lack of modernization. Many of these concerns can be, dealt with through information sharing. it is therefore important to note that supply chain management needs to involve the interest of regulators. Information sharing in this regard reduces the level of operational impact and cost on supply chains. Despite the many evolutions that can be noted in our Zambian border posts, the Chirundu border post has seen episodes of dysfunctions such as congestions at the boarder resulted in queues of commercial trucks extending more than five kilometers.

The delays at the boarder were because of increased commercial traffic passing through the boarder and the fact that Chirundu was only open to commercial traffic between 8am

and 5pm and not 24 hours a day. One of the most significant challenges currently facing our border posts and Chirundu is the insignificant information between the Zambian and Zimbabwean sides. The intermittent connectivity between the two sides has slowed down the fast-track lane from operating normally, the lack of connectivity between Asycuda world systems used by Zimbabwe and Zambia, limited ICT facilities to cater for SMEs and other cross borders trades e.g. baggage scanners, mobile payments, automated passenger declaration etc. Information sharing in this regard will play an important role.

However, under the eGovernment initiatives currently being developed in Zambia, the platform for collaborative information sharing could be considered for deployment with scholars such as Chipeta (2018) identifying information on business registration and licensing, customs and taxes rules, two way communication, channel online between the business and the government on business environment and e-transactions of services such as, e-Auditing, eProcurement, e-services within the realm of possibility.

2.7 Barriers to Information Sharing in Logistics-Supply Chain Operations

2.7.1 Managerial Barriers

The literature identifies barriers to information sharing in supply chain operations as including managerial barriers (Kembro, et al., 2014). Managerial barriers arise because managers dealing with supply chain do not realize the real benefits of information sharing and do not have confidence in information sharing system (Marsh & Flanagan, 2000) . These senior officials do want to invest in innovative culture conducive for information sharing. Zipf et al (2000) concluded that lack of leadership and managerial direction for information sharing makes implementation of information sharing extremely difficult.

Curry and Moore (2003) suggested that to achieve information sharing culture, support of senior management is, required.

2.7.2 Organizational Barriers

Organizational barriers are, categorized as those barriers that are, originated from altitudes of the organizations towards implementations of information sharing. These barriers are due to the organizational structures and groups involved the process of information sharing may become complicated because of organizational barriers (O'Dell and Grayson, 1998) Information sharing initiatives require radical changes in process and behaviour of individuals as well as organizations.

Normally the organizations and individuals resist the changes because of structural conflicts and managerial practices of different organization in supply chain. The delay to address these embedded barriers lead to disappointment and failures. Organizational factors that are deeply embedded in institutional and professional realities also create barriers to inter-organizational information sharing. Tsai (2002) reported that organizations with centralization in strong hierarchical structure have a significant negative impact on sharing of information in a supply chain.

The organizations with high level of bureaucracy and strict administrative control lack the information sharing spirit in supply chain (Bures, 2003). Researchers (Milward, 1982; Tsai, 2002; Willem and Buelens, 2007) are of the view, that formal rules, guidelines, procedures and regulation could be some barriers to information sharing as well. They have also reported that less formalized organization structure and voluntary information sharing arrangements can lead to more flexible and open interactions among

employees and seem to create more beneficial environment for information sharing in supply chain. Barson et al. (2000) has concluded that some organizations fear of losing company stability/market position in case they share technical information with other chain members. Caudle et al. (1991) has shown that without support from the top management, an innovation in information sharing system is less likely to be adopted. Top management support has been consistently found to play an important role in the adoption and implementation of information sharing systems and is treated as organizational barrier.

2.7.3 Financial Barriers

Financial constraints are a key barrier to Information sharing in supply chain. Cost considerations are the prime challenges to support the infrastructure and man-power requirements of information system. Information and technological systems require more funds because without this efficient information sharing cannot take place in supply chain. Large amount of financial resources are needed for redesigning internal organizational and technical processes, changing traditional and fundamental product distribution channels, customer service procedures and training of staff to achieve efficient information sharing in supply chain (Motwani et al., 2000). Cragg et al. (2002) has reported that lack of resources inhibits organizations to adopt information sharing using information technology. It is because of difficulties in raising finance to invest in information sharing systems (Damaskopoulos and Evgeniou, 2003).

Clark and Hammond (1997) reported that implementation of transparent information sharing system become very expensive in supply chain with many members. They have concluded that most chain members such as retailers show unwillingness to invest in

sophisticated infrastructure for using information technology tools for the purpose of ordering and business processing. The financing of feasibility studies, systems design and management efforts to start up new supply chain communication channels becomes a substantial barrier to implement the efficient information sharing system (Lee and Whang, 2000). Love et al. (2001) regarded the high initial investment and running cost of maintenance of an information sharing system in supply chain as financial barriers. They have reported that the cost of specialized man-power and training of personnel as basic obstacle to information sharing. Chong and Pervan (2001) identified initial setup cost as one of the major barrier for information sharing system. Most of the small to medium organizations do not have sufficient finances to employ consultants to help the implementation of information sharing systems (Soriano et al., 2002)

2.7. 4 Technological Barriers

The advancement of information technology has increased the ease of information sharing and has provided better methods to share and integrate information. Technological linkages across organizational units as well as up and down the supply chain are particularly critical to sharing information. Study has shown that complexity of a technology is a major factor that affects the adoption of information sharing (Newcomer and Caudle, 1991). Different organizations may use various types of hardware, software, data standards and definitions, as well as programming languages and the task of integrating them could be very challenging. Hoffman and Mehra (2000) stated that the technological factors can cause the failure of any information system in supply chain so that technological barriers need to be tackled at the earliest. Premkumar and Ramamurthy (1995) concluded that if the technology is simple to use, it is easier to adopt and other

characteristics such as functionality, reliability and accessibility influence the users to use the technology for information sharing. Monczka and Morgan (1997) termed poor IT infrastructure as a barrier in the supply chain integration. However, poor IT infrastructure may be attributed to lack of funds and lack of awareness and commitment of top management about the use of IT tools in a supply chain (Bender, 2000; Kilpatrick and Factor, 2000). The deployment of IT tools in a supply chain is also not free from barriers. Some of these barriers are due to lack of trust in information technology tools, fear of information system breakdown etc. (Kwan, 1999; Ayers, 2000; Zhao and Xie, 2002; Li, 2000; Agarwal and Shankar, 2003). Dawes (1996) found that differences in level of the technological capabilities of chain members may be an important barrier in participation in inter-organizational information systems. Lack of ability of professionals to maintain adequate levels of knowledge and expertise due to fast pace of rapidly and radically changing technology used in information sharing system is one of the major barrier of information sharing (Dawes, 1997; Holden et al., 2003).

Barriers originating from behaviour and actions of either individuals or groups within or between various business functions are considered individual barriers. Information is scattered among individuals and across groups or among group members. The information that other chain members might need may be available with any of individual or group in the chain. Constant et al. (1994) concluded that organizations' effort to encourage and facilitate the sharing of information by investing in collaborative information and communication technology becomes useless if employees are not willing to share the information. They have also stated that individuals are more willing to share

information when they are happy in their organizations and unsatisfied individuals always hesitate or refuse to share information.

They have suggested that it is important to explore people's attitudes toward sharing information and to see whether there are significant factors that can influence people's attitudes. Many employees are reluctant to share and contribute their own information to shared databases (Cress et al., 2006). Thorpe and Mead (2001) concluded that some individuals may feel that they are already having existing overload of information sharing. Information overload is described as having more relevant information than one can assimilate (Butcher, 1998). Johnson and Payne (1985) demonstrated that information overload can even worsen the effectiveness of decisions because more information sometimes only confuses and distracts the decision maker. Szulanski (1996) has reported that one of the major barriers for sharing information is lack of motivation that can lead to many different hindrances.

Individuals or organizations feel that power, ownership, and privilege of possessing crucial information are lost when they share the information. Some employees regard information as a symbol of power (Kolekofski and Heminger, 2003). Sharing information is viewed as losing power and social influence by Ardichvill et al. (2003). These factors inhibit information sharing and can result in something that has termed as information pathologies e.g. preservation of information from co-workers to show superiority (Jarvenpaa and Staples, 2000). Pendlebury et al. (1998) has cited lack of training as one of the barriers to information sharing. In his study, most respondents have reported that no formal training was provided regarding the use of the ICTS.

2.8 Conceptual Framework and Operational Definitions

A conceptual framework provides the underlying logic of the linkages between concepts in a research study (Bless & Achola, 1988; Reyes, 2004; Yin, 2012). For purposes of the current study, the figure below provided the conceptual framework. Collaborative information sharing between logistics-supply chain companies and regulatory authorities. Considering study objectives, the framework was, informed by terminology from knowledge management (KM) and knowledge sharing (KS) fields. Within the KM area, numerous terms are frequently used. Among terms that have high significance for change in the knowledge structure, terms related to distribution or dispersion are common.

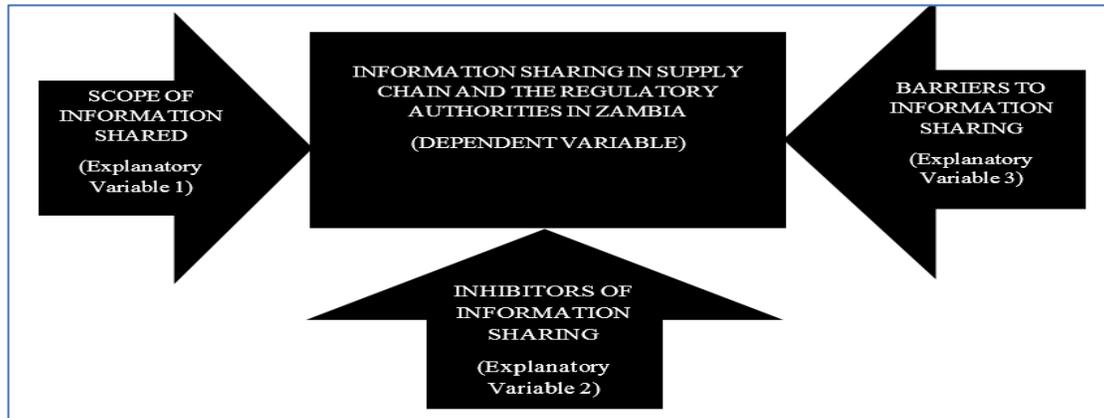
Four of those terms are Knowledge Transfer (KT), Knowledge Sharing (KS), Knowledge Flow (KF), and Knowledge Barriers. Barriers come in many forms, ranging from strictly individual/personal barriers through group-related barriers, intra- and inter-organizational barriers, barriers related to national differences, as well as an array of technology-related barriers. Several authors have developed categories with the purpose to create a structure.

Past studies resulted in a proposition of factors influencing knowledge dissemination and the following terms are, suggested: (1) Facilitators (which denominate factors with positive influence), (2) Inhibitors (factors with negative influence) and (3) Barriers which are factors that obstruct knowledge dissemination or information sharing, until certain conditions or levels are, fulfilled (Agarwal & Shankar, 2003; Cagliano, et al., 2006). The conceptual framework of the supply chain and regulatory authorities in Zambia.

In the model adopted for this study, barriers to information sharing (IS) are, defined as factors that may reduce the possibility of information sharing between supply chain partners but are not entirely insurmountable depending on certain conditions being, met

based on the conceptualization proposed by Bergqvist & Pruth (2006). On the other, inhibitors to information sharing are factors that are expected to negatively affect the ability of potential strategic partners to share information (Paulin & Winroth, 2013).

Figure 1- Information Sharing in Supply Chains and Explanatory Variables



Source: Author (2021)

Thus operational definitions adopted were as follows;

- 1) Collaborative information sharing- sharing of information relevant to operations of logistics/supply chain companies and regulatory authorities intended to exploit possible efficiencies and eliminate bottlenecks for the benefit of all parties involved. Thus the scope for information sharing was about where, how, when, and what type of information could be shared.
- 2) Inhibitors to Collaborative Information Sharing-hard factors or impediments to information sharing that require extensive effort to overcome to enable the process to take place.
- 3) Barriers to Collaborative Information Sharing- soft factors preventing the sharing of information in supply chains that can be addressed with relatively less effort.

2.9 Hypotheses Generation

A hypothesis is a proposed explanation for a phenomenon which is, tested using the answers and results from the analyzed data. Hypothesis can either be, confirmed or disproven, the following are the hypothesis that this research project sought to prove or disprove.

Hypothesis 1

Null Hypothesis: There is insufficient scope for information sharing between logistics-supply chain companies and regulatory authorities in Zambia

Alternate Hypothesis: There is sufficient scope for information sharing between logistics-supply chain companies and regulatory authorities in Zambia

Hypothesis 2

Null Hypothesis: There are no strong inhibitors for information sharing between supply chain and regulatory authorities in Zambia

Alternate Hypothesis: There are strong inhibitors to collaborative information sharing between supply chain and regulatory authorities in Zambia

Hypothesis 3

Null Hypothesis: There are barriers to information sharing between supply chain and regulatory authorities in Zambia

Alternate Hypothesis: There are strong barriers to information sharing between supply chain and regulatory authorities in Zambia.

2.10 Chapter Conclusion

This chapter has reviewed the empirical literature on information sharing in supply chains. The review has demonstrated the lack of adequate coverage of collaborative regulation cases of information sharing. Barriers to information sharing in regulator-private logistic/supply chain as identified and classified by the literature have also, been, discussed. This chapter has explored the main theories behind information sharing in supply chains and how they relate to barriers for the practice as a strategy for improving efficiency. Agency theory identifies the trust issues that arise in relationships where principals rely agents such as managers and public officials to make decisions on their behalf which may lead to barriers for information sharing in supply chains-logistics operations. Transaction cost theory on the other hand has been used to provide reasons for cooperation in supply chains through information sharing. The theory of asymmetric information has, similar to agency theory, demonstrated barriers to information sharing. However, the theory of asymmetric information may also be used as justification for supply chain participants to engage in information sharing to improve efficiencies. However, as argued in this paper, the scope for information sharing involving regulatory agencies and private sector supply chain-logistics firms.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the methodology that was employed to provide answers to the research questions and provide empirical evidence to the assumptions made in the hypothesis. This includes information as such research design, which refers to the overall strategy used to integrate the different components of the study into a coherent and logical way, to ensure that it effectively addresses the research problem. It constitutes the blueprint for the collection, measurement and analysis of data. Research population; this is the population from which the sample is drawn from and questions administered to.

Sampling design and sample size; the total number of respondents drawn from the population represented the sample size. It includes the method that is employed to come up with this number. Data collection involves the instruments that are used to collect this information from the selected respondents. Data analysis; involves the tools that are, used to analyze the answers provided by the respondents, into a logical manner.

Hypotheses are a proposed explanation for a phenomenon, which includes study variables, the dependent and the independent variable.

3.2 Research Philosophy

Social research can be conducted based on different research paradigms which influence the research process (Barker, 2000). These reflect assumptions about the nature of reality also referred to as ontology, how knowledge or truth can be established also known as epistemology as well as how reality can be presented known as methodology and the

methods or processes of arriving at such knowledge or instrumentation (Howell, 2012). A research paradigm describes a model of arriving at knowledge on a subject of interest that is, proven and widely accepted by researchers (Krauss, 2005).

3.2.1 Ontological Assumptions

Prior to clarifying the type of ontology used in this study, it is important to define ontology. Ontology is, defined by (Crotty: 2003:10) as “*the study of being.*” It is concerned with “*what kind of world we are investigating, with the nature of existence, with the structure of reality as such.*” Guba and Lincoln (1989:83) state that the ontological assumptions are those that respond to the question ‘*what is there that can be known?*’ or ‘*what is the nature of reality?*’ The distinction between two social research philosophies of positivism and interpretivism arises (Howell, 2012). Positivists assume an objective reality that is measurable quantitatively justifying quantitative research processes applying techniques such as regression analysis to quantify relationships; while interpretivists assume subjective reality requiring interviews with research subjects to investigate themes in the data (Krauss, 2005). Each extreme paradigm is justifiable in different social research scenarios but also has weaknesses. Some social researchers prefer a middle ground represented by the philosophy of realism where the quantitative and qualitative aspects of the world are complementary in providing reliable knowledge about the world (Guba & Lincoln, 1994); an process referred to as mixed methods research (Creswell, 2003).

From the forgoing the research process which aims at arriving at reliable knowledge cannot be, conducted without the researcher making ontological assumptions about the

subject matter and the state of the world as a preliminary step (Barker, 2000). In arriving at these assumptions, the researcher must for example decide whether to assume that barriers to information sharing in supply chains are an objective concept that can be studied irrespective of their own perspective (positivist philosophy) or a social construct whose meaning can only be fully grasped by relevant individuals(interpretivist philosophy) or a combination of both (critical realist philosophy) (Howell, 2012; Guba & Lincoln, 1994; Fernandes, Farinha, Martins, & Cesari, 2017; Menozzi, Urtiga, & Vannoni, 2012). Adoption of ontological assumptions will provide a basis for formulation of epistemological assumptions (Guba & Lincoln, 1994). In other words, the views on the nature of reality (ontology) have a logical bearing on how the researcher can then obtain knowledge of the subjects of interest(epistemology). For the purposes of this study, ontological assumptions were that an objective reality (opportunities for information sharing) but there are factors (barriers and inhibitors to information sharing) perceived or interpreted differently by respondents. Hence or combination of objective and subjective reality would be, needed.

3.2.2 Epistemological Assumptions

Epistemological beliefs or philosophies direct the researcher to assumptions of how and where reliable knowledge on phenomena of interest can be, obtained (Howell, 2012). It focuses the researcher on the sources of knowledge. In the topic of interest, the researcher will have to decide whether to look at society as a whole in trying to discover universal laws of corporate governance (positivist research) or study the unique perceptions or views of relevant individuals(interpretivist research) in different contexts that may influence knowledge obtained (Creswell, 2003). This step of the research process is

necessary for establishing the appropriate research methodology which provides a framework for how reality is, described (Howell, 2012). In relation to information sharing in supply chains, researchers have applied regression analysis to model the relationship (positivist research) or focused on the meaning of the concepts to understand their expected social relationships (interpretivist research) (Daiser, Ysa, & Schmitt, 2017). This aspect of the research process is important for identifying the methods for collecting the data to use in the selected framework (Krauss, 2005). The assumptions of this study were that knowledge is both experiential and absolute with the interaction between the two paradigms justifying a mixed methods research approach. The assumption also justified the collection of data from research subjects who experience the subject matter on a day to day basis and are therefore best placed to provide descriptions of the concept of information sharing between logistics-supply chain companies and regulatory bodies in Zambia.

3.2.3 Phenomenological Assumptions

Phenomenological research stems from lived experiences as described or interpreted by research participants (Holloway & Daymon, 2002). Phenomenological assumptions are assumptions about the fundamental qualities of the phenomenon being, studied (Yin, 2012). Consequently, they affect the dissemination of knowledge from sub-fields to the broader field of study. Microprocess research in organizational studies reveals implicit phenomenological assumptions that vary in the extent to which micro-processes are, treated as parts of larger systems (Adewole, 2005). Thus, for the purposes of this study, key assumptions were made about the attributes of the phenomena under investigation i.e. scope of information sharing, inhibiting factors, and barriers to information sharing.

Past research indicates that shared meanings are essential to coordinating across boundaries or amongst organizations (Donnellon, Gray & Bougon 1986; Kellogg, Orlikowski & Yates 2006). Sub-fields have their own “thought worlds” with particular “funds of knowledge” – what is known – and “systems of meaning” – how they know (Fleck 1979), creating barriers to knowledge dissemination across sub-fields. For purposes of this study therefore, it was assumed that the common perception of information sharing could be identified from the perspective of respondents based on aspects of the process such as its scope, frequency, nature of information to be shared as well as by whom.

3.2.4 Axiological Assumptions

Axiology is the study of value or, more adequately, theory on the nature of value (Guba & Lincoln, 1994). Axiology incorporates ethics or the theory of morality and aesthetics or theory of taste and of beauty, as well as other forms of value (Barker, 2000). Asking what ‘ought to be’ is axiological and was relevant for the present study as the assumption made was that information sharing between logistics-supply chain companies and regulatory authorities could be actualized if better understanding of inhibitors and barriers to the process could be obtained. The researcher further assumed that this enhanced understanding of the phenomenon could be, generated by combining the researcher’s perspective and interpretation of the concepts involved with the knowledge provided by study participants from both logistics-supply chain companies and their relevant regulatory authorities.

3.3 Research Design

The study employed a descriptive mixed methods research approach to the research problem in that it is easy to prove and/or disprove assumptions and not costly to perform and does not require a lot of time. Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e. g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Creswell, 2003). In a commonly used mixed methods notation system (Morse 1991), the components are indicated as qual and quan (or QUAL and QUAN to emphasize primacy), respectively, for qualitative and quantitative research. A mixed methods design as a product has several primary characteristics that should be considered during the design process (Howell, 2012).

3.4 Research Population

The population of this study comprised of regulatory authorities in Zambia such as ZRA, RATSA, RDA ZICTA and ZABS. It also comprised of logistics operators such as transporters, freight and forwarding companies and individual business owners. There was no sampling frame or complete list of this population.

3.5 Sampling and Sample Size

The sample size is an important feature of any empirical study that in which the goal is to make inferences about a population from a sample. The sample size for the purpose of this academic research was based on the expense of data collection, the time notwithstanding the need to have sufficient statistical power for meaningful inference. Using a survey system sample calculator, with sampling error of (5%) or 0.05, confidence

level 95% and total population in Lusaka Province of over 100 logistic operators, the generated sample was too large to successfully carry out a research. A non-probability sampling design, due to the lack of a sampling frame, was used to arrive at the sample. The sampling strategy applied was the convenience sampling approach. The sample also contained staff from regulatory bodies to capture the regulators' perspective on the subject matter. Convenience sampling is a type of nonprobability sampling in which people are, sampled simply because they are "convenient" sources of data for researchers (Bryman, 2012; Creswell, 2003).

In probability sampling, each element in the population has a known nonzero chance of being, selected using a random selection procedure. Nonprobability sampling does not involve known nonzero probabilities of selection. Rather, subjective methods are, used to decide which elements should be, included in the sample. In nonprobability sampling, the population may not be well denned. Nonprobability sampling is, often divided into three categories: purposive sampling, convenience sampling, and quota sampling (Yin, 2012). Convenience sampling differs from purposive sampling in that expert judgment is not used to select a representative sample of elements. Limited availability of resources and time justified the adoption of a convenience sampling approach for the study. The target sample was 100 respondents representing logistics-supply companies and regulatory bodies.

3.6 Data Collection

Sources of data collection were, identified to provide primary data. Data was, collected by a self-administered questionnaire. The questionnaire was both structured and unstructured. The questionnaires used questions measured on a five-point liker scale

ranging from strongly agree (1) to strongly disagree (5) with amid-point scale of neutral (3). Semi-Structured interviews questions were used to collect data from the logistics operators and regulatory authorities such as ZRA, RATSA, RDA for the qualitative aspects of the study.

3.7 Data Analysis

The process of obtaining raw data and converting it into information useful for decision making by users is data analysis. Data was, collected and analyzed to answer questions, test hypothesis, or disprove theories. In this research data collected was, analyzed using qualitative and quantitative methods. Quantitative data, from Likert Scale type variables was, analyzed correlational analysis. Correlational analysis tests the strength and direction of the linear relationship between variables (Creswell, 2003). Qualitative data was, analyzed by content analysis of submissions in text form of data captured by open-ended questions in the data collection instrument. Content analysis generally applies a multistage strategy where answers are, first read and categorized by some criterion such as underlying themes or keywords in an iterative manner until the data are, reduced to a few meaningful categories (Guba & Lincoln, 1994). The Statistical Package for Social Science (SPSS) and Excel were, used in processing and analysing data from the questionnaire responses. Results were, presented using tables and graphs. The funnel model was applied as depicted by the review of relevant literature to identify practices, barriers and inhibitors to information sharing from the global to the regional and specific Zambian context.

3.8 Reliability and Validity Issues

The quality of academic research work is typically evaluated in relation to the extent to which it adequately addresses reliability as well as validity concerns (Burns, 2000). In empirical research the question of reliability alludes to the consistency of study results as a product of the level of scientific rigor applied in the study; in turn defined in terms of commitment to the mitigation of bias (McNabb, 2012). To ensure the mitigation of bias, the results of the study were reviewed by the research supervisors/panel of examiners as well as compared and contrasted with the findings of other researchers. On the other hand, validity is concerned with the extent to which the study was designed to measure the phenomena that it intended to measure which in turn affects the veracity of claims made by the researcher (Myers, 2008). In other words, validity concerns a broad range of issues in empirical research from the questions to the tools used to collect requisite data and the soundness of the research (Bless & Achola, 1988). The current study ensured validity by maintaining the links in the design of the study between the objectives, the research questions and the data collection tools as well as analyses applied.

3.9 Chapter Summary

Chapter 4 of this report has described and supported the research methods and methodology that was applied by the researcher. The chapter has explained the critical realist research paradigm that was the basis of the study. It has also provided reasons for the mixed methods strategy applied as well as how the study population was perceived by the researcher. Further, the sample size and sampling procedure as well as data collection and analysis methods have been described. The detailed manner in which the variables were defined and measured has also been addressed as have the strategies to

ensure reliability and validity of the study. The applications of these can be evaluated in Chapter 5.

CHAPTER FIVE

ANALYSIS AND RESULTS

4.1 Introduction

The objective of this study was to investigate barriers and inhibitors to collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia that are a deterrent to attainment of efficiency in the management of logistics-supply chain operations. Data was, collected by a self-administered questionnaire that obtained details on respondent profiles, and perceptions of various aspects of the subject matter measured on a 5-point Likert Scale. Respondents were all based in the Lusaka city area. A total of 100 questionnaires were, distributed but only 88 were available for data analysis. The 88% response rate represented by this turnout was sufficient for purposes of the study. This chapter provides the analysis and discussion of the data that were, collected for the study. The presentation of the data is mainly in the form of tables and charts generated using the Statistical Package for Social Sciences (SPSS) version 20 as highlighted in the Chapter 4 on Research Methodology. The chapter also presents results of the hypothesis tests that were, conducted to assess the associations between variables.

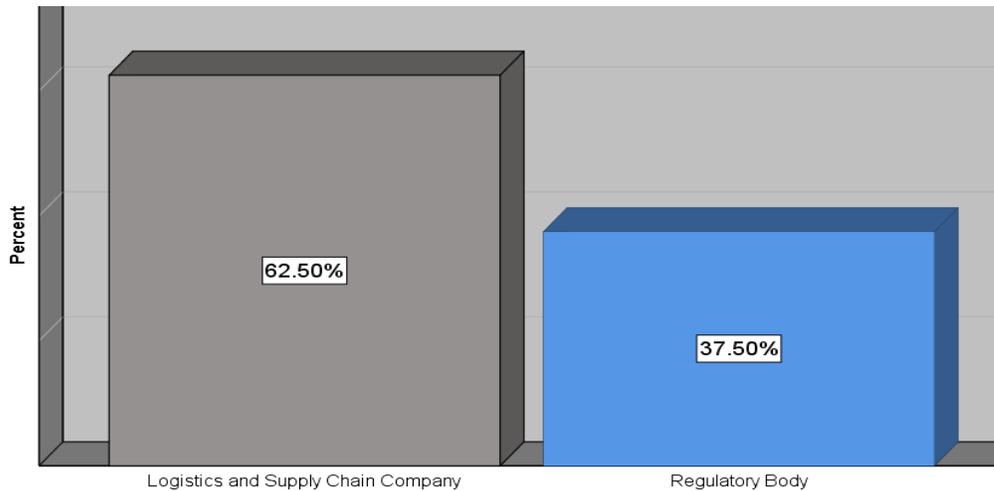
4.2 Respondent Characteristics

4.2.1 Organizations Represented

Figure 2 below shows the analysis of the 88 study respondents according to the organization they represented based on the two categories of logistics-supply chain company or regulatory body. The figure shows percentage frequencies while absolute frequencies are, provided in the narration of results. The chart shows that there were more

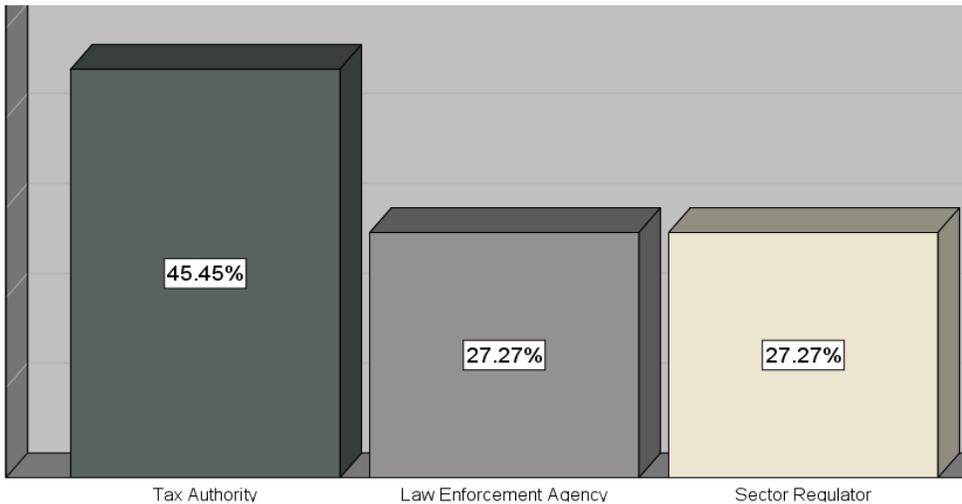
respondents representing logistics-supply chain companies (62.50% or 55 in absolute frequency terms) compared with those representing regulatory bodies (37.50% or 33 in absolute frequency terms).

Figure 2 Respondents by Organization Type



Source: Researcher (2021)

Figure 3 Regulatory Body Categories



Source: Researcher (2021)

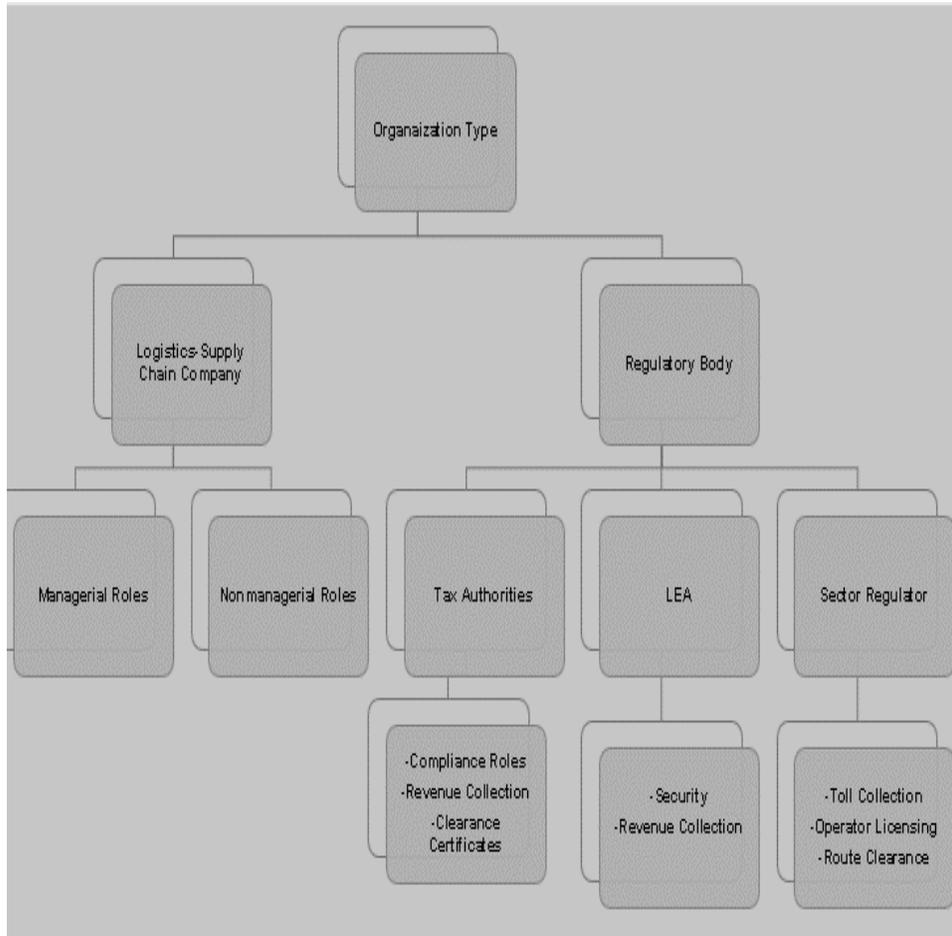
Of the “regulatory authorities,” content analysis of the data led to the identification of three types of organizations namely tax authorities, law enforcement agencies, and sector

regulatory bodies such as the Ministry of Transport and Communication (MoTC). Figure 3 above shows the distribution of regulatory body respondents amongst these 3 categories. The sample was, dominated by respondents from regulatory bodies representing tax authorities (45.45% or 15 out of 33). Respondents from regulatory bodies representing law enforcement agencies (27.27% or 9 out of 33) and sector regulators (27.27% or 9 out of 33) represented the rest of the sample. Overall, therefore, the sample contained a representative set of organizations that were relevant to the investigation.

4.2.2 Role in Organization

Respondents were, asked to provide a description of the roles they performed in their organizations. Content analysis was, again used to derive the main roles of respondents from the open-ended question that was, posed. The results, of the analysis suggested that roles were, best described relative to the three organization types. Respondents from logistics-supply chain companies described their roles in ways that led to the classification of the roles as managerial or nonmanagerial in relation to operational or administrative functions in their organizations. Those from tax authorities were either in compliance roles, clearance roles or revenue collection roles. On the other hand, respondents from law enforcement agencies were involved in either security roles or traffic patrol roles while sector regulators had roles involving toll collection, operator licensing and route clearance. The chart below shows the nominal distribution of respondents in these roles.

Figure 4 Respondent Roles in their Organizations



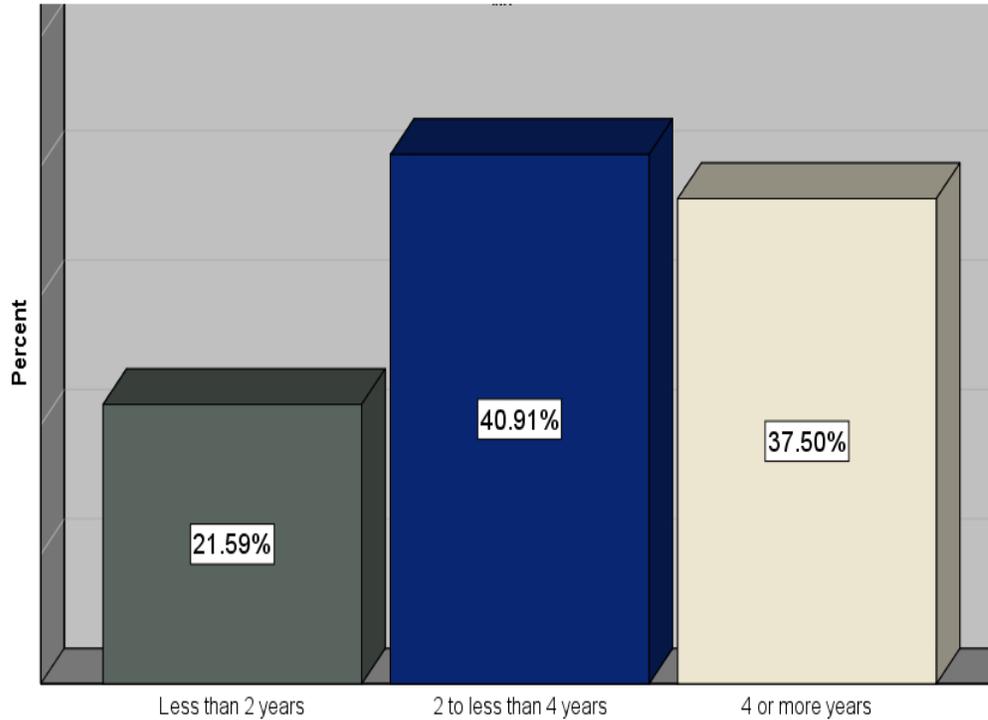
Source: Researcher (2021)

4.2.3 Years in Organization

Figure 5 below shows the distribution of study respondents by the years they had been with the organization they represented. The figure shows that the higher proportion of respondents had been with their organization for 2 to less than 4 years (40.91% or 36 out of 88 respondents in absolute terms). This was, followed by respondents who had been with their current organizations for 4 or more years (37.50% or 33 out of 88 respondents in absolute terms). Respondents with service lengths of less than 2 years represented

21.59% of the sample. The results suggested that respondents were sufficiently knowledgeable of the sector to contribute valuable insights to the discourse.

Figure 5 Distribution of Respondent Service Years with Current Organization

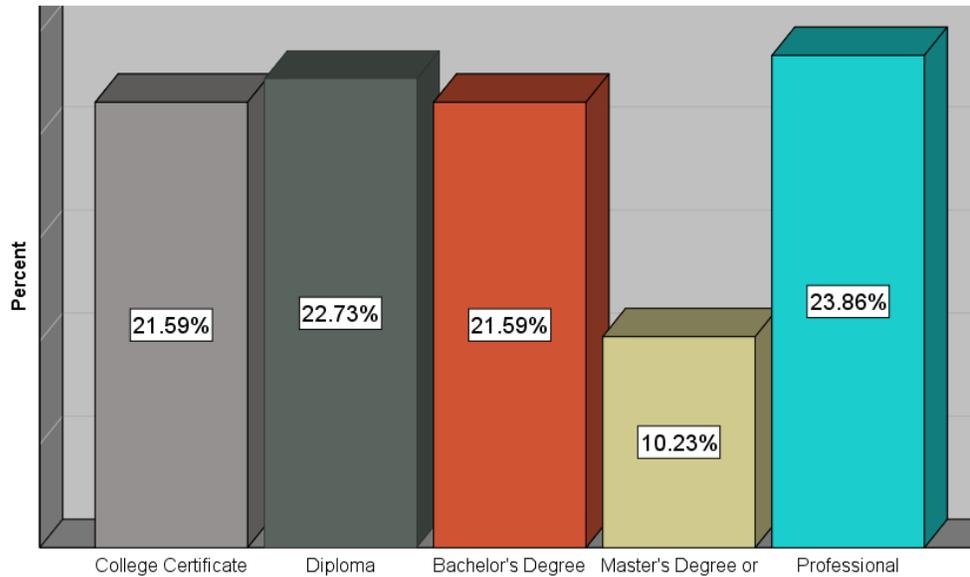


Source: Researcher (2021)

4.2.4 Qualification

Figure 6 shows the distribution of respondents according to the highest qualification attained at the time of this study. The highest proportion of respondents (23.86% of the sample) reported having professional qualifications as the highest held at the time of this study. This was, followed by respondents with diplomas as their highest qualifications at the time of this study (22.73% of the sample).

Figure 6 Distribution of Respondents by Highest Qualification at Time of Study



Source: Researcher (2021)

4.3 Respondent Views on Scope for Collaborative Information Sharing (IS)

4.3.1 Opportunities for Collaborative IS between RBs and LSC

Table 1 shows data that was collected in relation to the extent to which respondents agreed/disagreed that there were significant opportunities for information sharing between Regulatory Bodies (RBs) and Logistics-Supply Chain (LSC) companies.

The data in the table shows that most respondents agreed that there were many options for collaborative information sharing between logistics-supply chain companies and regulatory agencies or bodies (25% agreed plus 25% strongly agreed=50%). In contrast, only 31.8% of respondents cumulatively disagreed or strongly disagreed with the assertion. It may also be noted that 18.2% of respondents took a neutral position.

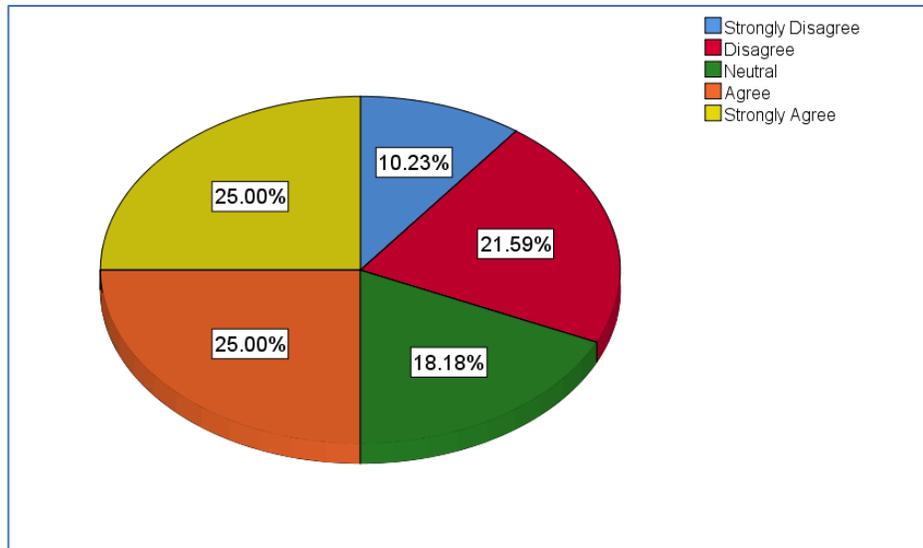
Table 1 Many Opportunities for CIS between RBs and LSC

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	9	10.2	10.2	10.2
	Disagree	19	21.6	21.6	31.8
	Neutral	16	18.2	18.2	50.0
	Agree	22	25.0	25.0	75.0
	Strongly Agree	22	25.0	25.0	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 7 shows the corresponding pie chart for the data in Table 1.

Figure 7 There are Opportunities for Collaborative Information Sharing



Source: Researcher (2021)

4.3.2 When and How Information Sharing Could Occur

Respondents were, asked to indicate when they felt information that could lead to supply chain efficiencies should be, shared between LSC and RBs. The question was, addressed in an unstructured manner to obtain as much insights from respondents as possible. Content analysis of the qualitative data generated aspects of the responses including frequency of information sharing and the cases where information sharing would be necessary. In relation to frequency of information sharing, respondents either suggested

a need-based approach while others proposed daily, weekly, monthly, or biannual routines.

The common thread in the responses was that regular sharing of information would work best in identifying areas where optimization could be, tapped. In relation to where information would be, shared, respondents offered possibilities including frequent stakeholder meetings, through trade association engagements with regulatory bodies, as well as feedback hubs to identify bottlenecks that could be contributing to delays and unnecessary costs. Some respondents felt that collaborative information sharing would best be built into the relationships between logistics-supply chain companies and relevant regulatory authorities at the policy-making stage with platforms such as SMART Zambia playing a critical role.

4.3.3 Types of Information Which Could be, Shared

Respondents were, also asked to indicate the type of information that logistics-supply chain companies could share with regulatory bodies to achieve operational efficiencies. Table 2 shows the data that was, collected. Logistics-information had the highest frequency (30.7%), followed by strategic information (26.1%), and inventory information. The least favored types of information for possible sharing was tactical information (5.7%) as well as other information (3.4%).

Table 2 Types of Information that Should be, Shared

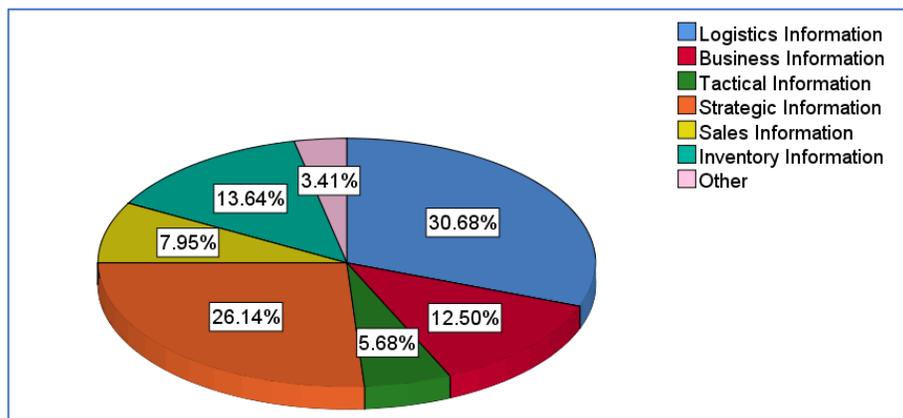
		Frequency	Percent	Valid Percent	Cum Percent
Valid	Logistics Information	27	30.7	30.7	30.7
	Business Information	11	12.5	12.5	43.2
	Tactical Information	5	5.7	5.7	48.9
	Strategic Information	23	26.1	26.1	75.0

Sales Information	7	8.0	8.0	83.0
Inventory Information	12	13.6	13.6	96.6
Other	3	3.4	3.4	100.0
Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 8 shows the corresponding pie chart for the data in Table 2.

Figure 8 Types of Information for Possible Sharing



Source: Researcher (2021)

4.3.3 Responsibility for Information Sharing

4.3.3.1 Regulatory Body Perspective

The question of responsibility for information sharing between logistics-supply chain companies and relevant regulatory authorities was a critical aspect of the data that was collected. From a regulatory authority perspective, the variety of regulatory bodies also entailed a large dispersion of views on how and by whom responsibility for information sharing between logistics-supply chain companies and relevant regulatory authorities would be, exercised. Some respondents such as those from Zambia Police suggested that professionals in areas such as logistics- purchasing and supply were, best placed to be, given the responsibility for participating in information sharing with logistics-supply

chain companies. Others from the tax authority side felt that those in charge of tax clearance and administration would be ideal in handling the responsibility for information sharing. Compliance teams were, also considered by other tax-authority related respondents as critical agents who could bare the responsibility for information sharing with logistics-supply chain companies. In reflecting the reality of bureaucratic rigidities that may constrain regulatory bodies, other respondents suggested that responsibility be, vested in teams that contribute to the formulation of their operational rules or those in most relevant official capacities. Departments in charge of operations or compliance issues of regulatory bodies were, also noted as possible dischargers of responsibility over information sharing with logistics-supply chain companies.

4.3.3.2 Logistics-Supply Chain Company Perspective

Qualitative data was, also collected on the question of responsibility over information sharing within logistics-supply chain companies. Most respondents indicated that such responsibility was, best exercised at managerial level in the relevant companies. This was in cases justified by the dominance of Small and Medium Enterprise (SME) amongst logistics-supply chain companies. Some respondents suggested that operations managers of the companies concerned would be involved in information sharing with regulatory bodies to exploit efficiencies available in such collaborations. Other study participants suggested that the responsibility be, held by procurement/purchasing departments of the companies would have the responsibility of operationalizing the information sharing with regulatory bodies.

4.3.4 Platforms for Sharing Information

Table 3 shows the distribution of respondent views on which platforms logistics-supply chain companies and regulatory bodies could use for their collaborative information sharing to exploit available supply chain efficiencies in Zambia. The most popular proposed platforms for information sharing were real-time online platforms (30.7%), electronic means (21.6%), face-to-face interactions (18.2%), composite platforms (15.9%), and manual documentation (13.6%). The data showed a clear pattern towards the use of Information Communication Technology enabled platforms for collaborative information sharing between logistics-supply chain companies and relevant regulatory authorities. However, possible sensitivities around the nature of information shared implied that some respondents still expressed preference for physical platforms (manual and face-to-face) while others considered composite or mixed platforms as best.

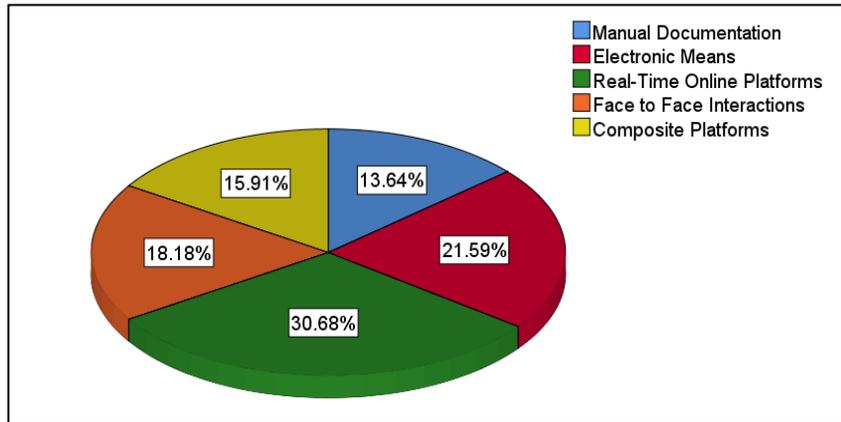
Table 3 Suggested Platforms for Collaborative Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Manual Documentation	12	13.6	13.6	13.6
	Electronic Means	19	21.6	21.6	35.2
	Real-Time Online Platforms	27	30.7	30.7	65.9
	Face to Face Interactions	16	18.2	18.2	84.1
	Composite Platforms	14	15.9	15.9	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 9 shows the corresponding pie chart for the data in Table 3.

Figure 9 Possible Platforms for Collaborative Information Sharing



Source: Researcher (2021)

4.4 Perceptions of Possible Inhibitors to Collaborative Information Sharing

4.4.1 Legal Framework and Laws

Table 4 shows data on the extent to which respondents agreed/disagreed that laws and the legal framework were inhibitors to information sharing between logistics-supply chain companies and regulatory bodies in Zambia. As defined in the conceptual and theoretical framework chapter, inhibitors to collaborative information sharing were, about factors with negative influence on the dependent variable i.e., information sharing. The data shows that most respondents disagreed that legal factors were inhibitors to collaborative information sharing (cumulatively 50%) between logistics-supply chain companies and regulatory bodies in Zambia. In contrast, respondents who agreed or strongly agreed that legal factors were inhibitors to information sharing being notably less (14.8% + 20.5%=35.3%). Only 14.8% of respondents took a neutral position.

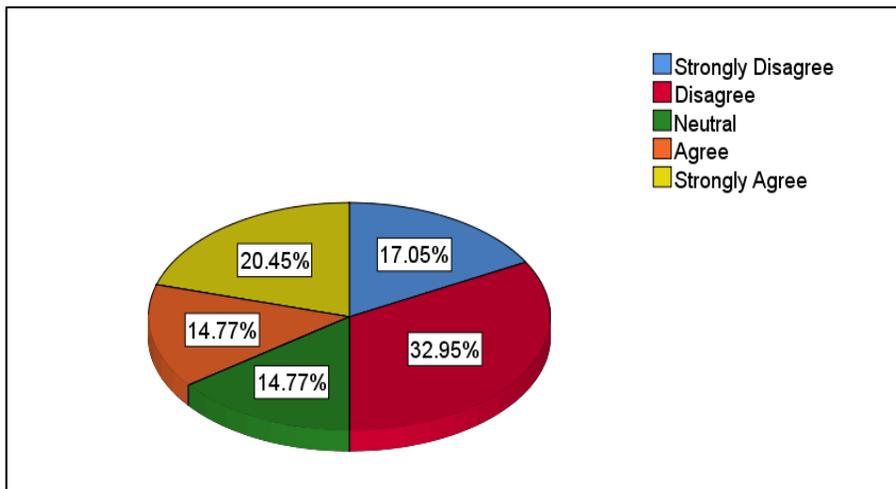
Table 4 Legal Factors Inhibit Collaborative Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	15	17.0	17.0	17.0
	Disagree	29	33.0	33.0	50.0
	Neutral	13	14.8	14.8	64.8
	Agree	13	14.8	14.8	79.5
	Strongly Agree	18	20.5	20.5	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 10 shows the corresponding pie chart for the data in Table 4.

Figure 10 Views on Legal Factors as Information Sharing Inhibitors



Source: Researcher (2021)

4.4.2 Security Risks and Concerns

Table 5 shows data on the extent to which respondents agreed/disagreed security risks and concerns were inhibitors to information sharing between logistics-supply chain companies and regulatory bodies in Zambia. More respondents agreed or strongly agreed (28.4% + 20.5%=48.9%) than disagreed or strongly disagreed (13.6% + 21.6%=35.2%) that security risks and concerns were inhibitors of collaborative information sharing

between logistics-supply chain companies and regulatory bodies. A further 15.9% of respondents took a neutral stance on the matter.

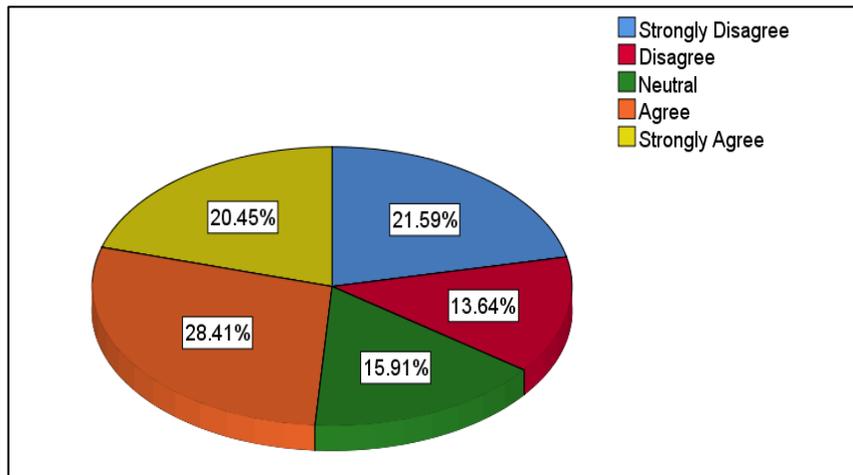
Table 5 Security Risks as Inhibitors of Collaborative Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	19	21.6	21.6	21.6
	Disagree	12	13.6	13.6	35.2
	Neutral	14	15.9	15.9	51.1
	Agree	25	28.4	28.4	79.5
	Strongly Agree	18	20.5	20.5	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 10 shows the corresponding pie chart for the data in Table 5.

Figure 11 Views on Security Risks as Inhibitors for CIS



Source: Researcher (2021)

4.4.3 Nature of Logistics-Supply Chain Information

Table 6 shows data on the extent to which respondents agreed/disagreed that nature of logistics-supply chain information was an inhibitor of collaborative information sharing between logistics-supply chain companies and regulatory bodies in Zambia. More respondents agreed or strongly agreed (22.7% + 25%=47.7%) than disagreed or strongly

disagreed (18.2% + 15.9%=34.1%) that the nature of logistics-supply chain information was an inhibitor of collaborative information sharing between logistics-supply chain companies and regulatory bodies. A further 18.2% of respondents took a neutral stance.

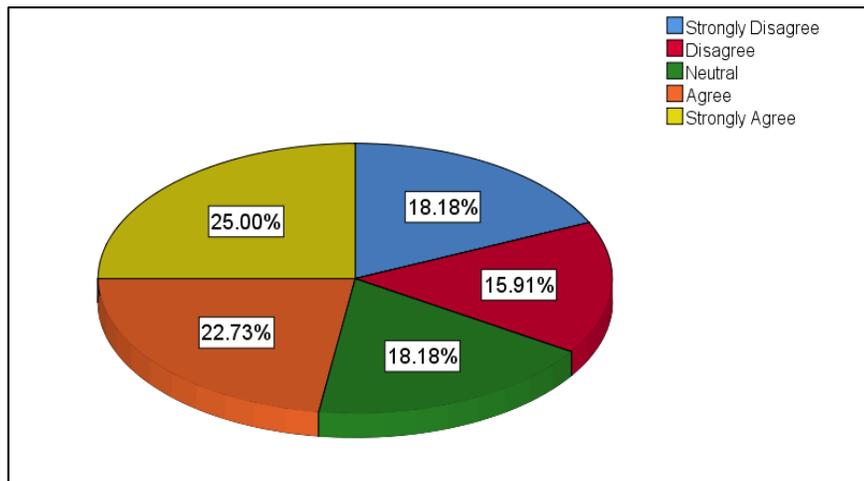
Table 6 Nature of Logistics-Supply Chain Info Inhibits Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	16	18.2	18.2	18.2
	Disagree	14	15.9	15.9	34.1
	Neutral	16	18.2	18.2	52.3
	Agree	20	22.7	22.7	75.0
	Strongly Agree	22	25.0	25.0	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 11 shows the corresponding pie chart for the data in Table 6.

Figure 12 Nature of Information Inhibits Collaborative Information Sharing



Source: Researcher (2021)

4.5 Perceptions of Barriers to Information Sharing

4.5.1 Lack of Information Communication Technology Infrastructure

For the purposes of this study, barriers to collaborative information sharing were, defined as factors that obstruct knowledge dissemination or information sharing, until certain conditions or levels are, fulfilled. Table 7 shows data on the extent to which respondents agreed/disagreed that lack of Information Communication Technology (ICT) Infrastructure was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. Slightly more respondents disagreed or strongly disagreed (42%) than agreed or strongly agreed (17% + 23.9%=40.9%) that lack of Information Communication Technology (ICT) Infrastructure was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 17.0% of respondents took a neutral stance on the matter.

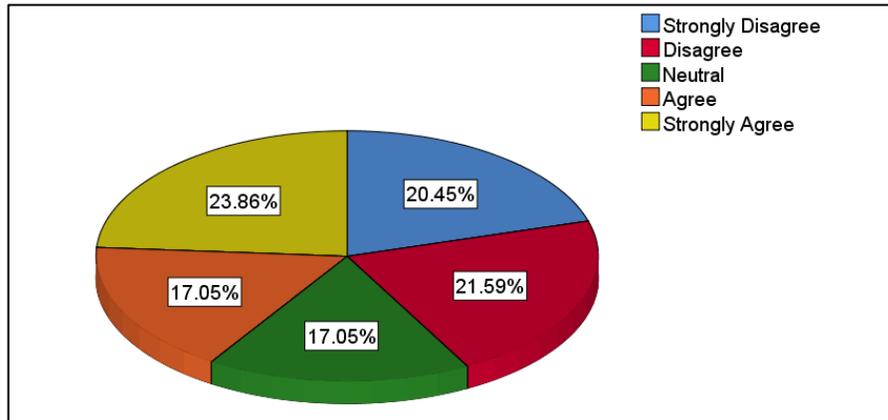
Table 7 Lack of ICT Infrastructure Barrier to Collaborative Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	18	20.5	20.5	20.5
	Disagree	19	21.6	21.6	42.0
	Neutral	15	17.0	17.0	59.1
	Agree	15	17.0	17.0	76.1
	Strongly Agree	21	23.9	23.9	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 13 shows the corresponding pie chart for the data in Table 7.

Figure 13 Perception of Lack of ICT infrastructure as a Barrier to IS



Source: Researcher (2021)

4.5.2 Lack of Managerial Skill to Exploit Opportunities

Table 8 shows data on the extent to which respondents agreed/disagreed that lack of managerial skill to exploit opportunities was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A higher proportion of respondents disagreed or strongly disagreed (50%) than agreed or strongly agreed (9.1% + 21.6%=30.5%) that lack of managerial skill to exploit opportunities was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 17.0% of respondents took a neutral stance on the matter.

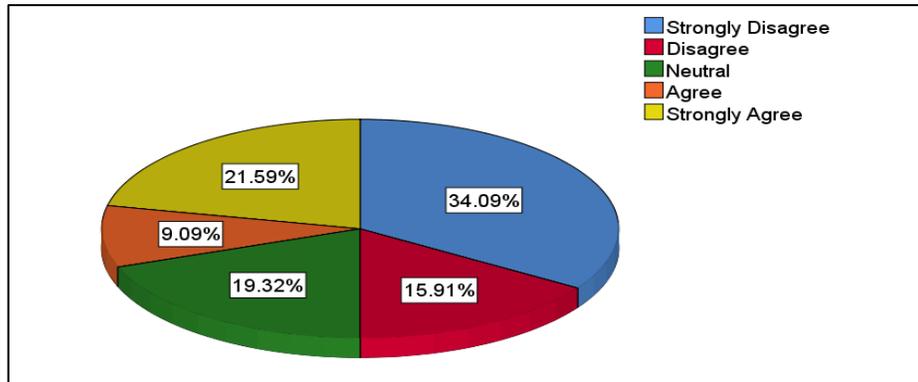
Table 8 Managerial Skill Deficiencies are a Barrier to Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	30	34.1	34.1	34.1
	Disagree	14	15.9	15.9	50.0
	Neutral	17	19.3	19.3	69.3
	Agree	8	9.1	9.1	78.4
	Strongly Agree	19	21.6	21.6	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 14 shows the corresponding pie chart for the data in Table 8.

Figure 14 Managerial Skill Deficiencies Barrier to IS



Source: Researcher (2021)

4.5.3 Political Influence Barrier to Collaborative Information Sharing

Table 9 shows data on the extent to which respondents agreed/disagreed that political influence or interference was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. Less respondents disagreed or strongly disagreed (35.2%) than agreed or strongly agreed (17% + 29.5%=46.5%) that political influence or interference was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 18.2% of respondents took a neutral stance on the matter.

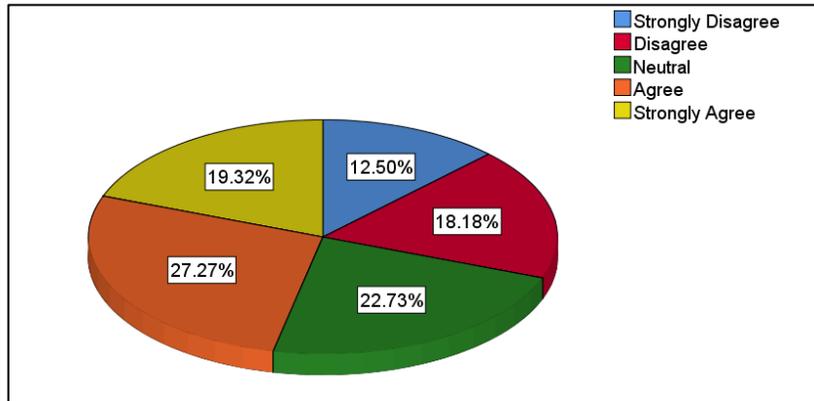
Table 9 Political Interference as a Barrier to Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	16	18.2	18.2	18.2
	Disagree	15	17.0	17.0	35.2
	Neutral	16	18.2	18.2	53.4
	Agree	15	17.0	17.0	70.5
	Strongly Agree	26	29.5	29.5	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 15 shows the corresponding pie chart for the data in Table 9.

Figure 15 Political Interference is a Barrier to Collaborative IS



Source: Researcher (2021)

4.5.4 Lack of Technical Expertise Barrier to Information Sharing

Table 10 shows data on the extent to which respondents agreed/disagreed that lack of technical expertise barrier was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. Slightly more respondents agreed or strongly agreed (19.3% + 28.4%=47.7%) than disagreed or strongly disagreed (39.8%) that lack of technical expertise barrier was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 12.5% of respondents took a neutral stance on the matter.

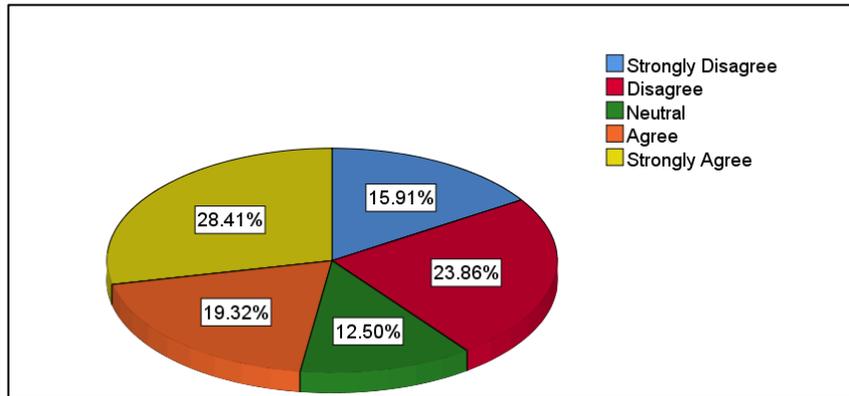
Table 10 Lack of Technical Expertise a Barrier to Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	14	15.9	15.9	15.9
	Disagree	21	23.9	23.9	39.8
	Neutral	11	12.5	12.5	52.3
	Agree	17	19.3	19.3	71.6
	Strongly Agree	25	28.4	28.4	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 16 shows the corresponding pie chart for the data in Table 10.

Figure 16 There is Lack of Technical Expertise as a Barrier to IS



Source: Researcher (2021)

4.5.5 Lack of Confidence Barrier to Information Sharing

Table 11 shows data on the extent to which respondents agreed/disagreed that lack of confidence was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. Less respondents disagreed or strongly disagreed (35.2%) than agreed or strongly agreed (17% + 29.5%=46.5%) that lack of confidence was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 18.2% of respondents took a neutral stance on the matter.

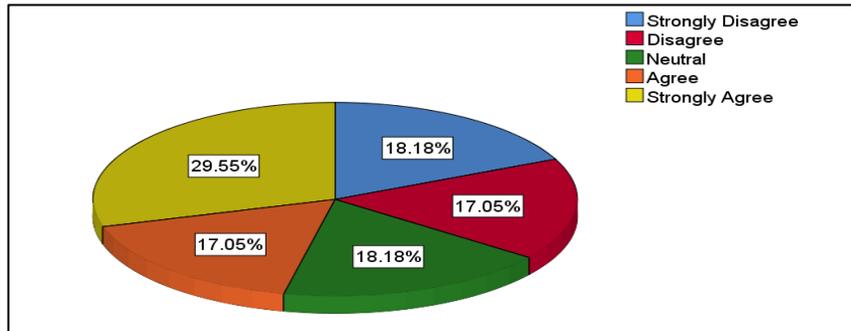
Table 11 Lack of Confidence a Barrier to Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	16	18.2	18.2	18.2
	Disagree	15	17.0	17.0	35.2
	Neutral	16	18.2	18.2	53.4
	Agree	15	17.0	17.0	70.5
	Strongly Agree	26	29.5	29.5	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 17 shows the corresponding pie chart for the data in Table 11.

Figure 17 Deficiency in Confidence is a Barrier to IS



Source: Researcher (2021)

4.5.6 Lack of Best Practice Examples Barrier to Information Sharing

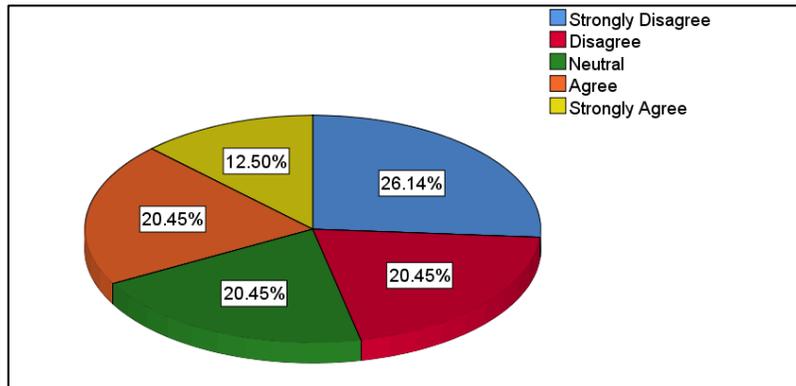
Table 12 shows data on the extent to which respondents agreed/disagreed that lack of best practice examples was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. Slightly more respondents disagreed or strongly disagreed (46.6%) than agreed or strongly agreed (20.5% + 12.5%=33%) that lack of best practice examples was a barrier to information sharing between logistics-supply chain companies and regulatory bodies. A further 20.5% of respondents took a neutral stance on the matter.

Table 12 Lack of Best Practice Examples a Barrier to Information Sharing

		Frequency	Percent	Valid Percent	Cum. Percent
Valid	Strongly Disagree	23	26.1	26.1	26.1
	Disagree	18	20.5	20.5	46.6
	Neutral	18	20.5	20.5	67.0
	Agree	18	20.5	20.5	87.5
	Strongly Agree	11	12.5	12.5	100.0
	Total	88	100.0	100.0	

Source: Researcher (2021)

Figure 18 shows the corresponding pie chart for the data in Table 12.



Source: Researcher (2021)

4.6 Hypothesis Test Results

4.6.1 Hypothesis 1-Scope for Collaborative Information Sharing

Hypothesis 1 of this study was that there was sufficient scope for information sharing between logistics-supply chain companies and regulatory authorities in Zambia. Specifically, the set of hypotheses were;

Null Hypothesis: There is no scope for information sharing between logistics- supply chain companies and regulatory authorities in Zambia

Alternate Hypothesis: There is sufficient scope for information sharing between logistics- supply chain companies and regulatory authorities in Zambia

To test this hypothesis, the Likert Scale measure variable relating to presence of opportunities for collaborative information sharing as perceived by study participants was, used. Results of the one sample mean t-test are, shown in Table 13. Against a test mean value of 3 from the 5-point Likert scale used to measure the variable, results show that the sample mean of 3.39 was significantly greater at the 5% level with a p-value of

0.007. Therefore, the alternative hypothesis of sufficient scope or opportunities for collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia.

Table 13 Significance of Opportunities for Collaborative Information Sharing

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
COLLOPPS	88	3.39	1.308	.139		
One-Sample Test						
	Test Value = 3					
					95% Conf Interval of the Difference	
	t	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
COLLOPPS	2.771	87	.007	.386	.11	.66

Source: Researcher (2021)

4.6.2 Hypothesis 2 -Intensity and Impact of Inhibitors to Information Sharing

Table 14 shows the correlation coefficients between factors adopted as inhibitors of collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia. The results in the table show correlation coefficients between inhibitor factors legal framework (LFIIS), security risks (SRIIS), nature of logistics-supply chain information (NLSCIIS), and the dependent variable measured as the scope for collaborative information sharing.

The results in the table show that all the factors were negatively correlated with their dependent variable, confirming their inhibitor status as defined for the purpose of this study. However, the results show that the correlation coefficients were statistically insignificant.

Table 14 Correlation Coefficients: Inhibitors & Collaborative Information Sharing

		COLLOPPS
LFIIS	Pearson Correlation	-0.082
	Sig. (1-tailed)	0.224
	N	88
SRIIS	Pearson Correlation	-0.092
	Sig. (1-tailed)	0.196
	N	88
NLSCIIS	Pearson Correlation	-0.121
	Sig. (1-tailed)	0.130
	N	88

Source: Researcher (2021)

4.6.3 Hypothesis 3- Intensity and Impact of Barriers to Information Sharing

Table 15 shows correlation coefficients between factors taken as barriers to collaborative information sharing and the variable measuring the scope for or opportunities for information sharing. Lack of ICTs (LICTIBIS), Lack of Managerial Skill (LMSBIS), Political Influence (PIBIS), Lack of Technical Expertise (LTEBIS), and Lack of Best Practice Examples (LBPEBIS), were each correlated with the dependent variable.

Table 15 Correlation Coefficients for Barriers to Information Sharing

		COLLOPPS
LICTIBIS	Pearson Correlation	-0.052
	Sig. (1-tailed)	0.315
LMSBIS	Pearson Correlation	0.039
	Sig. (1-tailed)	0.360
PIBIS	Pearson Correlation	-0.093
	Sig. (1-tailed)	0.195
LTEBIS	Pearson Correlation	-0.083
	Sig. (1-tailed)	0.221
LCBIS	Pearson Correlation	0.007
	Sig. (1-tailed)	0.472
LBPEBIS	Pearson Correlation	0.085
	Sig. (1-tailed)	0.217
	N	88

Source: Researcher (2021)

The results in the table above all show statistically insignificant correlation coefficients for factors taken as barriers to information sharing relative to the dependent variable.

These suggest that the variables were not strong linear predictors of information sharing in this context. In other words, they were factors that could not prevent exploitation of information sharing opportunities available in the operations of the logistics-supply chain companies.

4.7 Analysis of Findings

4.7.1 Scope for Collaborative Information Sharing

As demands for public sector entities to improve service delivery and efficiency increase, all public sector entities, including those in regulatory roles, need to explore possibilities for cost savings and value creation (Bergqvist & Pruth, 2006). These extend to collaborations with private sector entities. That logistics-supply chain operations account for the large part of value created by commerce is an established fact (Christopher, 2016). One of the motivations for the present study was however the observation that private sector collaborations with regulatory authorities for information sharing in logistics-supply chain operations especially in the context of lower-middle income countries such as Zambia has not been, explored in empirical studies. The study therefore involved a wide range of issues relating to scope for information sharing in this context including opportunities, nature of information to be, shared, as well as responsibility for information sharing.

The study found that there is great scope for collaborative information sharing between logistics-supply chain companies and regulatory authorities. Overall, respondents suggested that there are many opportunities for information sharing between the parties that can lead to efficiencies or cost savings for their mutual benefit. Despite this area not

being a prominent feature of the extant literature, the finding of the study is consistent with other emerging studies. For example, Asamoah et al(2016) conducted a study on the effects of Supply Chain Integration (SCI) on Supply Chain Performance (SCP) and Information Sharing using firms in Ghana. Their considers relationships but explores manufacturing and service firms belonging to one giant supply chain in Ghana. Their study applies structural equation modelling to explore the relationships. The results of the study confirmed positive associations between the variables with information sharing having a positive moderating effect on the relationship between integration and performance. However, this study did not consider barriers and inhibiting factors for information sharing in the context of regulatory agencies and supply chain/logistics firms. Respondents were, asked to indicate when they felt information that could lead to supply chain efficiencies should be, shared between LSC and RBs. The question was, addressed in an unstructured manner to obtain as much insights from respondents as possible. Content analysis of the qualitative data generated aspects of the responses including frequency of information sharing and the cases where information sharing would be necessary. In relation to frequency of information sharing, respondents either suggested a need-based approach while others proposed daily, weekly, monthly, or biannual routines. The findings of the study demonstrated the possibilities that are available but are largely untapped like past studies such as (Hoyt & Huq, 2000).

4.7.2 Findings on Inhibitors to Information Sharing

As noted from the guiding literature, Collaborative information sharing between logistics-supply chain companies and regulatory authorities. Considering study objectives, the framework was, informed by terminology from knowledge management (KM) and

knowledge sharing (KS) fields. Within the KM area, numerous terms are frequently used. Among terms that have high significance for change in the knowledge structure, terms related to distribution or dispersion are common. Four of those terms are Knowledge Transfer (KT), Knowledge Sharing (KS), Knowledge Flow (KF), and Knowledge Barriers. Barriers come in many forms, ranging from strictly individual/personal barriers through group-related barriers, intra- and inter-organizational barriers, barriers related to national differences, as well as an array of technology-related barriers. Several authors have developed categories with the purpose to create a structure. Past studies resulted in a proposition of factors influencing knowledge dissemination and the following terms are, suggested: (1) Facilitators (which denominate factors with positive influence), (2) Inhibitors (factors with negative influence) and (3) Barriers which are factors that obstruct knowledge dissemination or information sharing, until certain conditions or levels are, fulfilled (Agarwal & Shankar, 2003; Cagliano, et al., 2006).

For the purposes of this study, inhibitor factors that were, investigated where legal factors and laws, security risks and concerns, as well as the nature of logistics-supply chain information. Findings of the study using correlation analysis were that all the three factors had the expected negative signs for their correlation coefficients but respondents did not deem their impact significant as to prevent exploitation of collaborative information sharing opportunities. Hypothesis tests conducted did not conclude that the three inhibitors had statistically significant correlation coefficients with the dependent variable.

4.7.3 Findings on Barriers to Collaborative Information Sharing

The study investigated a set of possible barriers to collaborative information sharing including Lack of ICTs (LICTIBIS), Lack of Managerial Skill (LMSBIS), Political

Influence (PIBIS), Lack of Technical Expertise (LTEBIS), and Lack of Best Practice Examples (LBPEBIS). As noted from the literature, one aspect of barriers to information sharing relates to managers of organizations. These barriers arise because managers dealing with supply chain do not realize the real benefits of information sharing and do not have confidence in information sharing system (Marsh & Flanagan, 2000) . These senior officials do want to invest in innovative culture conducive for information sharing. Zipf et al (2000) concluded that lack of leadership and managerial direction for information sharing makes implementation of information sharing extremely difficult. Curry and Moore (2003) suggested that to achieve information sharing culture, support of senior management is, required. Other barriers are technological. However, in the context of the present study, political influence was, also deemed a relevant potential barrier to information sharing.

The results of the study suggest that respondents considered technological factors as not being a significant barrier. In fact, they favored platforms that make use of available ICT infrastructure as key for unlocking collaborative information sharing. These findings are consistent with those of past studies that have highlighted the possibilities for information sharing in logistics-supply chain operations arising from ICT developments such as (Khurana, et al., 2011).

4.8 Conclusion

This chapter has discussed the findings of the present study. The chapter has compared the findings of the present study with those of past studies in collaborative information sharing in supply chains and logistics operations. Theories such as the Theory of Asymmetric Information provide the argument for improving flows of information as a

key to promoting efficiencies in resource allocation that can benefit economic agents involved in various transactions/operations have also been used to provide context for the discussion. The conclusion and recommendations of the study are presented in the final chapter.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Information is critical role in promoting optimal decision making amongst economic agents, including those engaged in logistics-supply chain operations (Adewole, 2005). Theories such as the Theory of Asymmetric Information provide the argument for improving flows of information as a key to promoting efficiencies in resource allocation that can benefit economic agents involved in various transactions/operations. This study sought to investigate barriers and inhibitors to collaborative information sharing between logistics-supply chain companies and regulatory authorities in Zambia that are a deterrent to attainment of efficiency in the management of logistics-supply chain operations. In this chapter, the conclusions of the present study are, discussed. The chapter also presents policy recommendations as well as those for future research.

5.2 Conclusions

5.2.1 Broad Scope for Collaborative Information Sharing

The present study concludes that there is broad scope for collaborative information sharing which can unlock supply chain-logistics benefits in Zambia. As noted past research mainly focused on private sector collaborations but there are private sector-regulatory body collaborations that need to be, explored, and exploited (Agarwal & Shankar, 2003). As demands for public sector entities to improve service delivery and efficiency increase, all public sector entities, including those in regulatory roles, need to explore possibilities for cost savings and value creation (Bergqvist & Pruth, 2006). These extend to collaborations with private sector entities. That logistics-supply chain

operations account for the large part of value created by commerce is an established fact (Christopher, 2016). Thus, opportunities for collaborative information sharing that are mutually beneficial to logistics-supply chain companies and regulatory authorities need to be, identified, and maximized especially in resource constrained countries such as Zambia. Further, there must be clarity on responsibilities, the nature of information to be, explored, how often, as well as on which platforms to exploit the full scope of information sharing opportunities.

5.2.2 Supportive Laws and Policies may Lower Inhibitors to Information Sharing

From the present study, it is, concluded that inhibitors to information sharing between logistics-supply chain companies and regulatory bodies are bound to arise from laws and policies that eliminate possibilities for collaborative information sharing. Thus, inhibitors to information sharing defined as factors with negative influence, (Agarwal & Shankar, 2003; Cagliano, et al., 2006), emanate mainly from legal and policy environments that set the tone for agents to shun collaborative information sharing. Thus, to encourage and exploit collaborative information sharing opportunities, supportive laws and policies must be part of the framework in any country seeking to generate significant benefits using this strategy.

5.2.3 Barriers to Collaborative Information are Not Insurmountable

As noted, barriers knowledge dissemination or information sharing, until certain conditions or levels are, fulfilled (Agarwal & Shankar, 2003; Cagliano, et al., 2006). For the purposes of the present study, barriers including Lack of ICTs (LICTIBIS), Lack of Managerial Skill (LMSBIS), Political Influence (PIBIS), Lack of Technical Expertise (LTEBIS), and Lack of Best Practice Examples (LBPEBIS), were, investigated. From

the qualitative and quantitative analyses conducted, the study concludes that all the barriers identified are surmountable in the context of collaborative information sharing between logistics-supply chain companies. However, elimination of the barriers on its own may not be a sufficient condition to ensure collaborative information sharing occurs and its benefits are, enjoyed by economic agents. Rather, a more proactive or deliberate approach is, needed that 1) eliminates the barriers identified and 2) coordinates the actions of agents towards applying collaborative information sharing.

5.3 Policy Recommendations

- 1) Management and policymakers of logistics-supply chain companies and regulatory bodies should come together to have workshops exploring the scope for collaborative information sharing and making recommendations to central government and the legislature to provide any necessary legal and policy changes to support the practice.
- 2) Management and policymakers of logistics-supply chain companies and regulatory bodies should identify the exact inhibitors that prevent collaborative information sharing from occurring. From this study, legal factors have appeared to be the strongest inhibitor as they set strict parameters particularly for regulatory bodies whereas a flexible approach may be necessary.
- 3) Logistics-supply chain companies and regulatory bodies should invest in eliminating barriers to collaborative information sharing that are within their control e.g., training to enhance skills required in this area such as working with teams from different organizations.

5.4 Recommendations for Future Research

The present study was, conducted as a mixed methods study of inhibitors and barriers to collaborative information sharing between logistics-supply chain companies and relevant regulatory bodies. For future research, more insights could be, obtained;

- a) From quantitative case studies that focus on larger samples to test the strengths of specific inhibitors and barriers of collaborative information sharing.
- b) Expert interviews to obtain more detailed qualitative information from industry experts to arrive at a more codified perspective on the subject.

5.5 Limitations of the Study

The present study had several limitations that can be, highlighted in closing. Firstly, the study was exploratory in nature and therefore adopted a broad approach to the issues relating to information sharing in regulated logistics-supply chain operations in Zambia. More useful information may have been obtained by looking at specific operations such as transportation only. Secondly, the study relied on data obtained from self-administered questionnaire interviews. More information may have been obtained by focus-group discussions or expert interviews with a few industry respondents. Finally, the study was only conducted in Lusaka city whereas a countrywide focus could have provided a better basis for policy recommendations.

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APPENDIX



'Evaluation of Barriers to Information Sharing Between Lusaka Based Logistics-Supply Chain Companies and Regulatory Authorities In Zambia'

A. DATA COLLECTION INSTRUMENT-COVER LETTER

Dear Sir/Madam,

I am an MSc. Purchasing and Supply student at the University of Zambia Graduate School of Business (GSB) conducting a study on ***'BARRIERS TO INFORMATION SHARING BETWEEN LUSAKA BASED LOGISTICS-SUPPLY CHAIN COMPANIES AND REGULATORY AUTHORITIES IN ZAMBIA'*** Kindly assist me to collect information for the research study by providing your forthright responses to the questions in this document. You will not be required to provide any private information about yourself or divulge confidential information pertaining to your current or past employers.

The study is a part of my academic research and it will be used strictly for the stated purposes. For this reason, your name or any of your used materials will not be presented in the way that any user of the findings recognizes you. Your decision to participate in this voluntary study will be considered as confirmation of your being informed consent for the purposes of the study.

Thank you for your assistance.

RESEARCHER

B. QUESTIONNAIRE

Instructions to Respondents: *Kindly provide your responses to the questions contained in this document by marking the appropriate response boxes [X] as provided or filling in the black spaces as guided.*

PART 1: BACKGROUND INFORMATION

Question 1: Indicate the nature of your current organization

Logistics-Supply Chain	X
Regulatory Body (GRZ)	

Question 2:

If your answer to question 1 was regulatory body, kindly state which body.

Question 3:

Kindly provide a brief description of your role in your organization.

Question 4: How long have you been an employee of your current organization?

Less than 2 years	
2 under 4 years	
Over 4 years	

Question 5: Indicate your highest academic qualification at the time of this study.

College Certificate	
Diploma	
Degree	

Masters or higher	
Professional Qualification	

PART 2: SCOPE-DATA SHARING BETWEEN SUPPLY CHAIN & REGULATORY AUTHORITIES IN ZAMBIA

Question 5: There are many ways in which regulatory bodies can collaborate in relevant information sharing with regulated logistics-supply chain companies?

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 6: If your answer to question 5 was yes, kindly provide an example of one area of collaborative information sharing that you can think of between a regulatory body and a logistics-supply chain company from your line of work

Question 7: What type of information do you feel could be shared between regulatory authorities and logistics-supply chain companies in Zambia that could lead to operational efficiencies for the parties?

Logistics Information	
Business Information	
Tactical Information	
Strategic Information	
Sales Information	
Inventory Information	
Other (Specify)	

Question 8: For the type of information that you feel could be shared between regulatory authorities and logistics-supply chain companies in Zambia that could lead to operational efficiencies for the parties, when do you feel such information should be shared?

Question 9: For the type of information that you feel could be shared between regulatory authorities and logistics-supply chain companies in Zambia that could lead to operational efficiencies for the parties, who do you feel should be responsible for information to be shared?

Regulatory Authority Side: -----

-----**Logistics -Supply Chain Company Side :** -----

Question 10: For the type of information that you feel could be shared between regulatory authorities and logistics-supply chain companies in Zambia that could lead to operational efficiencies for the parties, how do you feel information involved should be shared?

Using manual documentation	
Using Electronic means e.g. e-mail	
Real-time online platforms	
Face to Face Interactions	

Question 11: For the type of information that you feel could be shared between regulatory authorities and logistics-supply chain companies in Zambia that could lead to operational efficiencies for the parties, where do you feel information should be shared?

PART 3: INHIBITORS TO COLLABORATIVE INFORMATION SHARING BETWEEN SUPPLY CHAIN & REGULATORY AUTHORITIES IN ZAMBIA

Indicate the extent to which you agree/disagree with each of the following statements:

Question 12: The legal framework in Zambia inhibits collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	

Strongly Agree	5	
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Question 13: Information security risks and measures inhibit collaborative information sharing between regulatory authorities and logistics-supply chain companies in Zambia.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 14: The nature of regulatory and logistics-supply chain operations inhibits collaborative information sharing between regulatory authorities and logistics-supply chain companies in Zambia.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

PART 3: BARRIERS TO COLLABORATIVE INFORMATION SHARING BETWEEN SUPPLY CHAIN & REGULATORY AUTHORITIES IN ZAMBIA

Question 15: Lack of Information Communication Technology (ICT) infrastructure in Zambia is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
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Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 16: Lack of managerial skill in Zambia is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 17: Political influence in Zambia is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 18: Lack of technical expertise in Zambia is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 19: Lack of institutional confidence is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

Question 20: Lack of exposure to best practice in Zambia is a barrier to collaborative information sharing between regulatory authorities and logistics-supply chain companies.

	Weight	Tick as Appropriate
Strongly Disagree	1	
Disagree	2	
Neutral	3	
Agree	4	
Strongly Agree	5	

End of Questionnaire

