**BINDURA UNIVERSITY OF SCIENCE EDUCATION**



**FACULTY OF COMMERCE**

**DEPARTMENT OF ECONOMICS**

**ENVIRONMENTAL MANAGEMENT PERFORMANCE-THE ROLE OF COLLABORATION IN THE SUPPLY CHAIN (CASE STUDY OF FISH FARMING INDUSTRY IN ZIMBABWE)**

**BY**

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**DEDICATION**

This study is a dedication to the Maponga family for all of your unwavering love, support, and hope for my future in academia. I sincerely appreciate the constant love and adoration you have shown to me, my mother, father, brother, and sisters.

**ABSTRACT**

This study was done to better understand how supply chain collaboration affects the effectiveness of environmental management. The case study of Zimbabwe's fish farming business. The three goals of the study are to determine how closely fish farming organizations work with their suppliers, to look at environmental management metrics in the fish farming industry's supply chain, and to determine how collaboration in the supply chain affects environmental management performance. Closed-ended questionnaires were used to collect data from procurement professionals, and open-ended interviews with the directors of the procurement department were also conducted in order to corroborate the findings of the closed-ended questionnaires. In chapter four, the results are displayed in tables and figures. According to the study, there is a strong link between effective environmental management and a cooperative supply chain. The researcher advises businesses in the private sector to collaborate vertically and horizontally to improve environmental performance. For manufacturing businesses to build environmental partnership with their suppliers and achieve sustainable performance, the research findings will be very crucial. It is advised that a sector strategy be employed in Zimbabwe's other public sector industries since this study concentrated on private sector organizations.

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# **LIST OF ACRYNOMS**

SCM - Supply Chain Management

GSCM - Green Supply Chain Management

EMP - Environmental Management Performance

SCC - Supply Chain Collaboration

EMA - Environmental Management Accounting

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# **CHAPTER ONE**

## **INTRODUCTION AND BACKGROUND**

## **1.1 Introduction**

This study examines the role of collaboration in the supply chain on environmental management performance, the research was carried out in Zimbabwe. This chapter is divided into eleven sections: introduction, background of the study, statement problem, aim of the investigation, research objectives, research questions, importance of the study, assumptions, limits, definition of important words, and chapter summary.

## **1.2 Background of the study**

Environmental management accounting (EMA) has evolved as a new technique in the accounting industry to give information in respect to environmental issues for various parties as a result of the rise in global demands and interest with regard to environmental issues during the past 20 years. In order to achieve the highest levels of sustainability performance, organizations used to focus primarily on the creation of wealth through superior economic performance in terms of success in assets, liabilities, and overall market strength. However, they now focus on environmental and social performance while achieving the high economic performance. Because poor product and process quality eventually results in environmental concerns, environmental challenges have been seen as a logical extension of quality difficulties (Lai, Wu & Wong, 2013).

There have been numerous phases in the environmental movement. The conservation school, which stressed the management of both renewable and non-renewable resources (especially forests) for future development, and the preservation school, which considered nature as having inherent value, were the two main schools that made up the movement at first (Eckersley 1992). The current environmental movement is increasingly more about risk, the risk that environmental deterioration poses to human health and well-being, in addition to these economic and aesthetic concerns. Environmental factors include things like population growth, urbanization, economic expansion, new technology forces, and climate change. As a result, efforts have been focused primarily on environmental performance to assure continuity, which has contributed to an unprecedented expansion of riches for many but has also left many behind in difficulties for the future.

Addressing the effects that various parties have on the environment throughout the world has drawn more attention. These repercussions have manifested in a variety of ways, including soil, water, and air pollution; chemical waste; and global warming, which is frequently brought on by industrial activity and economic growth (Li, 2004). When it comes to environmental performance and protection, environmental protection professionals inside an organization have primarily concentrated on adhering to environmental rules, a collection of norms that are momentary conceptions (Shireman, 2003). For a shared value or a "win-win-win" solution, the organization, environment, and society are the three interdependent triads. Additionally, the majority of environmental problems are brought on by supplier and customer actions along the supply chain.

Aside from that, environmental management problems in the business arena have been a focal point for decades, according to Sarkis, Zhu, and Lai (2011). According to Henriques and Sadorsky (1999), as manufacturers come under intense scrutiny from an array of sectors, particularly end-users, industrial clients, suppliers, and financial institutions, environmental management is becoming more and more important. This study aims to investigate how collaboration affects the effectiveness of environmental management. Such a change towards sustainability has mostly been brought about by the expansion of environmental legislation by the government as well as the demand for ecologically friendly goods and services from customers (Tan, Shi, Tseng, and Chiu (2014); Brandenburg, Govindan, Sarkis, and Seuring) (2014).

Organization buyers creates collaboration relationships with supplier rather than having adversarial relationships to create a clean environment and to ensure goods are produced with the ability to continue producing in the future. Thereby meeting customers’ needs by the use of three Rs that is reducing cost, recycling and reuse. This study will provide guidance on how collaboration in the supply chain benefits environmental management. By doing this, all parties involved may not only reduce their environmental impact but also enhance their commercial performance and create stronger relationships between customers and suppliers (Carter and Rogers, 2008; Cao and Zhang, 2010).

Environmental management can refer to a purpose or vision, attempts to guide a process, the use of a set of instruments, a philosophic practice attempting to build fresh viewpoints towards the environment and human cultures, and more. Barrow (2005).It is the planning, controlling of human actions to the natural environment. The term "supply chain management" refers to processes that are employed to organize, plan, and carry out the flow of the product, beginning with the acquisition of raw materials, the production process, and ending with the efficient and economical distribution of the finished product to the consumer. According to Gunasekaran, Subramanian, and Rahman (2015), supply chain cooperation is a long-term connection created among supply chain stakeholders with the goal of minimizing cost and risk while boosting quality and market value.

Furthermore, environmental management is becoming increasingly critical for manufacturers as they encounter serious scrutiny from a variety of stakeholders, particularly end-users, industrial customers, suppliers, and financial firms (Henriques and Sadorsky, 1999). Given this backdrop, manufacturing executives have used a variety of measures to address the environmental effect of their operations and products. The use of various environmental technology and waste reduction approaches to organizational performance (Klassen and Whybark, 1999; King and Lenox, 2002). In contrary, research on the influence of boundary-crossing activities such as green buying (Zsidisin and Siferd, 2001), reverse logistics (Carterand Ellram, 1998), product stewardship (Snir, 2001), and design for the environment (Chen, 2001) on organizational performance is just getting started.

Environmental considerations will be incorporated into supply chain management through supply chain collaboration (SCM). Environmental collaboration aims to reduce or eliminate wastes such as fuel, waste materials, hazardous chemicals, and greenhouse gases anywhere along supply network, such as designing products, supply chain design and screening, production, distribution of the finished product, and end-of-life management of the product. Collaboration is therefore essential for influencing any company involved in supply chain activities' overall environmental impact and improving sustainability performance. The rapid rise in competitiveness has compelled businesses to behave morally and responsibly throughout their supply chains due to the greater knowledge of environmental management methods. As a result of increasing awareness, businesses have collaborated to establish environmental management plans in response to the evolving environmental regulations and their effects on supply chain operations.

Whether upstream with suppliers or downstream with consumers, all of these supply chain management procedures require varying levels of connections with some other supply chain stakeholders. Finding clear patterns is still a goal because some of these environmental interactions have been found to be helpful and economically desirable additions to an organization's environmental strategy (Bowen et al., 2001; Florida, 1996; Geffen and Rothenberg, 2000).

## **1.3 Problem statement**

Maintenance of good environmental management has become a significant subject in obtaining sustainability among the organizations. Historical experiences indicates that problems originate from lack of top management support, monopoly suppliers, resistance to change, organizational cultures, lack of knowledge and absence of collaboration in the supply chain. This has negatively affected environmental performance and it has resulted in production of goods that are not eco-friendly, non-utilization natural resources like water, fuel and forestry not forgetting the issues of land pollution (mine dumps, litter) and water pollution (organization dump waste materials in water affecting the aquatic organism and aquatic plants).

The biggest winners from environmentally friendly operations were suppliers. Contrarily, customer collaboration produced a range of outcomes. Ultimately, there was evidence indicating downstream cooperation was linked to product-based performance while upstream practices were more closely related to procedure performance. The goal of this study is to better understand how collaboration in the supply chain affects environmental management performance. These actions may be directed against suppliers or consumers upstream or downstream. In order to make sure that all the stakeholders are environmentally conscious, collaboration is used across the supply chain, from the raw material suppliers to the final consumer of the products.

## **1.4 Aims of the study**

This project aims to enhance supply chain collaboration to improve environmental management performance.

## **1.5 Research objectives**

The study sets out the below objectives to be attained in the course of this study**;**

1. To assess the extent to which fish farming organizations collaborate with their suppliers
2. To examine environmental management metrics in supply chain within the fish farming industry
3. To evaluate the impact of supply chain collaboration on environment management performance

## **1.6 Research questions**

To address the aforesaid objectives, the research will explicitly respond to the questions below;

1. To what extent do fish farming organizations collaborate with their suppliers?
2. What are the environmental management performance measures in the supply chain?
3. What are the impacts of supply chain collaboration on environment management performance?

## **1.7 Significance of the study**

Understanding the relevance of environmental management is necessary for a business to remain in the highly competitive world, and doing so is very significant. The study will contribute to the body of knowledge regarding the influences of supply chain collaboration on the efficiency of environmental management. The research will assist buyers in conducting thorough research before choosing suppliers and all throughout the supply chain.

**1.7.1 to the government**

This research can guide policy makers in formulation of policies and procedures taking into consideration the role of supply chain collaboration on environmental management. It can generate new knowledge on the role of supply chain collaboration in public sector and disseminate that knowledge in other public institutions which can improve environmental management performance.

**1.7.2 to the academics**

The study will aid other purchasing and supply students who wish to conduct similar research on the influence of teamwork on environmental management. The research's findings can be applied to further study, and the university profited by giving researchers access to more databases for reference.

**1.7.3 to the researcher**

The researcher will benefit from completing this study successfully if she wants to earn an honors degree in purchasing and supply management from Bindura University. It may also be a move in the right direction for the researcher's career. As the researcher gains more understanding about environmental management through supply chain collaboration, this research is extremely important to her.

## **1.8 Limitations of the Study**

**1.8.1 Time constraint**

This research was conducted in constraint limitation of time as there are prior engagements such as fulfilment of the researcher’s obligation to the organization as a student on industrial attachment. The researcher mitigated by working late at night and information gathering was difficulty as there are a few researches done on environmental management in supply chain.

**1.8.2 Inaccessibility to information**

Procurement management was reluctant to contribute information because they believed it would reveal their business methods, but the researcher reassured the responder that the material was only being used for academic research.

**1.8.3 Lack of expertise**

The researcher lacks the necessary knowledge and abilities to do the investigation. However, in order to gather the required data for the project on time, the researcher asked the supervisor for assistance**.**

**1.8.4 Insufficient funding**

Due to the great distance and lack of funds to pay for transportation, the researcher was unable to contact the different representative companies. In contrast, the researcher got financial support from family members to do the investigation and also used modern technologies, such as email, Facebook, and the websites of the companies, to get the necessary data.

## **1.9 Delimitations of the Study**

* This study's primary focus was on the influence of supply chain collaboration on environmental management performance, not on any other elements that might support environmental management performance.
* Additionally, the researcher restricted herself to using questionnaires and in-person interviews to gather data for this study, which was conducted over the course of five months from December 2021 to April 2022.

## **1.10 Assumptions**

The following presumptions served as the foundation for the study:

1. Despite the limitations imposed by Covid-19, the researcher would have gathered all necessary data.
2. The respondents will answer questionnaires and interviews without bias to the proposed research
3. There will be sufficient resources and time to accomplish the research successfully
4. Permission would be granted to carry out the research for easy access to valid information.

## **1.11 Definition of key words**

**1.11.1 Environmental management**

With the goal of minimizing the effects of technical and technological advancement on the biosphere and the survival of living things, environmental management is a relatively new scientific discipline that was developed in the field of ecology at the turn of the 20th century (ivkovi, 2016).

**1.11.2 Collaboration**

Collaboration is “the process of working together among independent firms along a supply chain in delivering product to end customer” (Simatupang and Sridharan, 2008).

**1.11.3 Supply chain**

According to Chen and Paulraj (2004), a supply chain is a web of processing links for commodities, information, and services that has links for supply, transformation, and demand.

## **1.12 Structure of the study**

The current chapter of this research dissertation contains a full background of the study, an introduction, a statement of the problem, the purpose of the investigation, objectives, and relevant questions. It also includes restrictions and delimitations as well as the relevance of the study. The second chapter is on a review of the relevant literature, while the third part concentrates on the study technique. In addition, data from chapter four will be shown, analyzed, and the conclusions addressed. The final chapter, Chapter 5, focuses on the findings' summary, conclusion, and recommendations.

## **1.13 Chapter Summary**

Introduction, study background, statement problem, aims, significance, limitations, delimitations, and key word definitions have all been covered in this chapter. The researcher continues with a study of the literature in the following chapter to examine how collaboration in the supply chain affects environmental management performance.

# **CHAPTER TWO**

## **LITERATURE REVIEW**

## **2.1 Introduction**

The literature review on collaborative roles in environmental management performance is covered in this chapter. According to McMillian and Shumacher, (2010) a literature review is a narrative interpretative criticism of existing literature with the goal of providing an understanding of the current knowledge. This was done to help the researcher progress by giving her a greater grasp of past studies. This chapter explores and discusses the theoretical, conceptual and empirical framework, as well as providing responses to the research questions and objectives.

**2.2 Theoretical framework**

A research project's theoretical framework is a group of interconnected ideas that directs the study and links the reader to existing knowledge (Creswell, 2009). The theories behind how collaboration in the supply chain affects environmental management performance are explained in this segment.

## **2.2.1 Stakeholder theory**

Stakeholder theory and SCM were combined in this study by focusing on environmental performance decision opinions in SCM and examining how stakeholder theory influences these decisions. Stakeholder pressure is seen to be an important and crucial part of a firm's decision-making process and for the implementation of environmental management practices since it is critical and necessary to develop a green sustainable economy. (Tachizawa & Wong, 2015). As a result, stakeholder theory is beneficial to environmental performance since it aids in collaboration with suppliers, consumers, employees, the government, and rivals in making or buying, sourcing strategies, supplier strategies, and contracting decisions. Furthermore, stakeholders are involved in any SCM decision, and their participation can serve as a link between stakeholder theory and SCM decision making. There are important discoveries obtained in this study, regulatory governance and market stakeholders are of substantial importance for implementing environmental supply chain measures. Initiatives to improve the environmental sustainability of the supply chain can be accomplished through environmental education and regulatory governance, which also plays a significant role in helping businesses succeed.

### **2.2.1.1 Top Management’s Support**

Moreover, an organization's top management has the final word in decision-making and is the most powerful. As a result, before implementing the plans, environmental players within the organization require their permission and consent, and collaboration within the organization aids in gaining top management support. According to Cha and Yang (2008), top executives' attitudes and support levels have a substantial impact on organizational members' or partners' attitudes or participation in accepting such practices, management activities, and systems. Furthermore, without the enthusiastic support or commitment of senior leadership for the specific activities of the company, it is very difficult for members of the organization who are actively involved in the activities, or their partners, to provide high-level collaboration for the implementation of management operations.

High-level collaboration for the execution of management operations is particularly challenging for organization members who are actively engaged in the activities, or their partners.

As a result, the general management of internal members and external partners, as well as the development of a value stream, depend on senior executives' willingness and active support for the implementation of particular operations (internal collaboration). Additionally, it will be crucial for fostering cooperation between the companies Rai, Borah, and Ramaprasad (1996). Green supply chain management collaboration is the level of interaction between businesses designing and managing pollution avoidance technology and their primary suppliers and key consumers by Vachon and Klassen (2006).

### In addition, Chief Executive Officers (CEOs) are in charge of business management and accountable to shareholders for their success. Additionally, top executives, especially top management, are the main decision-makers in an organization, and the choices they make have an impact on the efficacy of the company as well as whether it will survive or fail. Boone, De Brabander, and Van Witteloostuijn (1996) as well as Takeuchi, Lepak, Wang, and Takeuchi (1996) (2007). Members of an organization will actively share crucial information and engage in the management of justifying and accepting change in themselves if the top management of the company set an example of genuine reinforcement and a desire to adapt, and this is recognized by internal or external members of the organization. As a result, there will be more collaboration with the change (Gioia, Chittipeddi, 1991).

### **2.2.1.2 Environmental Supplier involvement**

When suppliers are sufficiently confident and aware of the projects' direction, environmental management improves more quickly. In light of the stakeholder theory, it is prudent to investigate whether buyer firms lower operation leverage when they have a wide network of dependent suppliers. In such cases, the suppliers are significant stakeholders because they make precise savings in the partnership which also advantage the client organizations. As a result, it makes sense for a supplier to spend in R&D to meet new performance standards (Green Future (no date) in Army and Coro, 2006). Collaboration therefore necessitates supplier involvement in environmental management. Early supplier engagement in purchasing choices or the creation of new products promotes solid judgment and the production of environmentally friendly items. Companies that have collaborative ties with their suppliers can produce and procure environmentally unique products, particularly in the durable goods industry. This can be accomplished by involving suppliers early in the development of new products. Supplier-buyer partnership on environmental performance draws suppliers since it provides long-term benefits, as listed below.

Reduction of long-term costs, long-term collaborations have the greatest influence on environmental performance for continuous development, and the advantages of long-term supply chain collaboration are simple and practical. The longer they work together (supply and customer), the better they will learn each other's strengths, weaknesses, and working techniques, allowing them to come up with new ideas that benefit both parties while not harming the environment. . For instance, by keeping a supplier in the supply chain for an extended period of time, the purchasing organization gains from shared experience and easier communication while avoiding the added effort and expense of constantly learning a new supplier's operations, standards, and customs. Similarly, cost reduction helps to raise cash for future environmental measures as well as improved environmental management.

Measures in a growing or developing company may be difficult to finance, but if the buyer is aware of the supplier's movement, governance mechanisms, and perhaps other functional features, they can more quickly and effectively close expensive manufacturing process gaps. With the help of quality control and compliance software, it is much easier to keep in constant contact and mutual transparency with long-term suppliers as well as to improve and streamline operational functions, which saves time for both parties. As a result, delivery of goods with incorrect product specifications (waste of resources) can be reduced, and packaging materials can be recycled or reused. When you combine supplier and buyer research, you get better outcomes faster and more efficiently than if you did it alone. As a result, environmental issues will be resolved rapidly before they worsen, benefiting consumers, businesses, and the entire community. With actionable insights at their fingertips, they can track quality and environmental safety issues back to their source and take appropriate action.

## **2.3 Environmental management performance**

The major performance metrics, water use, waste production, greenhouse gas emissions, and total economic benefit are used to gauge environmental performance. The estimated production frontier is used as a benchmark for performance. Since green management has been proved to enhance long-term competitiveness and financial outlook, environmental performance monitoring has become more and more popular as its strategic value has been clear. (Rao and Holt, 2005).

Nevertheless, as rivalry has evolved from business-versus-company to supply chain versus supply chain, measuring performance, including environmental performance, can no longer be done at the level of a single company, but rather requires a holistic approach that includes the entire supply chain (Cabral, Grilo and Cruz-Machado, 2012). Furthermore, the extended supply chain of items, which includes the usage phase and end-of-life management, accounts for a major portion of the entire supply chain environmental impact (Veleva, Hart, Greiner, and Crumbley, 2003). To evaluate a company's environmental performance, key performance indicators (KPIs) are used to measure things like greenhouse gas emissions, water use, erosion, waste output, and total value added. The production frontier is calculated using data envelopment analysis, and performance is then measured against it. Customer happiness and the caliber of the product are qualitative measurements, whereas request lead time, distribution network response time, adaptability, resource optimization, and timely delivery are quantitative measurements. The environmental supply chain contributed to the creation of current demands without jeopardizing future generations' capacity to fulfill their own needs.

Other elements, like as environmental legislation, proper resources, and staff involvement, do, nevertheless, influence environmental performance. Examining an organization's current environmental management policy is critical because it is the first step toward enhancing environmental performance.

Environmental performance improves with frequent checks and attentive monitoring of these policies. Insufficient resources to adopt environmental measures has a detrimental impact on environmental performance, and collaboration is impossible without the necessary resources.Environmental management performance ensure a better quality of life for everyone, now and for generations to come. Different environmental management systems that include procedures and processes for staff training, monitoring, summarizing, and reporting of specialized environmental performance information to both internal and external stakeholders may be developed by organizational management. In order to include environmental thinking into supply chain management, environmental supply chain is therefore seen as an environmental innovation (SCM).

### **2.3.1 Greenhouse gases emissions**

The use of another party's power or heat (restricted to those who use natural gas or electronics as a heat source), as well as the release, discharge, or leakage of greenhouse gas emissions into the environment, are both induced by supply chain management (Global Warming Measure Promotion Law, Article 2.4). The phenomena of global warming is the increase in Earth's average temperature as a result of greenhouse gases like carbon dioxide and emissions released into the atmosphere as supply chain activities expand. Utilizing fossil fuels, such as coal, natural gas, and oil, releases carbon dioxide into the atmosphere, one of the factors contributing to global warming. Carbon dioxide emissions from the use of fossil fuels make for a sizable share of total CO2 emissions.

Furthermore, severe repercussions like floods brought on by rising sea levels as global warming continues decreased crop harvesting, more severe disease transmission, and extinction of wild species are to be predicted. As a result, supply chain integration should adopt air pollution control legislation, as well as legislation requiring special measures to combat greenhouse gas emissions. Organizations should employ the most sensible strategy that matches the individual characteristics of the measures.

## **2.3.2 Land pollutions**

Furthermore, a wide range of chemical compounds are mass-produced and employed in a number of applications in modern life. Toxins has been one of the compounds that is created accidently. Unless they are adequately managed during all phases of production, distribution, consumption, and disposal, certain chemicals harm the environment and endanger public health and ecological systems. Collaboration along the supply chain benefits the environment, the quality of life, and the survival of wild animals and plants. Reducing trash generation comes first, followed by reusing used goods and parts, recycling acquired resources as natural resources, and finally, heat recovery. Substances that can become waste as a result of these actions should be disposed of responsibly.

### **2.3.3 Water pollution**

Furthermore, water resources are critical to the existence of all living things, including humans, and they serve as the cornerstone of the societal pecuniary system. Meat water makes up 2.5% of the world's water resources. Similar to rivers, lakes, and groundwater, which may be used for drinking, daily tasks, and productive activities, just 0.8 percent of water is made up of these bodies of water. Water efficiency must be improved, as must water consumption efficiency. As a result, it is necessary to also keep track of the water input.

If disposed of in rivers or any other body of water, industrial byproducts, trash strong acids, viral toxic waste, and some toxic industrial wastes are especially dangerous. They are defined as explosive, poisonous, contagious, or hazardous to human health and the living environment. It is critical to assess the whole environmental impact, which includes not only the product of but also the input into commercial operations. While estimating the amounts of natural resources or resources that have been used in a circular fashion may be simpler in the material business, it might be trickier in the assembly, manufacturing, or distribution sectors. Because of this, it should start by calculating the inputs of measurable resources based on the conditions of the components and finished goods at the moment of input.

## **2.4 Environmental management performance and supply chain collaboration**

Considering environmental challenges are quickly becoming the most essential topics in supply chain, manager’s view environmental improvements as a basic competitive priority in addition to reduced costs, shorter lead times, and excellent quality. Indeed, since the advent of supply chain management, the need for a proactive, environmentally friendly supply chain has been emphasized. (Walton, Handfield & Melnyk, 1998). Green concerns in the marketplace are expanding, and the resulting green movements are forcing decision-makers to manage their organizations' performance from an ecological or environmental standpoint. Adopting a proactive environmental plan necessitates involving all stakeholders of the supply chain (Klassen & Whybark, 1999).

EMISSIONS TO AIR

EMISSIONS TO WATER

EMISSIONS TO LAND

SUPPLY CHAIN ACTIVITIES

NATURAL RESOURCES

ENERGY

**Figure 2.1 environmental management performance**

As shown by the above *figure 1,* The natural environment may be impacted by supply chain activities in a number of different ways, including air pollution from greenhouse gases and dust, water pollution from trash, acids, and metal emissions, and land pollution from pesticides, fertilizers, and resource use (water use, minerals and forestry). As a result, collaboration throughout the supply chain is required to ensure enhanced environmental management and, as a result, the production of items that can be produced for an extended period of time (sustainability). A rising number of companies in the sustainable supply chain are establishing cooperative relationships due to the diversity of the markets, competitive pressures, and shortened life cycle of the product. Collaboration is a type of commercial arrangement where participants concur to share information, take on social responsibility, and invest in one another in order to find solutions and accomplish shared goals.

When compared to prior solutions or readily available suitable alternatives, their design has a similar goal of attaining various environmental effects (lower of future hazards, water, air, carbon dioxide emissions, or fuel consumption). Eco-innovations provide value for the company and its customers by significantly lowering adverse environmental effects.

## **2.5 Collaboration in Supply Chain**

Collaboration throughout the supply chain facilitates the creation of synergies, enhances coordinated planning, and encourages real-time information sharing (Whipple and Russell, 2007). Two or more independent businesses that collaborate to plan and carry out supply chain operations more successfully than if they were done individually make up a collaborative supply chain (Simatupang and Sridharan, 2002). Partners exchange transactional data such as purchase orders, invoices, and payments. The three types of collaborative connections are strategic cooperation, collaborative process management, and collaborative transaction management. These collaboration categories were categorized using the following criteria: operational context, knowledge domain, depth of understanding, citizens features, collaboration focus, time horizon, process characteristics, technology characteristics, degree of involvement in decision making, classification of return on relationship, and people characteristics.

**2.5.1Transaction collaboration**

In order to create a strong foundation from which more sophisticated forms of collaboration can develop, collaborative transaction management, the initial level of collaboration, focuses on enabling the interchange of transaction data. The effectiveness of collaborative transaction management depends on being able to standardize transactional data and use technical support tools to automatically communicate data. The amount of knowledge acquired through this type of collaboration is essentially explicit in the sense that it can be "articulated and defined" in order to be "simply shared" (Lang, 2004). Collaborative transaction management partnerships have two features: vendor-controlled inventory and scorecard cooperation. Both projects require less human interaction between each business than more complicated forms of collaboration and work as means of transporting financial information between trading partners. Due to the amount of information and data involved, both are challenging to set up and manage.

**2.5.2 Event collaboration**

Instead of transactions, like in transaction cooperation, data transmission and relationship management are more focused on strategic planning and choice around significant events or challenges, like creating a shared business strategy or sharing information about new product releases or store openings. There is an interchange of both explicit and implicit knowledge. Because most of the transactional data sent are exception based, the explicit knowledge transfer that happens in this collaboration is more efficient than in a transaction collaboration. The interchange of more explicit and tacit knowledge, however, enables front-end planning to execute at greater levels because it takes place over lengthy time scales in organizational effectiveness levels. Compared to collaborative transactional managerial activities, collaborative event management activities usually place a greater emphasis on the prevention, identification, and resolution of problems.

**2.5.3 Process collaboration (strategic collaboration)**

True cross-enterprise or cross-functional integration is made possible by collaborative process management, which places equal emphasis on demand and supply processes. The key difference between strategic cooperation and other types of strategy and decision-making is the inclusion of both order and sales forecasting tools. The extensive integrated strategic planning process, the creation of an order forecast, and—possibly most significantly—the accomplishment of replacement instructions in accordance with the sales forecast and the order forecast are the primary differentiating aspects. For the aforementioned reasons, it is necessary for both trading partners to routinely agree upon and honor obligations to make purchases. The most difficult problem, though, is finding technology that can keep up with the growing collaborative cooperation.

**Figure 2.1 supply chain collaboration**

**2.6 The role of collaboration in supply chain**

In supply chain collaboration we have buyer-supplier collaboration and buyer-customer collaboration, below are the roles of collaboration in supply chain;

### **2.6.1 Information sharing**

Moreover, Information exchange on supply chain management also plays a part. At this level, partners are given information to aid in decision-making through the use of electronic data interchange, the website, or specialized technologies. Examples of information transmitted include forecasts for production or components, production and transportation plans and capacities, orders, product descriptions, costs, and campaigns, inventories, allocations, and the availability of products and materials, as well as contract conditions. At this level of management partnership, participants take part in joint planning, process improvement, and risk sharing. On issues like increasing forecast accuracy, solidifying strategic supply chain partnerships and profitability, enhancing sales and operations planning, direct material procurement and production capacity, manufacturing facility, and pricing plans, among others, decisions will be made collaboratively.

### **2.6.2 Lower long-term costs**

Aside from that, ongoing supply chain relationship is doable, simple, and evident every day. The longer you work together, the more adept you'll become for identifying one another's assets, flaws, and work styles as well as exploiting each other's deficiencies. For instance, by retaining a supplier in your supply chain for an extended period of time, you can gain cooperative experience and improve communication without having to repeatedly spend time and money learning the procedures, norms, and customs of a new provider. You can quickly and effectively close costly production cycle gaps if you understand your suppliers' speed, management approaches, and other operational aspects.

### **2.6.3 Drive better ethical standards**

Furthermore, consumers and organizations alike are increasingly placing a premium on ethical and ecological sourcing. Collaboration among several stakeholders is widely recognized as important for accomplishing significant and long-term change in global supply chains.

It is commonly acknowledged that cooperation between various stakeholders is essential for achieving major and long-term change in global supply chains. In collaboration with a supply chain partner, you may advance better ethical and environmental standards, boost visibility and accountability, and exert more control over parts of your supply chain that are challenging to alter. In addition, supply chain partners can pool their resources inside the boundaries of a single digital service to swiftly and effectively exchange effective internal audit function data, coordinate audit timeframes, and even rely on each other's research findings to avoid any pointless auditing and lessen audit fatigue among your suppliers.

### **2.6.4 New resource development and innovations**

Collaboration in supply chains may also aid in the discovery of new ecologically friendly materials. According to (Dyer and Nobeoka, 2000; Dyer, 1996; Takeishi, 2001), organizational competencies can be established by combining resources from various supply chain organizations. Green product innovation (GPI) collaboration opens the door to new designs that are more efficient and environmentally beneficial (Florida, 1996). Green design capabilities, according to Lenox and Ehrenfeld (1997), are formed through the integration of various knowledge resources. Greater supply chain collaboration can result in operational benefits such as increased innovation (Dyer and Nobeoka, 2000), faster time-to-market (Dyer, 1996), and improved financial performance (Carr and Pearson, 1999), all of which are crucial to a company's competitiveness. Improved business performance, customer happiness, a big market share, and improved revenue are just a few of the additional benefits of supplier collaboration, all while improving environmental management.

Through process integration and mutual trust among supply chain members, supply chains can gain a collaborative advantage that can minimize opportunity costs and monitoring costs, hence improving supply chain members' sustainable development performance, according to Cao and Zhang (2011). Supplier collaboration can also give a supply chain's trade partners a competitive advantage, allowing them to prosper and expand. Green product innovation brings companies together to create products that have a lower environmental impact. These products often consume less energy, emit fewer pollutants, and employ more ecologically friendly materials. In an industrial setting, firms often collaborate along the supply chain with customers and suppliers. Colla/borative innovation is the foundation of continuous environmental management performance and a winning weapon to obtain sustainable competitive advantages in the fierce market competition. It aims at improving the sustainable ability and realizing the value of innovation, has been gradually accepted by enterprises in the supply chain.

Apart from that, all supply chain network participants innovate and reform products, processes, markets, technologies, resource allocation, and organization in order to attain a balance in economic, social, and environmental performance. At the same time, innovative lean production can provide economic and environmental benefits (Yang, Hong, and Modi, 2014). In order to meet the overall aims of supply networks, Malone and Crowston (1994) contemplate that firms in supply chains must build adequate collaborative innovation to ensure consistency in decision-making. In collaborative innovations, firms integrate relational characteristics, such as trust, with contractual commitments. The supply chain is a natural type of exchange of goods, information, and money, and managing it knowingly and purposefully reaps many benefits, as demonstrated by figure 2 below.

When compared to earlier solutions or accessible relevant alternatives, the common role of collaboration in supply chain is to achieve various environmental benefits (such as reductions in environmental risk, water, air pollution, and energy use). Supply chain collaborations benefit both the customers and the company by curbing harmful effects on the environment, and it is important to consider the value provided throughout the eco-innovation lifecycle, including benefits for the natural environment, specifically by reducing the depletion of natural resources per unit of manufactured product and toxic materials both during and after their use (2018). Green technology has resulted in enormous breakthroughs in environmental management.

## **2.7 Conceptual framework**

A conceptual framework is a collection of general concepts and principles drawn from several domains that are used to outline a future presentation (Biklen, 2003). In this study, it was designed to show the relationship between the dependent variable (environmental management performance) and the independent variable (supply chain collaborations). The constructs and relationships between the variables are illustrated on *figure 2.3* below.

**Independent variables: Dependent variables:**

**The role of collaboration in supply chain**

Transaction collaboration

Event collaboration

Process collaboration

Ensure efficiency and effectiveness

New product innovations

Drive better ethical standards

**Environmental management performance**

Environmental sustainability

Emissions to water, land and air

 Use of environmental friendly materials

Working conditions and health

Use of three R’s (Reuse, recycle and reduce)

**Figure 2.4 conceptual framework**

## **2.8 Empirical Study**

This empirical review covers a collection of papers that attempt to give information on the influence of supply chain collaboration on environmental management performance research that was undertaken somewhere with the purpose of teaching and justifying such research. Their investigations went into great detail into the functions of collaboration in the supply chain and their influence on environmental performance. As part of the investigation, companies in China and Poland were investigated.

**2.8.1 Jihui, Xiaofei and Jianjun (2018)**

The old paradigm of growth for social and economic advancement has resulted in crises and difficulties. As a result, a number of countries have begun to look into long-term development. China faces significant environmental challenges as a developing nation. As a result, a hypothesis model of influencing elements of long-term supply chain management was developed based on the manufacturing industry in China. Economic sustainability, environmental sustainability, and social sustainability were the three pillars of the sustainable supply chain practice. Internal management cognition, industry pressure, customer pressure, and government participation are all contributing elements in developing a sustainable supply chain. The questionnaire data from 167 companies in Beijing, China, was examined using a structural equation model. Internal management cognition and government participation have a direct impact on the outcomes, according to the findings. Consumer pressure and industry force have a minor positive impact on internal management cognition, while the effect of government contribution on industry pressure is very noteworthy.

**2.8.2** **Barbara, Anna and Bartłomiej (2022)**

The purpose of this study is to determine whether a broad scope of supply chain collaboration that includes both customers and suppliers (upstream and downstream external collaboration) has a greater influence on the greening of innovation than a scope limited only to suppliers (upstream external collaboration) or consumers (downstream external collaboration) (downstream external collaboration). This objective was reached as part of a thorough investigation on the influence of relational capital on the innovativeness of Polish high-tech enterprises. The research outcomes were analysed using fuzzy conversion scales and descriptive statistics based on triangular fuzzy numbers. The application of fuzzy sets theory achievements allowed the hypotheses stated in the paper to be tested using fuzzy analysis of variance (fuzzy ANOVA).

The data support the hypothesis that the subjective scope of collaboration in supply chain is essential in green innovations. Those that collaborate with both suppliers and customers have a higher chance to green their ideas than companies that just collaborate with one group of partners. This study's findings contribute to the expanding body of information concerning the importance of collaboration in distribution network partners' environmental stewardship and effectiveness. The findings might have an impact on the development and implementation of approaches for sustainable supply chain management. SC managers dealing with the issue of long-term management during and after the COVID-19 epidemic can benefit greatly from this research.

**2.8.3 Wong, Wong, and Boon-itt, (2015)**

Environmental management integration into supply chains has recently gained attention. The absence of a theoretical basis and conceptual framework, however, hinders efforts to pool resources and abilities among supply chain partners. The study maps emerging practices, develops a theoretical framework, and makes research recommendations for further study in order to comprehend an emerging best practice known as "green supply chain integration," which is founded on theories of stakeholder and resource orchestration (GSCI). To ensure that the framework development process is auditable and reproducible, a thorough literature analysis of 142 scholarly publications is conducted. In order to find and evaluate similar ideas and practices, the article selection criteria are linked to the review question.

The study's findings demonstrate how stakeholder and resource orchestration theories may be utilized to explain an integrated approach to environmental management in supply chains. The study specifies four types of GSCI practices: internal GSCI, supplier GSCI, customer GSCI, and community stakeholder GSCI. A theoretical framework and proposal can also lead to new research avenues. Research limitations, the findings were derived from a thorough analysis of the available literature and unique methods that were not previously disclosed and may have been overlooked. The evolving practices and theoretical framework can be leveraged to conduct more empirical research. By creating a theoretical framework and prescription for future research, the study unifies theoretical concepts and empirical evidence from 0heterogeneous literature and identifies four emergent practices of environmental management.

**2.8.4 Abdul, Yongmei, Guangming (2016)**

In the UK food supply chain SMEs, supplier collaboration on Green Supply Chain Management (GSCM) practices and sustainable business performance was investigated. When procuring products or services, supplier cooperation refers to the management of collaborative relationships with important supply chain partners. Large-scale SCM, SC cooperation, and GSCM techniques have all been studied extensively. As a result, our study aims to address this void while also contributing to existing academic research and practice. Approach to the Study: A complete literature review was undertaken between 2000 and 2016 to evaluate publications published in international journals. For this study, supplier collaboration was drawn from prior literature in Supply chain collaboration and GSCM practices, while performance was drawn from previous literature in Supply chain collaboration and GSCM practices.

A conceptual framework was built based on a thorough literature assessment, which will then be empirically validated in the context of UK SMEs. Originality and findings, according to the literature analysis, supplier collaboration is critical for a company to implement GSCM in their operations, especially in SMEs. According to the literature, the primary factors of mutual collaboration include trust, dependency, knowledge and information sharing, risk and reward sharing between the firms. This research also implies that partnering with suppliers can assist organizations in implementing GSCM, which will result in long-term company success. This, however, has yet to be scientifically proven. Furthermore, this study discovered a link between supplier collaboration and trust, information sharing, knowledge, risk, and dependence. In terms of application, this research should aid SMEs in determining whether or not they need to work with their suppliers. Supplier collaboration, according to this study, is necessary for SMEs to practice GSCM. Furthermore, while the UK government is promoting a greener economy, this can only be achieved if SMEs, which account for 99 percent of all UK enterprises, green their operations, which requires close collaboration between buyers and suppliers.

**2.8.5. Jungeun and Hye-Young, (2020)**

The study's major goal was to look at the impact of stakeholder pressure on environmental supply chain practices. In the meantime, the role of environmental training as a mediating factor in the interaction between stakeholder pressure and the environmental supply chain was investigated. The SEM-PLS was employed in this research. The information was gathered from Thai sports companies' operations and general management. 58.5 percent of people responded. Environmental training appears to play a partial mediating function in the interaction between regulatory stakeholders and market acceptance of environmental supply chain policies, according to the mediation analysis. This study yielded two noteworthy findings: first, regulatory governance and market stakeholders are critical for implementing environmental supply chain strategies. Second, environmental training will result in more environmental supply chain practices efforts, as opposed to employing stakeholder governance mechanisms as a demand on the firm individually. The findings also revealed that while regulatory governance plays an important role, integrating it with market stakeholder involvement could help enterprises achieve greater efficacy in their sustainability programs. Given the importance of environmental training programs, it was also necessary to determine whether they serve as a mediator in diverse geographic and regulatory contexts, as well as in other industries. Furthermore, no supporting evidence in favour of non-market parties was found. Future research can look into the active role of non-market stakeholders in sustainability projects.

## **2.9 Gap Analysis**

There are few studies which were carried in connection with the role of collaboration in supply chain on environmental management performance and some of them where done outside of Zimbabwe but this research data collection was carried out in Zimbabwe. This research seeks to fill the gap in respect with the impact that the role of collaboration in supply chain has on environmental management performance in organizations in Zimbabwe.

## **2.10 Chapter Summary**

In this chapter, all the roles of supply chain collaboration and other influential factors on environmental management performances has been clearly outlined and evaluated. Also related theories has been outlined and as well as their impact on environmental management performance was fully explained, diagrams in this chapter helps for a further elaboration. In the succeeding chapter, the researcher proceed to research design and methodology, suitable ways used to collect data during this research.

# **CHAPTER THREE**

## **RESEARCH METHODOLOGY**

## **3.1 Introduction**

This chapter outlines the research methodology used to gather data from the field. Ishitiag (2019) defines research methodology as methods and techniques used by researchers to collect, analyze and interpret data more systemically and structurally. This chapter focuses on target population, sample size, sampling procedure, research instruments and analysis methods used in data collection. These will discuss the validity, the reliability and also the ethics of the research.

## **3.2 Research design**

A research design is a plan or strategy that guides and informs the conduct of a study (Babbie and Mouton, 2008). In several disciplines, qualitative and descriptive research methodologies have been widely used to conduct research. According to the Institute of People Management (2011), a research design is the approach and form of a study that is used to validate responses to research questions. To aid in the investigation of the digital supply chain's impact on organizational performance, the researcher used a descriptive research approach to collect data. The goal of a descriptive research is to describe a phenomenon and its characteristics.

This research is primarily concerned with what occurred rather than how or why it occurred. As a result, data is frequently collected using interviews, questionnaires, and survey instruments (Gall, Gall, and Borg, 2007). Data may be collected qualitatively in this type of study, but it is frequently analyzed quantitatively with statistical analysis used to discover relationships. It also allowed the researcher to conduct a more in-depth examination of the role of collaborative supply chain on environmental management. The advantage of using descriptive survey is that it allows the researcher opportunity for using qualitative and quantitative data in order to find features and data about the population under study.

##  **3.3 Population and Sample**

Any group of people for whom the researcher wishes to generalize the study's findings is referred to as a population. As supported by Mugenda and Mugenda (2003) target population refers to all kinds of people or organizations which possess certain characteristics and a sample is drawn from the population. The population, which the study targeted, will be composed of people working in nine branches of procurement department, stores departments and organizational management team at each organization in fish farming industry.

Cooper and Schindler (2003) defined sample size as a percentage of a population chosen to represent the population's characteristics. A targeted population of 50 respondents was chosen depending on their occupation. Fish farming organizations in Zimbabwe, are private limited firms with a modest number of workers and personnel.

|  |  |
| --- | --- |
| **Targeted group** | **Population** |
| Head of department | 8 |
| Buyers | 10 |
| Procurement Officers | 15 |
| Suppliers | 12 |
| Stores Clerk | 5 |
| **TOTAL** | **50** |

**Table 3.1 Population and Sample Size**

**Source: Primary data 2022**

The Solving’s of 1960 formula was used in this study to determine the sample size.

Formula: n= $\frac{N}{(1+Ne^{2})}$

 n = $\frac{50}{(1+50×0.1^{2})}$

 n = $\frac{50}{1.50}$

 n = 33

The sample size for the entire fish farming industry was 33. The researcher calculate the sample size because it was difficult to deal with the whole population. Respondents included heads of the department, buyers, procurement officers, organizational managers, stores clerks, and professional suppliers. Since the perspectives of different procurement professionals differ, this inclusive approach assures that there was no bias in terms of responses.

## **3.4 Purposive sampling**

The type of analysis being done determines the sample strategy. Patton (2001) defines sampling as a statistical evaluation technique in which a certain number of connotations are picked from a large population. The author utilized the widely used purposeful sampling approach (Keane, Herbohn, and Slaughter, 2011), which is effective in finding and selecting data scenarios for the most efficient use of limited resources (Patton, 2002). Finding and choosing people who are informed about the issue is what purposeful sampling implies. The purposive method result in sampling the respondent with the correct data and is less time consuming, it was used because it is simple to carry out with effective results since the exact population is targeted. This research has adopted the method in order to avoid time limits and the approach improves data validity. In this scenario, the researcher interact with personnel who help with the supply chain as well as management staff. On selecting suppliers for interviews a simple random sampling was used in which five suppliers were choose by randomly picking price tag that had supplier’s codes.

## **3.5 Data Sources**

The scholar will collect study data from both primary and secondary sources in order to evaluate the influence of supply chain collaboration on environmental management performance.

### **3.5.1 Primary Data**

To collect primary data, questionnaires and telephone surveys were employed. According to Kothari (1990), primary data refers to information that is collected for the first time and as such has an authentic nature. Because primary data was substantially related to the topic at hand, it was used in the study; it was further altered, and the researcher was able to manage the degree of accuracy error that was created (Kumar 2005).

### **3.5.2 Secondary Data**

For this study, secondary data was acquired from books, journals, e-journals, websites, mining periodicals, and government documents. Secondary data, according to Kothari (1995), is data that has previously been collected and analyzed by other researchers. As a consequence, the researcher discovered that obtaining secondary data from the internet and libraries, where information on environmental management performance in supply chains is publicly available, was straightforward.

## **3.6 Data Collection Instruments**

This sections explains the instruments used in this research for collecting data. Rabson (1997) argues that research instruments refer to the means by which research data are gathered from respondents. Use of appropriate instruments has a great bearing on the accuracy and reliability of information gathered. The researcher uses questionnaires and interviews as research instruments and it is essential to note the criteria used to select the proper methods are reliability, validity, costs and time consuming.

###  **3.6.1 Questionnaires**

Questionnaires are a sort of research instrument that consists of a sequence of questions designed to elicit information from respondents. In that they are written, they are comparable to written interviews. They provide a reasonably rapid and effective means of collecting large amounts of data from a large number of people. Every questionnaire is basically a survey, and the answers may be useful. In this study, the researcher will use written, standardized, and closed questions. The researcher received primary data from procurement personnel, clients, and management.

## **3.6.1.2 Justification on the use of Questionnaire**

The questionnaires were chosen because they were a cost-effective method of gathering information. Quick data analysis was enabled by using closed questions in the questionnaires that were straightforward and easy to interpret. Respondents were able to answer questions and submit feedback on their own time by using questionnaires. Alternative responses to closed-ended questions were offered on the questionnaire, which made it easier for respondents to understand the questions' meaning. However, in order to avoid the issue of questionnaires generating incorrect feedback in which some questions were left unanswered, the researcher made an attempt to make all questions clear. The researcher encouraged respondents to answer all questions while submitting questionnaires so that each component of the questionnaire was completed. The questionnaire consists of two sections: part 'A,' which inquired for demographic data on the participant, and section 'B,' which questioned for company information.

### **3.6.2 Interview**

Interviewing people is one of the most popular and widely used strategies for obtaining information from them about anything. Interviews were employed because they allow the researcher to go further into a topic in order to unearth new data and uncover new facets (Kothari, 1990). This study relied mostly on telephone interviews, which was preferable given the movement constraints imposed by the Covid 19 epidemic. The telephone interview offers for a more in-depth investigation of the issue as well as the ability to do more without having to go, saving time and allowing you to focus on other elements of your research. However, the instrument has limits, such as a restricted capacity to form relationships.

## **3.6.2.1 Justification on the use of interviews**

Interviews were considered an effective way of getting an in-depth and comprehensive analysis. . Structured interviews were used to get views, opinions from buyers about supply chain collaboration on environmental management performance. Questions asked during the interviews were specific and for consistence related questions were asked to all the respondents. Interviewing the right people who had some knowledge on buyer supplier relations and its impacts to the organization understudy added a significant value to the research.

## **3.7 Data Collection Procedures**

Data collection, according to Voss (2002), is a systematic method of obtaining and measuring information by examining a variety of sources to produce accurate data for a certain study. It is necessary to ensure that the data is acquired consistently and lawfully, under freedom of information and privacy protection rules. For the researcher to be able to collect data, she went through many authorities involved in the study. First, the researcher obtain informed consent from the participant. Before traveling, she was granted permission to collect data at the Bindura University of Science Education. The researcher interview consenting participants, asking questions in their language and taking quick notes on their responses. Analytical questions were asked after any answers that require clarification, assisting the researcher in discovering the information required. As data collection instruments, the researcher used closed-ended questionnaires and open-ended interviews.

## **3.8 Reliability and Validity**

**3.8.1 Validity**

According to Creswell and Poth, the degree to which a sample of test items correctly represents the test's content (2018). The measure of content validity, which will be used in this study, is how effectively data obtained using a certain instrument represents a specific domain or content of a specific idea. The questionnaires were pilot tested with three workers from various firms to confirm content authenticity, and any irregularities were addressed.

**3.8.2 Reliability**

According to Mugenda (2009), the ability of a research instrument to deliver consistent outcomes and data across time is referred to as reliability. When an instrument regularly measures what it was designed to measure, it is said to be reliable. The research instruments used for data collection were reliable since they were given to persons who were familiar with the subject matter and the researcher was involved in the process. The research conducted a pilot test to ensure the questionnaire's reliability by employing reliability analysis**.**

## **3.9 Data Presentation and Analysis**

After the collection of relevant data for the research, the researcher presented, interpreted and analyzed the data basing on research questions. According to Miles and Huberman (1994), data is provided, processed, and shown in diagrammatic, descriptive, or visual forms to show what the data suggests. The information gathered for the study was presented in the form of summaries, charts and tables. To exhibit an analytical point, the findings serve to answer the research question and the information was linked to the conceptual framework.

## **3.10 Ethical Consideration**

The collection of standards that a researcher must follow when performing a study involving research subjects is referred to as ethics. These are the study process's dos and don'ts, which are intended to keep participants safe.

**3.10.1 Confidentiality** - Participants were guaranteed confidentiality and it was preserved. Under pressure from anyone, the writer will not share the names, contact information, or identifying information from the data obtained. In no case should the researcher communicate the findings with family, friends, or anybody else.

**3.10.2 Withdrawal right**- This is a crucial right since it allows the researcher to feel less criticized and demonstrate that the data acquired is solely for academic interests. Forcing volunteers to stay in the study may imply personal interests in the data being collected. It also runs the danger of receiving skewed information from research participants, who will answer without enthusiasm or curiosity.

##  **3.11 Chapter Summary**

This chapter described the data collection and representation processes, as well as the research method for the topic under discussion, which included the study approach, design, target population, sample, instrument, data collection processes, ethical concerns, and method of data analysis.

**CHAPTER FOUR**

**DATA PRESENTATION, INTERPRETATION AND DISCUSSION**

**4.1 Introduction**

The data obtained from respondents using the methods indicated in the previous chapter is presented, interpreted, and discussed in this chapter. The presentation, interpretation, and discussion are based on the primary topics covered by the research instruments and are provided in tables, graphs, and charts.

**4.2 Questionnaire and Interview Response**

Thirty-three questionnaires were distributed to supply chain professionals and management of the companies in Zimbabwe’s fish farming industry. The table 4.1 below summaries the responses of the questionnaires and interviews.

**Table 4.1: Questionnaire and Interview Response Instrument**

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrument** | **Expected**  | **Actual**  | **Percentage** |
| **Questionnaire** | **33** | **33** | **100%** |
| **Interviews** | **10** | **9** | **90%** |

**Source: primary data (2021)**

Thirty-eight of the surveys issued to supply chain experts were completed and returned on time. Because the researcher followed up on surveys, the response rate was 100 percent, as indicated in table 4.1. A high percentage response rate assured the researcher that the necessary information had been acquired, as opposed to a response rate of less than 50%. According to Saunders, Lewis, and Thornhill (2000), any response rate more than 50% is representative and sufficient to ensure the validity of the findings. The research planned to conduct interviews with 10 managers, some from other branches, and a response rate of 90% was received. According to the data in table 4.1, respondents were cooperated with the study.

**4.3 Demographic profile of participant**

The demographic profile below depicts that, there were twelve females and twenty one males in the chosen sample. On age the researcher choose youthful stages, as stipulated by Al Sagga (2017) that organizations aim to hire young individual and they can gather more knowledge in research and development that can be leveraged to benefit the company.

Additionally, the chart clearly demonstrates below the respondents' educational backgrounds. Since 54.4 percent of the respondents had an undergraduate degree, it is apparent that they have the necessary skills and expertise for supply chain management. In addition, 20 respondents had work experience of 6 to 10 years, 3 had experience of 11 to 15 years, and 2 had experience of more than 15 years.

The chart also reveals that 21.2 percent of respondents were suppliers and 30.3 percent were buyers. This is true because trustworthy information is needed to meet these supply chain management expectations. Officers in charge of purchasing made up 18.2%, and store clerks made up 15.2%.

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristics** | **Variables** | **Frequencies** | **Percentages%** |
| Gender | Females | 12 | 36.4 |
| males | 21 | 63.6 |
|  |
| Age | 25-30years | 6 | 18.2 |
| 31-35years | 10 | 30.3 |
| 36-40 years | 9 | 27.3 |
| Above 40 years | 8 | 24.2 |
|  |
| Level of education  | Postgraduate | 6 | 18.2 |
| Undergraduate | 18 | 54.5 |
| Diploma | 4 | 12.1 |
| Certificate | 5 | 15.2 |
|  |
| Experiences in the procurement department | 0≤ Experience≤5 | 8 | 24.2 |
| 6≤ Experience≤ 10 | 20 | 60.6 |
| 11≤ Experience ≤15 | 3 | 9.1 |
| Experience ≥ 15 | 2 | 6.1 |
|  |
| Position held by responded | Head of department | 5 | 15.2 |
| Procurement officers | 6 | 18.2 |
| Buyers | 10 | 30.3 |
| Suppliers | 7 | 21.2 |
| Stores clerk  | 5 | 15.2 |

**Table 4.2: % demographic profile of the respondents. Source: primary data**

**4.4 Respondent’s organizations**

The given organizations below were chosen as there are the well-known and registered companies in fish farming industry Zimbabwe.

**Figure 4.1 fish farming organizations**

## **4.5 Does your organization collaborate with your suppliers?**

The study aimed at investigating if collaboration is in existence in supply chain for better environmental performance.

**Figure 4.2 collaboration with suppliers**

**Source; Primary data**

**4.6 How do organizations collaborate with other suppliers?**

|  |
| --- |
| **Transaction collaboration**  |
|  | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | strongly agree | 15 | 45.5 | 45.5 | 45.5 |
| agree | 13 | 39.4 | 39.4 | 84.8 |
| not sure | 5 | 15.2 | 15.2 | 100.0 |
| Total | 33 | 100.0 | 100.0 |  |

**Table 4.3 transaction collaboration**

**Source: primary data**

The table above shows 45.5% of the respondents strongly agree that they used transactional collaboration within their supply chains, 39.4% agrees to the statement and 15.2% of the respondents were not sure. From the table it shows that in the fish farming supply chain Zimbabwe transaction collaboration is in existence.

**Event collaboration**

Moreover, on event collaboration 63.6% of the respondents strongly agree, 24.2% of them agree, 6.1% were not sure and 6.1% strongly disagree. The results on the graph below shows that event is mostly used within the fish farming supply chain and this was supported by a total of 87.8%.



**Figure 4.3 Event collaboration**

**Strategic collaboration**

|  |
| --- |
|  |
| **Strategic** | **Frequency** | **Percent** | **Valid Percent** | **Cumulative Percent** |
| Valid | strongly agree | 23 | 69.7 | 69.7 | 69.7 |
| agree | 8 | 24.2 | 24.2 | 93.9 |
| not sure | 1 | 3.0 | 3.0 | 97.0 |
| strongly disagree | 1 | 3.0 | 3.0 | 100.0 |
| Total | 33 | 100.0 | 100.0 |  |

Table 4.5 strategic collaboration

The above table shows that collaboration is in existence within the fish farming supply chain in Zimbabwe. It also shows that strategic collaboration is mainly used followed by event collaboration and lastly transactional. A total of 93.9% respondents agrees that they used strategic collaboration within their supply chain, 3% indicates that they were not sure if it is in existence in their organization and 3% strongly disagree with the statement.

**4.7 Impact of Supply Chain collaboration practices on environmental management performance****.**

**Figure 4.4 The impact of supply chain collaboration**

*Note: 1= no impact 2= negligible impact 3=minor impact 4=moderate impact*

*5= major impact 6= critical impact 7= catastrophic impact*

A thriving supply chain develops emergency scenarios to reduce potential supply chain disruptions, which may manifest as foreseen or unexpected hazards, vitality demand, and delivery delays. According to Parast (2006), the adaptive skills of the supply chain reduce the likelihood of confronting emergency interruptions or disturbances; resist the spread by keeping control over functions and structures. As a result, recovering and providing rapid reaction and effective strategies to restore any disruption in the supply chain to a strong state of operations.

The impact on food safety, unsafe working conditions, and natural calamities would be detrimental to the fish farming supply chain. As a result, quality will have a significant negative influence on supply chain performance. Natural catastrophes, and the impact they have on the supply chain, are beyond the supply chain partners' control. Measures may be enlisted in a collaborative strategic management KO to mitigate the consequences of product quality and delivery. Adherence to industrial safety regulations can help to avoid unsafe working conditions. Silvestre (2018) stated that incorrect waste disposal might cause pollution and price rigging claims, which can lead to product boycotts if not adequately controlled.

**4.8** **To what extent is supplier collaboration real on environmental management performance in the fish farming business?**

**Figure 4.5 Supplier collaboration on environmental management**

**Source; primary data**

The graph depicts that, 20 respondents indicates that supplier collaboration is real on environmental management performance to a greater extent. Eleven respondents indicates that to a lesser extent supplier collaboration is real on environmental management and 2 suggested not at all.

**4. 9 Chapter summary**

This chapter shows results obtained from the field. The data was presented, analyzed and discussed in form of tables and graphs. Question by question analysis was used to analyze interview questions. Overall, this research perceptions and the interpretation showed that findings of this study positively supported collaboration in supply chain on environmental performance. The next chapter will provide a summary of the results, conclusions, suggestions, and areas that require additional investigation.

# **CHAPTER FIVE**

**SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

**5.1 Introduction**

This chapter makes a wrap over on all the findings made on this study, based on the results analyzed in chapter four. This chapter covers summary of the findings, conclusions and recommendations.

**5.2 Summary of the findings**

The research sought out to evaluate the role of collaboration in supply chain on environmental management performance in fish farming sector Zimbabwe.

The findings on this research revealed that all types of collaboration; event, transaction and strategic are in existence within the supply chain in the fish farming industry Zimbabwe. Not forgetting views and findings from the interviews, lack of proper technology, lack of common goal approach and commitment were the major challenges in implementing collaboration in supply chain. The study revealed that organizations due to lack of environmental requirements needed are losing tenders.

Apart from that, the study found out there is a positive impact of supply chain collaboration on environmental management performance. Collaborating all stages of supply chain leads organizations to improved environmental performance. It was verified by an average percentage of 76.25 of respondents in the questionnaire and 95% from the interviews who strongly agree that the role collaboration in supply chain has a positive impact on environmental management performance. The findings depicts that collaborative supply chain on environmental performance improves efficiency, opportunities for new products innovations, new markets, improved corporate image and it also saves as a cost saving tool within the fish farming sector in Zimbabwe.

In addition to that, companies in the fish farming sector has implemented various environmental practices to avoid emissions to air, emissions to water and emissions to land in their supply chain activities The interviews indicated that they give second tier suppliers design specifications to reduce pollution, prevent wastages and to develop new environmental friendly products. 60.6% of respondents agreed that they supply chain collaboration is real on environmental management performance, therefore the role of collaboration in supply chain improves environmental management performance.

**5.3 Conclusion**

Conclusions have been made following research objectives of this study outlined in chapter one. Lately, organizations have been facing increased pressure because now customers are demanding more environmentally friendly products and services which are sustainable. These environmental concerns have become significant in all perspectives including fish farming sector, the sector needs to address issues like information sharing, commitment, availing more resources for ecologically sound collaborative supply chain. They must avert challenges in order to attain environmental awareness fish farming industry, it was concluded that lack of knowledge, inadequate resources, poor management and resistance change are the major challenges in implementing supply chain collaboration on environmental management performance.

The findings on this study found out that the role of collaboration in supply chain positively impacts environmental management performance in that it improved efficiency, a cost reduction tool, brings new product innovations, improved corporate image and new markets. The study concludes that, the fish farming industry had implemented environmental measures within their supply chain to reduce emissions to air, emissions to water and emissions to land in order to improve environmental management performance.

**5.4 Recommendations**

* The researcher recommends companies in fish farming industry to make a requisite for all suppliers to avoid negative environmental impacts by employing environmental measures to attain green supply chain.
* The research recommends fish farming companies to completely implement collaboration in supply chain activities to attain better continuous environmental management performance.
* The study recommends fish farming companies in Zimbabwe to consider environmental management performance at strategic level.
* The research recommend that government apply going green economy through some regulatory laws on renewable energy, green investment and other laws that deals with environmental management.

**5.5 Area for further research**

This study focuses solely on how supply chain collaboration affects the effectiveness of environmental management in the fish farming sector in Zimbabwe. The researcher suggests that a similar study be carried out in other firms in Zimbabwe on a wider scale and with a larger sample size to determine if similar results can be obtained for more reasonable extrapolation of the findings.s

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## **Appendices**

## **Appendix A**

**BINDURA UNIVERSITY OF SCIENCE AND EDUCATION**

**FACULTY OF COMMERCE**

**DEPARTMENT OF ECONOMICS**

**Questionnaire**

My name is Lorraine Maponga, and I am a final-year student at Bindura University pursuing a Bachelor of Commerce Honors Degree in Purchasing and Supply. I am working on a research project titled Environmental management performance: the role of collaboration in supply chain, a case study of the fish farming business in Zimbabwe. I would appreciate your help in answering the questions on this form accurately. The research is solely for academic purposes, and your responses will be kept anonymous. The researcher wishes to thank you in advance for taking the time to complete this questionnaire.

## **Appendix B: Questionnaire**

**SECTION A: DEMOGRAPHIC**

**1 Gender**

|  |  |
| --- | --- |
| Female  | **1** |
| males | **2** |

**2 Age**

|  |  |
| --- | --- |
| 25 to 30 years | **1** |
| 31 to 35 years | **2** |
| 36 to 40 years | **3** |
| Above 40 years | **4** |

**3 Work experience**

|  |  |
| --- | --- |
| Below 5 years | **1** |
| 6-10years | **2** |
| 11-15 years | **3** |
| Above 15 years | **4** |

**5 Academic qualification**

|  |  |
| --- | --- |
| Certificate | **1** |
| Diploma  | **2** |
| Degree | **3** |
| Post-graduate | **4** |

**6 Name of organization**

………………………………………………………………………………………………

**7 Position you hold**

|  |  |
| --- | --- |
| Head of department | **1** |
| Procurement manager | **2** |
| Buyer | **3** |
| Supplier | **4** |
| Stores clerk | **5** |

**SECTION B: Organizational information**

**8 Does your organization collaborate with your suppliers?**

Yes

No

**9 How do you collaborate with your suppliers on five Likert scale**

 **Key: Strongly Agree (SA), Agree (A), Not Sure (NS), Disagree (D) and Strongly Disagree (SD).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of collaboration** | **SA** | **A**  | **NS** | **D** | **SD** |
| Transaction integration |  |  |  |  |  |
| Event collaboration |  |  |  |  |  |
| Strategic collaboration |  |  |  |  |  |

**10 Impact of Supply Chain collaboration practices on environmental management performance. Note: 1= no impact 2= negligible impact 3=minor impact 4=moderate impact**

**5= major impact 6= critical impact 7= catastrophic impact**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Natural resource utilization  |  |  |  |  |  |  |  |
| Acceptance of the environment management system such as 1SO, EMA |  |  |  |  |  |  |  |
| Reduction of long-term damage to ecosystems |  |  |  |  |  |  |  |
| Drive better ethical standards |  |  |  |  |  |  |  |
| Level of energy efficient production technology and solar system  |  |  |  |  |  |  |  |
| New resource innovations |  |  |  |  |  |  |  |
| Green buying and solid waste disposal at the level of registered contractors |  |  |  |  |  |  |  |
| Hazardous air emissions as well as greenhouse gas emissions |  |  |  |  |  |  |  |

**11. To what extent is supplier collaboration real on environmental management performance in the fish farming business?**

To a greater extent

To a lesser extent

Not at all

*Thank you for your cooperation.*

## **Appendix B**

**INTERVIEW GUIDE**

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**

**FACULTY OF COMMERCE**

**DEPARTMENT OF ECONOMICS**

Interview schedule

1. What is the impact of supply chain collaboration on environmental management performance?
2. Briefly explain the extent to which your organization collaborates with suppliers on environmental management performance concerns.
3. What are the ways used by your organization to improve waste management, emissions of greenhouse gases, water consumption and reducing air pollution to achieve environmental sustainability?
4. What other strategies could be implemented to improve environmental management performance in the fish farming business.