GREEN MANAGEMENT, EXPORT MARKET ORIENTATION AND SUSTAINABILITY OF AGRIBUSINESSES IN SOUTHWEST, NIGERIA

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A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (PH.D.) DEGREE IN BUSINESS MANAGEMENT IN THE DEPARTMENT OF BUSINESS MANAGEMENT, COLLEGE OF MANAGEMENT AND SOCIAL SCIENCES, COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA

SEPTEMBER 2024

ACCEPTANCE

This is to attest that this thesis is accepted in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy (Ph.D) in Business Administration in the Department of Business Management, College of Management and Social Sciences, Covenant University, Ota, Ogun State.

Miss Adefunke F. Oyinloye
(Secretary, School of Postgraduate Studies)   **Signature and Date**

Prof. Akan B. Williams
(Dean, School of Postgraduate Studies)   **Signature and Date**

DECLARATION

I, AKINOLA, OLUSEYI AKINTUNDE (20PAB02263), declare that this research was carried out by me under the supervision of Prof. Rowland E. Worlu and Dr. Mayowa G. Agboola in the Department of Business Management, College of Management and Social Sciences, Covenant University, Ota, Ogun State. I attest that this research work has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this thesis are duly acknowledged.

AKINOLA, OLUSEYI AKINTUNDE

Signature and Date

CERTIFICATION

We certify that this thesis titled **"GREEN MANAGEMENT, EXPORT MARKET ORIENTATION AND SUSTAINABILITY OF AGRIBUSINESSES IN SOUTHWEST, NIGERIA"** is an original research work carried out by **AKINOLA, OLUSEYI AKINTUNDE**. **(20PAB02263)** in the Department of Business Management, College of Management and Social Sciences, Covenant University, Ota, Ogun State, Nigeria under the supervision of Prof. Rowland E. Worlu and Dr. Mayowa G. Agboola. We have examined and found this work acceptable as part of the requirements for the award of Doctor of Philosophy (Ph.D) degree in Business Administration.

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DEDICATION

This study is dedicated to Jesus My Lord and Saviour whose strength is always made perfect in my weakness.

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LIST OF ABBREVIATIONS

AGD   :   Agricultural Green design
AP   :   Agricultural Productivity
AS   :   Agricultural Sector
AU   :   African Union
CAADP: Comprehensive Africa Agriculture Development Programme
CAI   :   Community Agricultural Information
CAN   :   Citizen Action Net for Social Development
CAP   :   Common Agricultural Policy
CARP :   Comprehensive Agrarian Reform Program
CBO   :   Community-based organisation
EAP   :   Export of Agricultural Products
ECS   :   Economic Sustainability
EMO   :   Export Market Orientation
ENS   :   Environmental Sustainability
EO   :   Export orientation
GDP   :   Gross Domestic Products
GM   :   Green management
GS   :   Governance Sustainability
SOS   :   Social Sustainability
UN   :   United Nations
UNEP :   United Nations Environment Programme
WB   :   World Bank
WFP   :   World Food Programme
WHO   :   World Health Organisation

ABSTRACT

The adoption and effective implementation of green management practices to address environmental concerns have posed a significant challenge in the agribusiness sector amidst various shocks, ranging from COVID-19 disruptions to climate variability and community crises. This challenge is particularly pronounced in a nation where over 70% of the population engages in small or medium-scale agriculture. The evolving food systems and the shift from large corporations to small and medium-sized enterprises (SMEs) in export market orientation highlight the imperative for a sustainable approach. This study explores the moderating effect of export market orientation on green management practices and the sustainability of agribusinesses in Southwest Nigeria. The research is grounded in three major theories—natural resource-based view, organic growth theory, and stakeholder theory. To fulfill its objectives, the study adopts a mixed-methods research approach, combining quantitative (i.e., questionnaire) and qualitative (i.e., interviews). The copies of questionnaire were distributed to 407 registered members of All Farmers Association of Nigeria (AFAN) in the six (6) selected states of Southwest Nigeria. Ten (10) directors of Ministries and executive members of AFAN were purposively selected based on their years of experience and service were also subjected to semi-structured interview. Structural Equation Modeling was used to analyse the quantitative data, while thematic analysis was used to analyse the qualitative data. The findings indicate a significant impact of green management practices on the sustainability of agribusinesses in the region. Specifically, green methods ($\beta= 0.600, >1.96$, P-value $=0.000 <0.05$), green materials ($\beta= 0.729, >1.96$, P-value $=0.000 <0.05$), green machinery ($\beta= 0.841, >1.96$, P-value $=0.000 <0.05$), and green measurement ($\beta= 0.816, >1.96$, P-value $=0.000 <0.05$) all play a crucial role in influencing sustainability. Additionally, export market orientation, encompassing export market intelligence generation ($\beta= 0.292, >1.96$, P-value $=0.000 <0.05$), export market intelligence dissemination ($\beta= 0.282, >1.96$, P-value $=0.000 <0.05$), and responsiveness to market intelligence ($\beta= 0.232, >1.96$, P-value $=0.000 <0.05$), emerges as a pivotal factor contributing to sustainability in the agro-industry. This study concluded that agribusinesses that integrate green practices and actively engage with international markets demonstrate a stronger foundation for achieving economic sustainability while concurrently promoting environmental stewardship and community development. The study recommends several actions based on its findings, including the promotion and support for green materials procurement, investment in green machinery and technology, enhancement of market intelligence generation and dissemination, promotion of community engagement and social responsibility, encouragement of environmental certification and standards compliance, support for research and innovation, development of a robust policy framework, and establishment of monitoring and evaluation mechanisms. The findings underscore the necessity for policymakers to prioritise the development and implementation of comprehensive policies that promote and incentivise green management practices, export market orientation, and sustainability initiatives within the agribusiness industry in Southwest Nigeria.

Keywords: Agribusiness, Export market orientation, Green management, Green Practice, Market intelligence, Sustainability

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In the 21st century, the design and operation of supply chains now place a high focus on sustainability. A focus on sustainability allows a supply chain to better serve more environmentally conscious expectations while often improving innovation performance (Adenle, Wedig, & Azadi, 2019). Economic, technological, and environmental factors have improved global living standards in a way that no one had imagined 10 years ago, and it is clear that, if supply chains do not become more sustainable, then it will be difficult to manage the world's resources. Supply chain sustainability is achieved by taking economic, environmental, and social factors into account while making decisions (Haanaes, 2022). With little incorporation of the social and governance aspects, most research focused on combining two of these four factors. Both social and environmental issues should be given significant weight in emerging nations, (Gopi & Saleeshya, 2022; Mani, Jabbor, & Mani, 2020) where industry supply chains are frequently labour-intensive and where environmental rules are still evolving.

Nigeria is a developing country with a large population and a small land area. This large population depends on the domestic agri-business sector for the needs of everyday life. Agri-businesses play an indispensable role in the world's economy. More than 10 percent of the GDP comes from agri-business (Anagah, 2023; Iderawumi & Kamal, 2022; Oyaniran, 2020). Agri-business products have three specific characteristics that make sustainability more complicated than in most sectors: seasonality, supply spikes, and perishability. Planning is required for seasonal products as consumption takes place throughout the year. Hence, most agricultural products in Nigeria have long supply lead times. Processing agricultural products, including purchasing, design, production, logistics and transporting requires sustainability development and if it is not properly managed, substantial product value can be lost.

In the agribusiness sector in Nigeria, particularly in the Southwest region, several commodities face significant green management issues. One of the prevalent challenges involves cocoa production, which accounts for about 70% of Nigeria's cocoa output. Despite its economic

significance, cocoa farming in Nigeria grapples with sustainability issues due to outdated farming practices, inadequate infrastructure, and limited access to finance and technology. According to the Cocoa Research Institute of Nigeria (CRIN), over 60% of Nigeria's cocoa farms are old and unproductive, resulting in low yields and environmental degradation (Oyaniran, 2020). Additionally, the lack of proper waste management systems contributes to pollution in cocoa-producing communities. Another critical commodity, oil palm, faces similar challenges. Nigeria, being the fifth-largest producer of palm oil globally, contends with issues such as deforestation, land degradation, and biodiversity loss due to unsustainable cultivation practices and inadequate regulatory enforcement. For instance, a report by the Nigerian Conservation Foundation (NCF) highlights that Nigeria loses approximately 3.5% of its forest cover annually due to activities like illegal logging and land clearing for oil palm plantations. These issues underscore the urgent need for comprehensive green management strategies and policy interventions to promote sustainable practices and mitigate environmental degradation in Nigeria's agribusiness sector.

Sustainable development is a planned activity to meet the needs of the present without compromising the ability of future generations to meet their own needs (Adebayo, Worlu, Moses & Ogunnaike, 2020). According to Oyaniran (2020), food security for both the current and future generations is the main goal of sustainable agricultural development. Therefore, the biggest worry in Nigeria's sustainable agricultural growth right now is whether agricultural production can guarantee long-term food security (Oyaniran, 2020). To meet global development objectives, every nation needs food systems that are healthy, sustainable, and inclusive. One of the most effective strategies for reducing extreme poverty, fostering shared prosperity, and feeding the estimated 9.7 billion people by 2050 is agricultural development. Compared to other sectors, the agriculture sector's growth is two to four times more successful in increasing the incomes of the poorest people. On the other hand, agriculture-driven growth, poverty alleviation, and food security are at risk of prevalent issues. Multiple shocks are affecting food systems in Nigeria, resulting in rising food prices and growing hunger. These shocks range from COVID-19-related disruptions to harsh weather, pests, floods and community crisis.

These issues are of serious concern, especially in developing countries like Nigeria where over 70% of the population is involved in one form of small or medium-scale agriculture or the other (Anabaraonye, Nwobu, Nwagbo, Ewa & Okonkwo, 2022). More than 80% of Nigeria's farmer's farm on the small scale and this accounts for 90% of Nigeria's agricultural produce (Oyaniran,

2020). However, with a population of roughly 200 million people, Nigeria's agricultural productivity is insufficient to meet the food demand of its growing population thus increasing the demand and supply gap. Between 2018 and 2020, on average 21.4% of the population in Nigeria experienced hunger with some people going for days without food (Iderawumi & Kamal, 2022). In the past years, the prevalence of severe food insecurity among the Nigerian population has been increasing, as the demand for food is rising together with a very fast-growing population. The question world over and especially within the locality of developing nations, therefore, becomes, how will agricultural sustainability be achieved especially in developing nations like Nigeria? How do organisations and farmers offer options for overcoming ubiquitous challenges of green management in a specific context and concern for the environment?

The issue of sustainable agriculture is of significant importance, and the various perspectives on how to approach it have sparked vigorous debate throughout the world (Gavrilova, 2020; Schreer & Padmanabhan, 2020). Nigeria's rural economy is mostly dependent on agriculture, which boosts GDP, reduces poverty, and is a deciding factor in food security. 14% of the GDP is contributed by agriculture, which also employs 31% of all workers. The agricultural industry is directly or indirectly responsible for the livelihood of about 53% of those who reside in rural regions (Okolie, Danso-Abbeam, Groupson-Paul & Ogundeji, 2022). Despite its large and beneficial contributions to the nation's economy, employment, export profits, and ecological balance, the agricultural sector is still confronted with several risks and difficulties, which influence green management initiatives.

In addition to promoting environmental sustainability, the shift to a green economy is anticipated to provide green jobs across all economic sectors, including forestry, agriculture, and fisheries (Abegunde, Sibanda & Obi, 2022). Modern agricultural firms are aware that implementing sustainability is unavoidable if they want to increase their market share, address the issue of food safety, and address growing social and environmental concerns. As a result, the number of products derived from sustainable agriculture has grown over time, and consumer preferences have changed in favour of healthier products with a sustainable supply chain.

The agricultural supply chain, comprising farmers, suppliers, processors, distributors, and other stakeholders, faces complexity and hazards due to numerous engaged actors, making it challenging to forecast and control external influences like weather, pests, and diseases (Iderawumi & Kamal, 2022). Issues such as the need for enhanced traceability, slow financial

transactions, heavy manual labor, and various socio-economic and environmental challenges along the supply chain raise concerns about efficiency and sustainability in agribusiness (Igiebor, Ikhajiagbe & Asia, 2023). With increasing customer awareness and the availability of updated databases, individuals in the agribusiness sector are pressured to enhance quality and safety throughout their supply chain.

Government initiatives aimed at increasing the quantity and quality of agricultural goods include efforts to strengthen the trading system, provide agricultural machinery, and improve export market orientation (Okakwu *et al*., 2022). Policies encompassing the creation of export-oriented food granaries, corporate-based agricultural commodity clusters, quarantine systems, cold storage and silos, expedited processing of export and investment licenses, and improvements in efficiency and value addition have been implemented (Oyaniran, 2020). Despite the implementation in the variety of goods exported from Nigeria, challenges in sustainable export market orientation persist, impacting market niche and subsequent market falls in 2018, 2019, 2020, and 2021 (Ju *et al*., 2022; Okakwu *et al*., 2022). This study delves into the challenges associated with sustainable export market orientation and proposes measures to overcome these challenges while minimising environmental impact.

Transportation poses a critical concern for agricultural sustainability beyond the farm gate, particularly in the context of export market orientation. The transport of chemicals and fertilisers used in agriculture can lead to pollution of surface and groundwater resources, causing habitat loss (Federal Ministry of Agriculture and Food Security, 2023). Iderawumi and Kamal (2022) recognised the significance of international cooperation and export in the strategic development of the agro-industrial complex, the Federal Ministry of Agriculture and Food Security has initiated the "Export of Agricultural Products" project to boost the export of agricultural goods, raw resources, and foodstuffs. This priority initiative aims to establish an industry-wide framework for marketing and supporting Nigerian agricultural exports, with the objective of increasing the agricultural export volume value by 12.5% by the end of 2018 and 30% by the end of 2025.

As global markets for agribusiness products expand, there is a corresponding increase in investments and activities in local markets worldwide. Supply chains not only benefit the companies directly involved but also contribute to social, economic, and environmentally sustainable development within regions or countries. The changing preferences of Western consumers, favoring organic, exotic, fair trade, pre-cut, and ready-to-eat products, present a

challenge for agribusiness chain partners to adapt and differentiate their offerings to meet specific market segments (Federal Ministry of Agriculture and Food Security, 2023). To capitalise on new trade and income opportunities, chain partners in Nigeria, including producers, processors, and exporters, must align with the quality and safety requirements and standards of importers, exporters, and retailers. This study seeks to explore how export market orientation influences green management and sustainability in the agricultural sector in Southwest Nigeria, addressing the challenges associated with transportation and market demands.

1.2 Statement of the Research Problem

Agriculture and agribusiness have been identified as export potentials for Nigeria to achieve a more diversified export structure and a better distribution of domestic income (FAO, 2020; Tijani, *et al*., 2018). Emphasis has been placed on export-led growth as a catalyst for development because export plays critical roles in bringing investment, technical advancement, and industrialisation, as well as income generation and employment in the domestic economy. The size of impacts and the efficacy of policies heavily depend on which sectors the county depends on for export due to the diverse characteristics of various economies. Regarding Nigeria, the country is vulnerable to shocks and unable to significantly contribute to the domestic economy due to the slow diversification process and low value-added content of its current exports.

The agricultural sector in Nigeria, while crucial for the nation's economy, faces significant environmental and health challenges. The green management initiative, aimed at minimising the negative environmental impacts of agriculture, is a notable step in the right direction (Tijani *et al*., 2018). However, a predominant issue lies in the fact that more than 80% of small-scale farmers prioritise profitability over environmental sustainability United Nations, 2022_. Outdated equipment and the prevalent use of harmful pesticides negatively impact product quality, rendering them internationally unacceptable. This underscores the urgent need to address the gap between profit-driven practices and environmentally conscious agriculture. This study serves as a valuable reference point for identifying the challenges faced by various stakeholders in implementing green management initiatives in the agricultural sector, facilitating a comprehensive understanding of the obstacles hindering sustainable agricultural practices in Nigeria.

The concept of integrating green management initiatives into Nigerian agriculture holds the promise of sustainable practices characterised by high yields and efficient resource utilisation. While such initiatives have contributed to the growth of many nations globally, the agricultural sector in Nigeria encounters challenges in adopting green methods and materials (Tijani *et al*., 2018). Despite research confirming the suitability of agricultural waste products for recycling, many of these materials, such as rice husk, palm oil waste, and sorghum/guinea corn husk ash, are often disposed of through open burning. This practice not only contributes to environmental degradation but also poses serious health hazards. For instance, the estimated annual disposal of Nigerian rice husk, ranging from 748,000 to 2 million tons, through open burning emphasises the scale of this issue. If unchecked, this can lead to massive environmental degradation and cause serious health hazards. Therefore, this study examined how using green (eco-friendly) methods can overcome challenges and improve the sustainability of the agribusiness by offering ideas for enhancing its economic, social, governance, and environmental aspects.

The concept of sustainable agricultural development, emphasising the implementation of green management initiatives, aims to conserve natural resources and promote eco-friendly practices (Rajput & Datta, 2020; Metelytsia & Gagalyuk, 2024). However, in the Nigerian agricultural industry, this goal faces significant challenges associated with outdated production methods. The prevalent use of manual production methods, such as hoes and cutlasses, contributes to inefficiency, high costs, and prolonged production times, negatively impacting both the quality of agricultural produce and the health of workers (Oyaniran, 2020; Torres da Rocha, et al. 2022). Failure to adopt advanced mechanised systems not only limits productivity but also poses risks to worker health. Research indicates that adopting technology can increase productivity by up to 41%, highlighting the urgent need for modernisation in Nigerian agriculture (Ibrahim, Srinivasan, & Georgantzis, 2022). Therefore, this study analysed how the implementation of green materials and machines have influenced the sustainability of agribusinesses in Nigeria.

Green measurement, or green logistics, faces challenges in the agricultural sector, as the adoption of eco-friendly transportation methods is hindered by inadequate infrastructure and outdated practices (Tijani et al., 2018). Nigeria's current ease of doing business index for agricultural activities stands at 38.57%, indicating the need for improvements in environmental practices (Oyaniran, 2020). For instance, the reliance on traditional transportation modes, such as trucks with high emissions, contributes to environmental degradation and undermines sustainability

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efforts. The need for modernised green logistics systems is evident for mitigating these challenges and advancing sustainable practices in agricultural transportation. Hence, this study examined the role of green measurement in mitigating these negative impacts and enhancing sustainability of the agribusinesses in Nigeria.

Export market orientation, the strategic focus of businesses on international markets, emerges as a crucial predictor of sustainability in the agricultural sector (Gupta & Chauhan, 2021). Reçica, Hashi, Jackson and Krasniqi (2020) argued that embracing export market orientation offers agricultural businesses the potential for increased market diversification, enhanced competitiveness, and access to a broader consumer base. However, challenges such as adapting to international standards, overcoming logistical complexities, and navigating regulatory issues pose challenges that need to be addressed for sustainable growth in the export-oriented agricultural landscape in Nigeria. While export market orientation enhances market access and economic growth, incorporating green management practices becomes imperative to ensure environmentally sustainable agricultural operations. Therefore, this study assessed the moderating effect of export market orientation on green management practices and the overall sustainability of agribusinesses in Southwest Nigeria

1.3 Research Questions

This study addressed the following questions:

i.   to what extent does green method (green design) influence the sustainability (economic, social, governance and environmental) of agribusinesses?

ii.   what significant effects do green materials (green purchasing) have on the sustainability (economic, social, governance and environmental) of agribusinesses?

iii.   to what extent do green machines (green production) impact the sustainability (economic, social, governance and environmental) of agribusinesses?

iv.   what is the relationship that exist between green measurement (green logistics) and the sustainability (economic, social, governance and environmental) of agribusinesses?

v.   what is the moderating effect of export market orientation on green management and sustainability of agribusinesses in Southwest, Nigeria?

1.4 Research Objectives

The broad objective of this study examined the moderating effect of export market orientation on green management and sustainability of agribusinesses in Southwest, Nigeria.

The specific objectives of this study were to:

    i.   investigate the influence of green method on the sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria;

   ii.   examine how green materials affects the sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria;

  iii.   ascertain how green machines enhances the sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria;

   iv.   evaluate if green measurement influences the sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria; and

    v.   establish the moderating effect of export market orientation on the relationship between green management and sustainability of agribusinesses in Southwest, Nigeria.

1.5 Research Hypotheses

The following research hypotheses were formulated in null (H_0) form:

    i.   Green method does not significantly influence the sustainability of agribusinesses in Southwest, Nigeria.

   ii.   Green material does not significantly affect the sustainability of agribusinesses in Southwest, Nigeria.

  iii.   Green machine does not significantly enhance the sustainability of agribusinesses in Southwest, Nigeria.

   iv.   There is no significant relationship between green measurement and the sustainability of agribusinesses in Southwest, Nigeria.

    v.   Export market orientation does not significantly affect the relationship between green management and the sustainability of agribusinesses in Southwest, Nigeria.

1.6 Significance of the Study

The global importance of SMEs in nations around the world cannot be overemphasised. This importance is even more significant in developing countries like Nigeria where it accounts for 96% of businesses and 84% of employment (FMITI, 2022). SMEs, therefore, play a very important role in not only the prosperity of a nation but also the environment with a special focus on the agribusinesses sector in Nigeria. Looking ahead, the 2030 Agenda for Sustainable Development marks the route to equitable prosperity, and results from this study will be of immense benefit in driving the required change toward the 2030 agenda especially the 1st goal pertaining to the eradication of poverty, the 2nd goal which addresses hunger, the 3rd goal that focusses on good health and well-being, the 6th goal which has to do with clean water and sanitation, the 8th goal which focuses on decent work and economic growth, and the 12th SDG goal that seeks to achieve responsible consumption and production.

The findings of the study will also help practitioners in the agribusinesses know how much their activities affect the economy while providing a descriptive overview of a sustainable and eco-friendly environment. The understanding gained from this study will help the agricultural sector provide metrics to measure the sustainability of green management strategies to avoid degrading pollution and environmental sabotage.

The outcomes of the findings will help SMEs especially agricultural business managers and owners know the specific tools and techniques needed for creating sustainable green management strategies for their customers. At the same time, they will become aware of how their effort influence the environment, either positively or negatively.

The results from this study will be of benefit to policymakers and government in designing policies that will greatly reduce SME failure and at the same time encourage SMEs generally and agricultural businesses specifically towards the adoption of environmentally sustainable acts. This study provides academia with several suggestions for further studies. Besides the findings and the contributions to knowledge, the study provides a platform for other researchers to build on. The knowledge gained from this research will grant the academia a deeper understanding as regards the field of green management, its concepts, and relevant theories that can be used to understand green management literature further.

This research is essential to SMEs as it assists them in understanding how the concepts of sustainable green management practices affect their manufacturing, logistics, purchasing, and design. The understanding that was gained from this work will help SMEs, especially those in the agribusinesses in categorising their level of green management behaviour, and assist them in getting help from relevant bodies and institutions if need be.

1.7 Scope of the Study

This study focuses on green management, export market orientation and sustainability (economic, social, governance and environmental) of agribusinesses in Nigeria. This comprehensive study delves into the crucial yet understudied nexus of green management, export market orientation, and sustainability within the Nigerian agribusiness landscape. The study sheds light on green management as a multifaceted paradigm, emphasising environmental awareness, eco-friendly technologies, and waste reduction throughout the entire business process. Focusing on four key dimensions—green method, green material, green machine, and green measurement—the research explores how these aspects intersect with sustainability considerations. With a specific focus on non-oil sectors, the study highlights the pressing need for economic diversification amid recent shocks in the oil and gas industry, positioning the exploration of export market orientation as a pivotal factor in promoting sustainable practices among entrepreneurs in the agribusiness sector.

Specifically, the study meticulously examines export market intelligence generation, dissemination, and responsiveness to market intelligence as key indicators of entrepreneurs' orientation towards global markets. The research also narrows down the proxies of sustainability to encompass economic, social, governance, and environmental dimensions. The significance of this inquiry is underscored by the deliberate choice to concentrate on the non-oil sector, driven by the imperative for economic diversification in the face of recent shocks in the oil and gas industry. The diverse spectrum of non-oil economic activities, spanning telecommunications, manufacturing, construction, tourism, real estate, finance, and services, presents a compelling scope for understanding and fostering sustainable practices within the agribusiness landscape.

This study is specifically confined to the agricultural sector, a decision motivated by concerns about the sector's underperformance, as evidenced by its contribution of only 23% to Nigeria's GDP in 2021, a notable contrast to figures in other African countries such as Niger (36%), Liberia

(36%), Chad (53%), and Sierra Leone (57%) (Statista, 2023). The focus on agribusinesses in the Southwest of Nigeria is substantiated by a report from the All Farmers Association of Nigeria (AFAN, 2018), which indicates that a majority of agribusinesses are concentrated in this region. According to AFAN's data from August 2020, out of 45,019 registered members, 26,197 are situated in the Southwest, aligning with the geographical prevalence of agribusinesses in the area. AFAN, a nationwide farmers' organisation with representation in all 36 states of Nigeria and the FCT, is structured around commodity associations, each centered on a specific agricultural product, such as maize, cassava, poultry, yam, cocoa, oil palm, and snails. This inclusive structure incorporates members from various commodity associations, such as the Snail Farmers' Association and the Poultry Farmers' Association, providing a comprehensive perspective on agribusiness activities in the Southwest.

The primary unit of analysis for this study consisted of business owners and managers who are registered members of the All Farmers Association of Nigeria (AFAN). To elucidate the impacts of green management and export market orientation on the sustainability of the agribusiness sector in Nigeria, the study employed various theory-based viewpoints, incorporating the natural resource-based theory, the organic growth theory, and the stakeholder theory. Finally, the scope of the study is to provide insights into the influences of green management and export market orientation on the sustainability of the agribusiness sector in Nigeria.

1.8 Operationalisation of Research Variables

The independent variable for the study is green management; the moderating variable is export market orientation, while the dependent variable is sustainability. The key variables of this study are expressed mathematically thus:

$$Y = f(X, M)$$

Where: $\mathbf{Y}$ = Dependent variable (Sustainability [SS])

M = Moderating variable (Export Market Orientation [EM])

X = Independent variable (Green Management [GM])

The dependent variable of sustainability is often measured by previous studies using the sustainability scale. The Sustainability Scale (SuS) uses three indicators which include economic

sustainability, social sustainability and environmental sustainability. Sezen-Gultekin & Argon (2020) went further to include two other dimentions which were cultural sustainability and administrative (or managerial) sustainability. In line with this, Ogunkan (2022) advocated that governance should also be a key dimension or proxy of sustainability. Hence, this study adopted the four indicators of sustainability namely economic, social, governance and environmental sustainability.

Hence, **Sustainability** (Y) is expressed using y_1, y_2, y_3, y_4

Where: y_1 = Economic Sustainability (ECS)

y_2 = Social Sustainability (SOS)

y_3 = Governance Sustainability (GOS)

y_4 = Environmental Sustainability (ENS)

With the participation of environmental risks in the research agenda, green management has brought different perspectives to management research. For this study, the development stages of green management were investigated from a Kuhnian perspective (Anand, Larson, & Mahoney, 2020). An increasing number of academic studies have used green methods, green materials, green machine and green measurement (Begum, Xia, Ali, Awan, & Ashfaq, 2022; Cantele & Zardini, 2019; Chawla., et al., 2020) Therefore, the independent variable of **Green Management** (x) is measured using x_1, x_2, x_3, x_4.

Where: x_1 = Green method (GMet)

x_2 = Green Materials (GMat)

x_3 = Green Machines (GMac)

x_4 = Green Measurement (GMea)

The moderating variable of export market orientation has been framed using the Resource-Advantage (R-A) theory by Hunt and Morgan (Varadarajan, 2023). The export market orientation (EMO) concept has its roots in market orientation (Dalgic, 2023). The domain of export market orientation encapsulates three generic indicators as identified by (Ipek & Bıçakcıoğlu-Peynirci, 2019; Katsikea, Theodosiou, & Makri, 2019: Navarro, Losada, Ruzo, & Dı´ez, 2010). The domains are: Export Market Intelligence Generation, Export Market Intelligence Dissemination, and Responsiveness to Market Intelligence.

Therefore, the moderating variable of **Export Market Orientation** (M) is represented using m_1, m_2, m_3:

Where: m_1 = Export Market Intelligence Generation (EMIG)

$\quad\quad\quad m_2$ = Export Market Intelligence Dissemination (EMID)

$\quad\quad\quad m_3$ = Responsiveness to Market Intelligence (RMI)

The graphic representation figure 1.1:

Figure 1.1: Schematic Model of the Study
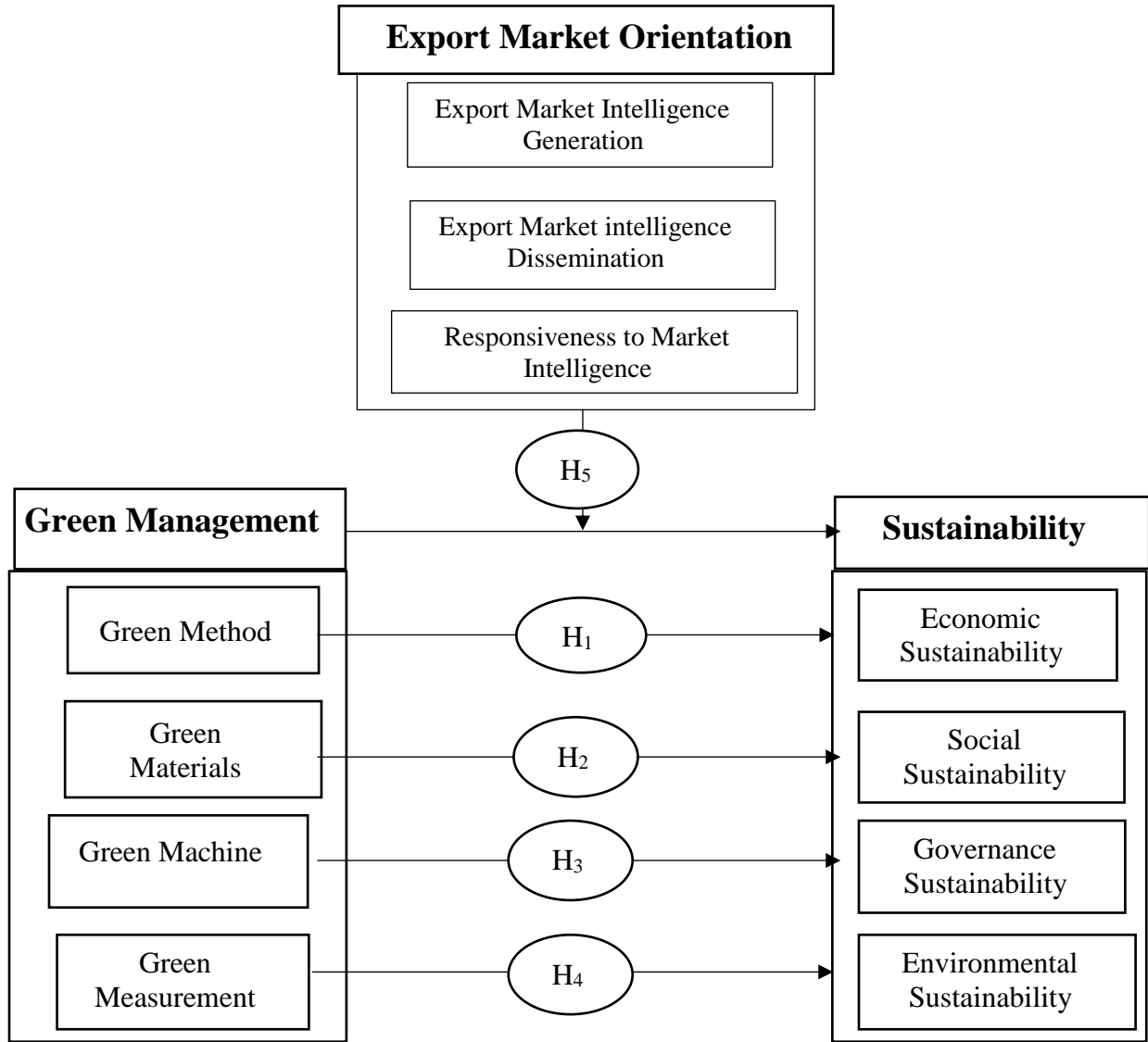
Note: 'H' and 'Hyp' denotes Hypothesis

Source: Adapted from Begum *et al*., (2022); Cantele & Zardini, (2019; Chawla., et al., (2020); Dalgic, (2023); Ipek & Bıçakcıoğlu-Peynirci, (2019); Katsikea *et al*., (2019); Navarro *et al*., (2010); Ogunkan (2022); Rahman, 2021; Raut, *et al*., 2019; Sezen-Gultekin & Argon (2020); Qian *et al*., (2020); Varadarajan, (2023)

1.9 Structure of the Study

This study was divided into five chapters. The first chapter discussed the introduction of the study. This section provided details on the background of the study, objectives, questions, hypotheses, significance, and scope of the study. It also defined the basic terms used in the study. At the same time, chapter two reviewed green management, export market orientation and sustainability (economic, social, governance and environmental) of the agribusinesses sector. Chapter Two was divided into three parts: the conceptual review, which provided insights on essential concepts from different scholars. The theoretical review discussed the theoretical foundation on which the work stands. The empirical review helped revise prior studies carried out by researchers in the same study area. The third chapter discussed the research designs and methods adopted for the study. The fourth chapter primarily emphasised on the results that was gathered from the field, while the fifth chapter focused on the conclusion and recommendations of the study.

1.10 Operational Definition of Terms

The following are contextual definitions as used by the author in this study:

Entrepreneurship: This refers to the process of identifying problems and potential opportunities in one's immediate surroundings and putting together the necessary tools in a creative manner to undertake the course.

Entrepreneurial orientation: is defined as a multi-dimensional structure, applied at the organisational level, which characterises the entrepreneurial activity of a business and encompasses one or more of these dimensions: risk-taking, innovativeness, autonomy, pro-activeness, and competitive aggressiveness.

Export: Goods and services produced by a firm in one country and then sent to another country

Export Diversification: Changing the export structure of an economy by varying and improving the goods for export.

Export-led orientation is an economic policy and trade directed to rapid industrialisation process of a country through exporting the nation's comparative advantaged goods.

Export Market Orientation: This refers to the capacity to investigate new prospects and identify current product market competencies which can improve [export] performance. It refers to a

process of aligning the intellect, attitude and knowledge regarding export activities with strategic and innovative organisational management.

Farmer: A farmer is someone who works in agriculture and raises live creatures for food or raw materials. They are people who raise field crops, orchards, vineyards, poultry, or other livestock.

Green Behaviour: This refers to any activity that benefits the environment or reduces environmental harm. It is also a set of actions taken by individuals to reduce their negative impact on the environment.

Green Method: The concept of the green method refers to the use of environmentally friendly processes in various industries. The term "green method" refers to a philosophy of using environmentally sustainable practices across different industries.

Green Management: This encompasses the process of increasing environmental consciousness, employing energy resources and eco-friendly technology, reusing trash, and recycling operations beginning with corporate production and ending with packaging and delivery to customers. It is also a practice to protect against pollution, global warming, natural resource depletion, and biological variety loss.

Green Machines: Green machines, also known as eco-friendly or sustainable technologies, refer to the utilisation of advanced technologies in different industries with the primary aim of reducing negative environmental impact.

Green Measurement: Green measurement refers to the evaluation of the environmental impact of various activities, products, and processes. This concept is closely tied to the idea of sustainability and the need to evaluate and minimise the negative impacts of human activities on the environment.

Green Material: Green materials are a crucial component of environmental sustainability and refer to the utilisation of materials that are not only eco-friendly but also made from renewable resources.

Innovation: is referred to as the execution of novel or improved products, production, process, marketing, organisational model and management of dynamic businesses vis-a-vis external relation with a global view.

Internationalisation: The process by which an agribusiness enters a foreign market.

International Business: The study of cross-national boundaries trades for individual/organisation consumers' needs satisfaction.

International/ Foreign trade: The interchange of goods and services across transnational boundaries.

Market Orientation: This is a business concept that places an emphasis on determining and satisfying client requirements and wants. It is also the process an agribusiness uses to create and market products that satisfy its consumers' needs.

Quality Standards: This refers to the rules, specifications, guidelines, or characteristics that are applied consistently to guarantee that materials, products, processes, and services are appropriate for their intended use and meet the quality expectations of customers.

SMEs: Small and mid-size enterprises (SMEs) are companies with sales, assets, or staff counts below a predetermined level.

Strategy: is the deliberate choice of mixing activities differently to deliver unique value.

Sustainability: This is the process by which an organisation takes steps to successfully run its business while taking into account, economic, social and environmental factors surrounding its activities and their outcomes. It is also known as the triple bottom line strategy to safeguarding an organisations' long term viability.

CHAPTER TWO

LITERATURE REVIEW

In this chapter, relevant literature was reviewed for providing appropriate conceptual, theoretical, and empirical frameworks for this study. Concepts relating to green management, export market orientation, and SME sustainability with a focus on agribusinesses in Nigeria were examined and appropriately segmented. The underpinning theories will also be discussed. Earlier scholarly empirical findings will also be highlighted and the gaps revealed.

2.1. Conceptual Review

The various elements discussed here include the meaning of management and dimension of green management, the strategic competences prerequisites for sustainability, and mediating feature of export market orientation for sustainable performance.

2.1.1 Management defined

Every organisation is involved in management because this is the avenue by which its efforts can be directed towards the actualisation of its purpose. It is the process by which the efforts of members of the organisation are coordinated, directed, and guided towards the achievement of its goals (Das & Jaiswal, 2021; Metelytsia & Gagalyuk, 2024). With vast companies, competition arose thereby requiring the development of economies of scale, (i.e., increased production lowering costs) and also a level of coordination and specialisation in the use of resources. The combination of coordination and specialisation problems then encouraged the development of organic management systems (Openstax, 2019; Worlu, Adeniji, Atolagbe & Salau, 2019).

Organic management is not necessarily more difficult, however it does reqiore a high level of management and the application of several techniques not commonly utilised in conventional farming. Producing intensive and field size organic vegetables, in particular, need the exact use of some unique and often extremely complex weed control technology. Many successful firms have used organic management systems to adapt successfully to considerable change and disruption in external markets and technology (Tseng, Islam, Karla, Fauzi, & Afrin, 2019). These systems value a number of factors, including: the collective contribution of knowledge and experience; a holistic assessment of the task environment and strategic responses to it; the

continuous redefinition of roles and the fluidity of tasks; the pervasive nature of commitment and response beyond existing hierarchies; the lateral flow of communication, information, and ideas; and an emphasis on creative and innovative responses rather than adherence to predefined responses.

In the 21st century, organisations and industries are again at crossroads. One of the major challenges managers face today is a consequence of an increasing international or global business environment. Many organisations are forced to integrate, operate and compete in a worldwide economy rather than being locally or nationally confined (da Silveira, Rosa & Siluk, 2024). This being as a result of – improvements in international information communication, international competitive pressures, increased mobility of labour, international business activities, greater cross-cultural awareness, and so on. Industrialisation has brought about economic improvements and sustainability of the 4Ms in management.

This sustainability of the 4Ms in management has become a major trend and force that is currently challenging organisations' survival and effectiveness (Openstax, 2019). The 4Ms of management are manpower, machinery, materials, and methods. They are considered the primary elements that impact the overall efficiency and effectiveness of an organisation. The 4Ms of management are interdependent and need to be managed effectively to achieve the desired results. The purpose of this literature review is to analyse the recent studies on the 4Ms of management, their importance, and their impact on the performance of organisations (See Figure 2.1)
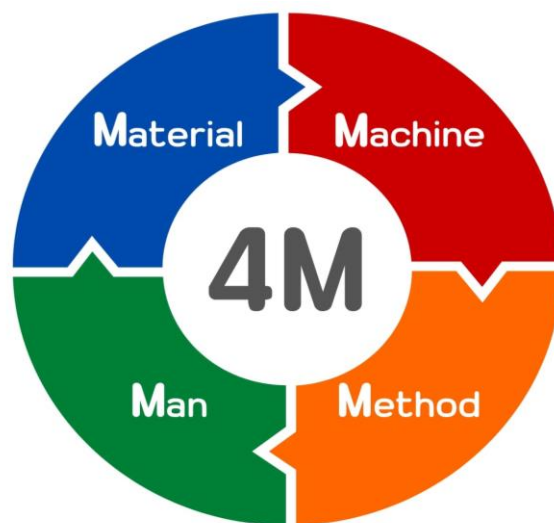
Figure 2.1: 4 M's in Management

Machinery

The use of advanced and efficient machinery can lead to improved production processes, increased output, and reduced costs (Alam & Alam, 2017). However, proper maintenance and management of machinery are crucial to ensure that it operates at its maximum potential (Chowdhury & Hossain, 2019). According to Ghani & Yasin (2022), organisations should invest in the latest technology and machinery to stay ahead of the competition and meet the changing demands of the market. Additionally, the use of modern machinery can also lead to increased safety in the workplace, reduced downtime, and improved quality of products (Chowdhury & Hossain, 2019). Effective machinery management includes regular maintenance and upgrades, which can extend the lifespan of the machinery and reduce the need for replacements (Ghani & Yasin, 2022). To ensure that machinery operates at its maximum potential, organisations should have a comprehensive maintenance plan in place and allocate adequate resources for maintenance activities (Alam & Alam, 2017).

Moreover, the integration of advanced technology, such as automation and artificial intelligence, can further improve the performance of machinery and increase efficiency (Ghani & Yasin, 2022). The use of technology can also provide valuable data and insights into the performance of machinery, allowing organisations to make informed decisions on maintenance and upgrades (Chowdhury & Hossain, 2019). As a result, effective machinery management is a critical aspect of organisational success and should be given proper attention and resources.

Although the demand for mechanisation in Nigeria is growing in a fairly consistent way however, the use of animal traction in farming is still very much common place in Nigeria, (Hiroyuki & Akeem, 2018). In Nigeria, agricultural mechanisation especially as regards to tractor use has remained low. This situation now goes ahead to compound the issue of a declining share of the workforce engaged in the agricultural sector. The adoption of mechanisation in agriculture in Nigeria would have gone a long way in addressing the issue of a reduced labour force by expanding the business of those who are still in the business however, a gap still remains

Materials

The availability of high-quality materials is crucial for the success of any organisation (Singh & Kumar, 2018). The use of substandard materials can lead to reduced quality, increased costs, and decreased customer satisfaction (Khan & Hossain, 2021). Organisations should focus on sourcing high-quality materials and implementing proper inventory management techniques to ensure timely availability and reduce waste (Mishra & Tiwari, 2022).

Moreover, organisations must have proper material management processes in place to ensure that they have the right Gangnumber of materials at the right time to meet the demand (Chowdhury & Hossain, 2019). This includes the efficient planning and procurement of materials, as well as the effective storage and distribution of materials to the production line (Gangwar & Pratap, 2018). In addition, organisations should also consider the environmental impact of their material, procurement, and management processes, such as reducing waste and using environmentally friendly materials (Alhassan *et al*., 2021).

Material management is an important aspect of supply chain management, and organisations must have a strong supply chain to ensure the timely delivery of high-quality materials (Uddin *et al*., 2019). Organisations should also develop partnerships with their suppliers to ensure that they have access to the necessary materials at competitive prices (Ali & Hossain, 2017). This can be achieved through supplier management processes, such as supplier selection and evaluation, supplier development, and supplier performance management (Siddique *et al*., 2021).

The importance of sustainable agriculture in Nigeria cannot be over emphasised. And this is why an effective management of agricultural raw materials has become crucial. for the success of agribusinesses. Agricultural Organisations have to focus on sourcing high-quality materials, implementing proper inventory management techniques, and developing strong relationships with their suppliers to ensure the timely delivery of materials. With the challenge of inadequate human capital (Odozi, Patience, & Agbugui, 2018) and a lack of proper mechanisation (Hiroyuki & Akeem, 2018), the importance of proper agricultural material management becomes more important. Farmers can become trained in the use of improved seeds of different crops varieties which have been known for high yield (Kuza, 2019) there by enabling better harvest per area of land cultivated.   improved quality, reduced costs, and increased customer satisfaction.

Methods

The use of efficient and effective methods is essential for the smooth functioning of an organisation (Ali & Hossain, 2017). The implementation of modern and innovative methods can lead to improved processes, increased efficiency, and reduced costs (Ahmed & Islam, 2019). According to Siddique *et al*. (2021), organisations should continually evaluate and update their methods to ensure that they align with the changing needs of the market and the organisation.

In addition, organisations should also consider incorporating technology and automation in their methods to streamline processes and increase efficiency (Ghani & Yasin, 2022). The use of technology can also provide organisations with a competitive edge by allowing them to perform tasks faster and with more accuracy (Khan & Hossain, 2021). Furthermore, the implementation of lean methodologies can help organisations eliminate waste and improve processes (Alhassan *et al*., 2021). The proper selection and implementation of methods can have a significant impact on the overall performance of organisations. For example, implementing just-in-time (JIT) inventory management methods can lead to reduced costs and improved customer satisfaction (Mishra & Tiwari, 2022). The implementation of Total Quality Management (TQM) can also lead to increased customer satisfaction and improved quality of products and services (Singh & Kumar, 2018).

In the 21st century, for any organisation that considers its customers and consumers as important stakeholders, sustainability and corporate social responsibility (CSR) have become strategic imperatives for financial sustainability and marketing success. Marketing is essential in any business. While some farms will concentrate on wholesale markets, such as the significantly undersupplied grain market, others will service local markets and maybe create their own processing and retail outlets. "Organic" is the most effective marketing term for quality food that has been independently certified and legally defined. Organic farming is a method that relies on competent management rather than the use of inputs like as fertilisers, herbicides, insecticides, and veterinary medications.

As a result, organisations of today have to inculcate management of sustainability metrics into their business plans in order to evaluate their overall performance and reflect on how their organisations are contributing to the society (Openstax, 2019). Organisations of today find themselves having to balance sustainability and profitability and this has brought about the need for a new form of management today. In the same vein, SMEs are shifting from a command and

control approach to a market and competition approach in implementing green management. The proper management of methods is essential for the success of organisations. Organisations should focus on incorporating technology and innovative methods in their processes and continually evaluate and update their methods to align with the changing needs of the market and the organisation. By doing so, organisations can improve their processes, increase efficiency, reduce costs, and achieve their desired results.

One important aspect of agricultural technology in Nigeria is the use of improved seeds and plant varieties. These seeds are often developed through plant breeding or genetic engineering and can have a range of desirable characteristics, such as higher yields, improved resistance to pests and diseases, and better tolerance to extreme weather conditions (Kuza, 2019). For example, the International Institute of Tropical Agriculture (IITA) has developed a number of improved plant varieties for crops like cassava, maize, and cowpea, which are important staple crops in Nigeria.

Another important aspect of agricultural technology in Nigeria is the use of digital tools and platforms to improve the efficiency and effectiveness of farming practices (Farmsquare, 2022). For example, the e-wallet system developed by the Central Bank of Nigeria (CBN) allows farmers to access credit and other financial services through their mobile phones, improving their access to capital and helping them to invest in their farms. In addition, a number of mobile apps and online platforms have been developed to help farmers with tasks like crop monitoring, market information, and weather forecasting, making it easier for them to make informed decisions about their farms.

Agricultural technology can also play a role in addressing some of the challenges facing the agricultural sector in Nigeria, such as food security and climate change. For example, improved irrigation systems and precision agriculture techniques can help farmers to conserve water and reduce their carbon emissions, while genetically modified crops with improved drought tolerance or pest resistance can help to reduce the risk of crop failure

Manpower

Manpower is considered the most important of the 4Ms of management as it represents the human capital of an organisation (Gangwar & Pratap, 2018). A well-trained and motivated workforce can lead to increased productivity and competitiveness (Uddin *et al*., 2019). According to Alhassan *et al*. (2021), effective human resource management practices, such as training and

development programmes, can improve the skills and knowledge of employees, leading to better performance. Additionally, employee engagement is also a crucial factor in the success of an organisation. Engaged employees are more productive, motivated, and committed to their work (Kreitner & Kinicki, 2018). Organisations that focus on employee engagement and satisfaction are more likely to retain their employees and attract new talent (Gallup, 2019). Furthermore, diverse and inclusive workplace environments can lead to increased creativity and innovation (Wentling & Palma-Rivas, 2021). This diversity in thoughts and ideas can lead to better decision-making and problem-solving capabilities, leading to improved organisational performance (Cox & Blake, 1991).

Effective human resource management practices can also improve employee morale and job satisfaction. Happy employees are more likely to remain with the organisation and contribute to its success (Helliwell & Huang, 2018). Furthermore, employee satisfaction is directly linked to customer satisfaction, as satisfied employees provide better customer service and improve the overall customer experience (Sarpong, Adu-Aboagye & Oppong, 2024). Moreover, effective human resource management practices can help organisations deal with workforce challenges, such as employee turnover and absenteeism. Retention strategies, such as flexible work arrangements and employee benefits, can reduce employee turnover and improve employee retention (Zhang & Zhang, 2024). Additionally, organisations can implement effective attendance management practices to reduce absenteeism and improve productivity (Chen & Wang, 2019). Besides, effective human resource management practices are crucial for the success of organisations. By focusing on employee training, development, engagement, and satisfaction, organisations can improve their performance and achieve their goals.

Although the Agricultural sector is a pivotal source of employment in Nigeria, over the years it has begun to experience a rapid decline in employment share in Nigeria (Odozi, Patience, & Agbugui, 2018). As Nigeria has developed, more and more people especially in the rural areas have abandoned agriculture as a means of livelihood choosing to relocate to the urban areas in search of employment. Also, the more educated the populace have become, the less interested they have become in viewing agriculture as their means of livelihood. There is therefore a need for the government in Nigeria to address this issue and make the agricultural sector and agribusiness appealing to the teeming populace in Nigeria as this will go a long way in addressing the issue of unemployment and also eliminate the social vices that arise as a result.

2.1.2 Green Management

Green management (GM) is an organisation-wide process that seeks to apply innovation toward achieving sustainability and competitive advantage. Green management components are also similar to the conventional form of management however; it aims to achieve productivity by minimising the harm caused to the environment (Chawla, *et al.*, 2020). It is the process of inculcating environmental and sustainability concerns into the process of management. Thus, GM involves areas like green design, green manufacturing, green logistics, and green purchase (Chawla., *et al.*, 2020; Sarker, *et al.*, 2019; Tseng, Islam, Karla, Fauzi, & Afrin, 2019).

Green management has evolved throughout history to suit the different requirements of human communities, to utilise natural resources, and enable humans to economically conduct business and trade (Li, Wang & Wang, 2021; The green management notion dates back to the early 1980s when several diverse innovations and changes sparked a growing interest in the synchronisation of product (and related service) movements from point of origin to point of usage (Mani, Jabbor & Mani, 2020).

Green management is defined as the network of organisations that are involved in the various processes and activities that produce value in the form of products and services in the hands of the ultimate consumer via upstream (supplier end of the green management) and downstream (customer end of the green management) alignment (Mangan & McKinnon, 2019). Green management is a connection of suppliers, manufacturing plants, warehouses, and distribution routes that work together to obtain raw materials, transform them into completed goods, and deliver them to clients (Rashidi & Cullinane, 2019; Rane & Thakker, 2020).

Green management considerations such as raw material, intermediate, and packaging procurement, plant location selection, manufacturing, storage, and transportation rules all have a big influence on sustainability (Saetta & Caldarelli, 2019; Sander, Föhl, Walter & Demmer, 2021). Because of its role in delivering consumer value and corporate success, green management has become a source of competitive advantage inside organisations. Green management is a connection that links diverse organisations to create value in products or services that meet the

demands of customers. Every company is a part of one or more green management practices and play a role in each of them. Supply holds a vital role in manufacturing as it stimulates and advances business operations from raw material acquisition to final product distribution to relevant stakeholders. The firms and business activities required to create, manufacture, distribute, and utilise a product or service with due consideration of the environment and sustainability concerns are referred to as green management.

Businesses rely on their green management to get what they need to stay afloat and grow (Kitsis & Chen, 2021; Li, Wang & Wang, 2021). The operation of green management is complicated because it comprises of many interconnected entities, each with its own set of duties and restrictions. This leads to complicated dynamics, which might result in unanticipated domino consequences. Green management decision-making is further complicated by information delays, poor visibility, and the existence of multiple uncertainty (Khan, Zhang, Anees, Golpîra, Lahmar & Qianli, 2018; Kaur, Sidhu, Awasthi & Srivastava, 2019).

Suppliers, manufacturers, distributors, and retailers/customers are all part of a typical green management. A focal enterprise includes the producer and distributor, as well as multiple divisions that conduct various green management responsibilities while interacting with one another. Sales, operations, procurement, and storage are the departments in question. In certain circumstances, the sales department is also responsible for forecasting demand. The operations department selects how much product to create based on this demand information as well as inventory information from the storage department. For the acquisition of essential raw materials, the operations and storage departments connect with the procurement department. Raw materials and product inventory are both managed by the storage department (Adhitya, Halim, & Srinivasan, 2015).

In carrying out its duties, each of these departments adheres to a set of policies. The sales department may have policies in place to determine which client orders to accept, price policies, and demand forecasting policies. To determine production rates and schedules, the operations department may use a specific scheduling policy. The procurement department has a procurement policy, such as purchasing at regular intervals or when inventory reaches a specified level (Hervani, Nandi, Helms & Sarkis, 2022). To handle the various raw materials and product inventory, the storage department may have a storage policy. As a result, each of these

departments operates as an independent and autonomous unit in green management, making its own decisions while engaging with one another. The producer obtains raw materials from several sources, makes the products, and transfers them to the distributor at the supply chain level (Ghosh, 2018; Adegbite, Guney, Kwabi & Tahir, 2019).

The rapid rate of change and ambiguity on how markets evolve has made it increasingly necessary for firms to be able to fully comprehend the green management with which they engage. Companies that understand how to create and engage in solid green management will have significant competitive edges in their respective marketplaces. Green management is a group of three or more stakeholders (institutions or persons) that are deeply invested in the upstream and downstream movements of commodities, facilities, funds, and/or knowledge/ technology from a supplier to a client (Barreiro-Gen, Lozano & Zafar, 2020; Hawkins & Hoon, 2020)

Throughout history, management has been about challenge and response. Challenges often materialise in the environment and managers must find new ways to respond to them. Management is a social activity (Daft, 2010; Witzel, 2012; Juneja, 2022). As a result, businesses are not closed entities but rather, interact with society. Business management, therefore, will often be a reflection of the prevailing situation within the society at large and this is where green management comes in. Managers today are being faced with more issues than before. Their decisions cannot be based solely on economic success of the organisation, adequate considerations have to be given to other issues like ethics, social values and environmental sustainability (Molina-Azorı́n, Claver-Corteś, Ló pez-Gamero, & Tarı́, 2019). Infact, commitment to the natural environment has become a strategic issue within the current competitive scenarios. Some authors suggest that environmental management may be a tool, which helps organisations to improve their competitiveness (Cantele & Zardini, 2019), while others, however, and have questioned the optimism of environmental advocates (Molina-Azorı́n, Claver-Corteś & Tarı́, 2019)

Firms are facing growing pressure to become responsible and greener. Several stakeholders press companies to reduce their negative impacts on society and the natural environment. Environment contamination and resource shortage due to human activities of production and consumption has increasingly threatened social welfare and sustainable development, and this has attracted global attention with the world seeking an effective solution. This has led to a fundamental revolution in many industries (Du, Yang, Xu, Tan, & Li, 2020). In fact, social responsibility in general and

environmental management in particular, are becoming an integral part of firm activities (Cantele & Zardini, 2019; Kitsis & Chen, 2021).

In this respect, the relationship between green management and sustainability (economic, social, governance, and environment) becomes an important issue. However, from an entirely ethical and sustainability-focused view, literature has argued that while there may not necessarily be a positive link between social responsibility and financial performance especially in the short run (Nirino, Ferraris, Miglietta, & Invernizzi, 2020), it is still desirable from a society's perspective that firms implement good social responsibility and environmental management practices. Although corporate social responsibility is no panacea that will cure society of all its ills, it is still considered a welcome development that needs to be encouraged and supported even without necessarily taking into account the consequences of these social actions of firms on the financial performance of firms.

Social responsibilities of organisations refer to the obligations of firms to pursue those policies and to follow those lines of action that are desirable in terms of the objectives and values of our society. However, Siegel (2009) retains the opinion that green management and social corporate responsibilities should not be practiced out of social responsibility but only because of profit maximisation. The most prominent objection to corporate social responsibility was the classical economic argument (Johnston, Amaeshi, Adegbite, & Osuji, 2021) and they argued that the social responsibility of a corporation is to make money for its shareholders, considering social responsibility a subversive doctrine that threatened the very foundation of free enterprise society. They opposed the idea of social responsibility because it imposes an unfair and costly burden on shareholders.

However, Adegbite, Guney, Kwabi, and Tahir (2019) made an effort to provide a reconciliation between the social and economic interests of corporations, recognising that, without demonstrating that social responsibility is consistent with stockholder interests, corporate social responsibility will always remain controversial. Moreover, within the stakeholder theory, the difference between the social and economic goals of a corporation is no longer relevant, because the central issue is the survival of the corporation, and this survival is affected not only by shareholders but also by various other stakeholders such as employees, governments, and customers (Worlu, *et al*., 2019; Ramakrishnan, 2020).

Mani, Jabbor and Mani (2020) argued that implementation of social and environmental strategies will be favoured when managers realise that these initiatives may help firms to reach a situation in which both the firm's financial performance and the society and environment will benefit. This is because, according to Shabbir and Wisdom (2020), many organisations worldwide are becoming more aware of their impact on the environment and are seeking to perform their operations in ways that secure and sustain the environment without sacrificing their profit making.

The corporate bodies are craving to accomplish reasonable advancement, enhance their personal satisfaction, and execute operations in such conduct that guarantee the security of the environment without forsaking profit making. Today, sustainability issues have been elevated to the top of corporate agendas. Pressures are being constantly mounted from both internal and external stakeholders thereby raising the expectation that managers are responsible for developing cleaner ways of doing business (Kitsis & Chen, 2021). Thus, eco-efficiency involves producing and delivering goods while simultaneously reducing the environmental impact and use of resources. The generation of pollution is thus regarded as a sign of inefficiency that management must correct. By using proactive environmental strategies, firms can eliminate environmentally hazardous production processes, redesign existing production systems to reduce life cycle impacts, and develop new products with lower life cycle costs (Molina-Azorı́n, Claver-Corte´s, Lo´pez-Gamero, & Tarı́´, 2019).

Moreover, a firm that shows good environmental initiatives will most probably acquire a high ecological reputation and may benefit from premium pricing and increased sales because of enhanced market legitimacy and greater social approval (Cantele & Zardini, 2019). Such approval may allow environmentally conscious organisations to market their management procedures as selling points for their products, and create a means to differentiate their products from their competitors (Tseng, Islam, Karla, Fauzi & Afrin, 2019). In the decision to go green, firms often encounter some drivers and barriers. Drivers towards the adoption of green management could include – organisational factors, suppliers' environmental compliance requirements, regulation, customers, competitors, and society (Du, Yang, Xu, Tan, & Li, 2020).

While barriers could be – a lack of top management commitment, lack of training in green management, resistance to adoption of advanced technology, and financial constraints. According to (Kaur, Sidhu, Awasthi, and Srivastava (2019), the top barriers to green management are – the

difficulty in transforming positive environmental attitudes into action, and a lack of awareness about reverse logistics adoption. followed are – a high cost of hazardous waste disposal, a perception of an "out of responsibility" zone', a lack of R&D capability on Environmental and Sustainability Education Research (ESER), and a lack of corporate social responsibility. These barriers are related to awareness, cost, commitment, and resources.

Kaur, Sidhu, Awasthi, and Srivastava, (2019) list the involved processes and labeled them as – inbound green management, operational green management, outbound green management, and reverse-logistics green management. The inbound GM aims to reduce waste through purchasing or procurement of raw materials, green supplier selection, green supplier development, and decrease of energy consumption, harmful material, and resources, the operational GM addresses activity in between the inbound and outbound logistics where the raw material is transformed into consumer useable goods through production at the enterprise level. This involves reuse, recycling, remanufacturing, green design, green production, and green packaging, the outbound GM aims at reducing carbon emissions and achieving higher fuel efficiency with associated activities are green distribution, green marketing, and eco-labeling, and finally the reverse logistics which involves repair, reuse, refurbishment, and recycling of materials and products.

2.1.3 Trends in Green management

The first trend in today's green management is the shifts in the competitive environment. Instead of individual enterprises or goods competing, supply networks are progressively dictating the competitive environment. Horizontal cooperation (sometimes known as complementarity or collaborating with rival companies to gain supply chain benefits) is becoming more common (Mangan & McKinnon, 2019). Supply chain efficiency being considered when designing is another trend gaining recognition in green management. Design is expanding far beyond merchandise to include the entire supply chain. This is referred to as supply chain efficiency design (DFSCE). The supply chain is currently being used by many firms to innovate and provide value. The use of the supply chain to enhance responsiveness and mass customisation is becoming increasingly popular (Mangan & McKinnon, 2019).

Supply networks are becoming increasingly global, with nodes focusing on distinct operations in different regions. A primary topic is revenue management (including taxes and currency rates)

especially since the inception of the global pandemic. Contract vendors (such as Foxconn) frequently create the real thing, whereas original equipment manufacturers (such as Puma) concentrate on the branding and supply chain. The WTO, UNCTAD, and others are continuing to work on economic cooperation, especially as "single platform" centralised internet procedures for customs and border compliance become more popular and used. This makes international trade easier and brings down the cost of transactions. (Mangan & McKinnon, 2019). A recent trend that has made a new wave in the global green management is the process of localisation and sustainability of the supply chain. Very little has wreaked havoc on supply chains like the COVID-19 epidemic, which has caused in industrial closures, increased transportation costs, lower demand, and delays.

The growth of technology is having a big impact on supply chains and logistics systems. More and more people are using apps like smart transportation, drone delivery, RFID, data analytics, and block chain. To meet the needs of "always-on" consumers, the supply chain is becoming more digital, which opens the door for more personalisation, automation, and regionalisation (PAL). Technology is a key part of making the supply chain more productive and competitive. It also helps to improve the system's overall effectiveness and efficiency. Conversely, if a business wants to have an edge in the market today, it needs to choose the right technology for the different parts or activities of supply chain (Bhandari, 2018) and rising carbon footprint (Yoro & Daramola, 2020).

The carbon footprint refers to the total amount of greenhouse gases (GHGs) produced by human activities, mainly from burning fossil fuels such as coal, oil, and natural gas for energy, transportation, and industrial processes (Caineng, Xiong, Huaqing, Zheng, Zhixin, Ying, & Songtao, 2021). The main GHG is carbon dioxide (CO_2), but others include methane, nitrous oxide, and fluorinated gases. The rise in the carbon footprint over the past century is mainly due to increased economic activity, population growth, and urbanisation, leading to increased demand for energy, transportation, and consumer goods (Yoro & Daramola, 2020). The burning of fossil fuels releases large amounts of CO_2 into the atmosphere, where it traps heat and contributes to global warming (Hussain, Butt, Uzma, Ahmed, Islam, & Yousaf, 2019).

The impacts of rising carbon footprint on the environment and the earth are widespread and long-lasting (Hoyt, Chaussard, Seppalainen & Harvey, 2020). Global warming has already led to rising

sea levels, more frequent and intense natural disasters such as hurricanes, droughts, and wildfires, and changes in ecosystems, wildlife populations, and weather patterns (Sharma, Sinha, & Kautish, 2021). These changes have serious consequences for human health and well-being, including increased air pollution, decreased food security, and increased spread of diseases. The rising carbon footprint also has significant economic impacts. Climate change is projected to cause billions of dollars in damages and costs, such as rebuilding after natural disasters and adapting to the impacts of global warming (Okere, Onuoha, Muoneke, & Oyeyemi, 2021).

Additionally, reducing the carbon footprint requires significant investments in renewable energy sources and energy efficiency technologies, as well as changes in consumption patterns and lifestyle choices. To address the rising carbon footprint and its impacts, it is essential to transition to low-carbon and renewable energy sources, improve energy efficiency, and reduce waste and emissions. Governments, businesses, and individuals can all play a role in reducing the carbon footprint by adopting sustainable practices and supporting policies that promote a low-carbon future.

Making an agribusiness operations greener is an important step towards reducing its environmental impact and improving its sustainability (Kazancoglu, Sagnak, Kayikci, & Kumar Mangla, 2020). There are many strategies and practices that an agribusiness can implement to achieve this goal. One of the most effective ways to make an agribusiness operations greener is to improve its energy efficiency (Naim, 2021). This involves upgrading equipment and facilities, implementing energy-saving measures, and using renewable energy sources, such as solar and wind power. By reducing its energy consumption, an agribusiness can lower its costs and carbon footprint, while also reducing its environmental impact (Hasan, Nekmahmud, Yajuan, & Patwary, 2019).

Another way to make an agribusiness operations greener is to adopt sustainable procurement practices. This can include purchasing products made from recycled materials, reducing packaging, and selecting suppliers that have sustainable practices (Strandhagen, Buer, Semini, Alfnes, & Strandhagen, 2022). By reducing the amount of waste it produces, an agribusiness can lower its costs, improve its environmental performance, and enhance its reputation as a responsible and sustainable organisation (Borowski, 2021). Waste reduction and management is also an important aspect of making an agribusiness operations greener.

Encouraging the use of alternative transportation, such as carpooling, telecommuting, and public transportation, can also help reduce an agribusiness carbon footprint and improve its sustainability (Zimon, Madzík, Dellana, Sroufe, Ikram, & Lysenko-Ryba, 2022). By reducing the number of cars on the road, an agribusiness can reduce its impact on the environment, lower its costs, and improve the health and well-being of its employees. Water management is another important aspect of making an agribusiness operations greener (Walker, Opferkuch, Roos Lindgreen, Raggi, Simboli, Vermeulen, & Salomone, 2022). This can include implementing water-saving practices, such as using drought-resistant plants, fixing leaks, and using low-flow fixtures. By reducing its water usage, an agribusiness can lower its costs, improve its environmental performance, and enhance its reputation as a responsible and sustainable organisation (Shah & Soomro, 2021).

Finally, involving employees in sustainability initiatives and educating them about the company's environmental goals and practices can increase engagement and support for green initiatives (Danilwan, Isnaini, Pratama, & Dirhamsyah, 2020). Reporting on the company's sustainability performance, including its carbon footprint, can also improve its reputation, attract environmentally-conscious customers and investors, and increase accountability for its environmental impact (Abualfaraa, Salonitis, Al-Ashaab & Ala'raj 2020). In conclusion, making an agribusiness operations greener involves implementing strategies and practices that reduce its environmental impact, while also improving its bottom line and reputation. By adopting these practices, companies can improve their sustainability, lower their costs, and enhance their reputation as responsible and environmentally-friendly organisations (Suharti & Sugiarto, 2020).

2.1.4 Relevance of Green Management and Sustainable Agriculture Sector

Green management (GM) is a complicated topic that has a significant impact on the success or failure of any sector, including the agricultural sector. Executives and managers in the agricultural sector are required to be well-versed in all aspects of green management, as well as the influence they may have on the organisation's overall efficiency. This understanding will help them to concentrate on the factors that provide value to organisations and even promote the importance of GM (Sabry, 2015). Suppliers, raw materials, producers or manufacturers, distributors, retailers, and consumers make up green management. The following are some of the most important advantages of green management: Lower stocks, increased productivity, shorter lead times,

improved responsiveness, ability to build customer loyalty, improved service quality, and increasing client expectations (Choudhary, Jadoun, & Rao, 2017).

Different supply chain requirements sometimes have conflicting needs when viewed as a whole. For example, sustaining high standard of customer support necessitates keeping high amounts of inventory; nevertheless, operating effectively necessitates lowering inventory levels. Only by seeing these requirements as components of a bigger picture can effective solutions of balancing their various demands be discovered. Effective green management necessitates concurrent increases in customer satisfaction as well as the supply chain's internal operational efficiency of many sectors, including the agriculture sector (Hugos, 2018).

Agriculture has a unique way of getting to where it is used. Outsourcing has been a big part of the agriculture supply chain because operations are so hard to run. The agriculture supply chain has been around for a long time because it involves so many different people, from the common farmers to the end customer. Also needed are expensive machinery and equipment and specialised logistics services. Most of this equipment needs to be maintained and used by trained professionals to sustain the agricultural sector as demonstrated in Figure 2.2.
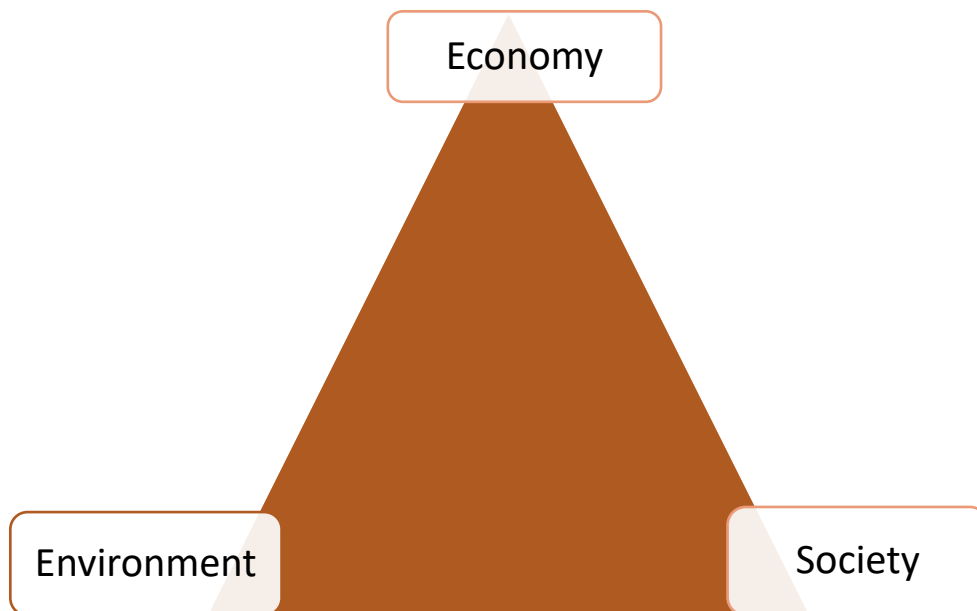
Figure 2.2: Pillars of Sustainable Agriculture
Source: Adapted from Hugos (2018)

Hugos (2018) affirmed that the majority of activities related to raw materials supply to final product pass through an intricate supply system, which encompasses purchase of raw-agriproducts, production and design transportation, and storage of the agriproducts.

2.1.5 Dimension of Green Management Practices

Green management (GM) is described as incorporating environmental considerations into supply-chain management, encompassing product design, green procurement and selection, manufacturing methods, final product delivery to customers, and product end-of-life management after its useful life (Oliveira, Espindola, DaSilva, DaSilva, & Rocha, 2018). The breadth of green management varies, from reactive monitoring of broad environmental management programmes to more proactive procedures adopted through the R's (Reduce, Re-use, Rework, Refurbish, Reclaim, Recycle, Remanufacture, Reverse logistics, etc).

GM is an agribusiness-wide approach to environmental stewardship. Companies engage in it to get financial, social, and environmental advantages. Financially, it enhances revenue by enhancing consumer confidence, lowers waste treatment costs, and improves asset utilisation. It benefits the environment by reducing waste production, increasing energy efficiency, reducing air and water pollution, and reducing non-environmentally friendly fuel usage. In terms of social benefit, it minimises the risk of waste and gas emissions from overall supply chain operations having an adverse effect on public health (Sahar, Afifudin, & Indah, 2020).

Companies feel that by implementing green supply chain strategies, they may increase their market competitiveness. Because there is a positive link between green practices and environmental performance in terms of energy, water consumption, waste and air emissions mitigation, both internal and external green supply chain activities contribute to increasing environmental performance. Due to demand from diverse interests and organisational forces, GM procedures are carried out (Sahar, Afifudin, & Indah, 2020). Organisational choices are influenced by institutional pressure. As a result, businesses are being forced to use green management dimensions to improve their business models. These dimensions include: green method (green adesign), green materials (green purchasing), green machines (green production) and green measurement (i.e. logistics) as presented in Figure 2.3.
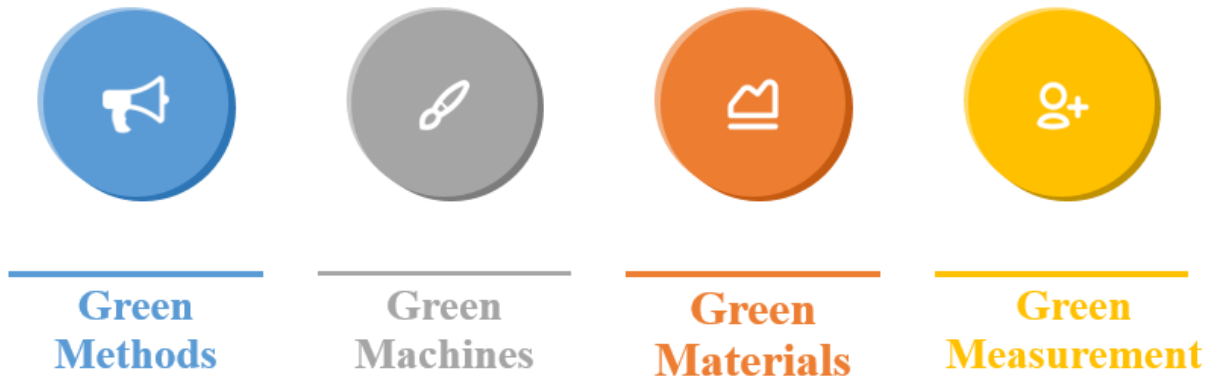
Figure 2.3: Dimensions of Green Management
Source: Adapted from Sahar, Afifudin and Indah (2020)

Green Methods

The concept of the green method refers to the use of environmentally friendly processes in various industries. The term "green method" refers to a philosophy of using environmentally sustainable practices across different industries. This philosophy emphasises the importance of reducing the carbon footprint of production processes and minimising waste generation. In recent years, the implementation of green methods has gained significant traction and has been widely adopted in various sectors such as agriculture, manufacturing, and construction. This approach focuses on reducing the carbon footprint of production and minimising waste. In recent years, there has been an increased interest in the implementation of green methods in various industries, such as agriculture (Kabir, 2020), manufacturing (Gonçalves *et al*., 2019), and construction (Lee & Kim, 2022). Green methods are not only beneficial for the environment, but they also have positive economic impacts, such as reduced energy costs and increased efficiency (Bertel *et al*., 2017).

The adoption of green methods is not only crucial for preserving the environment but also has a positive impact on the economy. The use of green methods leads to reduced energy consumption and increased efficiency, resulting in lower energy costs. Studies by Kabir (2020) and Gonçalves *et al*. (2019) have demonstrated the benefits of green methods in the agriculture and manufacturing industries, respectively. Furthermore, research by Lee and Kim (2022) has highlighted the importance of green methods in the construction sector.

Overall, the concept of green methods represents a crucial step toward creating a more sustainable future, where industries can continue to thrive while also taking care of the environment. The

adoption of green methods provides a win-win solution, where both the environment and the economy can benefit.

In agriculture, Eco-Friendly Farming has been generating interest in recent years. This is a process where farming methods are designed to promote the health of the soil, crops, and animals while also limiting the environmental footprint (AgriFarming, 2023) and can include crop rotation, cover cropping, natural fertilisers, rainwater harvesting, drip irrigation and so on. This all help to maintain soil health and reduce the need for synthetic inputs.

Green Materials

Green materials are a crucial component of environmental sustainability and refer to the utilisation of materials that are not only eco-friendly but also made from renewable resources (Saleh, 2021). These are materials that produce an environmental improvement throughout their whole life cycle, while also maintaining accountable performance (Merino & Alvarez, 2020). Green materials are materials that are local and renewable. The use of such materials in various applications has become increasingly popular in recent years, particularly in the fields of architecture, interior design, and transportation. The push towards green materials stems from the recognition of their potential to reduce the carbon footprint of production and the positive economic benefits that come along with it (Bharathi, Nashed, Lal & Foo, 2021).

The use of green materials has numerous benefits for the environment. They are made from renewable resources, which means that their production does not harm the environment and they can be replenished without causing any damage (Chiappinelli, Gerres, Neuhoff, Lettow, de Coninck, Felsmann & Zetterberg, 2021). Additionally, they are also known to have a low environmental impact, making them an ideal choice for various applications.

In the field of architecture, green materials have become increasingly popular due to their durability and cost-effectiveness (Zinatloo-Ajabshir, Morassaei & Salavati-Niasari, 2019). Architects and designers have been incorporating these materials into their designs, leading to the creation of structures that are not only aesthetically pleasing but also environmentally friendly. This trend has been observed in various countries across the world, as seen in the works of Zhang *et al*. (2021). Interior design is another field that has embraced the use of green materials. As people become more conscious of the impact their choices have on the environment, there has

been a growing demand for sustainable and eco-friendly materials in interior design. Liu and Chen (2020) have reported a significant increase in the use of green materials in interior design projects, leading to the creation of spaces that are not only stylish but also environmentally responsible.

Transportation is another industry that has adopted the use of green materials. With the increasing concern for the environment, car manufacturers have been incorporating environmentally sustainable materials into their designs, leading to the creation of vehicles that are not only eco-friendly but also cost-effective. This trend has been observed in various countries, as reported by Kim *et al*. (2022). The use of green materials not only reduces the carbon footprint of production but also has positive economic benefits, such as reduced material costs and increased durability. This has been demonstrated by Zhao *et al*. (2019), who have shown that the use of green materials in various applications leads to cost savings and increased product longevity, making it an ideal choice for industries looking to reduce their environmental impact while also saving mon

The use of green materials in various applications has become increasingly popular due to the numerous benefits it offers. Not only does it reduce the carbon footprint of production, but it also has positive economic benefits, such as reduced material costs and increased durability. The fields of architecture, interior design, and transportation have all embraced the use of green materials, leading to the creation of environmentally responsible structures, spaces, and vehicles.

The incorporation of green materials in agriculture can provide a wide range of options for practical sustainable applications. In a future in which the world population is increasing, the optimisation and increase of agricultural production with a minimum or null negative impact on the environment constitute a major challenge. Green materials can in turn increase crop yield production and reducing inputs. The most widespread fields of applications include delivery systems of active substances, mulch, pots, and soil moisture conditioners (Merino & Alvarez, 2020).

Green Machines

Green machines, also known as eco-friendly or sustainable technologies, refer to the utilisation of advanced technologies in different industries with the primary aim of reducing negative environmental impact. These machines are designed with energy efficiency in mind and are

implemented to minimise waste and reduce energy consumption, leading to a lower carbon footprint (Zhou *et al.*, 2020).

In recent years, the interest in developing and utilising green machines has been growing rapidly, with many industries such as manufacturing (Liu *et al.*, 2021), transportation (Gao *et al.*, 2019), and energy production (Wang *et al.*, 2022) embracing this trend. The use of green machines brings about numerous benefits not only for the environment but also for the economy. This includes reduced energy costs, increased efficiency, and improved competitiveness in the global market (Chu & Chen, 2017).

The integration of green machines in various industries has become an essential aspect of modern business, providing companies with the ability to reduce their carbon footprint and meet the demands of a more environmentally conscious market. The implementation of green machines not only contributes to a cleaner environment, but also has a positive impact on businesses, leading to lower costs, increased efficiency, and greater overall success.

Green Measurement

Green measurement refers to the evaluation of the environmental impact of various activities, products, and processes. This concept is closely tied to the idea of sustainability and the need to evaluate and minimise the negative impacts of human activities on the environment. In recent years, there has been an increased interest in the development of green measurement techniques and metrics to evaluate the sustainability of various industries and products. The use of green measurement is important in promoting environmental sustainability and the need to minimise the negative impacts of human activities on the environment (Wang & Chen, 2017).

Green measurement is a critical aspect of environmental sustainability, which involves evaluating the environmental impact of various activities, products, and processes (Zhang, Sun, Yang, & Wang, 2020). It is a crucial tool that helps to assess the sustainability of different industries and products and to identify areas where improvements can be made to reduce the negative impact of human activities on the environment (Begum, Xia, Ali, Awan, & Ashfaq, 2022). The concept of green measurement is closely linked to the idea of sustainability, which seeks to balance economic development with environmental protection. In today's rapidly changing world, it is important to ensure that the products and services we use do not harm the environment and that they are

produced sustainably (Awan, Arnold, & Gölgeci, 2021). Green measurement assists in the actualisation by providing a systematic way of evaluating the environmental impact of different activities and products.

In recent years, there has been a growing interest in the development of green measurement techniques and metrics (Awan, Sroufe, & Kraslawski, 2019). This trend is driven by the increasing awareness of the need to protect the environment and minimise the negative impact of human activities on the environment. The use of green measurement is important in promoting environmental sustainability, and it provides a basis for the development of policies and practices aimed at reducing the negative impact of human activities on the environment (Fernando, Jabbour, & Wah, 2019). Green measurement is a key tool for promoting environmental sustainability and for evaluating the impact of human activities on the environment. It is an important aspect of sustainable development and helps us to ensure that we are using resources responsibly and sustainably.

The environmental impacts of agriculture and food production are the effects different farming and food production practices have on the ecosystems, and how those effects can be directly or indirectly traced back to those practices. These environmental impacts vary based on the wide range of food and agricultural practices employed around the world. The environmental impacts depend not only on the production practices used by farmers but more so on the logistical processes employed (Awuchi, Awuchi, Ukpe, & Asoegwu, 2020). The connection between the farming system and emissions into the environment is indirect, as it also relies on other climate variables such as temperature and rainfall. Transportation, storage and energy use of agribusinesses all leave their footprints on the environment and agribusinesses have to become aware of this and ensure that their emissions into the environment are minimal.

In this study, four dimensions of green management practices, namely green method, green material, green machine, and green measurement, were thoroughly examined to evaluate their impact on the sustainability of agribusinesses in Southwest Nigeria. Additionally, two novel dimensions, "green man" and "green mother nature," were introduced to encompass a holistic understanding of environmental stewardship within the agribusiness sector. These new dimensions signify a comprehensive approach, acknowledging the role of human engagement

("green man") and the broader ecological context ("green mother nature") in fostering sustainable practices and addressing environmental concerns in agribusiness operations.

Green Man

The term "green man" refers to an individual who is actively committed to preserving and protecting the environment through sustainable practices and conservation efforts (Alzgool, 2019). This concept is rooted in the larger ideology of environmentalism, which emphasises the responsibility of individuals to recognise and mitigate their impact on the natural world. In recent years, there has been a growing recognition of the significance of the green man in promoting environmental sustainability and reducing the harm caused by human activities (Mert, 2022). This trend is reflected in the increasing interest and awareness surrounding environmental issues, and the desire for individuals to take an active role in addressing these challenges.

The green man is often viewed as a key player in raising environmental consciousness and inspiring others to take action to protect the planet (Fu, Sun, Zha, Liu, He, Sun & Jing, 2020). This figure represents the ideal of an environmentally conscious individual, who understands the importance of sustainability and is actively working to promote it in their daily life (Patwary, 2023). Whether it is through reducing waste, conserving energy, or advocating for environmental policies, the green man is seen as an example of the power of individual action in creating a more sustainable and livable world (Thor & Karlsudd, 2020).

The green man represents a critical aspect of the environmental movement, serving as a symbol of the importance of individual action and responsibility in creating a more sustainable future. Through their actions, the green man inspires others to take similar steps and helps to create a more environmentally aware society. Agriculture is the world's largest industry. It employs more than one billion people and generates over $1.3 trillion dollars worth of food annually. Pasture and cropland occupy around 50 percent of the Earth's habitable land and provide habitat and food for a multitude of species (WWF, 2023). When agricultural operations are sustainably managed, they can preserve and restore critical habitats, help protect watersheds, and improve soil health and water quality. Unsustainable practices have serious impacts on people and the environment and as a result, the need for sustainable resource management is increasingly urgent. Demand for agricultural commodities is rising rapidly as the world's population grows. Agriculture's deep

connections to the world economy, human societies, and biodiversity makes it one of the most important frontiers for conservation around the globe.

Green Mother Nature

There's a lot going on in the world currently and one of the items garnering a lot of global interest is the weather and climate. Green mother nature refers to the idea of environmental sustainability and the need to protect and conserve natural resources. This concept is closely tied to the idea of environmentalism and the need for individuals to take responsibility for their actions and their impact on the environment (Zhou *et al*., 2021). In recent years, there has been an increased interest in the role of green mother nature in promoting environmental sustainability and mitigating the negative impacts of human activities (Xu & Chen, 2022). The green mother nature concept highlights the importance of environmental protection and the need for individuals to take action to protect the environment and its natural resources (Liu *et al*., 2019). The protection of green mother nature is seen as crucial for the survival of future generations and the preservation of the planet for future use (Kim *et al*., 2020).

Green mother nature represents a crucial aspect of environmentalism and sustainability. The term refers to the idea that nature should be protected and conserved to maintain the health and well-being of the planet and its inhabitants. This concept is rooted in the recognition of the significant impact that human activities have on the environment, and the need for individuals to take responsibility for their actions (Mensah, 2019). The interest in green mother nature has increased dramatically in recent years as the effects of climate change become increasingly apparent. The concept has been embraced by individuals, organisations, and governments as a means to mitigate the negative impacts of human activities and promote environmental sustainability (Niamir, Ivanova, Filatova, Voinov, & Bressers, 2020).

One of the key aspects of green mother nature is the importance of environmental protection. This includes the protection of natural resources such as forests, water sources, and wildlife habitats. It also involves reducing waste and minimising the use of non-renewable resources, such as fossil fuels, to reduce the carbon footprint (Kedzierski, Frère, Le Maguer, & Bruzaud, 2020). Additionally, the green mother nature concept highlights the need for individuals to take action to protect the environment. This can include reducing their carbon footprint by using public

transportation, reducing waste, and making environmentally conscious choices (Cordero, Centeno, & Todd, 2020).

The protection of green mother nature is seen as essential for the survival of future generations and the preservation of the planet for future use. Without these efforts, the health of the planet and its inhabitants will continue to deteriorate, leading to negative consequences for all life forms (Rice, Cohen, Long & Jurjevich, 2020). In conclusion, the concept of green mother nature is a critical aspect of environmentalism and sustainability. It emphasises the importance of environmental protection and the role of individuals in promoting environmental sustainability. By taking action to protect the environment, we can ensure that future generations have access to a healthy and sustainable planet.

Climate change has serious effects on agriculture. With there being an increase in flooding in some parts and drought in others, crops and animals have been adversely affected (Amna, 2023). Mother nature is a very powerful force and farmers cannot go against it. However, by working in conjunction with mother nature, through spreading of risks, seed treatment, and improving the soil health (Hefty, 2019), farmers can continue to increase their yields.

2.1.6 Managing Sustainable Green Management Practices

Managing sustainable green management practices involves overseeing and implementing environmentally conscious strategies within business operations to ensure long-term ecological viability. This entails the adoption of sustainable methods, materials, and technologies, aligning with principles that prioritise environmental stewardship and overall sustainability. They include:

(i) Climate Change

Climate change is having a profound impact on the sustainability of businesses and is affecting various aspects of their operations (George, Merrill, & Schillebeeckx, 2021). One of the most significant effects is the disruption of supply chains, which can be caused by extreme weather conditions, such as droughts, floods, and heatwaves. These weather events can reduce the availability of raw materials, increase costs, and lower the quality of products, which can have a significant impact on an agribusiness bottom line (Flammer, Toffel, & Viswanathan, 2021). Another way in which climate change is affecting businesses is through increased energy costs.

As the cost of fossil fuels continues to rise, and the availability of renewable energy sources becomes more uncertain, companies are facing increased energy costs, which can be a major burden on their operations (Rosenbloom, Markard, Geels, & Fuenfschilling, 2020). Businesses that are unable to effectively manage their energy costs risk becoming less competitive in the marketplace.

Consumers are also becoming increasingly environmentally conscious, and they are demanding products and services from companies that have a low carbon footprint (Amankwah-Amoah, Khan, & Wood, 2021). Businesses that are not adapting to these changing preferences risk losing market share to more sustainable competitors. Companies must be proactive in reducing their environmental impact and demonstrating their commitment to sustainability to meet the demands of environmentally conscious consumers (Nawaz, Seshadri, Kumar, Aqdas, Patwary, & Riaz, 2021). Governments around the world are implementing new regulations and taxes aimed at reducing greenhouse gas emissions and mitigating the impacts of climate change. These regulations can increase costs for businesses and limit their ability to operate. Companies must be proactive in understanding these regulations and developing strategies to comply with them, while also reducing their carbon footprint and protecting their bottom line (Alam, Atif, Chien-Chi, & Soytaş, 2019).

Physical damage to an agribusiness assets, such as its facilities, equipment, and infrastructure, can also be caused by climate change (Hofmann, 2019). Extreme weather events, such as hurricanes, earthquakes, and wildfires, can cause significant damage to these assets, which can be costly to repair or replace. Companies must be proactive in protecting their assets and developing contingency plans to minimise the impact of these events on their operations (Bocken & Geradts, 2020). Finally, climate change is affecting market opportunities, as changing weather patterns and extreme weather events can reduce the demand for certain products and services, while creating new opportunities in other areas. Companies must be proactive in identifying these changes and adapting their business strategies accordingly to maintain their competitiveness and ensure their long-term sustainability (Ouyang, Li, & Du, 2020).

Basically, climate change is affecting businesses in many ways, and companies that are not adapting to these changes risk losing market share, facing increased costs, and reduced competitiveness. To ensure their long-term sustainability, businesses must adopt strategies that

reduce their environmental impact, mitigate the risks posed by climate change, and adapt to changing market conditions.

(ii) Incentives for climate-friendly policies

Incentives are a powerful tool for promoting climate-friendly policies in businesses and in the economy (Giorgi, 2022). One of the most effective incentives is financial, such as subsidies, tax breaks, and grants, which can help offset the costs of adopting environmentally friendly technologies and practices (Chiappinelli, Gerres, Neuhoff, Lettow, de Coninck, Felsmann, & Zetterberg, 2021). For example, companies that invest in renewable energy, energy-efficient equipment, or low-carbon transportation solutions may be eligible for tax credits or grants, which can help reduce their costs and increase their profitability.

Another type of incentive is regulatory, such as carbon taxes or emissions trading systems, which can create a financial incentive for companies to reduce their greenhouse gas emissions (Tang, He, Ma, & Wang, 2019). These types of policies provide a financial benefit to companies that reduce their emissions, while imposing a cost on those that do not. This creates a market-driven incentive for companies to adopt environmentally friendly practices and technologies, which can help reduce their carbon footprint and mitigate the impacts of climate change (Li, Liu, & Shi, 2021). The economic benefits of these types of policies can also be significant, as they can create new jobs and spur economic growth in the green economy, while reducing the risks associated with climate change.

In addition to financial and regulatory incentives, there are also non-financial incentives that can encourage companies to adopt climate-friendly policies (Chhikara, Garg, Chhabra, Karnatak, & Agrawal, 2021). For example, companies may be motivated by public recognition, such as awards or certifications, for their environmental achievements. This type of recognition can increase an agribusiness reputation and brand value, helping to attract customers, employees, and investors (Rogge & Ohnesorge, 2022).

Another type of non-financial incentive is collaboration with other companies, industry groups, or governments to jointly develop and implement climate-friendly policies (Chowdhury, Tarin, Roy, & Mahmood, 2022). By working together, companies can pool their resources and expertise to create more effective and efficient solutions, while also reducing the costs and risks associated

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with implementing these solutions individually (Gühnemann, Kurzweil, & Mailer, 2021). Collaboration can also help companies share best practices and gain access to new technologies, which can improve their competitiveness and help reduce their carbon footprint.

Incentives can also be used to promote climate-friendly policies at the national and global levels. For example, governments can encourage the adoption of renewable energy by offering subsidies or tax credits to companies and households that invest in renewable energy systems (Geyik, Hadjikakou & Bryan, 2022). They can also implement regulations to limit greenhouse gas emissions from power plants, transportation, and other sources, which can create a financial incentive for companies to reduce their emissions (Andrianarimanana, *et al*., 2023).

In conclusion, incentives play a critical role in promoting climate-friendly policies in businesses and in the economy as a whole. Financial, regulatory, non-financial, and collaborative incentives can all help create a supportive environment for companies to adopt environmentally friendly practices and technologies, reduce their carbon footprint, and mitigate the impacts of climate change. By using a combination of these types of incentives, businesses, governments, and other stakeholders can work together to create a more sustainable and resilient future.

2.1.7 Export Orientation

Export orientation refers to a strategic approach adopted by businesses and governments to focus on exporting goods and services to international markets (Ibidunni, Iyiola, & Ibidunni, 2014; Okoro, Ujunwa, Umar, & Ukemenam, 2020). This orientation emphasises the development and promotion of products for sale in foreign markets, with the aim of expanding market reach and increasing revenue through international trade (Geyik, Hadjikakou & Bryan, 2022). It involves policies and practices that support and incentivize exporters, such as subsidies, tax concessions, and credit facilities, to facilitate the export of goods and services (Andrianarimanana, et al., 2023). Additionally, export orientation is characterized by a high ratio of export revenues within total sales revenues, reflecting a significant emphasis on international trade and market expansion (Jawaid, Waheed, & Siddiqui, 2020; World Bank, 2019)

Historically, many developing nations have adopted an export-oriented model as a strategy for economic growth (Ibidunni, Iyiola, & Ibidunni, 2014; Okoro, Ujunwa, Umar, & Ukemenam, 2020). This approach involves liberalizing trade and focusing on exporting goods for which the

nation has a comparative advantage (Geyik, Hadjikakou & Bryan, 2022). Reduced tariff barriers, fixed exchange rates, and government support for exporting sectors are common policies associated with export-oriented industrialization, aiming to accelerate the industrialization process and promote economic development

However, the shift towards export orientation has not been without challenges (Andrianarimanana, et al., 2023). The pressure to meet global demands and compete in international markets has led to concerns about environmental sustainability and the impact on local economies (Jawaid, Waheed, & Siddiqui, 2020; World Bank, 2019). For instance, the expansion of agricultural production to meet export demands has contributed to deforestation (Coulibaly, 2019; Kromtit, Kanadi, Ndangra & Lado, 2017), habitat loss (Olayiwola & Okodua, 2013; Nwafor, 2018; Zoramawa, Ezekiel, & Umar, 2020), and pollution (Hultman, Katsikeas, & Robson, 2019), posing significant environmental challenges and consequences (Geyik, Hadjikakou & Bryan, 2022).

2.1.8 Export-Market Orientation

Export market orientation continues to be one of the most recent ideas in international marketing because earlier empirical investigations of market orientation were done in the setting of domestic markets. However, market orientation components like market intelligence generation, market intelligence distribution, and market intelligence responsiveness have been integrated into international marketing (Cadogan, 2003), leading to the development of the export market orientation idea. Many authors have put forth various definitions of export market orientation. Export market orientation, according to Mokhtar *et al*. (2009), refers to the degree of application of the marketing idea. It is an organisational culture committed to providing greater customer value, and it must be reflected in a firm's operations and procedures as depicted in Figure 2.4.
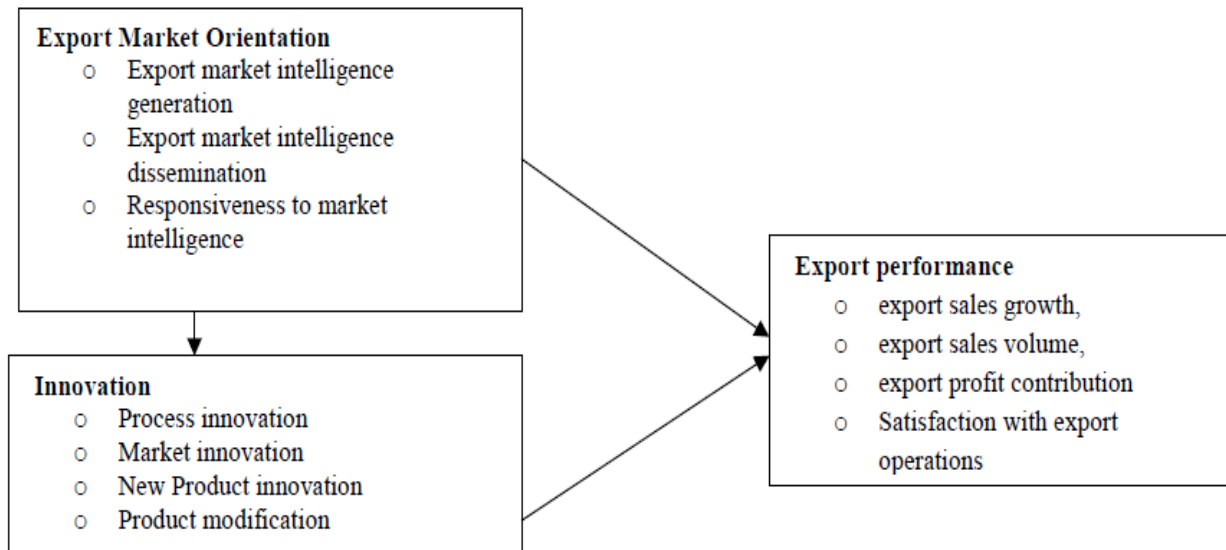
Figure 2.4: Framework for Export Market Orientation, Innovation and Export Performance

Source: Adopted from Bozic (2006), Hoq and Norbani (2009), Alzgool (2019)

Export market orientation has been commonly defined in this context as a firm's attempts to apply the marketing idea to the export sector (Cadogan *et al*., 2009), with a specific emphasis put on export markets rather than domestic markets (Cadogan *et al*., 2003). Market orientation competence is especially important for exporting enterprises because it allows them to gather up-to-date knowledge about target markets, appreciate the fundamentals of customer wants, and build a strategy to effectively compete in abroad markets (He *et al*., 2013;Katsikea *et al*., 2019;Yayla *et al*., 2018). When compared to other entrepreneurs, it is considered that individuals that frequently acquire precise market information and apply it effectively place a higher value on the obtained information since they understand how important it is to the success of their firm (Ahearne *et al*., 2013;Hall *et al*., 2017;Katsikea *et al*., 2019;Talvinen, 1995;Wood, 2001).

Concurrently, businesses are required to make greater use of the information included in customer reviews and to handle the consumer reviews input more efficiently (Katsikea *et al*., 2019; Melo, 2020). By making decisions that enable the coherent, integrative, and consistent application of quality aspects that are changed to meet consumers' quality expectations, or by giving adjustments to service delivery when necessary (Ahlin *et al*., 2012; Heusinkveld *et al*., 2009).

Export market orientation has been discovered to play a significant effect in strategic decisions such as marketing mix strategy adaption in export markets (Navarro-Garca *et al*., 2013) and export channel selection in this line of study (He *et al*., 2013). Studies in this field have shed light on how internal organisational elements contribute to great export success. As a result, researchers have discovered that export marketing strategy and managerial capabilities, knowledge on exports in the areas of knowledge management (including market research and marketing intelligence), relationship-building, product strategy (Ahmed, Julian, & Mahajar, 2008), pricing strategy (Doole, Grimes, & Demack, 2006), sales strategy (Katsikea, Theodosiou & Makri, 2019), marketing strategy (Lages & Montgomery, 2004), export promotions (Francis Furthermore, the integration of marketing, R&D, and engineering divisions to cater to overseas exports is most closely connected with improved export performance (Lim, Sharkey & Heinrichs, 2006;Ting, Guijun & Bojun, 2010).

2.1.9 Export-Led Orientation

Export-led orientation is a developmental strategy. It is a policy approach encompassing the encouragement of modern real-sector manufacture and support for the production of exports to achieve efficient and optimal allocation of resources within countries and to extend trade growth across countries. It promotes the production of commodities domestically for trade, thereby propelling the development of the economy by exploiting and exploring the areas of comparative advantage in the world economy (Iweama, Nkamnebe, Ramoni, & Gorondutse, 2020). The improved productivity helps to create economies of scale, improves production efficiency and optimal resource allocation, and capital formation. It gains foreign exchange for importing of commodities necessary for manufacture at cheaper rates from other nations.

Many developing nations have identified export-led orientation as a principal direction for market expansion for their domestic firms. The industrial structure will be enhanced leading to economies of scale via technology transfer and increased demand from the international markets which invariably resolve the problem of excess products and unprocessed or unexploited resources (Adegboyega, 2017; Kalaitzi, & Cleeve, 2018; Topuz, & Dağdemir, 2020). This evolves the substitution of primary products with manufactured products. It initiates learning of new technologies, apportions more efficiently the allocation of resources from the abundant factor

endowments of the country to produce at lower costs, yet, high in quality. This diverse the nation's basket of goods, thereby motivating demand domestically, and internationally.

Export-led strategy results in savings and capital accumulation through increased supply potential above the capacity to import, hence engendering rapid economic growth, although restricted by the level of market development (Adelakun & Olayiwola, 2020; Theoharakis, Angelis, & Batsakis, 2019). Nigeria involvement in export-led orientation premised on the pursuit of the oil export, and non-oil export of other sectorial productivities apart from crude oil and gas.

2.1.10 Nigerian Export and Sustainability

Nigeria is the key driver of international trade in West Africa and has been an active player in the field of foreign direct investment and trade (Joshua, 2020). Thus, there has been a proliferation of extant literature on export within the context of Nigeria, seeking to understand the causality between the economic development and impact of trade as a strategy on the economy (Abdul & Babayev, 2020; Bahuli, & Bala, 2020; Edem, 2017; Akims, Sakanko, & Magaji, 2020; Akpan, Nwosu, & Eweke, 2017, Arodoye & Iyoha, 2014; Awoke, Iwuoha, & Awoke, 2019; Kromtit, Kanadi, Ndangra & Lado, 2017; Ernest, Akintunde, & Bartholomew, 2020; Nwosa & Fasina, 2020; Vincent, 2017). These studies established the positive significance of export on the economy, however epileptic. Nigeria export contributes significantly to the funding of other sectoral developments, capital projects, and budget expenditure (Ogunbiyi & Abina, 2019).

Export in Nigeria had been anchored on agriculture and allied products predominately until the discovery of crude oil in the 1970s. In 2018, oil export accounted for 90% of export earnings, and 70% of government revenue. By 2019, it contributed 9.14% to the national GDP (NBS, 2019). Nigerian export ranked twelfth in the global market, as the largest Africa oil producer that accounted for over 99% of 2013 exports to the United States, and 42% of Nigerian crude oil sales in 2014 to Asia- China, India, Japan, and South Korea. However, by 2018, the United States accounts for 11.5%, making the US her 6th largest export destination supplying goods worth $7.1 billion (Export.gov, 2019). Forty per cent (40%) of Nigerian imports were from the sub-region, which makes it the largest consumer market but has limited capacity to accumulate domestic savings to finance investment (Markjackson, *et al*., 2018; Opebiyi, 2020; Zhang & Zhang, 2024).

The export analysis report stated a growth record from as low sales as N322.93 Million naira in February 1983 to an all-time high sale of N2648881.76 Million naira in December 2011. In 2014, Nigerian oil and natural gas export grew by sales to Europe (43%); Asia (29%); 13% to America and 12% to Africa, amounting to more than 91% total exports. By 2019, Nigeria export drove 1180% of manufactured products shipments. Export grew to 48% yearly between 1981 and 2019, to one million, three hundred and ninety-six (1,396) million naira in December 2019 (Trading Economics, 2019)

Nigeria, being a nation that is dependent on crude oil export for the bulk of its foreign revenue flow, was subjected to several years of price shocks which dropped the inflow of international revenue-making sustainable growth challenging to achieve (Imoughele, 2016). The volatility in the economy of Nigeria due to declined oil price contracted the commercial productivities and the economy by 0.67% and 2.06% to subsequent drop at -1.6% growth rate between 2016 and 2017 resulting into compounded inflation at 18.72% from 9.62% in 2016 (Export.gov, 2019; Kromtit *et al.*, 2017). The decline in oil export corroborated the literature that oil-dependent nations experience slow growth due to the exogenous effect of price shocks (Ahmed, Mahalik, & Shahbaz, 2016, Badeeb, Lean, & Clark, 2017, Balsalobre-Lorente, 2018). The price shock caused a gradual shift from oil dependence export to a more diversified economy. The shift gradually generates resilience against the global economic volatility and increase the nation's global market share, and reduction of the poverty level (Edeme, & Nkalu, 2019; Kalu, & Anyanwaokoro, 2020; Nwanko, 2018; PWC, 2015).

The fundamental point of export-led orientation is diversification of the economy as a strategy. Diversification, in the opinion of Owan, *et al.*, (2020) and Uwajumogu, Nwokoye, Ogbonna, and Okoro (2019), is developing the domestic production base of the economy, export competitiveness, and markets expansion to reduce the volatility risks to safeguard a balanced current trade account sustainably. Economic diversification unlocks increased resilience to oil price volatility, broadens government revenue base, and improves prospects (IMF, 2016; Ruch, 2020). Vincent (2017) suggested that agriculture and manufacture are the preferred sectors of the outward-led economy and therefore, the bedrock of economic and technological advancement.

2.1.11 Export Market Orientation and Agriculture in Nigeria

Exporting is a common method for small and medium-sized businesses to join international markets (SMEs). The capacity of SME exporters to create and sustain successful long-term partnerships with international clients is essential to their success. Many businesses, particularly those from developing nations, have turned to exporting as a crucial activity for their future development, profitability, and survival as a result of the world economy's growing degree of globalisation (Leonidas, 1995). This is mostly due to the fact that, as compared to other types of international participation like joint ventures and overseas manufacturing, exporting provides the simplest and most affordable way of expanding and accessing foreign markets. However, there is a lot of uncertainty in the international markets, therefore businesses must gather export market information/intelligence about rivals, clients, pricing, technology, and government restrictions, communicate this knowledge, and act on it.

Fruit exports from developing nations have surged as a result of the rising demand for both fresh and dried fruits in the majority of industrialised nations. This growth in fruit export markets is probably attributable to the efforts of exporting businesses, who not only engaged in information gathering and research to better understand the needs of their clients.

Although it is undeniable that Nigeria's fruit exports have increased, the majority of exporting companies continue to focus mostly on raw, unprocessed fruit exports. Furthermore, they lack modernised handling, storage, and transportation facilities, all of which are essential for guaranteeing that fruits travel vast distances while maintaining their freshness (Olayungbo & Olayemi, 2018) Additionally, the majority of them seldom ever conduct informational research on the needs of their international clients (Obura, Mayanja, Ikojo, & Cloete, 2007). As a result, Nigeria's capacity to access the projected US $1.2 billion worldwide fruit market has been hampered by its export of fruits, which might have more than doubled, expanding at a sluggish rate (Nigeria Export Promotions Board, 2008).

There has not been much research to assess the relationship between export market orientation, innovation, and export performance in Nigeria, particularly within the fruit exporting firms, even though the scenario tends to show that Nigeria's fruit exporting firms lack an export market orientation and have low levels of innovation. Consequently, the purpose of this study is to fill the information vacuum in this area.

The fundamental prerequisite for economic diversification as highlighted by IMF 2016, are supportive regulatory and institutional frameworks, and macro-economic stability, improved climate for foreign direct investment (FDI) and putting up necessary intermediaries for investment promotion. The pursuit of efficient production of high value-added products by improved technological capacity, quality human capital competitiveness, constructive tax structures and competitive income is critical to efficient quality integration in the global value chain (IMF, 2016).

Promotion of non-oil sector stimulates an increase in foreign exchange, generate more jobs, encourage collaborative international technology transfer, improve specialised skills and managerial knowledge, and spurs economic growth via embedded innovativeness of domestic firms for export competitiveness (IMF, 2016). The non-oil sector comprises of any chain of economic activities, outside crude oil and natural gas (Ogunsanwo, Obisesan, & Olowo, 2020). With a focus on non-oil export, Nigeria is in control of her commodities prices, and quantities as guided by the law of demand and supply, compared to the oil price that is exogenously determined and thus limit the potential of the economy (Olayungbo & Olayemi, 2018). For instance, NEPC (2016) reported that 13% of GDP is from information and communication Sector; 40% from agricultural products; 23% from agriculture, and 60% from service export.

Other sectors that have the potential for significant growth are consumer goods, retail industry, including E-shopping; and real estate due to a rising middle class and urban migration, the manufacture, as well as, infrastructure, especially transportation and power (PWC, 2015; Uwajumogu *et al.,* 2019). Nigeria's endowment of 90% arable land size, besides her large workforce with 72% under the age of 30 is strategically positioned within the ECOWAS region to cover a market of three hundred (300) million people. She also has comparative advantages in forty-four (44) solid minerals in commercial quantities, among which Iron-ore is the twelve (12th) largest reserves in the world (NEPC, 2016). Olayungbo and Olayemi (2018) stated that the agriculture value chain has enormous potential for enhancing industrialisation, thereby creating massive employment that will lead to economic growth and poverty alleviation. These positive contributions propel Nigeria to look inward to her vast natural resources deposit and an extensive service sector to support the oil and gas value chain, which has significant market potential via exploration and exploitation opportunities.

2.1.12 Dimensions of Export Market Orientation

The dimensions of export market orientation refer to key aspects and characteristics that businesses focus on to align their strategies with international market demands. These dimensions encompass areas such as market intelligence generation, dissemination, and responsiveness, emphasising the crucial elements that contribute to successful engagement with global markets.

(i) Export Market Intelligence Generation

According to Lohrke, Franklin, & Kothari (2015) and Oura, Ziber, & Lopes (2016), these tasks include organisation-wide market intelligence generation regarding present and future consumer needs in the international market, distribution of the market intelligence across departments, and organisation-wide market intelligence gathering. The process of gathering information about the needs and desires of an agribusiness export customers, the level of competition in those markets, and other exogenous factors like regulatory and technological advancements is known as export market intelligence generation.

Different authors have put out a variety of justifications for what export market intelligence generation is (Lohrke, Franklin, & Kothari, 2015; Oura, Ziber, & Lopes, 2016; Ribau, Moreira, Raposo, 2017). Although export market intelligence generation is typically linked with dramatic advancements in goods and productive designs, Aranda *et al*. (2001) contend that most export market intelligence generation are based either on the cumulative effect of incremental product improvements, processes, or on the inventive blending of already-existing techniques, concepts, or procedures. Export market intelligence generation, in the opinion of Mole & Worrall (2001), can be radical or gradual. While incremental innovations seek to improve on current items, radical innovations create new technologies, processes, or products to fulfil needs that may not yet be visible.

(ii) **Export Market Intelligence Dissemination**

The formal and informal information exchanges that enable the information created to reach the proper export decision-makers are known as the dissemination of export market intelligence (Olimpia & Amonrat, 2006). The purpose of market intelligence distribution is to give several departments "a shared basis for joint operations." Many authors have noted that a firm's

competitive advantage in global markets mostly depends on its capacity to spread information rather than its ability to obtain or acquire it. The ability of an agribusiness to develop new goods, and new manufacturing methods, adapt the old products and exploit new geographical markets and sectors within existing markets may all be seen as examples of export market intelligence dissemination (Lohrke, Franklin, & Kothari, 2015; Oura, Ziber, & Lopes, 2016; Ribau, Moreira, Raposo, 2017). An agribusiness can choose to disseminate and implement any or all of the aforementioned kinds of innovation collaboratively or separately. They do point out that the organisation will have to accept increased levels of risk and dedication when it chooses to engage and disseminate the export market information.

(iii) **Responsiveness to Market Intelligence**

Marisalvo (2010) says that the creation, analysis, and sharing of information about customers, rivals, and technology exhibit a favourable impact on business performance in support of the aforementioned claim. Businesses that have a systematic process for market monitoring and knowledge have the advantage of responding to market opportunities and threats more quickly and effectively, which leads to continuous growth in sales and profits, both of which are essential for firm survival.

The design and implementation of every response to the export intelligence that has been produced and communicated inside a corporation are included in responsiveness to market intelligence (Dodd, 2005). In this context, Toften & Olsen (2003) point out that acting on external information by integrating and assimilating it within the organisation is one method of building organisational knowledge. Scholars also concurred that for foreign operations to be effective, enterprises must act on the information that is often gathered. According to Salavou (2002), a firm's readiness to embrace export market-oriented strategies through the generation, dissemination, and use of pertinent market information determines how creative it will be. This is because companies that respond to the market show greater dedication to fast-changing client wants and continually work to assure their pleasure by introducing more radical product developments (Pelham & Wilson, 1996). In reaction, the company produces goods that are more valuable to customers, increasing its competitive position and eventually boosting earnings (Lohrke, Franklin, & Kothari, 2015; Oura, Ziber, & Lopes, 2016; Ribau, Moreira, Raposo, 2017)

2.1.13 Export Market Orientation and Export Performance

Many writers still recognise that adopting market-oriented conduct by businesses in their export activities is one way to achieve greater export success (Codagan *et al*. 2003). The consensus in research looking at how to export market orientation affects export success is that there is a positive association between these two factors (Akyol & Akehurst, 2003). According to Akyol & Akehurst's findings from 2003, companies that focus on learning about the export market are better positioned to succeed in their export markets than those that are not market-oriented because they have a better awareness of the demands and preferences of their consumers. Accordingly, Mehmet (2008) asserts that these businesses are likely to innovate and adapt their products, services, and operational practices to keep up with changing market needs.

Some writers have noted that there may be a weak or nonexistent association between export market orientation and enterprises' export success, in contrast to the overwhelmingly favourable relationship (Dodd, 2005). They contend that maintaining market-oriented conduct entails large expenses, which may outweigh any potential advantages such enterprises may have. Additionally, Spillan (2010) argue that market orientation is a poor predictor of organisational performance because it downplays the firm's creative capabilities. Stokes (2000) also noted that successful businesses typically prioritise client requirements after focusing initially on product and service improvements, as opposed to systematic information production, which may not be as effective. Regardless of the pro and con arguments, it should be highlighted that gathering specific information is crucial for boosting the worldwide competitiveness of businesses that operate internationally. However, the majority of businesses from underdeveloped nations that Nigeria subscribes to lack the internal means to get particular information on their activities (Obura *et al* 2007).

2.1.14 Export Market Orientation and Innovation

The authors have made the connection between innovation and an emphasis on the export market clear. For instance, Hoq *et al*. (2009) believe that one of the fundamental value-creating skills that propel market-oriented behaviour is innovation. They contend that creativity serves as a platform for economic success after wise intelligence collection and judgment. To achieve superior company performance results, Henard & Szymanski (2001) hypothesise that there is a substantial correlation between market orientation and innovativeness. According to Sabri (2003) observation,

businesses must pay closer attention to consumer wants in the current business climate by creating and acting upon information in the target market. This knowledge is crucial for businesses that may want to develop novel concepts, products, and methods, or even change already existing ones.

The capacity of an agribusiness to swiftly launch new goods and adapt novel methods into markets that are competitive is referred to as innovation (Guan and Ma, 2003). Many authors have noted that innovation can have a positive or negative impact on an agribusiness export performance. Ussahawaninitchakit (2007), for instance, makes the case that businesses operating in international markets have taken advantage of innovative capabilities to develop strategies for surviving in intensely competitive environments, maintaining competitiveness, and achieving export growth and performance. Basically, innovation is still one of the most important value-creation activities and a competitive advantage for businesses engaged in international trade. Innovation has the potential to boost and support higher export competitiveness, which can eventually result in sustained export performance. Freel (2007) does accept that financial constraints are a feature of innovation, which may over time diminish the beneficial results.

2.1.15 Export Market Orientation and Sustainability

Export market orientation in agribusiness plays a pivotal role in promoting sustainability (Palangkaraya, Spurling, & Webster, 2016). By focusing on international markets, agribusinesses can not only expand their reach but also contribute to sustainable agricultural practices (Lohrke, Franklin, & Kothari, 2015; Oura, Ziber, & Lopes, 2016; Ribau, Moreira, Raposo, 2017). One example of this is the growing demand for organic produce in international markets (Oura, Ziber, & Lopes, 2016). Agribusinesses that orient themselves towards exporting organic fruits and vegetables not only cater to the demand for healthier food options but also promote sustainable farming methods such as organic farming, which reduces the use of harmful chemicals and pesticides (Prange & Pinho, 2017; Ribau, Moreira, Raposo, 2017). Moreover, export market orientation encourages agribusinesses to adopt sustainable supply chain practices (Gloet & Samson, 2016). For instance, agribusinesses exporting coffee beans may work with local farmers in developing countries, providing them with fair trade opportunities and ensuring sustainable farming practices (Oura, Ziber, & Lopes, 2016). This not only benefits the local communities but also contributes to the long-term sustainability of the agricultural industry.

Furthermore, export market orientation can drive innovation in agribusiness, leading to the development of sustainable farming technologies and practices (Palangkaraya, Spurling, & Webster, 2016). For example, agribusinesses exporting dairy products may invest in sustainable packaging solutions to reduce environmental impact(Movahedi, Shahbazi, & Gaussens, 2017; Rehman 2016). This innovation not only meets the demands of international markets but also promotes environmental sustainability. However, it's important to consider the potential challenges of export market orientation on sustainability. Agribusinesses may face pressure to increase production to meet export demands (Gloet & Samson, 2016), potentially leading to overexploitation of natural resources and environmental degradation (Gloet & Samson, 2016). For instance, increased demand for a specific crop in international markets may lead to monoculture farming, which can have negative impacts on biodiversity and soil health.

Furthermore, agribusinesses may face challenges in maintaining sustainable practices while meeting the volume and quality demands of export markets (Palangkaraya, Spurling, & Webster, 2016). This can create a dilemma between fulfilling market demands and upholding sustainable agricultural practices (Gloet & Samson, 2016). For example, the pressure to meet export orders for a particular crop may lead to intensified use of fertilizers, impacting soil and water quality (Gomes, Vendrell-Herrero, Mellahi, Angwin, & Sousa, 2017; Tavassoli, 2018). Specifically, export market orientation in agribusiness presents both opportunities and challenges for sustainability (Gloet & Samson, 2016). While it can drive the adoption of sustainable practices, it also poses risks to environmental and social sustainability. Agribusinesses must strike a balance between meeting export market demands and upholding sustainable agricultural practices to ensure long-term viability and contribute positively to global sustainability efforts

2.1.16 Business Sustainability

Business sustainability refers to the strategic management of resources to address environmental, social, and economic challenges, ensuring the long-term viability of a business while minimizing negative impacts on the environment and society (Mahajan & Bose, 2018). It encompasses a commitment to meeting the needs of the present without compromising the ability of future generations to meet their own needs. In a business context, sustainability goes beyond environmentalism and focuses on maintaining or supporting processes continuously over time, preventing the depletion of natural or physical resources for the long term (Sanislav & Candea, 2016). This approach often involves considering the triple bottom line—economic,

environmental, and social aspects—while making business decisions. Sustainable business practices aim to create a positive or minimal negative impact on the global or local environment, community, society, or economy, and are essential for addressing environmental, social, and economic problems through the strategic management of resources.

Sustainable development, environmental management, stakeholder theory, corporate social responsibility, and corporate accountability are five conceptual pillars that drive business sustainability, according to a literature assessment. Sustainable development has been characterised as development that fulfils current demands while not jeopardising future generations' ability to satisfy their own. It is a process of change in which resource exploitation, investment direction, technology development orientation, and institutional change are all in sync and increase both current and future capacity to satisfy human wants and ambitions (Sanislav & Candea, 2016).

Environmental management is a strategy for achieving economic and environmental success by integrating environmental protection with all managerial tasks. Identification of significant corporate environmental challenges to be incorporated into business strategy is one contribution environmental management can offer to achieve company sustainability. There are three primary approaches to environmental protection used by organisations. The organisation's top-down environmental initiatives can be formulated and implemented as a first step. The second is concerned with the establishment of comprehensive environmental management structures and processes. The third focuses on the changes that are required in corporate culture in order to enable the accomplishment of strong environmental performance (Sanislav & Candea, 2016)

In the face of escalating environmental concerns, natural resource constraints, increased awareness of social responsibility, and the need to remain profitable, sustainability has become a top priority for every company (Adhitya, Halim, & Srinivasan, 2015). Sustainability is very context-dependent, and as a result, it means various things to different people depending on who they are and where they live. It is characterised in the most basic terms as the capacity to fulfill the requirements of the present generation without overwhelming the next. It is a purposeful effort to recognise the economy, society, and environment's connectivity and interdependence (Achebo, 2018).

Corporate sustainability thus entails the meticulous management of financial, social, and environmental risks and possibilities, as well as the management of the triple bottom line (people, profits, and the planet). Sustainability has acquired widespread acceptability in society and has been adopted by companies all around the world since its start thirty four years ago. Sustainability in business, defined as a balance of economic, environmental, and social elements, is increasingly recognised as a critical component of production and consumption (Micheli, Cagno, Mustillo, & Trianni, 2020) as depicted in Figure 2.5.

Figure 2.5: Sustainability Framework
Source: Adopted from Sanislav & Candea, 2016; Achebo, 2018; Micheli, *et al*., 2020

The goal of an agribusiness sustainability plan is to achieve a balance of economic, environmental, and social goals. Sustainability in agribusiness has been a subject of significant challenges and issues across countries, impacting both environmental and economic aspects (Palangkaraya, Spurling, & Webster, 2016; Oura, Ziber, & Lopes, 2016). One of the primary challenges has been the pressure on the need for sustainable practices in the industry (Achebo, 2018), particularly in the face of climate change and global competition (Achebo, 2018; Micheli, et al., 2020). For instance, changes in weather patterns have had dramatic effects on crop yields, such as early frosts causing severe drops in citrus crops and reduced snowfall leading to spring droughts in mountain

regions, affecting crop growth (Li, Xu, & Zheng, 2018). These challenges have necessitated the adoption of more sustainable production methods, placing considerable pressure on agribusinesses to adapt to changing environmental conditions and market demands.

Agricultural expansion, driven by the need to meet global food demands, has been a major driver of deforestation and ecological destruction, contributing to habitat loss and pollution (Achebo, 2018). This has been a significant environmental challenge that agribusinesses have had to address, as it directly impacts the conservation of natural habitats and the well-being of wildlife (Prange & Pinho, 2017; Ribau, Moreira, Raposo, 2017). Oura, Ziber, and Lopes (2016) argued that the consequences of such expansion have included the degradation of ecosystems and the loss of biodiversity, highlighting the critical need for sustainable agricultural practices to mitigate these adverse effects. In addition, the shift of demand from domestic high-added-value products to cheaper products with lower health and environmental standards has posed a risk of quantitative decrease in agricultural production, with harmful consequences for producers (Palangkaraya, Spurling, & Webster, 2016). This shift has created challenges in maintaining sustainable intensification and preserving the quality and sustainability of agricultural products, impacting both producers and consumers (Achebo, 2018; Micheli, et al., 2020).

Furthermore, the twin policy challenge of ensuring global food security for a growing population (Prange & Pinho, 2017; Ribau, Moreira, Raposo, 2017) while improving environmental performance has required raising the environmental and resource productivity of agriculture (Palangkaraya, Spurling, & Webster, 2016). This has necessitated the development of cost-effective agri-environmental policies, management of water issues for agriculture, dealing with climate change challenges, and preserving biodiversity and ecosystem services related to agriculture (Li, Xu, & Zheng, 2018). The consequences of not addressing these challenges include the potential for reduced agricultural productivity, increased pollution discharges, and damage to biodiversity, ultimately impacting global food security and environmental sustainability.

The challenges and issues in the sustainability of agribusiness have also been evident in the diverse and heterogeneous agricultural systems in regions such as sub-Saharan Africa, South Asia, and East Asia (Palangkaraya, Spurling, & Webster, 2016). These regions have faced significant challenges in moving towards more sustainable development pathways (Prange & Pinho, 2017; Ribau, Moreira, Raposo, 2017), including evidence of public health risks associated with wastewater and excreta management practices, as well as implications on manure quality as a

fertilizer (Achebo, 2018; Micheli, et al., 2020). These challenges have underscored the need for practical approaches to address sustainability indicators and promote sustainable agricultural development in these regions.

The three stages that human civilisation has experienced are the primitive, farming and industrial societies with each one of these stages of human development is closely tied to nature (Li, Xu, & Zheng, 2018). After entering the period of industrial civilisation, mankind gradually formed a self-centered master mentality and changed nature at will, thereby intensifying the conflict between humanity and environmental carrying capacity. Environmental problems, such as global warming, tight resource constraints, environmental pollution and ecological degradation, have become increasingly serious, thereby prompting people to rethink and understand the status of mankind in nature and the relationship between economic development and the environment. Basically, the challenges and issues in the sustainability of agribusiness across countries have encompassed a wide range of environmental, economic, and social aspects. From the pressures of climate change and global competition to the need for sustainable intensification and the preservation of biodiversity, agribusinesses have faced complex and interconnected challenges. Addressing these challenges is crucial for ensuring the long-term viability of agricultural systems and promoting sustainable agricultural practices on a global scale.

2.1.17 Dimensions of Corporate Sustainability

The dimensions of corporate sustainability encompass the various facets and elements that organisations consider to integrate sustainability into their business practices. These dimensions may include economic viability, social responsibility, environmental stewardship, and effective governance, reflecting a comprehensive approach to long-term sustainable business strategies.

(i) Environmental Sustainability

As the basis for attaining sustainable development world over, environmental protection and the improvement of organisational performance become issues of serious concerns for businesses and societies. Globalisation and industrialisation have resulted in a shifting of the impact of local environmental issues to a larger scale or a wider region, often been transformed into international environmental challenges (Martinez-Martinez, Cegarra-Navarro, Garcia-Perez, & Wensley, 2019; Tiwari, Dharwal, & Fulzele, 2022). The has brought about a relentless focus on the adoption and

implementation of environmental sustainability practices which is also one of the major factors that has led to the transition from Millennium Development Goals to Sustainable Development Goals (Adomako, Amankwah-Amoah, Danso, Konadu, & Owusu-Agyei, 2019; Singh, Sharma, Sharma, & Dwivwdi, 2021).

Martinez-Martinez, Cegarra-Navarro, Garcia-Perez, and Wensley (2019) argue that awareness of and responsiveness to environmental issues have become an imperative for firms today and organisations should seek to develop integrated knowledge frameworks within their business models right from the beginning of theor operations and throughout their life cycle. In agreement, Moro, Cauchick-Miguel, & Mendes (2022) go on further to propose the use of product-service system, which is a business model that emphasises the provision of bundles of products and services that are offered to customers with the intent of creating significant positive and/or reduced negative impacts on the environment and/or society. Bidwell, *et al.* (2022) argues that adopting a sustainable business model as a result of the demands of customers for sustainability in business processes, will lead to better economic opportunities for industries and export performance (Lahouel, Taleb, Zaied, & Managi, 2022; Tiwari, Dharwal, & Fulzele, 2022).

Wong and Ngai, (2021) goes futher and opined that organisations should seek to develop environmental competencies which are the abilties of firms to use corporate environmental practices to facilitate export performance, saying that this can lead to an overall increase in the capacity and profitability of the firm. They go on to propose a 5R application towards environmental competency which is about the ability of the organisation to develop capacity in the areas of – recycle, reuse, reduce, re-design, and reimagine saying that these acts will influence the sustainability of the firm and also enhance their competitive advantage in export performance.

Recycling being the process of material collection and their conversion into raw materials for new products, reuse is about the repeated use of materials in their original format; reduction refers to source reduction or waste prevention when procuring needed raw materials; re-designing denotes the continual finetuning of the process to increase sustainability; and re-imagining is about implementing new innotative techniques that could enhance the supply chain. However, Lahouel, Taleb, Zaied, and Managi (2022) goes on to argue that the relationship between investments in environmental sustainability and competiveness is U-shaped. This implies that, there is an optimal level of environmental sustainability beyond which competitiveness and profitability may begin

to decrease. And beyond this, there is the ongoing debate on whether it can be ecconimically viable for small, cash strapped firms in developing countries to adopt environmental sustainability as their strategic position (Adomako, Amankwah-Amoah, Konadu, & Owusu-Agyei, 2019)

(ii) Economic sustainability

"In today's hypercompetitive global business environment, economic performance and sustainability have become urgent topics (Gangi, D'Angelo, Daniele, & Coscia, 2022). The problems related to the exploitation and pollution of the environment and a continuous shrinkage of existing natural resources make environmental issues an extremely important corporate imperative. It is essential to connect economic processes with environmental issues, as this is the only approach that allows for further corporate development and real compression of environmental and economic threats. It can be seen even in the shift from the paradigm of traditional economics to the paradigm of ecological economics, which focuses on the protection of the natural environment and the rational management of natural resources (Wysocki, 2021)

Generally, economic sustainability focuses on practices that promote long-term economic growth without negatively impacting local social, environmental, and cultural aspects. It involves businesses having to create products that people want, in ways that protect and preserve the environment and society at large (Simon, 2022). Economic activities generates effects that may not have positive impacts on the natural environment and this has led the society at large to require businesses to respect nature and take responsibility for export performance. Organisations have to find a way streamline their production process in such a way that it will meet the expectations of stakeholders, while also aligning with theory economic interest (Wysocki, 2021). This is only when a sustainable economy can be achieved.

 A sustainable economy is an economy where people can live normally without having to be concerned about future availability or affordability of supplies. Focus on economic sustainability croped up in response to a growing realisation that a linear economic system, which is the takemake-dispose system prevailent today is not sustainable because eventually, natural resources will be depleted. As a result, a circular economic model, where resources are recycled rather than being cast out as waste, is being pursued as this can allow indefinite economic growth without

depleating the natural resources (Briassoulis, Pikasi, & Hiskakis, 2021; Colijn, Fraiture, Gommeh, & Metze, 2022; Geueke, Groh, & Muncke, 2018).

Unlike the linear economy which gives room for waste, the circular ecomony is all about business efficiency and it is an economic model that focuses on restoration and regeneration which translates into economic sustainability (Rossi, Bertassini, Ferreira, Neves do Amaral, & Ometto, 2020). Business efficiency is about using fewer resources to produce same or more quantity of products and services. This is often through the 3R process of sustainability of – reduce, reuse and recycle. The reduction principle targets the minimisation of raw material use, energy input, and waste production whereas the reuse principle refers to the repeated use of products or components for their intended purpose. Recycling is mostly used to save energy, resources, and emissions and decrease the environmental impacts of a material's use (Geueke, Groh, & Muncke, 2018).

Research on the economy as a circular flow took its first foundations from the reformulations of the Tableau ´economique (Quesnay, 1758) and Marx's reproduction schemes (Marx, 1867). Despite Quesnay (1758) and the physiocrats, along with classical economists, described the economy as a circular flow, they never used the term "Circular Economy" in the current fashion. This was not even done by Boulding (1966) in his seminal work. In this view, even though starting from a different perspective, Boulding (1966) highlighted the urgent need of closed-loop systems in the economy as a precondition for preserving human life. Circular Economy (CE) can be defined as an economic model wherein resourcing, purchasing, production, and reprocessing operations are designed to preserve environmental performance and human well-being (Murray *et al*., 2017). Based on this definition, CE represents a competitive sustainable strategy to promote economic development without resource challenges, through environmental conservation, energy efficiency, and cost-effective waste management (Bastein *et al*., 2013;

MacArthur, 2013; Genovese *et al*., 2017; Abbey *et al*., 2018). More recently, the feasibility of the CE perspective has been addressed adopting a political approach based on a social transformation and a fairer society (Genovese and Pansera, 2020). CE techniques transform wastes in valuable eco-efficient inputs that can be reused, repaired, and recycled (Guide and Van Wassenhove, 2009; Crowther and Gilman, 2014; Goltsos *et al*., 2018). Moreover, CE improves the business models of individual firm, supply chain (SC) and society in a systemic way, reducing price volatility of resources and enhancing SC relationships and employment opportunities (Atasu *et al*., 2010; Kok

et al., 2013; Battini *et al*., 2017; Mokhtar *et al*., 2019). Although the lack of institutional support, regulations, environmental awareness, and economic incentives affecting the transition towards CE (Centobelli, Cerchione, Esposito, Passaro, & Shashi, 2021).

(iii) Social Sustainability

Social sustainability has taken on a new influence and greater prominence, becoming a serious issue in the public discourse, also influencing debates on government policy, business practices, and consumer behaviours. There is a fast-growing global realisation for the need to effectively address not only issues concerning the global environment and economy, but also and more so issues concerning social inequalities, racial injustices, and discriminatory employment practices (Mejia, Bak, Zientara, & Orlowski, 2022; Torkayesh, Ecer, Pamucar, & Karamasa, 2021). Although happiness and wellbeing are the ultimate desires of employees across the world however, a large number of employees are working themselves to death in order to cope with the global economic challenges relating to financial obligations (Sanusi & Johl, 2022). This has led to an increase in the issue of social sustainability.

Social sustainability is simply a measure of people's welfare and lays emphasis on the well-being people require from where they live and work (Contreras & Abid, 2022). It raises interest regarding the way organisations behave towards their employees and the local community. It therefore brings to the fore matters regarding how firms care for their employees' wellbeing and how they seek to improve societal conditions among those working and living in the local community (Mejia, Bak, Zientara, & Orlowski, 2022). Mani, Jabbor, and Mani (2020) also view social sustainability as the ability of firms in attending to the social issues that are associated with the safety and welfare of the people within their locality. Considering the high population of the world, countries cannot only focus on their economic and environmental infrastructure and dedicate their budgets to these areas anymore therefore, social sustainability shines light upon other equaly important segments of nations like livability, social justice, social responsibility, human right, health equity, education equity, workforce rights, and many other relevant social issues (Torkayesh, Ecer, Pamucar & Karamasa, 2021).

The social dimension of sustainability in business has its focus on the impact that organisations have on the society, and requires that organisations set up their business operations in a socially

responsible manner in regards to their employees, human capital and the community, thereby meeting the requirements for human well-being (Sander, Föhl, Walter, & Demmer, 2021). Although social sustainability is as important as the other dimensions of sustainability, it was not given as much attention compared to the environmental and economic dimensions (Lee, Che-Ha, & Alwi, 2021; Sander, Föhl, Walter, & Demmer, 2021; Torkayesh, Ecer, Pamucar, & Karamasa, 2021). This has often been adduced to the following – the problematic nature of social indicators and their measurement which have been difficult to understand, the challenging nature of implementing social aspects compared to environmental goals, and because sustainability has mostly been theoretically discussed rather than practically implemented (Afshari, Agnihotri, Searcy, & Jaber, 2022; Desiderio, García-Herrero, Hall, & Vittuari, 2022; Kibukho, 2021).

Today however, issues regarding social sustainability has gradually evolved from a relatively deemphasised pillar of sustainability to a more integrated perspective over the years (Afshari, Agnihotri, Searcy, & Jaber, 2022). Hosta and Zabkar (2020) is of the opinion that consumers perceive the social and environmental dimensions of sustainability as psychologically distinct and align the social dimension of sustainability with local, short-term and affective reflections while the environmental dimension with global, long-term and cognitive thoughts. Sander, Föhl, Walter, and Demmer (2021) on their part view the environmental aspects as having a greater impact in promoting the sustainability of a brand than the other dimensions of sustainability so, less attention should be given to the social aspect of sustainability. Hosta and Zabkar (2020) on the other hand are of a different opinion and argue that both environmental and social dimensions are of equal importance and should be equally prioritised.

Silva and Ruel (2022) on the other hand are of the opinion that social sustainability in this present dispensation has become more important than the other dispensations of sustainability. In agreement with this position, Barreiro-Gen, Lozano, and Zafar (2020) further argue that in response to the COVID pandemic, operations have shifted their focus away from environmental sustainability and upon social sustainability. Hervani, Nandi, Helms, and Sarkis (2022) also are of the opinion that a strategic focus on social sustainability creates a holistic pathway to meet both socioeconomic and socio-environmental sustainability objectives and as such, social sustainability is of equal importance as all other sustainability dimensions. This therefore requires firms to strive towards inserting social sustainability into the core and all dimensions of their corporate structure

(Ali & Kaur, 2021). Mani, Jabbor, and Mani (2020) are also of the opinion that socially oriented companies perform better than others both in the short and long term, while others tend to suffer a loss of reputation.

Social sustainability has also been given attention principally in the context of large corporations and mainly in developed nations (Ali & Kaur, 2021; Westham, Moores, & Burch, 2021). As a result, is not wide- spread among SMEs especially in developing nations (Gopi & Saleeshya, 2022; Mani, Jabbor, & Mani, 2020). One of the key barriers is the notion that SMEs generally adopt short-term survival strategies as well as the perception of the fewer benefits of social sustainability adoption. However, SMEs often do not realise that social sustainability can be capitalised upon as opportunities to build sustainable competitive advantage. Furthermore, similar to how globalisation and the digital age have drastically changed the competitive landscape for many SMEs, in the near future, the adoption of social sustainability may no longer be optional for SMEs (Lee, Che-Ha, & Alwi, 2021).

Furthermore, Ali and Kaur (2021) is of the opinion that, a focus on social sustainability can be of immense benefit to oganisations in terms of improving their business image and long-term business performance. It also has the ability to generate competitive advantage (Lee, Che-Ha, & Alwi, 2021) and can be critical towards the success of organisations during both normal and uncertain times (Hervani, Nandi, Helms, & Sarkis, 2022). As a result, it should be given due considerations especially by firms in developing countries.

(i) Sustainability Governance

Governance as a fourth dimension of sustainability was added at the 2002 World Urban Forum in Nairobi where it was made clear that the four dimensions or pillars – environmental, economic, social, and governance are of great importance in regards to sustainability and serious importance should to be paid to these four pillars for true and sustainable development to be achieved (Ogunkan, 2022). In traditional parlance, "governance" and "government" are synonymously used to denote power dynamics in resource management for overall country development however as regards sustainability, governance differs from government and management in the following ways – governance differs from management because it is based on coordination instead of control, governance involves multiple interrelated stakeholders, including private and public

sectors and economic organisations, governance emphasises the balance of interests and scientific decision-making, governance is a continuous interaction and aims to maintain the continuity of relationship (Bannor & Arthura, 2024).

Forje and Tchamba (2022) on the other hand differentiates governance from government in five ways – governance is a set of institutions and actors that are drawn from but also beyond the government; it recognises the confusing boundaries and responsibilities in dealing with social and economic issues; governance detects the power dependence in relationships flanked by institutions involved in collective action; it also underscores the importance of self-directed governing networks of actors; governance acknowledges the capacity to get things done without depending on the government's supremacy to command or use its authority.

Governance provides an understanding of the integration of actors in a group's decisions, while these actors within the concept of governance are not limited to states and governments, but include a plethora of public, private, and non-state actors, encompassing a larger and more diverse number of actors (Debbarma & Choi, 2022; Li, Xu, & Zheng, 2018; Ogunkan, 2022; Wang, Zhang, & Qiu, 2022). Sundqvist-Andberg and Akerman (2022) goes even further to suggest a form multi-stakeholder delibration and collaboration in export performance. This being in agreement with (Cerveny, Derrien, Meyer, & Miller, 2022; Wang, Zhang, & Qiu, 2022; Westham, Moores, & Burch, 2021).

2.1.18 Green Management and Sustainability of Agricultural Sector

Agriculture can be said to constitute the bedrock of most economies and while individual SMEs have limited environmental footprints, their combined impact can exceed that of large businesses. Small and medium-sized enterprises are said to exhibit significantly lower sustainability performance than large firms because they are more reluctant to engage in sustainability measures (Ernst, Gerken, Hack, & Hülsbeck, 2022). This reluctance on the part of agricultural sector is problematic and a challenge to the global sustainability agenda given the sheer number of SMEs in the agricultural sector, and their economic importance, as well as their significant cumulative contribution to global pollution and social misconduct.

Driven by the dual effect of government regulations and market demand, firms are strongly motivated to introduce green product design. However, green product design requires huge

investments requiring huge resources, and this could be challenging for SMEs. Other challenges for SMEs in their bid to introduce green design could include – poorly-designed regulations, lack of clear policy direction, and product market regulations. All these has the potential of stifling competition, thereby becoming a big hurdle to SMEs especially those operating in renewables, energy, environment and sustainability sectors. (Du, Yang, Xu, Tan, & Li, 2020; Zafar, 2021).

With green management design becoming a vital issue for businesses today, it has led to intense competition in green design by companies in both the upstream supply side and the downstream retail side. Even with the challenges faced by owners and managers of agribusinesses, they still have a vital role to play in sustainable development. According to Zafar (2021), the agricultural sector has emerged as important drivers of radical green innovative designs in the industrial and services sectors. He goes on to suggest that governments especially in developing countries should come up with policies and interventions that will assist SMEs to overcome their major barriers. These interventions could include things like knowledge-sharing, raising environmental awareness, enhancing financial support, supporting skill development and skill formation, improving market access and implementing green taxation. According to the East Africa Development Bank (EADB), green management adoption by SMEs in developing countries comes with both challenges and opportunities (EADB, 2022).

2.2 Theoretical Review

The theoretical review encompasses three key frameworks: (i) Natural Resource Based View, which examines how firms leverage their resource endowments for competitive advantage; (ii) the Organic Growth Theory, which explores how organisations foster sustainable growth through internal capabilities and innovation; and (iii) the Stakeholder Theory, which emphasises the importance of considering diverse stakeholders' interests in strategic decision-making processes.

2.2.1 Natural Resource Based View

The Natural Resource-Based View (NRBV) theory is a management perspective that argues that a firm's resources and capabilities are key determinants of its competitiveness and long-term success. The theory was first introduced in 1995 by Stuart L. Hart   (Baumgartner & Hitt, 1995) and has since been further developed and refined by numerous authors (Liu & Yang, 2017). The

natural resource based-view (NRBV) works on the principle that an agribusiness competitive advantage fundamentally depends upon its relationship with the natural environment.

The NRBV framework identifies how companies can generate competitive advantage based on capabilities that support sustainable development. Stuart Hart (1995) developed a framework of three interconnected capabilities that firms can build including (i) pollution prevention, (ii) product stewardship, and (iii) sustainable development. Each of these has an underlying driving force for the natural environment. Pollution prevention capabilities help to minimise emissions and waste. Product stewardship capabilities minimise life-cycle costs of products. Sustainable development capabilities minimise the environmental burden that results from firm growth and development.
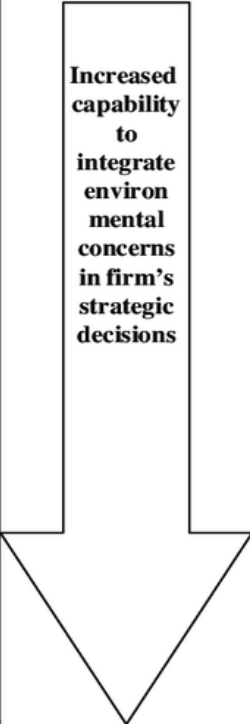
The basic assumption of the NRBV theory is that a firm's resources and capabilities, such as its natural resources, intellectual property, and technology, are critical to its competitiveness and long-term success. In particular, the theory suggests that a firm's natural resources play a crucial role in determining its competitiveness and should be managed in a way that promotes sustainability and long-term success (Albarracin & Chaves, 2024; Waluyo, 2024).

The NRBV theory has been supported by several authors who argue that the theory provides a useful framework for understanding the role of natural resources in a firm's competitiveness (Han & Lee, 2019; Bannor & Arthura, 2024). The theory has also been applied in a variety of contexts, including the management of natural resources in the extractive industries, such as oil and gas, as well as in the renewable energy sector (Mandych, 2024).

The natural resource based view (NRBV) operates under the tenet that a company's relationship with the natural world directly affects its ability to compete (Andersen, 2021). The NRBV framework outlines the ways in which businesses can gain a competitive edge by developing capabilities that promote sustainable development. A framework of three interconnected skills that businesses might acquire was created by Stuart Hart in 1995: **(i) pollution prevention, (ii) product stewardship, and (iii) sustainable development**. Each of these influences the environment naturally in some way. Capabilities for pollution prevention aid in reducing emissions and waste. Product lifecycle expenses are reduced by capabilities for product stewardship. Having sustainable development capabilities reduces the environmental impact of business growth. Alongside these driving forces, businesses create three crucial competencies (resources): continuous improvement,

stakeholder integration, and a shared vision. As shown in Figure 2.6, each of them individually promotes competition by cutting costs, eliminating rivals, and securing a future position.

Strategic Capability	Environmental Driver	Key Organisational Process	Competitive Advantage	
Pollution Prevention	Minimize resource use. Minimize emissions effluent and waste	Continuous improvement Environmental management	Lower costs Increased profitability	Increased capability to integrate environ mental concerns in firm's strategic decisions
Product stewardship	Minimize life-cycle costs of products. Re-use of waste and water, renewable energy sources, packaging, reduced transport	Stakeholder integration Resources in value chain assessed. Environmental certification and standards	Preempt competitors through exclusive access and/or environmental barriers	
Sustainable Development	Minimize environmental burden of firm growth and development	Shared vision Environmental Strategy	Securing future position	

Figure 2.6: A framework of three interconnected business skills
Source: Adapted from Hart (1995)

(a) Pollution Prevention

Inefficient use and handling of production byproducts, resources, and materials leads to pollution. The reduction of pollution improves a business's capabilities by lowering costs significantly and boosting output and efficiency. According to Roberts (2022), less wasteful products lead to increased input use and treatment efficiency, which lowers the cost of disposal and raw materials. This suggests that streamlining or eliminating outmoded technology or pointless operations will optimise operational processes. This will increase productivity and decrease manufacturing times, which will cut pollution and operational expenses. – Strategies for limiting pollution help businesses meet or surpass legal requirements, strengthening their social license to operate and reducing potential compliance/liability expenses.

(b) Product Stewardship

An organisation's operational value chain includes all activities and processes, all of which have an impact on the environment. The company must reduce these effects as it moves toward

sustainability. In the company's product design and development processes, product stewardship addresses stakeholders' environmental concerns. In order to maintain its competitiveness, the company works to reduce both the environmental costs and life cycle costs of its products. By predicting future market patterns, taking action to ensure access to resources, and developing environmental competencies, this competitive advantage is attained.

(c) Sustainable Development

The goal of sustainable development is to break the harmful connections between the economic world and the environment. It illustrates environmental issues on a worldwide scale and looks at how domestic and international policies might be put into practice to create sustainable and resilient global cultures and marketplaces. The adoption of sustainable management practices by a company necessitates a sizable financial investment as well as a long-term dedication to market expansion. This is because there aren't any immediate profits. This dedication could improve a company's performance in the future relative to its rivals, increasing its competitive edge going forward.

Despite its supporters, the NRBV theory has also been criticised for its narrow focus on the role of natural resources in a firm's competitiveness. Some authors argue that the theory fails to consider the role of other factors, such as market conditions and social and environmental factors, in determining a firm's competitiveness (Chen & Zhang, 2018). Furthermore, the theory has been criticised for its limited attention to the impact of a firm's natural resource management practices on the environment and local communities (Chen & Zhang, 2018).

Green agriculture is inextricably linked to innovation. Green innovation strives to lessen the negative environmental impact of products or manufacturing processes while also coordinating firms' economic and ecological effects. Green innovation, when compared to general innovation, has "double externalities," which means that, in addition to having the same positive spillover effects as other general innovations, green innovation will generate positive externalities by lowering the cost of the external environment while reducing negative externalities. Green innovation may offset the costs of environmental legislation, allowing businesses to receive "Innovation offsets" and "First Mover Advantage." This behavior cannot be isolated from the support of enterprise resources, and one of the most significant resources for agricultural enterprise innovation is intellectual capital.

The Natural Resource-Based View (NRBV) theory is a management perspective that argues that a firm's natural resources and capabilities are key determinants of its competitiveness and long-term success. In the context of resource scarcity and ecological damage, it has become necessary for agribusinesses to combine sustainable development with the problem of natural resources and the environment. Agribusinesses can create and sustain competitive advantages within their natural environment.

The theory has been supported by several authors (Chen & Zhang, 2018; Roberts, 2022), but has also been criticized for its narrow focus and limited attention to the impact of a firm's natural resource management practices on the environment and local communities. The Natural Resource-Based View (NRBV) theory, which emphasises the strategic advantage gained from a firm's unique natural resource endowments, is complemented by the Organic Growth Theory, which addresses the limitations of NRBV by focusing on the sustainable development of internal capabilities and investments in human capital. While NRBV theory recognizes the competitive advantage derived from valuable, rare, and inimitable natural resources, it often overlooks the dynamic nature of resource-based advantages and the potential for resource depletion or environmental impacts, highlighting the need for a broader perspective on sustainable growth. In contrast, Organic Growth Theory emphasises the cultivation of internal capabilities, innovation, and human capital development to drive sustainable growth, acknowledging the importance of nurturing and investing in organisational resources and capabilities for long-term success, thus addressing the weaknesses of NRBV theory by focusing on sustainable internal development and innovation. Hence, the need for the Organic Growth Theory.

2.2.2 Organic Growth Theory

The organic growth theory is an economic theory pioneered by the economist Marshall Alfred (1987). Organic Growth Theory introduces a step-by-step approach so that corporates can grow and be profitable without compromising the ability of future generations to meet their needs. Organic (or internal) growth involves expansion from within a business, for example by expanding the product range, or number of business units and location. Organic growth builds on the business' own capabilities and resources.

A forward-thinking way of approaching corporate growth would entail a clear vision for impact and a strategy that supports such a vision. In this model, relevance, measurability and scalability would be used as guiding principles. Similarly, impact-driven growth would require corporates to put in place effective transparency mechanisms to leverage the benefits of this modern approach. The shift to ecologism (Organic Growth Theory) from one of the main results of capitalism (corporates) is a necessity. With the current pace of increasing awareness of the climate-change threat and the fast changes in carbon-emission regulations, the decision for corporates between adoption of organic growth theory or accepting the consequences will come soon. Future work will be devoted to further developing each step in the Organic Growth Theory, defining concrete actions for the evolution of corporations.

Organic growth is ultimately often more difficult to come by because it takes longer and it usually requires a shift in how the company operates. Still, organic growth is arguably better in the long term because it prevents the loss of an agribusiness as an independent entity (versus a merger or acquisition) and it also prevents an agribusiness from taking on substantial debt (through loans or borrowed resources). One of the most fundamentally sound things an agribusiness can do to fuel organic growth is to understand its target market. Consistent research into the way the target customers/clients think and make decisions helps an agribusiness understand where to invest the majority of their funds (into the goods and services most purchased), what new products or services the target clientele would enjoy and use, and tailoring the marketing and pricing of products and services toward the clientele who are most frequent patrons.

However, all the actors can experience the tension between high export volume and low domestic consumption of organic, a tension that can compromise the sustainability of the system. Many of the actors agreed that they preferred or would prefer to sell their products within domestic borders if there would be a demand for it. Some of them sell their products in Hungary for lower prices just to support local distribution. Some of them see the problem in the lack of central will to strengthen the organic sector and to provide a better standard of living for the citizens in order to be able to afford organic products. People are very price-sensitive when it comes to food consumption. And many simply just cannot afford high quality products. The question is also if prices of organic food products are too high, or if prices of the conventional ones are too low. This is a complex issue and there is no good or bad solution for how to strengthen the domestic organic market. Some respondents also mentioned that people in Hungary have low health and

environmental consciousness. They have to be informed more about the advantages of organic food consumption because many do not even know what organic means.

Clearly, more accurate information needs to be provided both for the producers and the consumers of the organic food sector. The central support, both financial and ideological is also inevitable for the future development of the organic sector. More support of the organic sector would not only result in more sustainable use of the Hungarian lands but also could create more work in rural areas and could provide healthier food for the population. Organic growth theory helped to better understand which conventions regulate the actions of the different actors and how they perceive their actions. Sustainability lies in the core of 'green management' and it can be concluded that for some actors green, civic, and domestic conventions are perceived to play equally important roles as market and industrial ones in their business activities. Although this theory espouses an idea of how agribusinesses could grow in a sustainable manner however, the theory fails to stress the interconnected relationships between an agribusiness and its customers, suppliers, employees. The theory conspicuously did not provide information on how agribusinesses can be successful when they deliver value to the majority of their stakeholders. This leads to the inclusion of the stakeholder theory.

2.2.3 Stakeholder Theory

The stakeholder theory, which was first introduced by Edward Freeman in 1984, is a normative theory that argues that organisations have obligations to all stakeholders, including shareholders, customers, employees, suppliers, and the community (Freeman, 1984). The theory posits that companies must balance the interests of all stakeholders in order to be successful in the long-term. The author of stakeholder theory, Edward Freeman, assumed that organisations are not solely responsible to their shareholders but rather to a wider group of stakeholders (Freeman, 1984). This includes suppliers, employees, customers, and the community. Freeman argued that companies must balance the interests of all stakeholders in order to be successful in the long-term (Freeman, 1984).

Stakeholder theory has received support from several researchers in the field of corporate social responsibility. For example, Donaldson and Preston (1995) have argued that stakeholder theory provides a more comprehensive understanding of organisational responsibility and can help organisations to better balance the interests of all stakeholders. Similarly, Mitchell *et al*. (1997)

found that companies that adopt a stakeholder approach outperform those that focus solely on shareholder interests. However, stakeholder theory has also received criticism from some scholars. For example, Jensen (2001) argued that stakeholder theory is unrealistic and can lead to conflicting interests among stakeholders. He argued that companies should prioritise the interests of shareholders, as they provide the financial capital that allows companies to operate. Similarly, McDonald (2002) argued that stakeholder theory is too vague and that it is difficult to determine which stakeholders are most important.

In recent years, stakeholder theory has continued to receive both support and criticism. For example, in 2017, Post and Preston (2017) conducted a review of the stakeholder theory and found that it continues to play an important role in shaping organisational behavior. However, they also noted that the theory has been criticised for its lack of operationalisation and its unrealistic expectations. Similarly, in 2019, Song and Lee (2019) conducted a study that examined the implementation of stakeholder theory in organisations and found that companies are facing challenges in balancing the interests of all stakeholders.

Stakeholder theory and green management are interconnected in that both seek to balance the interests of different groups and promote long-term sustainability. In the context of green management, organisations are seen as having obligations to protect the environment and conserve natural resources. Stakeholder theory similarly argues that companies must balance the interests of all stakeholders, including the environment and the community, in order to be successful in the long-term. In this sense, the implementation of green management practices can be seen as fulfilling the obligations of companies to their stakeholders, as outlined by stakeholder theory. For example, an agribusiness that adopts green management practices such as reducing energy consumption, reducing waste, and promoting recycling is acting in the interests of both the environment and the community, as well as contributing to the long-term sustainability of the company.

Furthermore, stakeholder theory can also be used as a framework for evaluating the success of green management practices. For example, if an agribusiness implements green management practices and experiences positive outcomes, such as reduced costs, improved brand image, and increased customer loyalty, then it can be seen as fulfilling its obligations to its stakeholders. In conclusion, the linkage between stakeholder theory and green management lies in the common

goal of balancing the interests of different groups and promoting long-term sustainability. Stakeholder theory provides a framework for understanding the obligations of companies to their stakeholders, including the environment and the community, and for evaluating the success of green management practices.

2.3 Empirical Review

Green management has been used for over two decades, and there is a growing body of research committed to its exploration. Recent research has discovered a link between GGM adoption and corporate performance. According to studies, GGM can assist a firm in translating its environmental sustainability strategy into practical value-creating operations (Agarwal, Giraud-Carrier, & Li, 2018).

2.3.1 Green Method and Sustainability

Research in this area has consistently shown that professional purchasers who consider environmentally preferable criteria in the procurement process have the power to reduce waste and environmental impacts and costs. In fact, global experience and examples show how environmentally preferable criteria early in the procurement process improve the organisations' environmental sustainability while addressing ethics, social regeneration and economic concerns.

The recent research on the impact of green methods on sustainability suggests that there are numerous positive effects of adopting sustainable practices. The use of renewable energy sources such as solar and wind power has been found to significantly reduce greenhouse gas emissions and improve energy efficiency (Biesbroek, Dewulf, & Faaij, 2020). Furthermore, the implementation of green transportation methods, such as electric vehicles and bike lanes, has been shown to reduce air pollution and increase the sustainability of transportation systems (Banerjee & Blok, 2021).

Waste management practices, such as composting and recycling, have also been found to play an essential role in reducing the carbon footprint and improving sustainability (Ndungu, Muriuki, & Kibue, 2019). Additionally, sustainable agriculture practices, such as agroforestry and regenerative agriculture, have enhanced soil fertility and improved ecosystem health, leading to a more sustainable food system (Lal, 2017).

Moreover, incorporating green practices into the design and construction of buildings has been found to increase their energy efficiency and overall sustainability (Gupta, Singh, & Misra, 2020).

For example, green roofs and walls have been shown to improve air quality and reduce the urban heat island effect, leading to a more sustainable urban environment (Nguyen, Ngo, & Tung, 2019).

In addition to the environmental benefits, adopting green methods can also have positive economic impacts. For example, investing in renewable energy sources can create jobs and stimulate economic growth while reducing dependence on non-renewable energy sources (Zhou, Lu, & Tan, 2022). Similarly, implementing green transportation systems, such as electric vehicles and bike lanes, can reduce the cost of transportation and improve mobility (Banerjee & Blok, 2021).

It is important to note, however, that while green methods have numerous benefits, their successful implementation depends on various factors, including political support, public awareness, and technological advancements. To fully realise the potential of green methods in promoting sustainability, it is necessary to address these challenges and develop comprehensive strategies that support the transition to a more sustainable future.

2.3.2   Green Materials and Sustainability

The use of green materials has been demonstrated in the works of Xu, Ren, and Chen (2020). They identified numerous positive impacts on sustainability. They established that green building materials, such as bamboo, recycled plastic, and sustainable timber, have been shown to reduce construction's carbon footprint and improve overall building sustainability. The submission of Bansal and Singh (2021) also revealed that the use of biodegradable and compostable materials, such as plant-based plastics, has also been found to significantly reduce waste and improve the sustainability of the material cycles.

In the works of Khan, Ali, and Ahmed (2019), biodegradable and compostable materials have been found to reduce waste and improve the sustainability of packaging systems. Additionally, using environmentally friendly packaging materials like paper and cardboard has reduced waste and dependence on non-renewable resources. This was corroborated by the findings of Gupta, Kaur and Kaur (2021), who inferred that the use of green materials in consumer products, such as clothing and textiles, has been found to improve their sustainability by reducing their environmental impact throughout their lifecycle. In the same vein, Kadam, Mahajan, and Kumar (2020) added that the use of natural fibres, such as organic cotton and bamboo, and

environmentally friendly dyeing methods, such as low-impact dyes, has been shown to significantly reduce water usage and toxic waste in the textile industry.

Li, Wang and Wang (2021) conducted a study on the need to manage a closed-loop supply chain with take-back legislation and consumer preference for green materials and design. It was revealed that the manufacturer's optimal green product design, production, and recycling strategies are determined under the requirement of the mandated targets (including collection and recycling rates). In addition, higher consumer preference for green product design always increases profit. From the perspective of motivating product design, the mandated targets and the consumer preference for green product design can motivate the manufacturer to implement the green product design. It was added that the manufacturer could not be incentivised to implement green product design with too low or too high maximum potential recycling benefit with the green product design.

Liu, Blome, Sanderson and Paulraj (2018) emphasised the effect of green design strategy and supply chain integration capabilities on the performance of the auto industry. This paper aims to examine how supply chain integration capabilities inform green design strategy adoption and whether green design strategy can lead to higher environmental and economic performance levels. The authors compared the results from two different data groups (i.e. Chinese firms vs Western firms) using the structural equation modelling approach. In the Chinese context, internal and external supply chain integration capabilities are significantly related to successfully adopting a green design strategy. However, the relationships are insignificant in the Western context. Green design is found to impact environmental performance in both contexts positively; however, no significant relationship is revealed between green design and economic performance in either context. By implication, managers should understand their specific organisational context and then strategically develop their external and internal supply chain integration capabilities to maximise their green design efforts for improved environmental performance. Companies can be certain that the more gains made in environmental management, the more economic returns can be expected.

Hong, Wang and Gong (2019) ascertained the inevitability of green product design. Consumers' reference behaviours should be addressed in previous research on green product design. This study investigates a green-product design problem in a two-echelon supply chain by considering consumers' reference behaviours. The reference point is associated with a functional product with a utility-based reference form. Tax regulation and the environmental awareness of consumers are

also considered in investigating their effects on green-product design and pricing strategies. Analytical results show that consumers' reference behaviours significantly influence green-product design and pricing decisions. When faced with consumers with different recognition levels of reference, the product design and pricing strategies should be adjusted. Tax regulation and consumer green awareness also affect the firms' decisions. Tax regulation can encourage firms to increase the greenness degree of their product only when the tax level or the green development cost is low. In contrast, consumer green awareness always plays a positive role in green design. By comparing the results between different supply chain structures, we find that the retailer-led supply chain outperforms the manufacturer-led supply chain in environmental performance improvements. The best environmental performance is achieved when the supply chain is coordinated

2.3.3 Green Machine and Sustainability

The recent research on the impact of green machines on sustainability suggests that the use of eco-friendly technologies in various industrial sectors can have significant benefits for the environment and the economy. The adoption of green machines, such as electric vehicles and renewable energy systems, has been found to reduce greenhouse gas emissions and improve energy efficiency, leading to a more sustainable future (Biesbroek, Dewulf, & Faaij, 2020).

The manufacturing sector is one area where green machines have been shown to have a significant impact. The findings from the works of Chen, Lin, and Tseng (2020) revealed that implementing green manufacturing processes, such as using eco-friendly production methods and integrating renewable energy sources, has been found to reduce waste and greenhouse gases gas emissions. This corroborated the study by Yao, Zhang and Zhang (2019). They revealed that using green machines, such as energy-efficient equipment, has been shown to improve energy efficiency and reduce the carbon footprint of manufacturing processes.

In the agriculture sector, the study by Chung, Lee and Kim (2022) indicated that green machines, such as precision agriculture equipment, have been found to enhance the efficiency and sustainability of farming practices. This suggests that precision agriculture, which involves the use of technology to optimise crop production, has been shown to reduce the use of pesticides and

fertilisers, improve water management, and increase crop yields. These benefits contribute to a more sustainable agriculture sector and enhance food security.

In the transportation sector, the works of Banerjee and Blok (2021) established that green machines, such as electric vehicles and hybrid vehicles, have been found to reduce greenhouse gas emissions and improve energy efficiency significantly. This was supported by Katsanevakis, Stergiou and Zervakis (2019). They added that the use of green machines in the shipping industry, such as electric and hybrid ships, has been shown to reduce emissions and improve the sustainability of shipping operations.

According to the findings by Lal (2017), the use of green machines in the agriculture sector has also been found to impact sustainability positively. For example, the use of sustainable agriculture equipment, such as electric tractors and precision agriculture technologies, has been shown to reduce energy use, improve resource efficiency, and enhance soil health.

In the manufacturing sector, the works of Ndungu, Muriuki, and Kibue (2019) demonstrated that the use of green machines had been found to reduce waste, conserve resources, and improve overall sustainability. The findings by Gupta, Singh and Misra (2020) revealed that the implementation of green technologies in the production process, such as 3D printing and robotics, has increased efficiency and reduced waste, leading to a more sustainable manufacturing process.

2.3.4   Green Measurement and Sustainability

Green measurement is an important tool in promoting sustainability, as it allows organisations and individuals to assess their environmental impact and track progress towards sustainability goals. A growing body of research suggests that green measurement (logistics) has a positive impact on sustainability and is a critical component of the transition to a more sustainable future.

One aspect of green measurement is the use of environmental performance indicators (EPIs), which help organisations track their environmental impact and assess the effectiveness of their sustainability initiatives (Ma, Zhang, & Zhang, 2021). EPIs can include metrics such as carbon footprint, water usage, and waste reduction, and can be used to set targets and measure progress towards sustainability goals (Stamou & Zopiatis, 2018).

Another aspect of green measurement is the use of life cycle assessment (LCA), a tool that evaluates the environmental impact of a product or service throughout its entire lifecycle, from

production to disposal (Liu, Chen, & Xia, 2020). LCA provides a comprehensive and systematic approach to green measurement, allowing organisations to identify and prioritise areas for improvement in their sustainability efforts (Ravi & Kammula, 2019).

The adoption of green measurement and sustainability reporting has been found to have numerous benefits, including improved environmental performance, enhanced reputation and credibility, and increased stakeholder engagement (Ma, Zhang, & Zhang, 2021). In addition, the use of green measurement can help organisations to comply with environmental regulations and standards, and to access new markets and opportunities (Ravi & Kammula, 2019).

Trivellas, Malindretos and Reklitis (2020) amplified the implications of green logistics management on sustainable business and supply chain performance of agribusinesses sector. Green agribusinesses supply chains are increasingly attracting research interest, owing to their potential capacity for resilience against recent crises (e.g., financial, COVID-19) as well as end-consumers' concerns on sustainability issues. In this context, this paper aims to explore the relationship between green supply chain management practices and three different performance aspects, namely, supply chain, green (environmental) and business performance, and controlling for environmental dynamism. Field research was conducted through a structured questionnaire contacted to 134 executives of firms in the agribusinesses sector in Greece. The results reveal that information sharing, logistics networking and transportation are the most powerful factors that impact sustainable, business and supply chain performance. In addition, green packaging is related to financial and social performance aspects. Interestingly, green warehousing and logistics emissions failed to establish any relationship with performance outcomes. The conclusions and recommendations drawn in the present study are expected to provide meaningful guidance for the supply chain decision-making process, as logistics managers are becoming increasingly aware of exploiting all available resources, knowhow and competitive advantages for attaining sustainable performance.

Liu and Ma (2022) emphasised the nexus between green logistics management and supply chain system construction based on internet of things technology. The Internet of Things technology is an important part of modern intelligent systems. It plays an important role in the development of information, and it is also indispensable in industry, trade, manufacturing and daily life. However, due to the substantial increase in online orders, serious environmental pollution has also appeared

in the logistics industry, and the society is paying more and more attention to it. The reliability assessment of the supply chain and the analysis of the green logistics innovation strategy have improved the environmental pollution of the logistics industry and reduced the vehicle emissions in transportation by 26.9%. In addition, the data system for green packaging and green warehousing has been updated, and the accuracy of information circulation has increased by 45.97%. Effectively reduce costs in all aspects of the logistics industry, and the first to develop green logistics will undoubtedly take the initiative in the development of the logistics industry. Green logistics is considered to be one of the trends in the future development of logistics industry.

Agyabeng-Mensah, Afum, Acquah, Dacosta, Baah and Ahenkorah (2020) examined the role of green logistics management practices, supply chain traceability and logistics ecocentricity in sustainability performance. The priority giving to green practices in today's competitive market has made green logistics management practices (GLMPS) a significant driver of organisational performance. The purpose of this study is to explore the influence of GLMPS, logistics ecocentricity and supply chain traceability on sustainability performance. The study uses structured questionnaires to gather data from 274 managers of manufacturing firms in Ghana. The partial least square structural equation modeling approach is used to analyse the data to test the proposed hypotheses. The results obtained from the analysis indicate that GLMPS positively influence social sustainability and environmental sustainability. However, GLMPS negatively influence business performance. The results further reveal that logistics ecocentricity and supply chain traceability augment GLMPS to achieve significant improvement in both business performance and environmental sustainability through the mediation effect approach.

However, green measurement can also be challenging, as it requires significant resources and expertise, and may involve trade-offs between environmental, social, and economic objectives (Stamou & Zopiatis, 2018). To overcome these challenges and fully realise the potential of green measurement in promoting sustainability, it is important to develop and implement consistent and harmonised methodologies, and to engage stakeholders in the green measurement process (Liu, Chen, & Xia, 2020).

In conclusion, green measurement is a critical tool in promoting sustainability, as it helps organisations and individuals to assess their environmental impact and track progress towards sustainability goals. The use of environmental performance indicators and life cycle assessment,

in particular, has been found to have numerous benefits, including improved environmental performance, enhanced reputation and credibility, and increased stakeholder engagement. However, the successful implementation of green measurement depends on addressing the challenges associated with its adoption, including the development of consistent and harmonised methodologies and stakeholder engagement.

2.3.5   Export Market Orientation on Green Management and Sustainability

Kazemi, Rousta and Na'ami (2019) examined the causal model of export entrepreneurship and export market orientation on export performance. The aim of this study is to define and introduce the variable of export entrepreneurship and factors affecting it in a global export-centric model. However, we seek to find the effect of the variables of export entrepreneurship and export market orientation on export performance. To test the research hypotheses, a sample of 296 people employed in food and agricultural products company located in Tehran Province has been used, whose information has been obtained. Data has been collected using standard questionnaire and the obtained information has been analysed by SPSS and Smart PLS software. The research findings demonstrate that resources and the intensity of competition have a positive effect on export entrepreneurship, but the impact of market distance on export entrepreneurship has not been confirmed. The results indicate the positive impact of export market orientation and export entrepreneurship on the export performance of sample companies. However, the moderating impact of the degree of globalisation on the relationship between export market orientation and export performance has been confirmed.

Muis (2020) assessed the marketing strategy and capability as the mediators in relationship of market orientation and export performance. The research examined the performance of export marketing performance through the implementation of market orientation intervened by export marketing strategy and export marketing capability. Primary data were collected through questionnaires from 108 samples out of 148 rattan processing Small and Medium Enterprises (SMEs) in nine provinces in Indonesia. The respondents were marketing managers or owners of SMEs with at least two years of experience. Structural Equation Modeling (SEM), which was processed by using Lisrel 8.7, was employed. The results indicate that market orientation, export marketing strategy, and export marketing capability are well implemented in the business

operation of SMEs. However, the export marketing performance needs to be improved. Concerning the variables studied, market orientation has a significant effect on export marketing strategy, export marketing capability, and export marketing performance. Then, export marketing strategy affects export marketing performance significantly. Moreover, export marketing capability also has a significant effect on export marketing performance. Finally, export marketing strategy and capability intervene in the relationship between market orientation and export performance.

Fernandes, Ferreira, Lobo and Raposo (2020) ascertained the impact of market orientation on the internationalisation of SMEs. A key point in the internationalisation process of companies comes with the choice of international market. Following this choice, the results companies may thereby obtain help in measuring their level of international performance. This study aims to measure the impact of internationalisation processes in keeping with company market orientations (MOs) through measuring their effect on international performance. The authors obtained the data from a questionnaire sent out by email to a total of 8,103 exporting companies and/or with interests in exporting (the study population) registered in the AICEP-Portugal Global database that provided the email addresses of the company representatives responsible for internationalisation. The authors received a total of 320 valid responses (sample). The results display a positive MO effect both on internationalisation processes and on international performance. The authors also note the importance of studying the influence of strategic orientations on internationalisation processes, motivated by the particular SME's characteristics.

Staboulis, Natos, Gkatsikos, Tsakiridou, Mattas, Bojar and Roldán (2022) assessed the role of the young farmer scheme in the export orientation of Greek agriculture. The present paper attempts to investigate whether the Sub-Measure 6.1 "Start-Up Aid for Young Farmers" payments of the 2014–2020 Rural Development Programme have a role to play in explaining Greek farms' export orientation and export performance through a statistical analysis of farm-level data. The results demonstrate considerable differences in farm structures between beneficiaries and non-beneficiaries and provide support for the contention that beneficiaries are more likely to operate more productive and economically efficient farms. However, the results also provide a sobering assessment of the role of the young-farmer-related subsidies in stimulating export orientation and export performance

Stepanova (2020) clarified the role of export orientation in agribusiness enterprises. The article discusses the export opportunities of agricultural enterprises in the framework of the Federal project "Export of agricultural products". The export volumes of agricultural products were determined and trends in the development of Russian exports in the markets of Southeast Asia and the Asia-Pacific region as a whole were identified. A significant share of Russian exports is grain. The main importance for Russian exports of agricultural products is China, which has high requirements for the quality of wheat. Of particular relevance is the activity of the "Rosselkhoznadzor" in the field of quality assessment of regional agricultural products. The implementation of measures to support agricultural enterprises focused on exports will allow developing in new foreign markets, increasing exports and foreign exchange earnings several times.

Vasilchenko and Sandu (2020) conducted an Innovative-investment development of agriculture in the conditions of formation of the export-oriented economic sector. Creating a highly productive export-oriented agricultural sector of the economy and increasing the efficiency of agricultural production in agriculture is possible on the basis of stimulating innovation and investment. The purpose of this study is to assess the impact of investment resources on the activation of innovative processes on the example of the livestock industry and to develop recommendations for increasing the innovation and investment activity of agriculture in the context of the formation of an export-oriented economy. The author's paradigm of increasing innovation and investment activity in the agricultural sector of the economy is formed on the basis of the concept of NIS, diffusion of innovations, as well as theories of structural transformation of the economy. As a result of the analysis and evaluation of the innovation and investment development of agriculture, tendencies have been identified for increasing innovative activity and the imbalance between the existing innovative potential and the effectiveness of its use. Differentiation of regions by the level of provision with investments in fixed assets in agriculture was carried out, interregional differences were revealed. The developed author's methodology for assessing the level of innovation of the livestock industry in the Russian regions will allow us to formulate approaches to improving the structural investment policy. The practical significance of the results of the study is to develop a scheme for the development of organisational and economic support for increasing innovation activity in the context of the formation of an export-oriented agricultural sector of the economy.

2.4 Gaps in Literature

Various gaps are discovered during a thorough review of several relevant literatures. These gaps are then divided into five sections, which are discussed further below.

i. **Gaps in Perspective**

Previous research, for example, has focused on the variables affecting green management and supply chains, as well as sustainable warehouse modeling, while ignoring the importance of green sustainable export market orientation (Wahab, Sayuti, & Ab Talib, 2018). Several studies have investigated the impact of green behaviour and practices on the environment. These studies have mainly been evaluated by psychologists, leaving a significant gap in the area of business and marketing management. Although marketers are consumer psychologists, they frequently overlook the business aspect of green management behaviour. A study on sustainable green management behaviour should fully incorporate the business management perspective.

ii. **Gaps in Geographical Location**

Several studies have been conducted in countries such as China (Liu, *et al*., 2020; Yang, *et al*., 2021), New Zealand (Baah, *et al*, 2021), Canada, South Africa (Waheed, *et al*., 2020), the United Kingdom (Trivellas, Malindretos & Reklitis, 2020; Vasilchenko & Sandu, 2020), and the United States of America (Derbel, 2020; Fernandes, *et al*., 2020). However, few have looked at green management, export market orientation, and sustainability (economic, social, governance, and environmental) of the agricultural sector in the Nigerian context (Kazemi, *et al*., 2019). The differences between Nigeria and these countries are that most of these countries are developed countries with appropriate systems on the ground compared to what is available in Nigeria, so the results obtained from these studies may not be replicable in the Nigerian context. As a result, the differences in the population's environment and living conditions represent a significant gap in the literature.

iii. **Gaps in Methods**

Existing studies on green management, export market orientation, and agricultural sector sustainability (economic, social, governance, and environmental) have used a single method (i.e. questionnaire or interview) to achieve their research objectives. This means that data is obtained in a consistent manner regardless of context. This results in a disparity in the quality and depth of

data obtained from research participants. Hence, the need for mixed-methods approach becomes important for this study.

iv. **Gaps in Theory**

The aims of this study is to bridge the theoretical gap and explain how the resource based view theory may influence the green management variables. Earlier works attempted to comprehend the impact of green behaviors and practices on the environment; however, they failed to employ theories that integrate the green management, export orientation, and behavioral aspects. Majority of studies have solely focused on the use of Resource based view theory to explain the position of the supply chain management on organisational performance. However, there is a lack of extensive knowledge on its relevance to green management resilience and strategies. This has long left a gap in the literature that must be filled immediately with the adoption of the organic growth and contingency theories.

v. **Gaps in Concept**

Although earlier works have looked at green management behaviour, but these studies have not been able to conceptualise both variables in a way that clearly shows the depth of understanding of the variables. This study plans to fill that gap by going in depth with these concepts (i.e. green management, export market orientation, and sustainability). Throughout these years, efforts have been undertaken to combine past empirical results of GGM investigations. However, the vast majority of them are either qualitative or based on tiny samples (Fang & Zhang, 2018). Few have sought to incorporate previous findings from a quantitative standpoint but none have been centred fully on the Nigerian economy.

CHAPTER THREE

METHODOLOGY

3.1 Preamble

This chapter describes the systematic procedure of the research. It the covers research design, the population of the study, sample size determination, source of data, research instruments, validity and reliability of the research instrument, and the procedure for testing the hypotheses.

3.2 Study Area

The study area for this study is restricted to registered members of the All Farmers Association of Nigeria (AFAN). AFAN is the largest association of farmers across every state in Nigeria (Federal Ministry of Agriculture and Food Security, 2023). This study area only covers AFAN members in the Southwest of Nigeria. The Southwest region is selected because it is unarguably endowed with vast arable land and human resources that can be cultivated to produce sufficient food. Yaqoob. Muhammad, Kabir and Adeola (2022) claimed that the Southwest region contributes 80% of agricultural produces in Nigeria. Akinfenwa (2022) added that the Southwest region contributes the highest revenue-generating cash crops to the Federal government, especially Cocoa, tobacco, Cashew, etc., and also has the best agro policies and blueprints when compared to other regions in Nigeria. The cluster and purposive sampling techniques were used to randomly select farmers in six (6) states, namely Ekiti, Lagos, Ogun, Osun, Oyo and Ondo, where adoption (full or partial) of maize, cassava, cashew, cocoa, rice and soybean recommended technologies had been reported.

3.3 Research Philosophy

To guide this research, this study used a pragmatism philosophy. Pragmatism is a positivist and interpretivist philosophical position. It also reconciles objectivism and subjectivism, as well as facts and values (Saunders, Lewis, & Thornhill, 2019). The philosophy of pragmatism guides the theories, concepts, ideas, hypotheses, and findings. The study aims to contribute practical solutions that shaped future practices (Saunders, Lewis, & Thornhill, 2019)

For the quantitative aspect of the study, this study adheres to the positivist philosophical stance. Positivism is an epistemological position held by objectivists. It takes a realistic stance to generate a law-like generalisation (Bell, Bryman, & Harley, 2022). In this study, the qualitative method is based on the interpretivism philosophical stance. From the standpoint of subjectivism,

interpretivism is an epistemological position. This philosophy investigates the meanings that humans create, with the researcher focusing on people and their perceptions to derive meaning. The why and how of social action are central to interpretivism (Bell, Bryman, & Harley, 2022).

The theories, concepts, ideas, hypotheses, and findings are guided by the philosophy of pragmatism. The study's goal is to contribute practical solutions that shaped future practices (Saunders, Lewis, & Thornhill, 2019)). For the quantitative aspect of the study, this study adheres to the positivism philosophical stance. Positivism is an epistemological position held by objectivists. It takes a realistic stance in order to generate a law-like generalisation (Bell, Bryman, & Harley, 2022). This study tested hypotheses and collected primary data via structured questionnaires and interviews to measure and judge the true nature of reality.

In this study, the interpretivism philosophical stance was used for the qualitative method. From the standpoint of subjectivism, interpretivism is an epistemological position. This philosophy investigates the meanings that humans create, with the researcher focusing on people and their institutions to derive meaning (Bell, Bryman, & Harley, 2022). The why and how of social action are central to interpretivism (Bell, Bryman, & Harley, 2022). This study thus created a new and rich meaning for the research participants based on their subjective perspectives on green management, export market orientation and sustainability.

3.4 Research Approach

This study used the abductive approach, combining inductive and deductive approaches to generate new or modify existing theories. This study used the deductive approach to test the relationship between the variables and report the findings for generalisation (Saunders, Lewis, & Thornhill, 2019). As a result, this study employed a quantitative instrument to collect data from respondents and a relevant tool to analyse the data gathered in the field to draw the necessary conclusions about the proposed hypotheses.

This study also employs an inductive approach to comprehend the nature of the problem. A decision was made regarding the design and strategy that helped in understanding the events of the event to develop or modify existing theories (Saunders, Lewis, & Thornhill, 2019). As a result, this study used a qualitative instrument to collect data from respondents and a relevant tool to

analyse the data collected in the field to draw the necessary conclusions about the research questions.

3.5 Research Design

A research design is a set of methods for capturing and evaluating the variables specified in the research problem (Maxwell, 2019; Rowell, Bruce, Shosh, & Riel, 2017). Eden and Nielsen (2020) proposed that the research design is the structure of investigations designed to identify variables and their interactions with one another. This study employed a descriptive and explanatory research design with quantitative and qualitative stages (Oyeniyi *et al*., 2016). This descriptive survey research aid in the comprehensive and reliable valuation of the study's variables (green management, export market orientation, and sustainability) (Lury, et al., 2020). The research design attempts to describe and explain the relationships between the variables (Molina-Azori'n *et al.,* 2019).

3.5.1   Research Design: Quantitative

The research design for this study was descriptive-explanatory (conclusive). This design assisted the researcher in collecting participant profiles, which ultimately helped in understanding the event and situation being studied, as well as explaining the relationship between the variables being studied (Saunders, Lewis, & Thornhill, 2019). The cross-sectional study was conducted in such a way that all data for the study was collected at the same time (Molina-Azori'n *et al*., 2019). The survey design was used as a strategy to collect information from research participants.

3.5.2   Research Design: Qualitative

This research also used an exploratory research design. The cross-sectional research was carried out through interviews with a few selected respondents in Southwest Nigeria. Exploratory research is justified because it allows the researcher to clarify pertinent issues and identify information needs related to the research problem (Oyeniyi, *et al*., 2016).

The combination of explanatory and exploratory designs is crucial because it helps to provide in-depth information on issues the researcher may not have the opportunity to generate from the quantitative instrument. In this study, the explanatory design (questionnaire) was employed to elicit information from the members of the All Farmers Association of Nigeria (AFAN). Likewise, the exploratory design (interview) focused on various stakeholder groups, which include

the **government** through the Ministry of Agriculture and Ministry of Environment and the **executive members** of the All Farmers Association of Nigeria (**AFAN**).

Basically, this study adopted a mixed research method for achieving both broad and specific objectives. The mixed-method integrated quantitative and qualitative data collection techniques and analysis procedures (survey and interview) (Creswell & Clark, 2017). The mixed method is selected for a few reasons. First of all, it allows the research questions to be better answered. Secondly, it provides the researcher with the opportunity to better evaluate the extent to which findings are reliable (Mohajan, 2017). Thirdly, it enables the researcher to strengthen the validity of the research findings (Gaus, 2017), and lastly, it allows the researcher to exhibit greater confidence in what was found when they are derived from more than one method of investigation (Webb *et al*., 1999).

The mixed- methods enable the study problem to be investigated from different angles, as it relates to the nature of data, gathering methods and analysis and often ensures that the shortcomings of either of the two methods are complimented by one another (Johnson, Russo, & Schoonenboom, 2019; Biddle & Schafft, 2015). Specifically, this study adopted the concurrent explanatory approach of the mixed methods that involved questionnaire instrument, and the subsequent use of semi-structured interviews to get further information from association executives and government agencies in the agricultural industry.

3.6 Population of the Study

The population of this study consists of members of the All Farmers Association of Nigeria (AFAN) in the six (6) selected states of Southwest Nigeria. The six (6) selected states are: Ekiti, Lagos, Ogun, Ondo, Osun and Oyo. The survey includes only the registered members of the All Farmers Association of Nigeria (AFAN) in the six (6) selected states of Southwest, Nigeria.

The decision to select AFAN, the Southwest region, is based on four key considerations: (i) The difficulties in reaching the entire population of AFAN. (ii) the region is unarguably endowed with vast arable land, and human resources that can be cultivated to produce sufficient food, and (iii) farmers in the region can easily be accessed during their quarterly meetings compared to the Eastern and Northern regions that are mapped with insecurity, bandit crises, kidnapping syndrome and social unrest and finally (v) the region contributes the highest revenue-generating cash crops to the Federal government.

According to AFAN Prospectus (2020), the population of members of the All Farmers Association of Nigeria (AFAN) in the six (6) selected states is **8,629**. The population is further broken down across the selected states as shown in Table 3.1.

Table 3.1: Breakdown of Population of the Study

SN	AFAN States	Total Registered members
1	Ekiti State	1,218
2	Lagos State	1,172
3	Ogun State	1,682
4	Ondo State	1,376
5	Osun State	1,491
6	Oyo State	1,690
Total		**8,629**

Source www.afan.gov.ng (2022)

The population for the qualitative approach comprised of various stakeholder groups which include the **government** through the Ministry of Agriculture and Ministry of Environment, and the **executive members** of All Farmers Association of Nigeria (**AFAN**).

3.7 Sample Size Determination

A sample, according to Creswell and Creswell (2019), is a subset of the total population chosen for the study. It enables the researcher to extrapolate findings from the sample to the entire population. Samples are essential because it is challenging to study the entire population (especially when the population is large). The overall population of members of the All Farmers Association of Nigeria (AFAN) in the six (6) selected states is **8,629**. As a result, including all of them in the sample is practically impossible in this single study. According to Bidwell and Boston (2020), when the population size is within 50,000, it is considered finite, and thus a sample size determination is required.

Based on the sample size determination table by Taherdoost (2016), a 95% confidence level with a 5% marginal error was selected for this study. Hence, the sample size becomes 370. The main essence of using a 5% margin error is to ensure sampling adequacy. Israel (2013) advocated for 10% adjustment if the population is more than 7,000. The rationale for the 10% adjustment is to

ensure satisfactory representation of respondents. Therefore, the sample size becomes 370 (See Table 3.2). To ensure proper representation and adequacy as suggested by Israel (2013), the sample size was increased by 10%. This suggests that **407** members of the All Farmers Association of Nigeria (AFAN) across the six (6) states were selected for this study.

Table 3.2: Table for Determining Sample Size of a Known Population

	A variance of the population P=50%					
	Confidence level=95% Margin of error			Confidence level=99% Margin of error		
Population Size	5	3	1	5	3	1
50	44	48	50	46	49	50
75	63	70	74	67	72	75
100	79	91	99	87	95	99
150	108	132	148	122	139	149
200	132	168	196	154	180	198
250	151	203	244	181	220	246
300	168	234	291	206	258	295
400	196	291	384	249	328	391
500	217	340	475	285	393	485
600	234	384	565	314	452	579
700	248	423	652	340	507	672
800	260	457	738	362	557	763
1000	278	516	906	398	647	943
1500	306	624	1297	459	825	1375
2000	322	696	1655	497	957	1784
3000	341	787	2286	541	1138	2539
5000	357	879	3288	583	1342	3838
10000	370	964	4899	620	1550	6228
25000	378	1023	6939	643	1709	9944
50000	381	1045	8057	652	1770	12413
100000	383	1056	8762	656	1802	14172
250000	384	1063	9249	659	1821	15489
500000	384	1065	9423	660	1828	15984

Source: Taherdoost (2016)

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As a result of this valuation, the sample size for the quantitative approach is given as **407**. Therefore, a sample size of 407 participants (four hundred and seven) was used for this study. The distribution of the sample size of 407 was based on the proportion or population of the six (6) states in Southwest, Nigeria, as demonstrated in Table 3.3.

Table 3.3 Sampling Frame or Population Distribution (Quantitative)

SN	AFAN States	STATES Codes	Population	Sample Size
1	AFAN, Ekiti State	State 'A'	1,218	58
2	AFAN, Lagos State	State 'B'	1,172	55
3	AFAN, Ogun State	State 'C'	1,682	79
4	AFAN, Ondo State	State 'D'	1,376	65
5	AFAN, Osun State	State 'E'	1,491	70
6	AFAN, Oyo State	State 'F'	1,690	80
	Total		**8,629**	**407**

The sample size for the interview was 10 (ten) as recommended by (Malhotra *et al*., 2017) that recommended between 8 to 25 participants are required for interview. Two (2) directors from each Ministry of Agriculture and Ministry of Environment were selected for the interview. Any executive member (i.e. the Chairman/Vice-Chairman, or Secretary) of the All Farmers Association of Nigeria (AFAN) across the States were selected for the interview. The directors and executive members were selected based on their years of experience and service. They are also assumed to be mature enough to provide reasonable and dependable answers to the questions raised on green management, export market orientation and sustainability (See Table 3.4).

Table 3.4: **Distribution of Respondents for Qualitative Data Collection**

SN	AFAN States	STATES Codes	No of Executives	Ministry of Agriculture	Ministry of Environment
1	AFAN, Ekiti State	State 'A'	1		
2	AFAN, Lagos State	State 'B'	1		
3	AFAN, Ogun State	State 'C'	1	2	2
4	AFAN, Ondo State	State 'D'	1		
5	AFAN, Osun State	State 'E'	1		
6	AFAN, Oyo State	State 'F'	1		
	Total		**6**	**2**	**2**

3.8 Sampling Frame

The sampling frame provided in Table 3.3 encompasses a comprehensive examination of members within the All Farmers Association of Nigeria (AFAN) in six distinct states located in the Southwest region of Nigeria. This sampling frame holds significant importance in research and data collection for several reasons. Firstly, it ensures that the study is conducted with a degree of representation from the chosen states, enabling a regional perspective to be incorporated into the research. Secondly, by targeting members of AFAN, a relevant and specific group within the agricultural sector, it guarantees that the collected data is pertinent to the research's agricultural focus. The use of a detailed analysis enhances the depth and accuracy of the study, making the findings more robust and applicable for policy development and agricultural planning in the region. This sampling frame serves as the foundation for conducting a rigorous and meaningful study, providing valuable insights into the agricultural landscape of the Southwest, Nigeria, and fostering informed decision-making in this sector.

Qualitative: This sampling frame for the interview sessions consists of various stakeholder which includes the Ministry of Agriculture and Ministry of Environment, and the **executive members** of the All Farmers Association of Nigeria (**AFAN**). The ten (10) participants (i.e. directors and executive members) are required to have spent a minimum of five years and are equally expected to provide a historical overview of green management, export market orientation and sustainability of the agricultural sector in Nigeria.

3.9 Sampling Techniques

This study adopted a cluster and purposive sampling techniques. The cluster sampling technique is a probability sampling with the main purpose of selecting respondents without equal chances of being selected. Given that the study population was divided into various clusters based on their products in the six selected states, the questionnaire was then administered to the research participants, who were randomly selected from the clusters since they converge quarterly for their meetings. The division of the study population into clusters based on their products in the six selected states is a systematic approach, allowing for the effective stratification of the sample. Administering the questionnaire to participants who converge quarterly for their meetings within these clusters not only simplifies the data collection process but also enhances the likelihood of obtaining representative responses. Furthermore, this approach helps minimise potential biases that could arise from non-random selection and ensures that the study's findings are more applicable and generalisable to the broader population of interest.

The choice of employing a purposive sampling technique for the interview section of the study carries both methodological and substantive implications. Firstly, by selectively targeting active farmers from the population, the researcher ensured that the participants possess the specific knowledge and experience relevant to the research objectives, which is imperative for obtaining in-depth and contextually rich data. Additionally, the selection based on their locations (states) and grouping according to their produce aligns with the study's regional and thematic focus, contributing to the study's overall coherence and its ability to provide insights into the practices of farmers in the chosen regions and specific crops. The criteria of selecting participants with a minimum of five years of experience in practicing green management and export market via recommended technologies further reinforces the depth of expertise among the interviewees. This enhances the quality and reliability of the data gathered, making it more likely that the findings are valuable and actionable for agricultural development in those specific sectors.

For the qualitative approach, all the ten (10) interviews were **purposively** conducted for directors and selected executive members. The purposive sampling technique enables the researcher to rely on responses that assisted in answering the research questions and meeting specific objectives. The technique is often useful when working with very small samples. Thus, the study purposively selected the samples using the following three criteria:

i.   The selected participants must be registered members of the All Farmers Association of Nigeria (**AFAN**) in any of the selected states;

ii.   The farmers' agri-business must have existed for a minimum of 10 years because it takes time to be adequately interested in long-term sustainability and recognise that healthy soil promotes healthy crops; and

iii.   The selected farmers must have partially or fully engaged in export market orientation and adopted recommended technologies to promote an eco-friendly environment.

The use of purposive sampling is warranted due to the need to select participants who specifically meet the study's criteria, which include AFAN membership, a minimum of 10 years in agri-business to ensure a long-term sustainability perspective, and engagement in export market orientation with the adoption of eco-friendly technologies. This deliberate selection ensures that the chosen participants possess the desired expertise and experiences that directly align with the research objectives, enhancing the relevance and depth of the data collected. Purposive sampling enables the study to focus on individuals with the necessary qualifications to provide valuable insights into sustainable agriculture and eco-friendly practices within the context of the All Farmers Association of Nigeria.

3.10 Sources of Data

The primary and secondary sources of data were used for the study. The secondary source comprises internet facilities, journals, libraries, textbooks, and bulletins. On the other hand, the primary data source helped elicit information from the cross-section of All Farmers Association of Nigeria (**AFAN**) members in any of the selected states. The study used quantitative data (questionnaire) and qualitative data (interview) to collect the primary data. The questionnaire was directed to the registered members of the All Farmers Association of Nigeria in the selected states, while the semi-structured interview was used to elicit responses from the directors of two major Ministries and executive members of selected associations that are connected to green management and export market orientation. Trained research assistants were employed to support the researcher in distributing and collecting the research instruments. Email and phone calls were made to follow up on respondents' timely feedback. Permission was sought and obtained from the relevant authority before the respondents were made to respond to the questionnaire and interview guide.

3.11 Research Instrument

This study made use of a structured questionnaire and secondary data as quantitative modes of data collection while structured interviews were used for the collection of qualitative data based on the (Creswell & Creswell, 2019) concurrent explanatory approach of the mixed methods.

i.   Quantitative Instruments (Questionnaire)

The quantitative technique involves using a set of questions (structured questionnaire) to elicit a response from respondents. The questions for quantitative data were adapted from Chikodili (2012), Akani (2015) and Fadeyi, Oladele, Imhonopi, & Nwachukwu, (2019) and divided into two sections: A and B, respectively. Section A focused on the descriptive and demographic characteristics of the respondents: the demographic profile. On the other hand, section B covered relevant questions about the objectives of the study and vital questions examining the constructs connected with green management, export market orientation and sustainability of the agricultural sector in Nigeria (See Appendix 1).

Section A deals with the demographic data of the respondents. Section B captures research data for green management (green method, green material, green machine, between green measurement). Part C captures the export market orientation scale, while part D captures the sustainability scale. According to Lury, Fensham, Heller-Nicholas, Lammes, Last & Uprichard (2020), the use of a questionnaire typically yielded accurate results because respondents can respond to the questionnaire at their leisure without the presence of undue influence of interviewers.

Furthermore, the use of questionnaires is justified because they are more efficient, particularly in explanatory and exploratory research, due to their flexibility, which allows them to adapt to different conditions, and their confidential nature (Osuagwu, 2021). The questionnaire used a five-scale Likert format to capture the precise level of attention and responses to the research items. 1 = Strongly Agree (SA), 2 = Agree (A), 3 = Undecided (U), 4 = Disagree (D), and 5 = Strongly Disagree (SD). The Likert scale pattern of the research instrument guides the respondents' selection process. Hence, the questions compiled were grouped as follows:

i.   Section A: Items of respondents' demographic profile (Items 1-7).
ii.   Section B: Items on green management, export market orientation and sustainability (Items 1-59). This is presented in Table 3.5.

Table 3.5: Items in the questionnaire and their sources

S/N	Constructs	Variables	Number of Items	Sources
1	Green Management	Green Method (Items 1-3)	3	Begum et al.,(2022); Rahman (2021); Raut, Luthra, Narkhede, Mangla, Gardas, & Priyadarshinee (2019).
		Green Materials (Items 4-6)	3	
		Green Machine (Items 7-9)	3	
		Green Measurement (Items 10-13)	3	
2	Export Market Orientation	Export market intelligence generation (Items 1-10)	10	Dalgic, (2023; Ipek & Bıçakcıoğlu-Peynirci, (2019); Varadarajan, (2023)
		Responsiveness to Market Intelligence (Items 1-10)	10	
		Export Market Intelligence Dissemination (Items 1-10)	10	
3	Sustainability	Economic Sustainability (Items 1-Q4)	4	Ogunkan (2022); (Sezen-Gultekin & Argon, 2020).
		Social Sustainability (Items 1-Q4)	4	
		Governance Sustainability (Items 1-Q4)	4	
		Environmental Sustainability (Items 1-Q4)	4	

ii. Qualitative Data (Semi-Interview)

The semi-structured interviews were based on a series of cautiously constructed open-ended questions that foster spontaneous conversation and active participation. For the qualitative approach, the interview population comprises stakeholders from various sectors, including government representatives from the Ministry of Agriculture and Ministry of Environment, as well as executive members of the All Farmers Association of Nigeria (AFAN). A sample size of 10 participants was chosen in alignment with the recommendation by Malhotra et al. (2017), which suggests between 8 to 25 participants for interviews. Specifically, two directors from each Ministry of Agriculture and Ministry of Environment were selected based on their expertise and tenure. Moreover, executive members of AFAN, including the Chairman, Vice-Chairman, or Secretary, from different states were chosen for their insights and involvement in agricultural affairs. The selection criteria emphasised the individuals' years of experience and service within

their respective organisations. The interviews were conducted across various states, ensuring a diverse representation of perspectives and experiences. The exercise recorded personal interactions between the researcher and the respondents. The questions were uniform for the respondents; the exercise allowed for flexibility. It was estimated that the respondents spent between ten to fifteen minutes to complete the survey questionnaire.

3.12 Validity of Research Instruments

Content and construct validity were used in this study. An instrument's content validity refers to whether it contains all the necessary information for the researcher to accurately assess the attributes of interest (Osuagwu, 2021). On the other hand, construct validity is a method of ensuring that items in a research instrument truly measure the constructs claimed to measure (Brown, 2020), while the validity of an instrument is determined by its ability to collect the desired data. The purpose of the validity test is to ensure that the data collected is consistent with the intended goal and purpose of the research (Kimberlin & Winterstein, 2019; Miles & Huberman, 1994). Content validity, construct validity, and criterion-related validity are the three major types of validity.

To ensure appropriate validity in this study, content and construct validity were used. The questionnaire items were presented to experts, supervisors, and relevant professors in the field of research context at Covenant University's department of business management. Their feedback helped in confirming the validity of the questionnaire instrument by ensuring that any necessary revisions, rephrasing, addition, and deletion of questionnaire items that deviate from the measured value were carried out.

Confirmatory Factor Analysis (CFA) was used to demonstrate construct validity, allowing the researcher to determine the discriminant and convergent validity of the research instrument. Divergent validity assesses how far items in the research instrument deviate from or are unrelated to the measured constructs. In contrast, convergent validity assesses how far items in the research instrument align with or are related to the constructs they intend to measure (Oyeniyi *et al*., 2016). To conduct Confirmatory Factor Analysis (CFA) and calculate the Average Variance Extracted (AVE) of 0.5 for the variables, a structural equation modeling software such as SmartPLS was used. First, a measurement model was specified by defining the latent factors and their corresponding observed indicators. The software (i,e. SMART PLS) estimated the model

parameters, and the AVE values were assessed to ensure that they meet the threshold of 0.5, indicating that at least 50% of the variance in the latent construct is explained by its observed indicators, thereby demonstrating good convergent validity. The result of the validity test is depicted in Table 3.6.

Table 3.6: Validity Table

Variables	AVE ($\geq$0.5)	No of Items
Green methods	0.686	3
Green machines	0.696	3
Green materials	0.631	3
Green measurement	0.614	3
Export market orientation	0.688	22
Sustainability	0.671	20
Average Mean	**0.664**	**51**

3.13 Reliability of Research Instrument

To ensure the reliability of the research instrument, reviewers were engaged for both internal and external validity to observe the collection of the data and the analysis process to establish validation of evidence for important findings and conclusions in the study. The researcher also made use of archival records on issues relating to green management, export market orientation and sustainability. Basically, three conditions for CFA loading specify that; firstly, when the minimum value criterion exceeds 0.70, all scale and measurement items are significant. Secondly, each of the construct composite reliability should exceed 0.80, and lastly, the construct average variance extracted estimate (AVE) should exceed 0.50. The essence is to ensure internal consistency, while the Cronbach alpha coefficient was used to decide the reliability of the instrument. Thus, in determining the reliability of the research instrument used in this study, Cronbach's Alpha was used, and it was based on the assumption which states that the research instrument is reliable if the value is higher than 0.70.

3.14 Pre-distribution of Research Instrument

A pilot study was conducted to determine the reliability of the research instrument. Usually, a survey is said to be reliable if it gives the same result when it is administered repeatedly. Experts, such as professors, in the field of investigation, assisted in developing the instruments for both face

and content validity. For the pilot survey, twenty (20) copies of the questionnaire were made available to the farmers' association in Ota, Ogun state, Nigeria. The essence of the pilot study is to ensure that the items on the research instrument are not only reliable but also valid.

The inclusion of a pilot study, as indicated in Table 3.7, is a valuable approach to assess the applicability and dependability of the research device. The use of SEM_SmartPLS to calculate Cronbach's alpha coefficients ensures that the measurements are internally consistent and reliable. These findings in the pilot study confirm the robustness of the research instrument and demonstrate the diligence in the research process, strengthening the validity of the study's results and enhancing its credibility.

Table 3.7: Reliability Table

Variables	No of items	Cronbach's Alpha	Composite Reliability
Green methods	3	0.811	0.867
Green machines	3	0.782	0.873
Green materials	3	0.706	0.836
Green measurement	3	0.785	0.825
Export market orientation	22	0.878	0.902
Sustainability	20	0.744	0.847
Average	**51**	**0.784**	**0.858**

Table 3.7 presents the reliability statistics for various variables in the study. The Cronbach's Alpha values generally indicate good internal consistency for the constructs, with scores exceeding 0.7. The high composite reliability values, mostly above 0.85, suggest that the measurement items reliably capture the underlying latent constructs. This implies that the constructs are robust and consistent in measuring the intended concepts, which enhances the reliability and validity of the study's findings, ensuring that the data accurately represents the constructs under investigation.

3.15 Method of Data Presentation and Analysis

(i) Quantitative Data Analysis

For this phase, the data collected were presented using frequency tables, percentages, and charts. The data were analysed using IBM SPSS v.26 software. The mean and standard deviation scores of the dependent and independent variables were determined using descriptive statistics. Also, the demographic characteristics were analysed using descriptive statistics. Structural Equation Modelling (SEM)(Partial Least Square (PLS)) version 3.0 was used to measure hypotheses 1, 2, 3, 4 and 5. Table 3.8 indicates the quantitative data analysis phase.

Table 3.8: Quantitative Analysis Matrix

Objectives	Research Hypotheses	Method of Data Analysis
1.	Green Method does not significantly influence the Motive of youth punter sustainability of agricultural sector in Southwest, Nigeria	Multivariate/ SEM/PLS version 3.0
2.	Green Material does not significantly affect the sustainability of agricultural sector in Southwest, Nigeria	Multivariate/ SEM/PLS version 3.0
3.	Green Machine does not significantly impact the sustainability of agricultural sector in Southwest, Nigeria;	Multivariate/ SEM/PLS version 3.0
4.	There is no significant relationship between green Measurement and the sustainability of agricultural sector in Southwest, Nigeria	Multivariate/ SEM/PLS version 3.0
5.	Export market orientation does not significantly impact green management and the sustainability of agricultural sector in Southwest, Nigeria	Multivariate/ SEM/PLS version 3.0

The use of Structural Equation Modeling-Partial Least Squares (SEM-PLS) version 4.0 for the quantitative analysis in this study was justified by the method's suitability for analyzing large data quantities and its ability to estimate model parameters with a minimum reliability threshold of 0.60, aligning with the research's reliance on established measures. Additionally, the choice of SEM-PLS was motivated by its causal-predictive nature, making it a useful method for balancing explanation and prediction, which is essential for studies aiming to derive managerial

recommendations that are predictive by nature. Furthermore, the established nature of SEM-PLS as a multivariate analysis technique in the social sciences, along with its capability to test path coefficients' significance through bootstrapping routines, provided a robust analytical framework for evaluating the research hypotheses related to green management, export market orientation, and the sustainability of the agricultural sector in Southwest, Nigeria, as outlined in Table 3.8.

(ii) Qualitative Data Analysis

For qualitative data analysis, the recorded interview was transcribed verbatim and thematically. The thematic analysis was used to make a replicable inference by interpreting and evaluating texts like documents and oral communication. Manual thematic analysis was used to analyse the data obtained via in-depth interviews.

3.16 Ethical Consideration

The study was conducted in line with Covenant University Ethics Committee requirements. The researcher informed the respondents from the selected association and necessary approval (verbal) was gotten from the executive members of the All Farmers Association of Nigeria (AFAN). Information collected from respondents were treated with the utmost confidentiality, and the data collected were used for the research only. The researcher ensured that studies by previous researchers were acknowledged by quoting them using American Psychological Association (APA) referencing style (6th edition) in accordance with the school of postgraduate studies of Covenant University.

For the important purpose of anonymity, the respondents' names were not allowed to be written on the questionnaire. All information such as job title, name, and strongly expressed opinions that may allow the participant to be known were removed. The researcher also ensured that all information gotten on the field for the study were kept sensitive and used for research purpose only. The researcher ensured that as much as possible, the questionnaire was administered without any form of bias. The researcher did not impose any responsibility on the participant, and no assumption was made regarding the respondents' opinions. The researcher ensured that the results from respondents were not altered regardless of the situation.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter delves into the comprehensive analysis of the raw data obtained through structured questionnaire, aiming to shed light on the pivotal role of **export market orientation** and its potential to bolster the relationship between **green management practices** and **sustainability** within the **agribusiness sub-sector** in Southwest Nigeria. To achieve this, a meticulous examination of the collected data was conducted utilising a combination of descriptive statistics, which offered a concise summary of the dataset, and inferential statistics, which helps to draw meaningful conclusions and establish connections between variables. Subsequently, the chapter embarks on an in-depth discussion of the research findings, meticulously aligning them with the predefined objectives of the study.

4.1 Response Rate

The study is delimited to registered members of the All Farmers Association of Nigeria (AFAN) as its target population. The research employs cluster and purposive sampling techniques to systematically select farmers from six states: Ekiti, Lagos, Ogun, Osun, Oyo, and Ondo. These states were chosen due to their reported adoption of recommended technologies in the cultivation of maize, cassava, cashew, cocoa, rice, and soybean. As such, the primary unit of analysis comprises business owners and managers who are active members of AFAN. The allocation of the sample size, which consists of 407 participants, is proportionally distributed among the six states in the Southwest region of Nigeria.

Following diligent follow-up efforts, a total of 353 completed questionnaires were successfully retrieved and deemed suitable for inclusion in the analysis. This remarkable response rate, standing at 87%, underscores the robustness of the dataset, thereby substantiating its appropriateness for establishing a solid foundation and ensuring the validity and reliability of the research investigation focused on examining the intricate relationship among the variables under study. The remaining 13% was due to non-responses, incomplete questionnaires, or participants declining to participate after initially showing interest. The response rate to the questionnaire administered was as presented in Table 4.1.

Table 4.1: Respondents' Response Rate

Sample Size	Number	Percentage
Correctly filled and Returned	353	87%
Not Returned and not filled	54	13%
Total	407	100%

Source: Researcher's Field Results, 2023
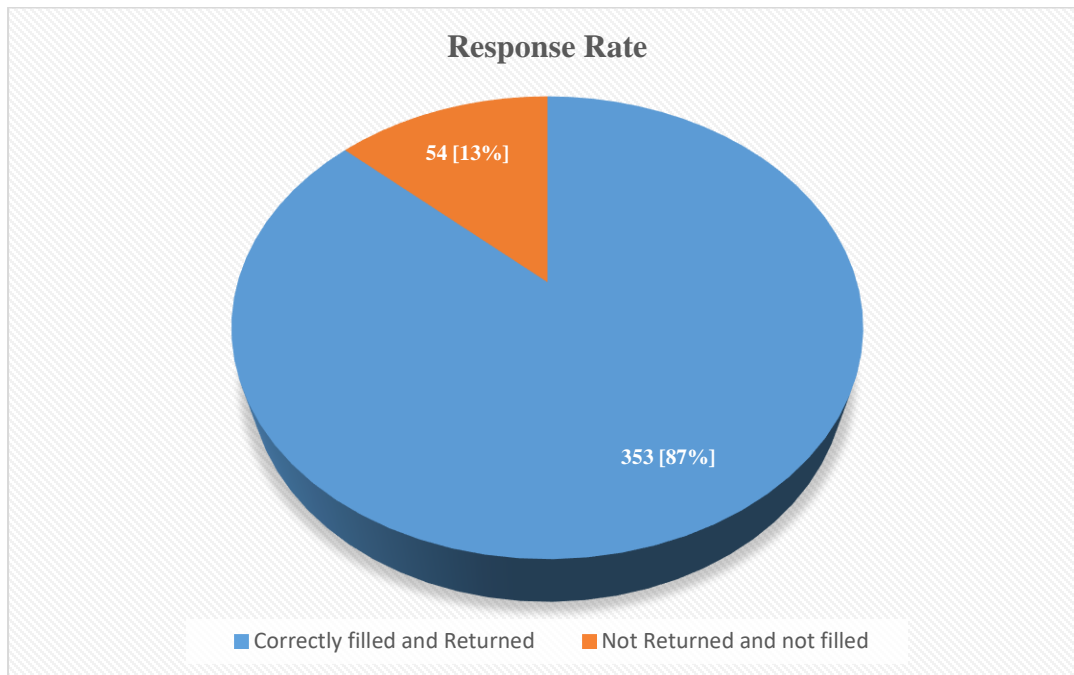
Figure 4.1: Response rate across the selected study areas

Figure 4.1 showcases the response rate achieved from the administration of questionnaires to the selected target respondents, and it is indeed an encouraging outcome. This substantial response rate is a positive indicator of the study's robustness and lends itself to the potential for attaining reliable results. Such a response rate instills confidence in the representativeness of the data collected and, consequently, enhances the feasibility of generalising the research findings to the broader agricultural sector. It signifies that a substantial proportion of the intended participants actively engaged with the survey, thereby strengthening the research's potential to yield insights that can be applicable and insightful for stakeholders within the agricultural industry.

Table 4.2: Breakdown of Retuned Questionnaire

S/N	AFAN States in Southwest	AFAN Code(s)	Copies Distributed	Copies Retrieved	% of Copies Retrieved
1	AFAN, Ekiti State	State 'A'	58	49	84%
2	AFAN, Lagos State	State 'B'	55	48	87%
3	AFAN, Ogun State	State 'C'	79	63	80%
4	AFAN, Ondo State	State 'D'	65	60	92%
5	AFAN, Osun State	State 'E'	70	62	89%
5	AFAN, Oyo State	State 'F'	80	71	89%
	Total		**407**	**353**	**87%**

Table 4.2 provides a detailed breakdown of the returned questionnaires distributed across the various states of the All Farmers Association of Nigeria (AFAN) in the Southwestern region. The table indicates the total number of questionnaires distributed in each state (Copies Distributed), the number of questionnaires that were successfully retrieved (Copies Retrieved), and the percentage of retrieved copies in relation to those distributed (% of Copies Retrieved). Notably, the response rate across all states is commendable, with an overall percentage of 87%. This signifies that a substantial majority of the intended respondents actively participated in the survey. Specifically, Ondo State demonstrated the highest response rate at 92%, while Ogun State had the lowest response rate at 80%. These findings reflect a strong engagement from members of AFAN across the Southwestern states, lending credibility to the research's potential for generating reliable and representative data for analysis within the agricultural sector in the region.

4.2 Demographic Characteristics of the Respondents

Table 4.3 presents a comprehensive overview of the demographic characteristics of registered members within the All Farmers Association of Nigeria (AFAN) operating across the diverse states of Southwest Nigeria. These demographic variables encompass a range of essential factors, including gender, age distribution, marital status, educational qualifications, years of experience in the agricultural sector, and the specific nature of agricultural commodities engaged in, with a specific focus on export commodities. This detailed breakdown of demographic attributes offers valuable insights into the composition of the AFAN membership within the region. It provides a

snapshot of the diversity and profile of the individuals who play a pivotal role in the agricultural landscape in Southwest Nigeria (See Table 4.3).

Table 4.3: Demographic Characteristics of Respondents across the selected AFAN

SN	Variables	Sub variables	Frequency	Percentage [%]
1.	Gender	Male	202	57%
		Female	151	43%
		Total	**353**	**100%**
2.	Age	Below 30 years	24	7%
		31-40 years	156	44%
		41-50 years	121	34%
		51yrs & Above	52	15%
		Total	**353**	**100%**
3.	Marital Status	Single	83	24%
		Married	249	70%
		Others	21	6%
		Total	**353**	**100%**
4	Educational Qualification	SSCE	57	16%
		Diploma	101	29%
		HND/B.Sc.	131	37%
		Postgraduate	64	18%
		Total	**353**	**100%**
5	Years of experience in the business	1-5years	38	11%
		6-10years	139	39%
		11-15years	114	32%
		Over 16yrs	62	18%
		Total	**353**	**100%**
6	Nature of your agricultural [export] commodities	Crops	76	21%
		Livestock	71	20%
		Fisheries	55	16%
		Forestry	48	14%
		Agro-Processing	53	15%
		Agro-Allied	50	14%
		Total	**353**	**100%**
7.	Size of your business	Small	214	61%
		Medium	139	39%
		Total	**353**	**100%**

Interpretation:

Table 4.3 provides a comprehensive overview of the demographic characteristics of respondents who are registered members of the All Farmers Association of Nigeria (AFAN) across various selected states in Southwestern Nigeria. The table reveals crucial insights into the composition of this agricultural community and has significant implications for understanding and addressing the dynamics within the sector.

The gender distribution of respondents show that 57% are male, while 43% are female. This gender imbalance within the AFAN membership highlights the need for gender-inclusive policies and initiatives to ensure equitable participation and opportunities for female farmers. Encouraging women's involvement in agriculture can enhance productivity and contribute to overall sector growth.

Regarding age, the majority of respondents fall within the age group of 31-40 years (44%), indicating a relatively young and active farming population. This demographic trend suggests the potential for innovation and adaptability within the sector. However, it is essential to provide support and training to harness the energy and creativity of this younger generation of farmers.

Marital status data reveal that 70% of respondents are married. Understanding the family structure of farmers is crucial for designing policies that consider the role of families in agricultural practices and the potential impact on decision-making processes within households.

Educational qualifications vary among respondents, with 37% holding HND/B.Sc. degrees and 29% having diplomas. This educational diversity underscores the importance of tailored training programmes and extension services to meet the needs of farmers with varying levels of formal education.

The nature of agricultural commodities engaged in by respondents indicate a diverse range of activities, with 20% involved in livestock farming and 16% in fisheries. This diversity highlights the multifaceted nature of agriculture in the region and the potential for value chain development and market opportunities across different agricultural sectors.

In terms of business size, 61% of respondents classify their businesses as small, while 39% identify as medium-sized enterprises. This distribution suggests that the majority of farmers operate at the small-scale level, emphasising the importance of targeted support and access to resources to help smallholder farmers thrive.

Overall, Table 4.3 underscores the significance of understanding the demographics of AFAN members within the Southwestern Nigerian context. It highlights the need for gender-responsive policies, youth engagement strategies, and tailored capacity-building programmes to address the diverse characteristics and challenges faced by farmers. Additionally, the data emphasise the potential for sector growth and transformation through inclusive and sustainable agricultural practices.

4.3 Descriptive Analysis and Interpretations

This section present results from frequency distribution and interpretations of how export market orientation can strengthen green management and sustainability of agribusinesses in Southwest, Nigeria. This section focuses on the analysis of the issues relating to green management dimensions (green method, green material, green machine, green measurement); measures of export market orientation (export market intelligence generation, responsiveness to market intelligence, export market intelligence dissemination); and sustainability of agribusinesses include Economic Sustainability (ECS), Environmental Sustainability (EVS), Social Sustainability (SUS), and Governance Sustainability (GOS). These issues constitute the unit of analysis.

Descriptive statistics serve the purpose of elucidating fundamental characteristics within a dataset, offering concise summaries of both the sample itself and the various measurements contained therein. Prior to delving into the analysis of these descriptive statistics within this study, it is imperative to assess the level of satisfaction based on the scores provided by respondents. This assessment involves categorising the satisfaction levels into five distinct tiers on the Likert scale.:

<u>Higher score – a lower score</u>

Number of levels

<u>5-1</u>

5

$= 0.80$

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Therefore, Table 4.4 illustrates the criteria for understanding the mean satisfaction level.

Table 4.4: The Criteria for Understanding the Mean Scores of Satisfaction Level

Scale	Mean scores	Level of satisfaction
1	1.00 – 1.80	Extremely Dissatisfied
2	1.81 – 2.60	Dissatisfied
3	2.61 – 3.40	Undecided/Not sure
4	3.41 – 4.20	Satisfied
5	4.21 – 5.00	Extremely Satisfied

4.4 Analysis of Research Variables

This section emanates from an examination of frequency distributions and subsequent interpretations, specifically aimed at elucidating how export market orientation can fortify the facets of green management and the sustainability of agribusinesses in Southwest Nigeria. Within this segment, the analysis is centered on various dimensions of green management, encompassing green methods, green materials, green machinery, and green measurements. Additionally, it encompasses the evaluation of export market orientation, spanning aspects like the generation of export market intelligence, responsiveness to market intelligence, and the dissemination of such intelligence. Furthermore, the assessment extends to the sustainability of agribusinesses, encompassing economic sustainability (ECS), environmental sustainability (ES), social sustainability (SS), and governance sustainability (GS). To facilitate this analysis, descriptive statistics such as frequency distributions and means are employed as analytical tools.

The descriptive statistics for the dimensions of green management, encompassing green methods, green materials, green machinery, and green measurements are presented in Tables 4.5 – 4.8. Table 4.6 shows the frequency distribution of export market orientation which includes the generation of export market intelligence, responsiveness to market intelligence, and the dissemination of such intelligence. Table 4.7 reveals the dimensions of sustainability of

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agribusinesses, encompassing economic sustainability (ECS), environmental sustainability (ES), social sustainability (SS), and governance sustainability (GS).

4.4.1 Dimensions of Green Management

Tables 4.5 to 4.8 offer an insightful portrayal of the descriptive statistics pertaining to the various dimensions constituting green management. These dimensions encompass an array of essential facets, including green methods, green materials, green machinery, and the meticulous assessment of green measurements. Through these tables, a comprehensive and detailed examination of each dimension is provided, shedding light on the inherent characteristics and trends observed within the realm of green management. These statistical insights serve as a valuable foundation for understanding the nuances of sustainable practices and eco-conscious strategies within the agribusiness sector, thereby facilitating a more profound comprehension of the dynamics at play in Southwest Nigeria's agricultural landscape.

Table 4.5: Frequency Distribution of Green Method across the selected AFAN States

NO	ITEM	Frequency and Percentage					Total	Mean
	Green Method	**SA**	**A**	**U**	**D**	**SD**		
1	My company has established ways of improving the quality and amount of crops	117	142	10	56	28	**353**	4.402
		33.1%	40.2%	2.8%	15.9%	8.0%	**100%**	
2	The way we do our business is good for the environment.	112	126	12	56	47	**353**	4.103
		31.7%	35.7%	3.4%	15.9%	13.3%	**100%**	
3	The way we operate matches our fundamental beliefs.	101	155	11	32	54	**353**	4.383
		28.6%	43.9%	3.1%	9.1%	15.3%	**100%**	
	Total Average Mean: Extremely Satisfied							**4.296**

Table 4.5 offers a detailed insight into the frequency distribution of Green Method assessments across the selected AFAN states in Southwest Nigeria. The table encompasses various items under Green Method, and each item is evaluated using a Likert scale, ranging from "Strongly Agree (SA)" to "Strongly Disagree (SD)." The mean score for each item is provided as well as the total average mean. From the table, it is evident that the respondents' evaluations of Green Methods

are generally positive. A significant portion of respondents, 73.3%, express agreement with the statement that their companies have established ways to enhance crop quality and quantity. Likewise, 67.4% of respondents believe that their business practices are environmentally friendly. Additionally, 72.5% of respondents feel that their operations align with their fundamental beliefs, indicating a strong commitment to green management practices within their agricultural businesses.

The total average mean score of 4.296 suggests that respondents are, on average, highly satisfied with the Green Method practices within their agricultural businesses. These findings have implications for the sustainability of agribusinesses in Southwest Nigeria. The positive assessments of Green Methods indicate a general awareness and commitment to environmentally friendly and sustainable agricultural practices among AFAN members. This bodes well for the region's agribusiness sector as it signifies a proactive approach to mitigating environmental impact and aligning agricultural operations with fundamental beliefs. The high level of satisfaction implies that these practices are well-received and integrated into the operations of these businesses, potentially leading to improved agricultural productivity and long-term sustainability.

Table 4.6: Frequency Distribution of Green Material across the selected AFAN States

NO	Green Material	Frequency and Percentage					Total	Mean
		SA	**A**	**U**	**D**	**SD**		
1	We make sure that the resources we use do not cause any damage to the environment.	156 44.2%	142 40.2%	10 2.8%	30 8.5%	15 4.3%	**353** **100%**	4.174
2	The materials we use are carefully chosen with the environment in mind.	136 38.5%	144 40.8%	10 2.8%	30 8.5%	23 6.5%	**353** **100%**	3.962
3	We buy materials that are good for the environment	122 34.6%	172 48.7%	9 2.6%	34 9.6%	16 4.5%	**353** **100%**	4.005
	Total Average Mean: Satisfied							**4.047**

Table 4.6 provides a comprehensive overview of the frequency distribution of Green Material assessments across the selected AFAN states in Southwest Nigeria. This table examines various items related to Green Material practices, and each item is assessed using a Likert scale, ranging from "Strongly Agree (SA)" to "Strongly Disagree (SD)." Additionally, the mean score for each item is presented, along with the total average mean. The table reveals that respondents hold generally positive views regarding Green Material practices. A significant majority of respondents, 84.4%, express agreement with the practice of ensuring that the resources they use do not harm the environment. Additionally, 79.3% of respondents believe that they choose materials with environmental considerations in mind. Furthermore, 83.3% of respondents endorse the practice of purchasing environmentally friendly materials, highlighting their commitment to green management and sustainability in their agricultural operations.

The total average mean score of 4.047 indicates that respondents are, on average, satisfied with the Green Material practices within their agricultural businesses. These findings have significant implications for the sustainability of agribusinesses in Southwest Nigeria. The positive assessments of Green Material practices underscore a strong commitment among AFAN members to environmentally conscious choices in resource utilisation and material procurement. This commitment reflects a proactive approach to reducing environmental harm and aligning material selection with eco-friendly principles. The high level of satisfaction suggests that these practices are well-integrated into the daily operations of these agricultural businesses, potentially leading to enhanced sustainability, reduced environmental impact, and the promotion of more responsible resource management within the agribusiness sector.

Table 4.7: Frequency Distribution of Green Machine across the selected AFAN States

NO	Green Machine	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	The machines we use for production do not cause harm to the environment.	114	127	20	64	28	**353**	3.794
		32.3%	36%	5.7%	18.1%	7.9%	**100%**	
2	We operate our machines with safety in mind	126	132	12	48	35	**353**	4.103
		35.7%	37.4%	3.4%	13.6%	9.9%	**100%**	
3	We do not overwork our machines to make them last longer.	112	135	10	46	50	**353**	3.962
		31.8%	38.2%	2.8%	13.0%	14.2%	**100%**	
	Total Average Mean: Satisfied							**3.953**

Table 4.7 provides a comprehensive overview of the frequency distribution of Green Machine assessments across the selected AFAN states in Southwest Nigeria. This table assesses various items concerning Green Machine practices, and each item is evaluated using a Likert scale, ranging from "Strongly Agree (SA)" to "Strongly Disagree (SD)." Furthermore, the mean score for each item is presented, along with the total average mean. The table reveals that respondents generally hold positive views concerning Green Machine practices. A significant portion of respondents, 68.3%, express agreement with the practice of using machines that do not harm the environment. Additionally, 73.1% of respondents believe in operating machines with safety as a priority. Furthermore, 70% of respondents endorse the practice of not overworking machines to extend their lifespan, indicating a strong commitment to responsible machinery use and sustainability in their agricultural businesses.

The total average mean score of 3.953 suggests that respondents are, on average, satisfied with the Green Machine practices within their agricultural businesses. These findings have significant implications for the sustainability of agribusinesses in Southwest Nigeria. The positive assessments of Green Machine practices highlight a commitment among AFAN members to the responsible use and maintenance of machinery in their agricultural operations. This commitment

reflects a proactive approach to minimising environmental harm and ensuring safety in machine operation. Additionally, the recognition of not overworking machines to extend their lifespan signifies a practical strategy that can lead to reduced resource consumption and greater sustainability. The high level of satisfaction suggests that these practices are well-incorporated into the daily operations of these agricultural businesses, potentially leading to enhanced sustainability, reduced environmental impact, and safer working conditions within the agribusiness sector.

Table 4.8: Frequency Distribution of Green Measurement across the selected AFAN States

Green Measurement	Frequency and Percentage					Total	Mean
	SA	A	U	D	SD		
1 We regularly check the environmental impact of our business activities.	127 36%	142 40.2%	20 5.7%	50 14.1%	14 4%	**353** **100%**	3.678
2 The transportation methods we use help to minimise harm to the environment	133 37.7%	143 40.5%	22 6.2%	23 6.5%	32 9.1%	**353** **100%**	4.027
3 We purchase materials that are environmentally friendly	123 34.8%	134 38%	21 6%	42 11.9%	33 9.3%	**353** **100%**	3.502
Total Average Mean: Satisfied							**3.736**

Table 4.8 presents the frequency distribution of green measurement practices among the selected AFAN states in Southwest Nigeria. The respondents showed a commendable commitment to monitoring and assessing the environmental impact of their business activities, with 76.2% in agreement. They also demonstrated a strong focus on eco-friendly transportation methods, with 78.2% in agreement. However, there is room for improvement in purchasing environmentally friendly materials, as only 72.8% of respondents agreed with this statement. This suggests that efforts to enhance sustainability in agribusiness should include a greater emphasis on sourcing eco-friendly materials.

These findings have important implications for the green management and sustainability of agribusinesses in the Southwest region of Nigeria. The high level of agreement with the first two green measurement items signifies a commendable commitment to environmental responsibility among the respondents. Regularly checking the environmental impact of business activities and using eco-friendly transportation methods are positive practices that contribute to sustainability. However, the lower level of agreement with the third item suggests that some respondents may need to improve their efforts to purchase environmentally friendly materials, which is crucial for reducing the ecological footprint of their agricultural operations. Overall, these findings highlight the need for continued emphasis on green management practices and the adoption of environmentally friendly materials to enhance sustainability in agribusiness in the region.

4.4.2 Dimensions of Export Market Orientation

Tables 4.9 to 4.11 provide valuable insights into the descriptive statistics related to the key dimensions of export market orientation, which are crucial for understanding how agribusinesses in Southwest engage with international markets. These dimensions encompass export market intelligence generation, responsiveness to market intelligence, and export market intelligence dissemination. The analysis of these dimensions sheds light on the strategies and practices adopted by agribusinesses to gather market information, respond effectively to market trends, and disseminate intelligence within their organisations. This information is vital for formulating recommendations and strategies aimed at strengthening the export market orientation of these businesses, ultimately contributing to their sustainability and growth in the global marketplace.

Table 4.9: Frequency Distribution of Export Market Intelligence Generation across the selected AFAN States

NO	Items for Export Market Intelligence Generation	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	We take bold decisions standing out among competitors in overseas markets	101 28.6%	149 42.2%	22 6.2%	51 14.5%	30 8.5%	353 100%	4.190
2	My firm searches for up to-date information about target markets,	113 32%	134 38%	21 6%	63 17.8%	22 6.2%	353 100%	4.254
3	My firm places special emphasis on export markets rather than on domestic markets	99 28.0%	107 30.3%	18 5.1%	80 22.7%	49 13.9%	353 100%	3.976
4	My firm gathers market knowledge related to target customers	136 38.5%	133 37.7%	21 6%	18 5.1%	45 12.7%	353 100%	4.008
5	My firm meets the foreign customers' expectations	104 29.5%	126 35.7%	25 7.1%	45 12.7%	53 15%	353 100%	3.891
6	We adapt strategies to address different customers' needs in export markets	124 35.1%	122 34.6%	20 5.7%	55 15.5%	32 9.1%	353 100%	4.104
7	We develop export sales strategy in achieving superior export performance	120 34%	119 33.7%	16 4.5%	63 17.9%	35 9.9%	353 100%	4.275
	Total Average Mean: Satisified							**4.100**

120

Table 4.9 delves into the dimension of responsiveness to market intelligence among members of AFAN in Southwest, Nigeria. This dimension assesses their ability to adapt and respond to market information effectively. The overall mean score of 3.838 suggests a general satisfaction with their level of responsiveness to market intelligence. The data highlight several noteworthy findings. Firstly, a considerable proportion of respondents (61.2% of SA and A combined) agreed that their firms take advantage of opportunities in foreign markets based on market intelligence. This suggests a proactive approach to capitalising on market insights to expand their export activities, demonstrating a commitment to international market growth.

Secondly, a significant number of respondents (66.0% of SA and A combined) expressed their firms' pursuit of high levels of export customer responsiveness. This indicates a focus on meeting the needs and expectations of foreign customers, which is a fundamental aspect of effective export strategies. Additionally, a similar percentage (69.2% of SA and A combined) reported being more responsive to export customers' expressed needs, highlighting their dedication to tailoring their offerings to foreign markets.

Furthermore, the data reveal that many respondents (67.8% of SA and A combined) regularly collect accurate market information, indicating a commitment to staying informed about changing market conditions. This practice is essential for making informed decisions and adapting to evolving market dynamics. However, it is important to note that for items related to making better use of consumer reviews feedback (47.2% of SA and A combined) and ensuring consistent implementation of quality elements based on consumers' expectations (46.1% of SA and A combined), a smaller proportion of respondents agreed. These findings suggest that there may be room for improvement in terms of incorporating customer feedback into their operations and consistently meeting consumers' quality expectations in export markets.

In summary, Table 4.10 demonstrates that members of AFAN in Southwest, Nigeria, generally exhibit a satisfactory level of responsiveness to market intelligence. They prioritise using market information for decision-making, emphasise customer responsiveness in foreign markets, and actively collect market data. However, there is potential for enhancing the utilisation of consumer feedback and ensuring consistent quality implementation, which are critical for long-term competitiveness in export markets.

Table 4.10: Frequency Distribution of Responsiveness to Market Intelligence across the selected AFAN States

NO	Responsiveness to Market Intelligence	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	My firm takes advantage of opportunities in foreign markets based on market intelligence	109 30.9%	128 36.3%	20 5.6%	58 16.4%	38 10.8%	**353** **100%**	3.811
2	My firm seeks high levels of export customer responsiveness for their businesses	105 29.7%	128 36.3%	20 5.6%	68 19.3%	32 9.1%	**353** **100%**	3.901
3	Our firm is more responsive to the export customers' expressed needs	136 38.5%	114 32.3%	25 7.1%	33 9.3%	45 12.7%	**353** **100%**	3.878
4	My firm regularly collect accurate market information	101 28.6%	132 37.4%	24 6.8%	42 11.9%	54 15.3%	**353** **100%**	4.103
5	We make better use of the information contained in the consumer reviews feedback	121 34.3%	125 35.4%	23 6.5	35 9.9%	49 13.9%	**353** **100%**	3.673
6	We ensure consistent implementation of quality elements based on consumers' expectations	134 38%	106 30%	21 5.9%	42 11.9%	50 14.2%	**353** **100%**	3.690
7	Our firm promotes exchange of intelligence within and across departments	122 35.6%	135 38.2%	24 6.8%	43 12.2%	29 8.2%	**353** **100%**	3.811
	Total Average Mean: Satisfied							**3.838**

Table 4.10 sheds light on the responsiveness to market intelligence among members of AFAN in Southwest, Nigeria. The table encompasses seven items that assess the degree to which these agribusinesses utilise market intelligence to make strategic decisions and enhance customer responsiveness. The overall mean score of 3.838 indicates a general satisfaction with their level of responsiveness to market intelligence. Firstly, the data reveals that a considerable proportion of respondents (67.2% of SA and A combined) agree with the statement that their firms take advantage of opportunities in foreign markets based on market intelligence. This suggests that the surveyed agribusinesses actively leverage market information to identify and seize opportunities in international markets, which is critical for expanding their export activities.

Secondly, respondents also express a commitment to seeking high levels of export customer responsiveness for their businesses (66.0% of SA and A combined) and being more responsive to export customers' expressed needs (70.8% of SA and A combined). These findings imply that the surveyed agribusinesses prioritise meeting the needs and demands of their foreign customers, which is a key aspect of successful export market strategies.

Additionally, the results indicate that a substantial portion of respondents (66.0% of SA and A combined) regularly collects accurate market information, highlighting their dedication to maintaining up-to-date market intelligence. This practice is essential for making informed decisions and adapting to changing market conditions. However, it is noteworthy that for items related to making better use of consumer reviews feedback (50.1% of SA and A combined) and ensuring consistent implementation of quality elements based on consumers' expectations (51.9% of SA and A combined), a smaller proportion of respondents agree. These findings suggest that there may be room for improvement in terms of incorporating customer feedback into their operations and consistently meeting consumers' quality expectations.

In summary, Table 4.10 indicates that members of AFAN in Southwest, Nigeria, exhibit a generally satisfactory level of responsiveness to market intelligence. They prioritise utilising market information to identify opportunities, enhance customer responsiveness, and stay updated on market conditions. However, there is potential for improvement in areas related to utilising consumer feedback and consistently meeting quality expectations, which are crucial for maintaining competitiveness in export markets.

Table 4.11: Frequency Distribution of Export Market Intelligence Dissemination across the selected AFAN States

SN	Export Market Intelligence Dissemination	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	We achieve our objectives by exporting our products and brands to foreign markets	103	142	22	41	45	**353**	4.101
		29.2%	40.2%	6.2%	11.6%	12.8%	**100%**	
2	I collect information on exporting operations	104	127	21	61	40	**353**	3.985
		29.5%	36%	5.9%	17.3%	11.3%	**100%**	
3	I engage in the activities associated with generating information about the firm's export customers' needs	106	125	23	56	43	**353**	4.003
		30%	35.4%	6.5%	15.9%	12.2%	**100%**	
4	I display higher commitment to offering radical product innovations	108	122	22	60	41	**353**	3.872
		30.6%	34.6%	6.2%	17%	11.6%	**100%**	
5	I disseminate information on how the existing products can be modified to suit the export markets	101	132	24	42	54	**353**	3.861
		28.6%	37.4%	6.8%	11.9%	15.3%	**100%**	
6	I constantly ensure customers' satisfaction by offering more radical product innovations	121	125	23	35	49	**353**	3.998
		34.3%	35.4%	6.5%	9.9%	13.9%	**100%**	
7	I generate and respond to information in the target market place	107	121	22	47	56	**353**	4.000
		30.3%	34.3%	6.2%	13.3%	15.9%	**100%**	

8	I display a higher commitment towards rapidly evolving customer needs	101	139	25	52	36	**353**	4.190
		28.6%	39.4%	7.1%	14.7%	10.2%	**100%**	
Total Average Mean: Satisfied								**4.001**

Table 4.11 offers a comprehensive view of the export market intelligence dissemination practices among the members of the All Farmers Association of Nigeria (AFAN) in the Southwest region. This dimension explores how these agricultural businesses share and utilise market intelligence within their organisations, which is crucial for effective export strategies. The overall mean score of 4.001 signifies a high level of satisfaction with their efforts in this regard.

One of the notable findings from this table is that a substantial majority of respondents (69.4% of SA and A combined) believe that their organisations achieve their objectives through exporting products and brands to foreign markets. This perspective underscores the vital role that exports play in their overall business success. It suggests that these agribusinesses view international markets as significant opportunities for growth and profitability. This is a positive sign for the agricultural sector in the Southwest, as it reflects a proactive approach to expanding beyond domestic boundaries.

Another key observation is that a significant proportion of respondents (65.5% of SA and A combined) reported engaging in activities associated with generating information about their firms' export customers' needs. This indicates a strong commitment to understanding the preferences, demands, and expectations of foreign customers. By actively seeking and utilising this information, these businesses can tailor their products and services to meet international market requirements effectively. This customer-centric approach is essential for achieving success in competitive export markets.

Furthermore, the data reveal that many respondents (66.3% of SA and A combined) believe that they generate and respond to information in the target marketplace. This reflects their dedication to staying well-informed about the dynamic nature of foreign markets. In today's global business environment, adaptability and responsiveness to changing conditions are critical. This finding

suggests that these agribusinesses are agile and prepared to adjust their strategies and offerings to remain competitive in international trade.

Additionally, a substantial proportion of respondents (67.8% of SA and A combined) expressed their organisations' higher commitment toward rapidly evolving customer needs. This indicates their willingness to adapt quickly to changing customer preferences and market trends. Such adaptability is crucial for maintaining competitiveness and ensuring that products and services remain relevant and appealing to international consumers.

However, it is worth noting that for the item related to collecting information on exporting operations (65.5% of SA and A combined), a slightly smaller proportion of respondents agreed. This implies that there may be an opportunity for improvement in terms of systematically collecting and utilising data specific to exporting activities. By enhancing their data collection processes, these agribusinesses can gain more comprehensive insights into export operations, which can, in turn, inform more effective export strategies.

In conclusion, Table 4.11 sheds light on the proactive and customer-centric approach of AFAN members in Southwest, Nigeria, toward export market intelligence dissemination. These agricultural businesses recognise the significance of international markets, actively seek information about foreign customers' needs, and demonstrate adaptability to market dynamics. While there is room for enhancing the systematic collection of information related to exporting operations, their overall commitment to effective export strategies positions them well for success in international trade.

4.4.3 Dimensions of Sustainability of Agribusinesses in Southwest

Tables 4.12 to 4.15 provide a comprehensive overview of the descriptive statistics related to sustainability dimensions within the agribusiness sector in Southwest Nigeria. These tables explore critical facets of sustainability, including Economic Sustainability (ECS), Environmental Sustainability (ES), Social Sustainability (SS), and Governance Sustainability (GS). The data presented in these tables offer valuable insights into how agricultural businesses in the region are approaching and managing sustainability challenges and opportunities. Sustainability has become an increasingly important consideration for businesses worldwide, particularly in sectors like

agriculture, where the impact on the environment, society, and governance practices is profound. The information presented in these tables can inform policymakers, researchers, and industry stakeholders about the current state of sustainability efforts within the region's agribusiness sector and provide valuable benchmarks for future initiatives.

Table 4.12: Frequency Distribution of Economic Sustainability (ECS) across the selected AFAN States

NO	ITEM	Frequency and Percentage					Total	Mean
	Economic Sustainability (ECS)	**SA**	**A**	**U**	**D**	**SD**		
1	I am able to make a profit from my farming activities for 2019-2022 (January to December)	110 31.2%	131 37.1%	20 5.7%	55 15.6%	37 10.5%	**353** **100%**	4.28
2	I have access to resources and technologies that help me increase my productivity and income	103 29.2%	124 35.1%	22 6.2%	58 16.5%	46 13%	**353** **100%**	4.38
3	The prices I receive for my agricultural products are fair and reflect their true value	101 28.6%	152 43.1%	16 4.5%	30 8.5%	54 15.3%	**353** **100%**	4.10
4	I am able to save and invest my profits in my farm or other income-generating activities	113 32%	136 38.5%	18 5.1%	48 13.6%	38 10.8%	**353** **100%**	3.91
5	I have access to financial services such as credit, insurance, and savings that help me manage risks and grow my business	111 31.5%	124 35.1%	22 6.2%	50 14.2%	46 13%	**353** **100%**	4.25
	Total Average Mean: Extremely satisfied							**4.18**

Table 4.12 provides an insightful analysis of Economic Sustainability (ECS) among members of AFAN in Southwest Nigeria. This dimension assesses various aspects of farmers' economic well-being and their ability to sustain and grow their agricultural businesses. The overall mean score of 4.188 suggests a high level of satisfaction with economic sustainability practices within the surveyed group. Firstly, the data indicates that a significant proportion of respondents (68.3% of SA and A combined) reported making a profit from their farming activities for the period from

2019 to 2022. This is a positive sign of economic sustainability, as it demonstrates that the majority of farmers have been successful in generating income from their agricultural ventures. This finding has implications for the overall economic growth of the region through agriculture.

Secondly, the respondents also expressed satisfaction regarding their access to resources and technologies that enhance productivity and income (64.3% of SA and A combined). This result implies that farmers in the region have access to essential tools and resources that empower them to increase their agricultural output and income. It suggests that investments in agricultural infrastructure and technology have contributed to economic sustainability. Thirdly, a notable proportion of respondents (71.7% of SA and A combined) indicated that they receive fair prices for their agricultural products that reflect their true value. Fair pricing is essential for economic sustainability, as it ensures that farmers are adequately compensated for their efforts and encourages continued agricultural production. This outcome suggests that there is a relatively fair trading environment for agricultural products in Southwest Nigeria.

However, it is worth noting that fewer respondents (70.5% of SA and A combined) reported being able to save and invest their profits in their farms or other income-generating activities. While this percentage is still relatively high, it indicates that there may be room for improvement in encouraging savings and investment practices among farmers, which could further enhance their economic sustainability. Lastly, a substantial proportion of respondents (66.6% of SA and A combined) reported having access to financial services such as credit, insurance, and savings, which help them manage risks and grow their businesses. Access to financial services is crucial for mitigating economic vulnerabilities and fostering economic sustainability. These findings indicate that efforts to provide financial inclusion to farmers have been somewhat successful.

In summary, Table 4.12 demonstrates that members of AFAN in Southwest Nigeria generally exhibit a high level of satisfaction with their Economic Sustainability (ECS). They are making profits from farming, have access to resources and technologies, receive fair prices for their products, and have access to financial services. These factors collectively contribute to the economic well-being of farmers and have positive implications for the region's agricultural sector and economic growth. However, there is still room for improvement in encouraging savings and investment practices among farmers to further enhance their economic sustainability.

Table 4.13: Frequency Distribution of Environmental Sustainability (ES) across the selected AFAN States

NO	Environmental Sustainability (ES)	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	I use environmentally-friendly techniques and inputs in our agribusiness activities	116 32.9%	142 40.2%	20 5.7%	43 12.2%	32 9%	**353** **100%**	4.00
2	I implement measures to reduce pollution and waste on my agribusiness activities	106 30.1%	132 37.4%	18 5.1%	51 14.5%	42 11.9%	**353** **100%**	4.10
3	I am aware of the environmental impacts of my agribusiness practices.	118 33.4%	141 40%	19 5.4%	34 9.6%	41 11.6%	**353** **100%**	3.83
4	I participate in environmental programmes and initiatives, such as certification schemes or conservation projects, that promote sustainable farming practices	116 32.9%	138 39.1%	20 5.6%	36 10.2%	43 12.2%	**353** **100%**	3.56
5	I collaborate with other farmers, researchers, and stakeholders to develop and implement sustainable agriculture practices	113 32%	140 39.7%	19 5.4%	34 9.6%	47 13.3%	**353** **100%**	4.01
	Total Average Mean: Satisfied							**3.90**

Table 4.13 provides valuable insights into Environmental Sustainability (ES) among members of AFAN in Southwest Nigeria. This dimension assesses farmers' practices related to environmentally friendly and sustainable agricultural activities. The overall mean score of 3.904 suggests a generally positive attitude and commitment to environmental sustainability practices within the surveyed group. Firstly, the data indicates that a significant proportion of respondents (73.1% of SA and A combined) reported using environmentally-friendly techniques and inputs in their agribusiness activities. This demonstrates a strong commitment to environmentally sustainable practices, as farmers are actively adopting methods that are less harmful to the environment. This finding has positive implications for reducing the ecological footprint of agricultural activities in the region.

Secondly, the respondents also expressed satisfaction with their implementation of measures to reduce pollution and waste in their agribusiness activities (67.5% of SA and A combined). This indicates a proactive approach to minimising negative environmental impacts and reducing pollution levels. It reflects a recognition of the importance of responsible environmental stewardship in agricultural practices. However, it is noteworthy that fewer respondents (73.4% of SA and A combined) reported being aware of the environmental impacts of their agribusiness practices. While this percentage is still relatively high, it suggests that there is room for enhancing farmers' knowledge and awareness of the ecological consequences of their actions. Increasing awareness can further motivate sustainable practices. Furthermore, a smaller proportion of respondents (59.3% of SA and A combined) indicated participation in environmental programmes and initiatives that promote sustainable farming practices. While this percentage is less than the others, it suggests that there may be untapped potential for more farmers to engage in initiatives such as certification schemes and conservation projects. Encouraging such participation can significantly contribute to overall environmental sustainability.

Lastly, a considerable proportion of respondents (71.7% of SA and A combined) reported collaborating with other farmers, researchers, and stakeholders to develop and implement sustainable agriculture practices. Collaboration is crucial for knowledge sharing and the adoption of best practices. These findings highlight a cooperative spirit among farmers in the region, which can facilitate the dissemination of sustainable farming techniques.

In summary, Table 4.13 reveals that members of AFAN in Southwest Nigeria generally exhibit a positive attitude and commitment to Environmental Sustainability (ES). They are using environmentally-friendly techniques, reducing pollution and waste, and collaborating with stakeholders to promote sustainable practices. However, there is room for improvement in raising awareness about the environmental impacts of agribusiness practices and increasing participation in environmental programmes and initiatives. Overall, these findings have positive implications for reducing the environmental footprint of agriculture in the region and fostering sustainable farming practices.

Table 4.14: Frequency of Social Sustainability (SS) across the selected AFAN States

SN	Social Sustainability (SS)	Frequency and Percentage					Total	Mean
		SA	A	U	D	SD		
1	I engage with and support my local community by participating in events and initiatives.	103	124	22	58	46	353	4.19
		29.2%	35.1%	6.2%	16.5%	13%	100%	
2	I provide opportunities for education and training to my employees.	126	132	12	48	35	353	4.22
		35.7%	37.4%	3.4%	13.6%	9.9%	100%	
3	I implement inclusive policies that promote diversity and equality on my farm	113	140	19	34	47	353	4.06
		32%	39.7%	5.4%	9.6%	13.3%	100%	
4	I maintain positive relationships with my employees, treating them fairly and with respect.	114	127	20	64	28	353	3.72
		32.3%	36%	5.7%	18.1%	7.9%	100%	
5	I have received education or training on socially sustainable agribusiness practices.	111	124	22	50	46	353	4.11
		31.5%	35.1%	6.2%	14.2%	13%	100%	
	Total Average Mean: Satisfied							**4.06**

Table 4.14 presents insightful data regarding Social Sustainability (SS) practices among members of AFAN in Southwest Nigeria. This dimension assesses the farmers' commitment to socially responsible and sustainable agricultural practices. The overall mean score of 4.063 suggests that respondents are generally satisfied with their efforts in promoting social sustainability within their agribusinesses. Firstly, the data reveals that a substantial proportion of respondents (64.3% of SA and A combined) engage with and support their local communities by participating in events and initiatives. This indicates that these farmers are actively involved in community development activities, demonstrating a strong sense of social responsibility. Such engagement can lead to positive social impacts, including improved community well-being and enhanced relationships between farmers and their localities.

Moreso, respondents expressed satisfaction with providing opportunities for education and training to their employees (73.1% of SA and A combined). This suggests that farmers value employee development and empowerment. Offering education and training can enhance the skills and livelihoods of agricultural workers, contributing to increased social sustainability within the workforce. Furthermore, a significant proportion of respondents (71.1% of SA and A combined) indicated the implementation of inclusive policies that promote diversity and equality on their farms. This reflects a commitment to fostering an inclusive and equitable working environment, which is essential for social sustainability. Inclusivity can lead to improved labor relations and overall farm performance.

However, it is noteworthy that a smaller percentage of respondents (68.3% of SA and A combined) reported maintaining positive relationships with their employees, treating them fairly and with respect. While this percentage is still relatively high, it suggests that there may be opportunities for enhancing workplace dynamics and ensuring that all employees are treated equitably. Positive relationships with employees are crucial for a harmonious work environment. Lastly, a considerable proportion of respondents (69.3% of SA and A combined) indicated that they have received education or training on socially sustainable agribusiness practices. This signifies a recognition of the importance of continuous learning and skill development in promoting social sustainability. Education and training can empower farmers to implement more socially responsible practices in their operations.

In summary, Table 4.14 reveals that members of AFAN in Southwest Nigeria generally exhibit a positive attitude and commitment to Social Sustainability (SS). They engage with their local communities, provide educational opportunities to employees, implement inclusive policies, and participate in education and training related to social sustainability. However, there is room for improvement in maintaining positive relationships with employees to ensure fairness and respect in the workplace. Overall, these findings have positive implications for promoting social responsibility and sustainable practices within the agricultural sector in the region.

Table 4.15: Frequency Distribution of Governance Sustainability (GS) across the selected AFAN States

Governance Sustainability (GS)	Frequency and Percentage					Total	Mean
	SA	A	U	D	SD		
1 I maintain accurate records of my farm's financial transactions and operations	126 35.7%	132 37.4%	12 3.4%	48 13.6%	35 9.9%	**353** **100%**	3.80
2 I comply with all relevant laws and regulations related to my farming operations	116 32.9%	138 39.1%	20 5.6%	36 10.2%	43 12.2%	**353** **100%**	4.00
3 I have implemented policies and procedures to prevent corruption and promote ethical business practices	111 31.5%	124 35.1%	22 6.2%	50 14.2%	46 13%	**353** **100%**	3.62
4 I ensure that my business operates in a transparent and accountable manner	103 29.2%	124 35.1%	22 6.2%	58 16.5%	46 13%	**353** **100%**	3.44
5 I engage with and seek feedback from my stakeholders, such as customers, suppliers, and community members	107 30.3%	121 34.3%	22 6.2%	47 13.3%	56 15.9%	**353** **100%**	3.89
Total Average Mean: Satisfied							**3.75**

Table 4.15 provides insights into Governance Sustainability (GS) practices among members of AFAN in Southwest Nigeria. This dimension assesses the extent to which farmers prioritise governance, ethics, and transparency in their agricultural operations. The overall mean score of 3.755 indicates that respondents are generally satisfied with their governance sustainability efforts, although there is room for improvement in certain areas. Firstly, the data indicates that a significant proportion of respondents (68.6% of SA and A combined) maintain accurate records of their farm's financial transactions and operations. This demonstrates a commitment to financial transparency and accountability, which is crucial for sound governance practices. Accurate

record-keeping can enhance decision-making, facilitate audits, and ensure compliance with financial regulations.

In addition, respondents expressed a high level of compliance with relevant laws and regulations related to their farming operations (72.0% of SA and A combined). This adherence to legal and regulatory frameworks is a positive sign for governance sustainability, as it ensures that farmers operate within the boundaries of the law. Compliance can lead to improved credibility and reduced legal risks. Furthermore, a considerable proportion of respondents (66.6% of SA and A combined) indicated that they have implemented policies and procedures to prevent corruption and promote ethical business practices. This demonstrates a commitment to maintaining integrity and ethical standards in agricultural operations. Anti-corruption measures are essential for fostering trust and sustainability within the agricultural sector.

However, it is noteworthy that a smaller percentage of respondents (61.4% of SA and A combined) reported ensuring that their business operates in a transparent and accountable manner. While still a majority, this finding suggests that there is potential for enhancing transparency in certain aspects of their operations. Transparent business practices can lead to increased stakeholder trust and improved governance sustainability. Lastly, respondents indicated that they engage with and seek feedback from their stakeholders, such as customers, suppliers, and community members (64.6% of SA and A combined). This reflects a willingness to involve key stakeholders in decision-making processes and listen to their perspectives. Engaging with stakeholders can lead to better-informed decisions and stronger community relationships.

In summary, Table 4.15 reveals that members of AFAN in Southwest Nigeria generally exhibit a positive attitude and commitment to Governance Sustainability (GS). They maintain accurate financial records, comply with laws and regulations, implement anti-corruption measures, engage with stakeholders, and seek feedback. However, there is room for improvement in ensuring transparency and accountability in certain aspects of their operations. Overall, these findings have positive implications for governance and ethics within the agricultural sector in the region.

4.5 Test of Hypotheses

The hypotheses were empirically tested using Smart PLS to determine whether the independent variables had a significant impact on the dependent variables. Hypothesis testing, a statistical method, was employed to ascertain the presence or absence of evidence supporting the hypotheses under investigation. All the hypotheses examined in this research were formulated in the null form.

4.5.1 Test of Hypothesis 1

H_0: Green method [design] does not significantly influence the sustainability of agribusinesses in Southwest, Nigeria

The first hypothesis examined the relationship between green methods [design] and the sustainability (including economic, social, governance, and environmental aspects) of agribusinesses in Southwest Nigeria. To analyse the data, path coefficients, t-statistics, R-squared values, and p-values were employed. Figure 4.2 illustrates how the path coefficient elucidates the direction and strength of the relationship between the variables under investigation. Additionally, the R-squared value offers insight into the degree to which green methods explain variance in the sustainability (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria (See Figure 4.3).
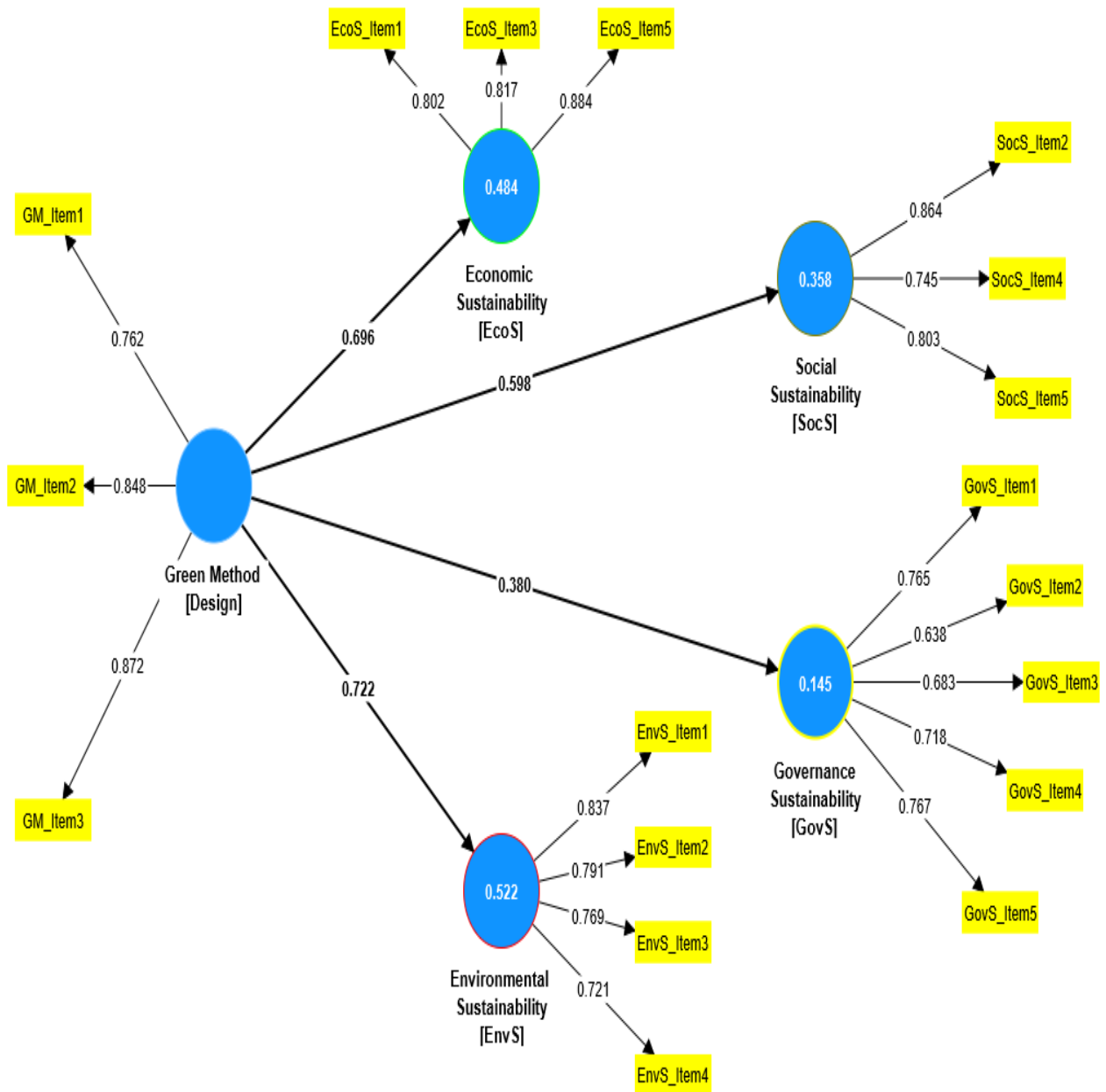
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Figure 4.2: Green method and Sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria
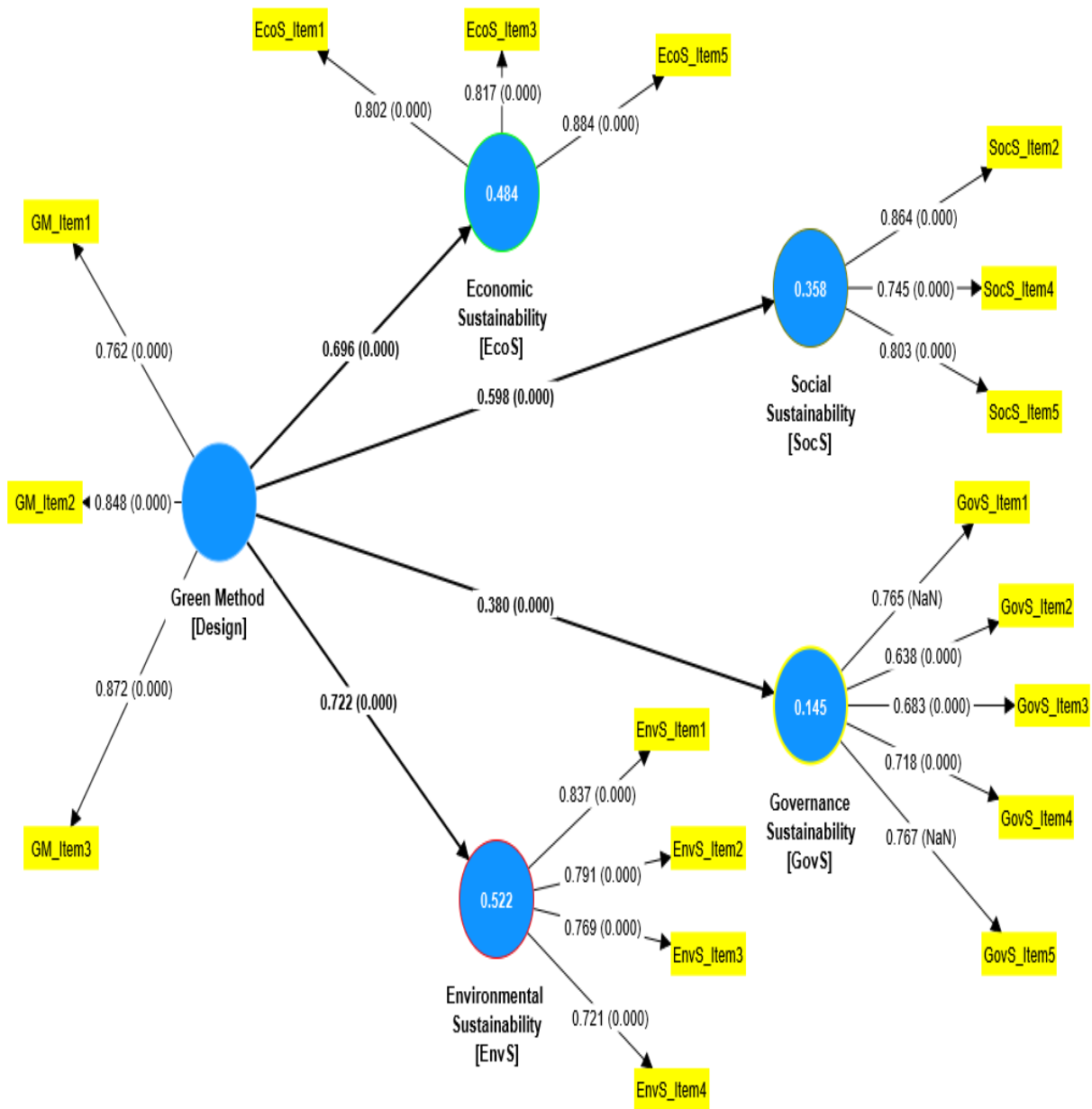
Figure 4.3: Path co-efficient and P-values for Green method and Sustainability (economic, social, governance and environmental) of agribusinesses

Figure 4.2 showcases the structural model employing the Partial Least Squares (PLS) algorithm, illustrating the relationship between green methods [design] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. Figures 4.2 and 4.3 also present the loading values for each measurement item associated with these constructs. Utilising the PLS Bootstrapping Model, β coefficients and p-values are estimated to provide insights into the significance of the relationships between green methods [design] and the sustainability aspects of agribusinesses in Southwest Nigeria. In Figure 4.3, the p-value is

depicted, indicating the degree of statistical significance. A significance level of 0.05 is adopted as the threshold for determining statistical significance. It is noteworthy that all measurement values related to green methods [design] and the sustainability dimensions of agribusinesses in Southwest Nigeria, as obtained from the research instrument, demonstrate statistical significance at a p-value of 0.05.

Table 4.16: Construct Validity and Reliability for Hypothesis One

	Factor Loading	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**	**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Green Method (GMTHD)			0.867	0.686	0.811	3
GMTHD1	0.762	0.238				
GMTHD2	0.848	0.152				
GMTHD3	0.872	0.128				
EcoS			0.874	0.698	0.783	5
SocS			0.846	0.648	0.729	5
EnvS			0.861	0.609	0.787	5
GovS			0.839	0.512	0.766	5

Fornell and Larcker (1981) established recommended thresholds for assessing the reliability and validity of measurement scales. These guidelines involve multiple criteria. First, factor loadings should surpass the minimum threshold of 0.60. Second, the construct is composite reliability should equal or exceed 0.80. Third, the average variance extracted (AVE) for the construct must be greater than 0.50. Lastly, Cronbach's Alpha should be equal to or greater than 0.70 to ensure the instruments' reliability.

Table 4.16 presents the factor loadings for all measurement items related to green methods [design] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. To evaluate the instrument's validity and reliability, several criteria, including Cronbach's Alpha, average variance extracted (AVE), and composite reliability, were employed. The analysis demonstrates that the factor loading, composite reliability, AVE,

and Cronbach's Alpha criteria were all met, confirming the robustness of the instrument. The study also assessed construct validity by examining both convergent and discriminant validity, providing evidence of the relationship between green methods [design] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Additionally, the analysis employed the variance inflation factor (VIF) to investigate the presence of common method bias (CMB). While a VIF score of one indicates no collinearity issues, researchers typically suggest a VIF threshold of 10. However, some scholars advocate for a more conservative approach with a VIF limit ranging from 2.5 to 5 (James *et al*., 2017; Kock, 2015). Table 4.17 reveals that all VIF values associated with each item in the measurement variables were well below the conservative threshold, confirming the absence of common method bias in the analysis.

Table 4.17: Heterotrait-Monotrait Discriminant (**HTMT**)

	EcoS	SocS	EnvS	GovS	GRNMET
EcoS	**0.835**				
SocS	0.747 [0.678; 0.836]	**0.805**			
EnvS	0.749 [0.633; 0.819]	0.725 [0.627; 0.822]	**0.780**		
GovS	0.723 [0.467; 0.826]	0.748 [0.632; 0.833]	0.783 [0.442; 0.840]	**0.716**	
GRNMET	**0.849** [0.696; 0.841]	**0.845** [0.598; 0.829]	**0.802** [0.722; 0.862]	**0.733** [0.380; 0.808]	**0.829**
VIF	**3.712**	**3.381**	**3.779**	**2.826**	**3.193**

The discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. The analysis demonstrated that all HTMT values significantly differed from 1, as the upper confidence intervals were below the 1 threshold. Additionally, the HTMT values for all constructs remained below the critical value of 0.85, providing further support for discriminant validity. Furthermore, the average correlation between heterotraits and heteromethods was lower than the correlation between monotraits and heteromethods, reinforcing the evidence of discriminant validity. Table 4.17 displays the heterotrait-monotrait discriminant values for green methods [design] and the

sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.

Table 4.18: Coefficient value of Hypothesis One

Variables and Cross Loading	Path Co-efficient (O)	F-square	Std. Dev. (STDEV)	T-Statistics (O/ STDEV	P Values
Green method → Economic Sustainability	0.696	0.939	0.066	10.616	0.000
Green method → Social Sustainability	0.598	0.557	0.064	9.405	0.000
Green method → Environmental Sustainability	0.722	0.990	0.052	13.936	0.000
Green method → Governance Sustainability	0.380	0.169	0.085	4.491	0.000
Green method → Sustainability	**0.600**	**0.664**	**0.059**	**8.883**	**0.000**
Green Method [GRNMET]	**R Square (R^2)**			**R Square (R^2) Adjusted**	
Economic Sustainability	0.484			0.479	
Social Sustainability	0.358			0.351	
Environmental Sustainability	0.522			0.517	
Governance Sustainability	0.145			0.136	

Table 4.19 provides the outcomes of the Smart Partial Least Squares (PLS) analysis conducted to assess hypothesis one, which aimed to explore the relationship between green methods [design] and the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The statistical analysis divulges that green methods significantly and positively impact all four dimensions of sustainability among agribusinesses in Southwest Nigeria.

The results unveil that green methods wield a substantial and favourable influence on economic sustainability (β= 0.696, R2=0.484, t-statistics= 10.616, >1.96, P-value =0.000 <0.05). With a path coefficient of 0.696, a robust relationship between green methods and economic sustainability is evident. Furthermore, the R2 value of 0.484 indicates that approximately 49% of the variance in economic sustainability can be attributed to green methods.

Moreover, the findings reveal a significant and positive impact of green methods on environmental sustainability (β= 0.722, R2=0.522, t-statistics= 13.936, >1.96, P-value =0.000 <0.05). The path coefficient of 0.722 underscores the robustness of the relationship between green methods and environmental sustainability. The R2 value of 0.522 indicates that roughly 52.2% of the variance in environmental sustainability is explained by green methods.

Conversely, the findings reveal a significant and positive impact of green methods [logistics] on social sustainability (β= 0.598, R2=0.358, t-statistics= 9.405, >1.96, P-value =0.000 <0.05). The path coefficient of 0.598 underscores the robustness of the moderate relationship between green methods [logistics] and social sustainability. The R2 value of 0.358 indicates that roughly 36% of the variance in social sustainability is explained by green methods [logistics].

The results also indicate a substantial and positive effect of green methods on governance sustainability (β= 0.380, R2=0.145, t-statistics= 4.491 >1.96, P-value =0.000 <0.05). The path coefficient of 0.380 emphasises a meaningful relationship between green methods and governance sustainability. The R2 value of 0.145 suggests that about 15% of the variance in governance sustainability can be accounted for by green methods.

To evaluate the predictive relevance of the constructs and indicators in the PLS-SEM analysis.. Additionally, the effect size was determined using the f-square measure. As presented in Table 4.19, the f-square values for EcoS, SocS, EnvS and GovS were 0.939, 0.557, 0.990 and 0.169 respectively. These values indicate a substantial effect size of the sample concerning the constructs under review.

On the other hand, it is noteworthy that among the examined variables, economic sustainability exhibited the highest predictive value. Subsequently, environmental sustainability demonstrated the second highest predictive value, while social sustainability and governance sustainability exhibited lower levels of predictive value, in that order. These findings highlight the significance of green methods in fostering economic and environmental sustainability, emphasising the need for further attention to social and governance sustainability aspects in agribusinesses in Southwest Nigeria.

Evaluation of the Model Fitness

For this study, various fit indices were employed to assess the structural equation model's adequacy. These fit indices encompass three key categories: absolute fit measures, incremental fit measures, and parsimony fit measures, following the recommendations of Hu and Bentler (1998) and Hair *et al*. (2017).

Absolute fit measures serve to gauge how well the sample data align with the predefined model expectations. Root Mean Square Residual (RMSR) within the absolute fit measures was used as an indicator of model fit. An RMSR value of 0.08 or less is generally considered indicative of a good model fit (McNeish, An & Hancock, 2017; Maydeu-Olivares, Shi & Rosseel, 2017). In this study, the RMSR values for green methods and sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria were calculated, resulting in values of 0.063, 0.062, 0.059 and 0.060, respectively, all below the 0.08 threshold. Additionally, the Goodness of Fit (GOF) index was used, with a commonly accepted threshold of 0.90, indicating a good model fit (Sharma *et al*., 2005). The Chi-square/Degree of Freedom (CMIN/DF) criterion suggests an acceptable model fit when the hypothetical model yields a value below 3 (Xiong, Skitmore & Xia, 2015).

Incremental fit indices compare the tested results to a baseline model, ensuring that all variables are uncorrelated. Among these measures, the Normed Fit Index (NFI) and Comparative Fit Index (CFI) typically have cutoff values set at 0.90, indicating a good model fit. Green (2016) also suggested a threshold between 0.90 and 0.95. In this study, the NFI values were computed and found to be 0.946, 0.942, 0.931 and 0.932 for the respective dimensions, all closely approaching 1, confirming the model's acceptability.

Parsimony fit indices are crucial for comparing values in alternative models and assessing how well other samples from the same population would fit the structural equation model. The Parsimony Comparative Fit Index (PCFI), based on the CFI, is used to evaluate parsimonious fit. Fornell and Larcker (1981) recommended a threshold of 0.50 for PCFI. The results of the study indicate that the model fit indices met the critical thresholds, suggesting that the structural equation model aligns well with the data and is deemed fitting for further analysis. The Chi-square/DF, RMSR, NFI, GFI, and CFI values all support the adequacy of the model, underscoring its suitability for investigating the relationships between the variables.

Table 4.19: Model Fit Index for Individual Initiative and Sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

Model Fit Index	Measures	Abbreviated	Accepted value	Model Value
	The goodness of Fit Index	GFI	≥ 0.90	0.930
Absolute Fit Index	Chi-square/Degree of Freedom	CMIN/DF	<3.0	2.739
	Root Mean Square Residual	RMSR	<0.08	0.059
Incremental Fit Index	Comparative Fit Index	CFI	≥ 0.90	0.924
	Normed Fit Index	NFI	≥ 0.90	0.939
Parsimony Fit Index	Parsimony Comparative Fit Index	PCFI	≥ 0.50	0.568

The measurement model analysis has demonstrated that all model fit indices fall within the acceptable range and exceed the recommended cutoff levels, aligning with the guidelines of Fornell and Larcker (2009). Specifically, the Root Mean Square Residual (RMSR) for this model is calculated at 0.059, which is well below the threshold of 0.08. This indicates a strong fit for the RMSR in this model, providing evidence of its goodness of fit. Consequently, the null hypothesis one (H_{01}), which posits that green methods do not have a significant combined impact on the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria, is rejected based on this outcome.

In summary, these results establish that green methods significantly predict the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. This finding aligns with prior research conducted on the sustainability aspects of agribusinesses in the region, reinforcing the importance of green practices in promoting sustainability across various dimensions.

This result confirms the qualitative findings derived from interviews, demonstrating that the adoption of green methods significantly predicts the sustainability of agribusinesses in Southwest

Nigeria. The interviews encompassed a diverse range of stakeholders, including representatives from governmental bodies such as the Ministry of Agriculture and the Ministry of Environment, as well as executive members of the All Farmers Association of Nigeria (AFAN). Within the interview section, five prominent themes emerged, shedding light on the multifaceted ways in which green methods influence the sustainability of agribusinesses in the region. These themes collectively underscore the pivotal role that environmentally responsible practices play in shaping the agricultural landscape of Southwest Nigeria [See Figure 4.4].
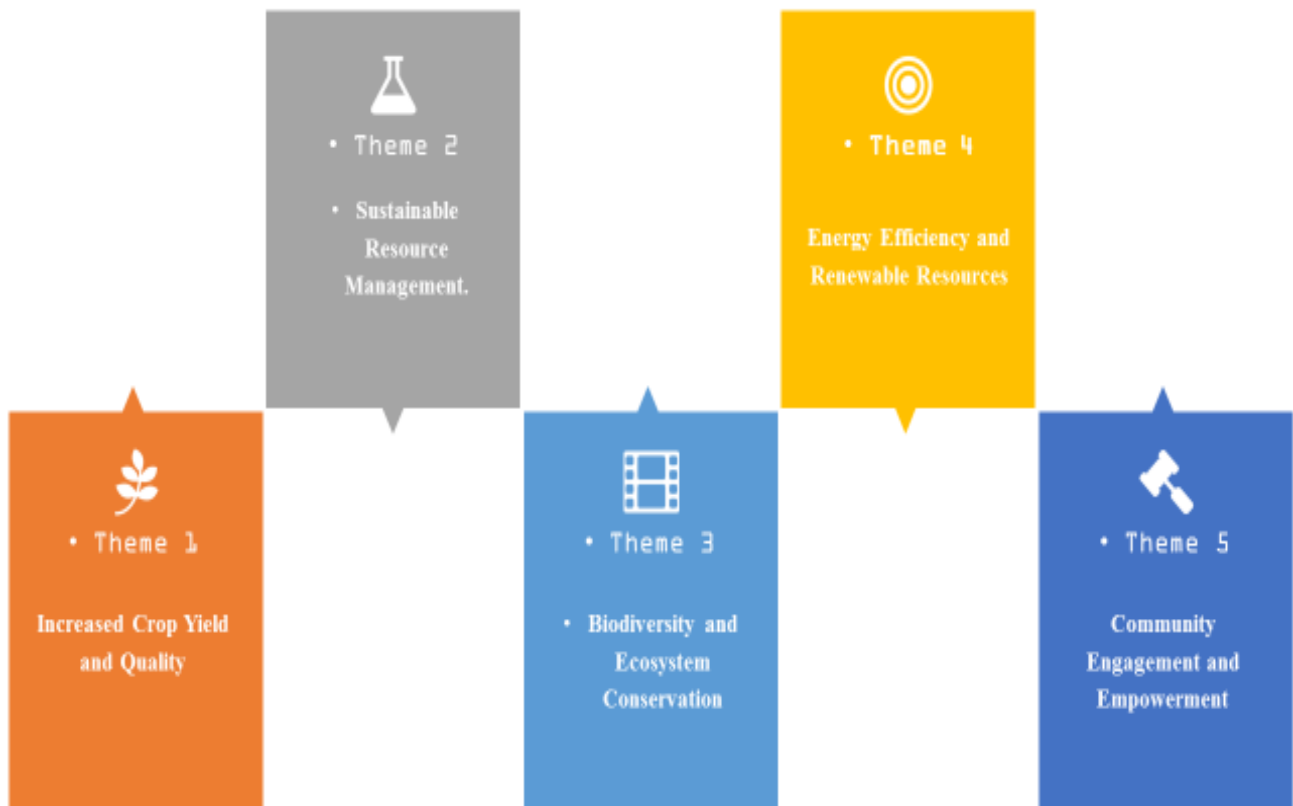
Figure 4.4: Themes showing the pivotal role of green methods on sustainability

Theme 1: Increased Crop Yield and Quality

Interview Response 1:

"As a farmer in Southwest Nigeria, I've noticed that adopting green methods like organic farming and sustainable irrigation systems has significantly improved my crop yield and quality. Before, I struggled with inconsistent harvests and pest infestations. Now, with eco-friendly practices, I can produce healthier crops and meet market demands more reliably. This not only boosts my income but also contributes to food security in our region."

Interview Response 2:

"I work in the agribusiness sector in Southwest Nigeria, and we've seen a remarkable difference in the quality of products since embracing green methods. We used to rely heavily on chemical fertilisers and pesticides, which harmed the environment and left residues on our crops. By transitioning to organic farming and natural pest control, we've not only improved the safety of our produce but also found a niche market of consumers who prefer eco-friendly, high-quality products."

Theme 2: Sustainable Resource Management

Interview Response 1:

"As a farmer, water scarcity has always been a concern in Southwest Nigeria. However, by implementing green methods like rainwater harvesting and drip irrigation, I can manage water resources more sustainably. This not only ensures the survival of my crops during dry spells but also reduces my dependence on expensive, fossil-fuel-powered irrigation pumps, making my farming practices more eco-friendly and cost-effective."

Interview Response 2:

"In our agribusiness, we used to struggle with soil degradation and erosion due to unsustainable land practices. Green methods such as crop rotation and cover cropping have helped us restore soil health and prevent erosion. By adopting these practices, we're not only safeguarding our land for future generations but also ensuring the sustainability of our agribusiness in Southwest Nigeria."

Theme 3: Biodiversity and Ecosystem Conservation

Interview Response 1:

"As a farmer, I've noticed the positive impact of green methods on biodiversity in our region. By avoiding monoculture and planting a variety of crops, we attract beneficial insects and birds that help control pests naturally. This promotes a healthier

ecosystem, which in turn supports our agribusiness by reducing the need for chemical pesticides and fostering a more resilient environment."

Interview Response 2:

"In our agribusiness, we've started setting aside areas for wildlife conservation, like creating bird sanctuaries and preserving natural habitats. These green initiatives not only benefit local wildlife but also contribute to our sustainability efforts. They have garnered positive attention and support from the community, further enhancing our brand image and marketability."

Theme 4: Energy Efficiency and Renewable Resources

Interview Response 1:

"I've been using solar-powered irrigation systems on my farm, and it's been a game-changer. It not only reduces my electricity costs but also minimises my carbon footprint. By harnessing the abundant sunlight in Southwest Nigeria, I'm able to water my crops sustainably while contributing to a cleaner environment."

Interview Response 2:

"Our agribusiness has invested in renewable energy sources like biogas digesters, which convert agricultural waste into clean energy. This not only helps us manage waste efficiently but also reduces our reliance on non-renewable energy sources like fossil fuels. It's a win-win for our sustainability goals and operational efficiency."

Theme 5: Community Engagement and Empowerment

Interview Response 1:

"As a farmer, I've found that adopting green methods has allowed me to collaborate more with my fellow farmers in Southwest Nigeria. We share knowledge on sustainable practices, exchange seeds, and collectively address challenges like water management. This sense of community empowerment strengthens our resilience and makes our agribusinesses more sustainable in the long run."

Interview Response 2:

"In our agribusiness, we've initiated programmes to educate local communities about sustainable farming practices. We offer training, workshops, and employment opportunities, which not only enhance our social responsibility but also create a pool of skilled labor that benefits our business. By involving the community, we build a more sustainable agribusiness ecosystem."

In conclusion, the interview responses from various stakeholders, including government representatives and agricultural association leaders, provide compelling evidence of the profound impact of green methods on the sustainability of agribusinesses in Southwest Nigeria. The consistent themes that emerged, such as increased crop yield and quality, sustainable resource management, biodiversity conservation, energy efficiency, and community engagement, collectively emphasise the pivotal role of eco-friendly practices in ensuring sustainability and resilience in the agricultural sector of the region. These insights underscore the importance of continued investment in green initiatives and sustainable farming practices to not only bolster the economic prospects of agribusinesses but also foster environmental stewardship and community empowerment, thereby promoting a more sustainable and prosperous future for Southwest Nigeria's agricultural landscape.

4.5.2 Test of Hypothesis 2

H_{02}: **Green material [purchasing] does not significantly influence the sustainability of agribusinesses in Southwest, Nigeria**

The second hypothesis examined the relationship between green materials [purchasing] and the sustainability (including economic, social, governance, and environmental aspects) of agribusinesses in Southwest Nigeria. To analyse the data, path coefficients, t-statistics, R-squared values, and p-values were employed. Figure 4.5 illustrates how the path coefficient elucidates the direction and strength of the relationship between the variables under investigation. Additionally, the R-squared value offers insights into the degree to which green materials [purchasing] explain variance in the sustainability (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria (See Figure 4.6).
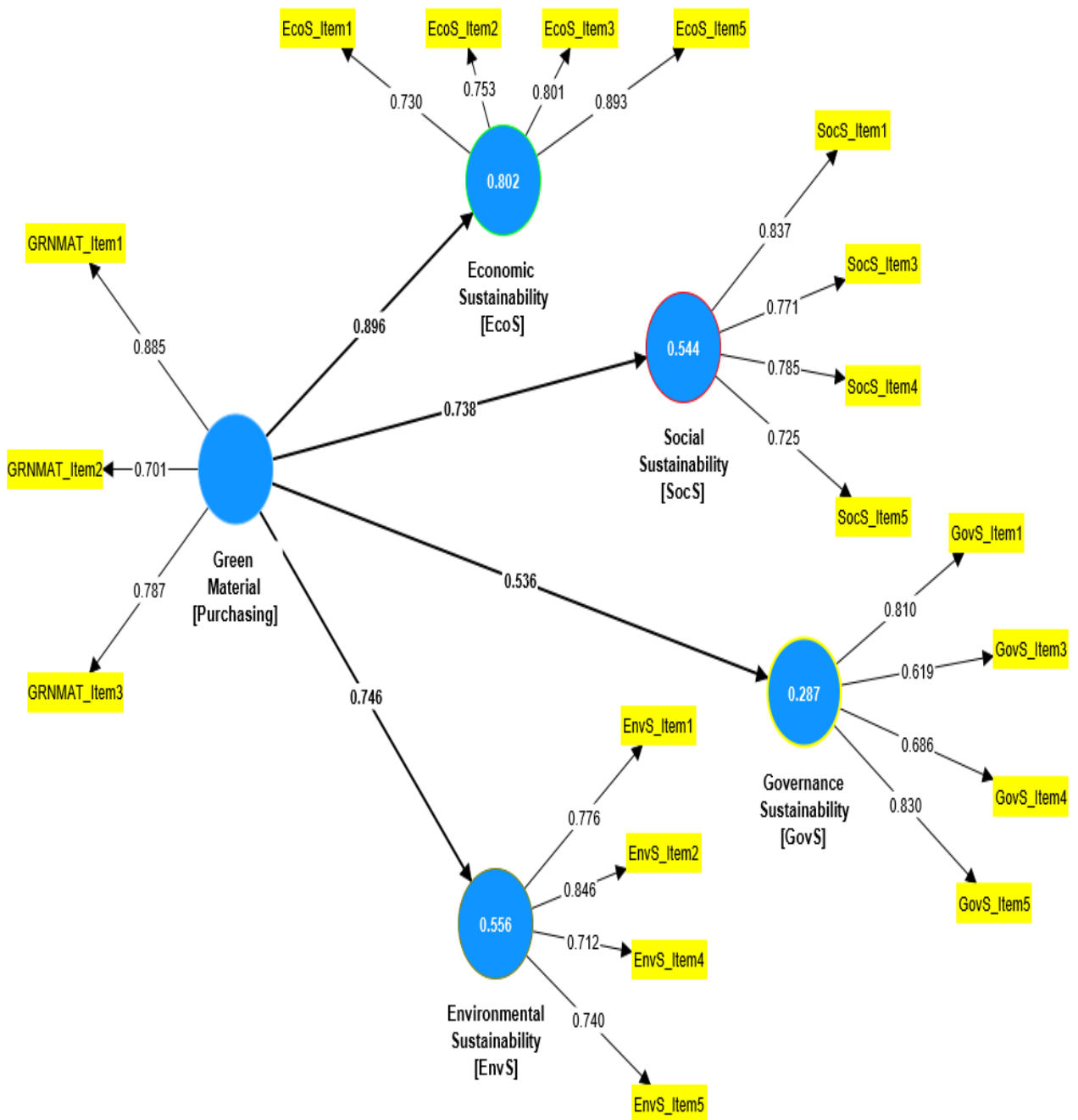
Figure 4.5: Path co-efficient for Green material [purchasing] and Sustainability (economic, social, governance and environmental) of agribusinesses

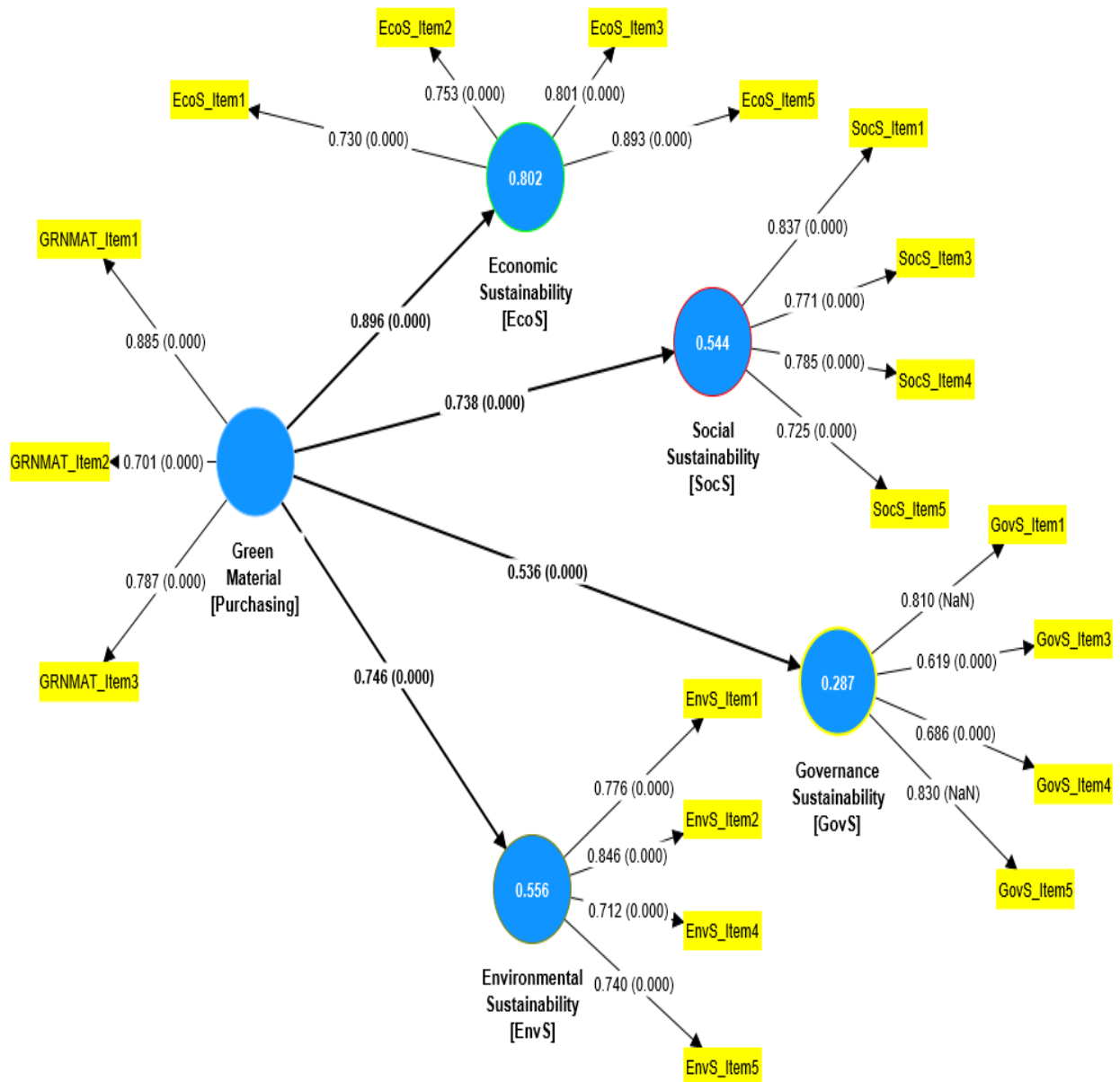**Figure 4.6: Path co-efficient and P values for Green material and Sustainability (economic, social, governance and environmental) of agribusinesses**

Figure 4.5 showcases the structural model employing the Partial Least Squares (PLS) algorithm, illustrating the relationship between green materials [purchasing] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The figure also presents the loading values for each measurement item associated with these constructs. Utilising the PLS Bootstrapping Model, β coefficients and p-values are estimated to provide insights into the significance of the relationships between green materials [purchasing] and the sustainability aspects of agribusinesses in Southwest Nigeria. In Figure 4.6, the p-value is

depicted, indicating the degree of statistical significance. A significance level of 0.05 is adopted as the threshold for determining statistical significance. It is noteworthy that all measurement values related to green materials [purchasing] and the sustainability dimensions of agribusinesses in Southwest Nigeria, as obtained from the research instrument, demonstrate statistical significance at a p-value of 0.05.

Table 4.20: Construct Validity and Reliability for Hypothesis Two

	Factor Loading	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**	**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Green Material (GRNMAT)			0.836	0.631	0.706	3
GRNMAT1	0.885	0.115				
GRNMAT2	0.701	0.299				
GRNMAT3	0.787	0.213				
EcoS			0.874	0.635	0.807	4
SocS			0.862	0.610	0.787	4
EnvS			0.853	0.593	0.771	4
GovS			0.828	0.550	0.731	4

Fornell and Larcker (1981) established recommended thresholds for assessing the reliability and validity of measurement scales. These guidelines involve multiple criteria. First, factor loadings should surpass the minimum threshold of 0.60. Second, the construct's composite reliability should equal or exceed 0.80. Third, the average variance extracted (AVE) for the construct must be greater than 0.50. Lastly, Cronbach's Alpha should be equal to or greater than 0.70 to ensure the instruments' reliability.

Table 4.20 presents the factor loadings for all measurement items related to green materials [purchasing] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. To evaluate the instrument's validity and reliability, several criteria, including Cronbach's Alpha, average variance extracted (AVE), and composite reliability, were employed. The analysis demonstrates that the factor loading, composite reliability, AVE, and Cronbach's Alpha criteria were all met, confirming the robustness of the

instrument. The study also assessed construct validity by examining both convergent and discriminant validity, providing evidence of the relationships between green materials [purchasing] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Additionally, the analysis employed the variance inflation factor (VIF) to investigate the presence of common material bias (CMB). While a VIF score of one indicates no collinearity issues, researchers typically suggest a VIF threshold of 10. However, some scholars advocate for a more conservative approach with a VIF limit ranging from 2.5 to 5 (James *et al*., 2017; Kock, 2015). Table 4.21 reveals that all VIF values associated with each item in the measurement variables were well below the conservative threshold, confirming the absence of common material bias in the analysis.

Table 4.21: Heterotrait-Monotrait Discriminant (HTMT)

	EcoS	SocS	EnvS	GovS	GRNMAT
EcoS	**0.842**				
SocS	0.744 [0.711; 0.829]	**0.811**			
EnvS	0.749 [0.639; 0.822]	0.741 [0.638; 0.821]	**0.845**		
GovS	0.723 [0.514; 0.846]	0.740 [0.644; 0.810]	0.786 [0.552; 0.849]	**0.699**	
GRNMAT	**0.893** [0.699; 0.836]	**0.884** [0.560; 0.847]	**0.945** [0.730; 0.841]	**0.686** [0.472; 0.813]	**0.813**
VIF	**3.768**	**3.275**	**3.760**	**2.548**	**3.416**

The discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. The analysis demonstrated that all HTMT values significantly differed from 1, as the upper confidence intervals were below the 1 threshold. Additionally, the HTMT values for all constructs remained below the critical value of 0.85, providing further support for discriminant validity. Furthermore, the average correlation between heterotraits and heteromaterials was lower than the correlation between monotraits and heteromaterials, reinforcing the evidence of discriminant validity. Table 4.21 displays the heterotrait-monotrait discriminant values for green materials [purchasing] and the

sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.

Table 4.22: Coefficient value of Hypothesis Two

Variables and Cross Loading	Path Co-efficient (O)	F-square	Std. Dev. (STDEV)	T-Statistics (O/ STDEV	P Values
Green material → Economic Sustainability	0.896	4.055	0.020	43.972	0.000
Green material → Social Sustainability	0.738	1.193	0.047	15.755	0.000
Green material → Environmental Sustainability	0.746	1.253	0.046	16.268	0.000
Green material → Governance Sustainability	0.536	0.403	0.091	5.914	0.000
Green material → Sustainability	**0.729**	**1.726**	**0.051**	**20.477**	**0.000**
Green Material [GRNMAT]	**R Square (R^2)**			**R Square (R^2) Adjusted**	
Economic Sustainability	0.802			0.800	
Social Sustainability	0.544			0.539	
Environmental Sustainability	0.556			0.552	
Governance Sustainability	0.287			0.280	

Table 4.22 provides the outcomes of the Smart Partial Least Squares (PLS) analysis conducted to assess hypothesis two, which aimed to explore the relationship between green materials [purchasing] and the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The statistical analysis divulges that green materials [purchasing] significantly and positively impact all four dimensions of sustainability among agribusinesses in Southwest Nigeria.

The results unveil that green materials [purchasing] wield a substantial and favourable influence on economic sustainability (β= 0.896, R2=0.802, t-statistics=43.972, >1.96, P-value =0.000 <0.05). With a path coefficient of 0.896, a robust relationship between green materials [purchasing] and economic sustainability is evident. Furthermore, the R2 value of 0.802 indicates that approximately 80.2% of the variance in economic sustainability can be attributed to green materials [purchasing].

Moreover, the findings reveal a significant and positive impact of green materials [purchasing] on environmental sustainability (β= 0.746, R2=0.556, t-statistics= 16.268, >1.96, P-value =0.000 <0.05). The path coefficient of 0.746 underscores the robustness of the relationship between green materials [purchasing] and environmental sustainability. The R2 value of 0.556 indicates that roughly 56% of the variance in environmental sustainability is explained by green materials [purchasing].

In the same vein, the findings reveal a significant and positive impact of green materials [purchasing] on social sustainability (β= 0.738, R2=0.544, t-statistics= 15.755, >1.96, P-value =0.000 <0.05). The path coefficient of 0.738 underscores the robustness of the relationship between green materials [purchasing] and social sustainability. The R2 value of 0.544 indicates that roughly 54.4% of the variance in social sustainability is explained by green materials [purchasing].

The study's results also indicate a substantial and positive effect of green materials [purchasing] on governance sustainability (β= 0.536, R2=0.287, t-statistics= 5.914, >1.96, P-value =0.000 <0.05). The path coefficient of 0.536 emphasises a meaningful relationship between green materials [purchasing] and governance sustainability. The R2 value of 0.287 suggests that about 28.7% of the variance in governance sustainability can be accounted for by green materials [purchasing].

To evaluate the predictive relevance of the constructs and indicators in the PLS-SEM analysis, effect size was utilised. Additionally, the effect size was determined using the f-square measure. As presented in Table 4.19, the f-square values for EcoS, EnvS, SocS and GovS were 4.055, 1.253, 1.193 and 0.403, respectively. These values indicate a substantial effect size of the sample concerning the constructs under review.

On the other hand, it is noteworthy that among the examined variables, economic sustainability exhibited the highest predictive value. Subsequently, environmental sustainability demonstrated the second highest predictive value, while social sustainability and governance sustainability exhibited lower levels of predictive value, in that order. These findings highlight the significance of green materials [purchasing] in fostering economic and environmental sustainability, emphasising the need for further attention to social and governance sustainability aspects in agribusinesses in Southwest Nigeria.

Evaluation of the Model Fitness

For this study, various fit indices were employed to assess the structural equation model's adequacy. These fit indices encompass three key categories: absolute fit measures, incremental fit measures, and parsimony fit measures, following the recommendations of Hu and Bentler (1998) and Hair *et al*. (2017).

Absolute fit measures serve to gauge how well the sample data align with the predefined model expectations. Root Mean Square Residual (RMSR) within the absolute fit measures was used as an indicator of model fit. An RMSR value of 0.08 or less is generally considered indicative of a good model fit (McNeish, An & Hancock, 2017; Maydeu-Olivares, Shi & Rosseel, 2017). In this study, the RMSR values for green materials [purchasing] and sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria were calculated, resulting in values of 0.060, 0.051, 0.053 and 0.063, respectively, all below the 0.08 threshold. Additionally, the Goodness of Fit (GOF) index was used, with a commonly accepted threshold of 0.90, indicating a good model fit (Sharma *et al*., 2005). The Chi-square/Degree of Freedom (CMIN/DF) criterion suggests an acceptable model fit when the hypothetical model yields a value below 3 (Xiong, Skitmore & Xia, 2015).

Incremental fit indices compare the tested results to a baseline model, ensuring that all variables are uncorrelated. Among these measures, the Normed Fit Index (NFI) and Comparative Fit Index (CFI) typically have cutoff values set at 0.90, indicating a good model fit. Green (2016) also suggested a threshold between 0.90 and 0.95. In this study, the NFI values were computed and found to be 0.919, 0.936, 0.958 and 0.949 for the respective dimensions, all closely approaching 1, confirming the model's acceptability.

Parsimony fit indices are crucial for comparing values in alternative models and assessing how well other samples from the same population would fit the structural equation model. The Parsimony Comparative Fit Index (PCFI), based on the CFI, is used to evaluate parsimonious fit. Fornell and Larcker (1981) recommended a threshold of 0.50 for PCFI.

The results of the study indicate that the model fit indices met the critical thresholds, suggesting that the structural equation model aligns well with the data and is deemed fitting for further analysis. The Chi-square/DF, RMSR, NFI, GFI, and CFI values all support the adequacy of the

model, underscoring its suitability for investigating the relationships between green materials [purchasing] and the sustainability dimensions of agribusinesses in Southwest Nigeria. The model fit index for Green materials and Sustainability (economic, social, governance and environmental) is presented in Table 4.23.

Table 4.23: Model Fit Index for Green materials and Sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

Model Fit Index	Measures	Abbreviated	Accepted value	Model Value
	The goodness of Fit Index	GFI	$\geq$0.90	0.951
Absolute Fit Index	Chi-square/Degree of Freedom	CMIN/DF	<3.0	2.102
	Root Mean Square Residual	RMSR	<0.08	0.058
Incremental Fit Index	Comparative Fit Index	CFI	$\geq$0.90	0.922
	Normed Fit Index	NFI	$\geq$0.90	0.938
Parsimony Fit Index	Parsimony Comparative Fit Index	PCFI	$\geq$0.50	0.590

The measurement model analysis has demonstrated that all model fit indices fall within the acceptable range and exceed the recommended cutoff levels, aligning with the guidelines of Fornell and Larcker (2009). Specifically, the Root Mean Square Residual (RMSR) for this model is calculated at 0.058, which is well below the threshold of 0.08. This indicates a strong fit for the RMSR in this model, providing evidence of its goodness of fit. Consequently, the null hypothesis two (H_{02}), which posits that green materials [purchasing] do not have a significant combined impact on the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria, is rejected based on this outcome.

In summary, these results establish that green materials [purchasing] significantly predict the sustainability dimensions (i.e., economic, social, governance, and environmental) of

agribusinesses in Southwest Nigeria. This finding aligns with prior research conducted on the sustainability aspects of agribusinesses in the region, reinforcing the importance of green practices in promoting sustainability across various dimensions.

This outcome from the quantitative [questionnaire] solidifies the qualitative findings obtained through interviews, providing clear evidence that the adoption of green methods significantly correlates with the sustainability of agribusinesses in Southwest Nigeria. The interviews comprised a diverse array of stakeholders, ranging from governmental representatives from the Ministry of Agriculture and the Ministry of Environment to executive members of the All Farmers Association of Nigeria (AFAN). These interactions within the interview section revealed four prominent themes that shed light on the multifaceted impact of green materials on agribusiness sustainability in the region. Together, these themes underscore the pivotal role that environmentally responsible practices play in shaping the agricultural landscape of Southwest Nigeria [See Figure 4.7].

Figure 4.7: **Themes on the multifaceted impact of green materials and agribusiness sustainability**

Theme 1: Cost Savings

Interview Response 1:

"As a farmer in Southwest Nigeria, my transition to purchasing green materials has been a game-changer for my agribusiness. By investing in eco-friendly supplies and equipment, I've not only reduced operational costs but also increased my overall profitability. For instance, adopting energy-efficient machinery has lowered my electricity bills, while using organic fertilisers has improved soil health, reducing the need for costly chemical inputs."

Interview Response 2:

"In our agricultural cooperative, we've seen a significant impact on our financial sustainability by embracing green material purchasing practices. By sourcing recycled packaging materials and utilising solar-powered irrigation systems, we've not only reduced waste but also lowered production expenses. These savings allow us to allocate resources towards other essential aspects of our agribusiness, ultimately ensuring its long-term economic sustainability."

Interview Response 3:

"The Ministry of Agriculture in Southwest Nigeria has been promoting the adoption of green materials in agribusinesses. We've witnessed how this shift has positively affected the sustainability of local farms and agro-processing units. Green material purchasing has allowed farmers to access cost-effective and environmentally friendly resources, resulting in improved profitability. This not only benefits individual businesses but also contributes to the broader economic sustainability of our region."

Theme 2: Environmental Conservation

Interview Response 1:

"As a farmer, I've observed that purchasing green materials, such as biodegradable mulch and non-toxic pesticides, has had a profound impact on the environment. These choices have significantly reduced the chemical runoff into nearby water bodies and mitigated soil pollution. By minimising our ecological footprint, we are playing a vital role in safeguarding the delicate ecosystems in Southwest Nigeria."

Interview Response 2:

"In our agribusiness, the adoption of green materials has enabled us to reduce our carbon footprint. We've shifted to purchasing eco-friendly packaging materials and equipment with lower energy consumption. This not only aligns with our commitment to environmental sustainability but also appeals to consumers who prioritise eco-conscious products, thereby enhancing our brand's reputation and marketability."

Interview Response 3:

"Government initiatives in Southwest Nigeria have encouraged agribusinesses to prioritise green material purchasing. This strategic approach has led to a noticeable reduction in plastic waste and chemical pollution in our region. As a result, our ecosystems are becoming more resilient, ensuring the long-term environmental sustainability of our agro-industry."

Theme 3: Product Quality

Interview Response 1:

"Using green materials in my agribusiness has positively impacted product quality. For instance, organic fertilisers and natural pest control methods have resulted in healthier crops with fewer chemical residues. This not only meets the growing demand for clean and organic produce but also allows us to access premium markets with higher price points."

Interview Response 2:

"Our cooperative's commitment to green material purchasing has opened up new market opportunities for us. By adopting sustainable packaging and labeling practices, we've gained access to international markets that prioritise environmentally friendly products. This expansion not only diversifies our customer base but also strengthens the sustainability of our agribusiness in Southwest Nigeria."

Interview Response 3:

"The Ministry of Agriculture's support for green material purchasing initiatives has led to an improved market reputation for agribusinesses in our region. By adhering to sustainable sourcing and production practices, our products are seen as high-quality and environmentally responsible, making them more competitive in both local and

global markets. This not only benefits individual businesses but also contributes to the overall sustainability and growth of the agro-industry in Southwest Nigeria."

In conclusion, the insights garnered from these interviews collectively emphasise the integral role of green methods in ensuring the sustainability and resilience of agribusinesses in Southwest Nigeria. By incorporating eco-friendly practices, such as sustainable resource management, biodiversity conservation, and community engagement, the region's agro-industry can not only enhance its economic sustainability but also contribute to environmental stewardship and social empowerment. These findings highlight the importance of continued efforts to promote and support the adoption of green methods within the agricultural sector, fostering a more sustainable and prosperous future for Southwest Nigeria's agricultural landscape.

4.5.3 Test of Hypothesis 3

H$_{03}$: Green machine [production] does not significantly influence the sustainability of agribusinesses in Southwest, Nigeria

The third hypothesis examined the relationship between green machines [production] and the sustainability (including economic, social, governance, and environmental aspects) of agribusinesses in Southwest Nigeria. To analyse the data, path coefficients, t-statistics, R-squared values, and p-values were employed. Figures 4.8 and 4.9 illustrate how the path coefficient elucidates the direction and strength of the relationship between the variables under investigation. Additionally, the R-squared value offers insights into the degree to which green machines [production] explain variance in the sustainability (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.
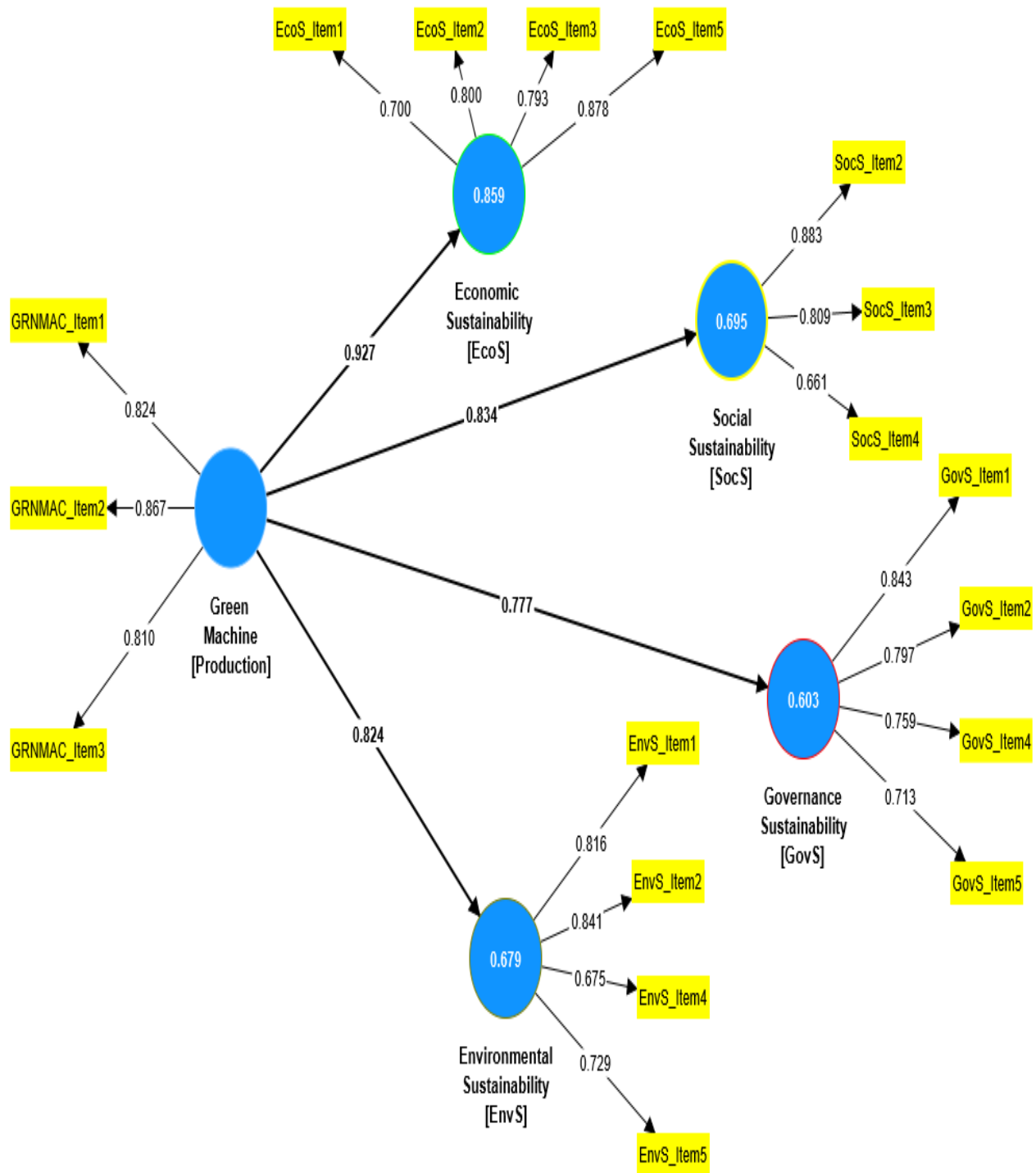
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Figure 4.8: Path co-efficient for Green machine and Sustainability (economic, social, governance and environmental) of agribusinesses
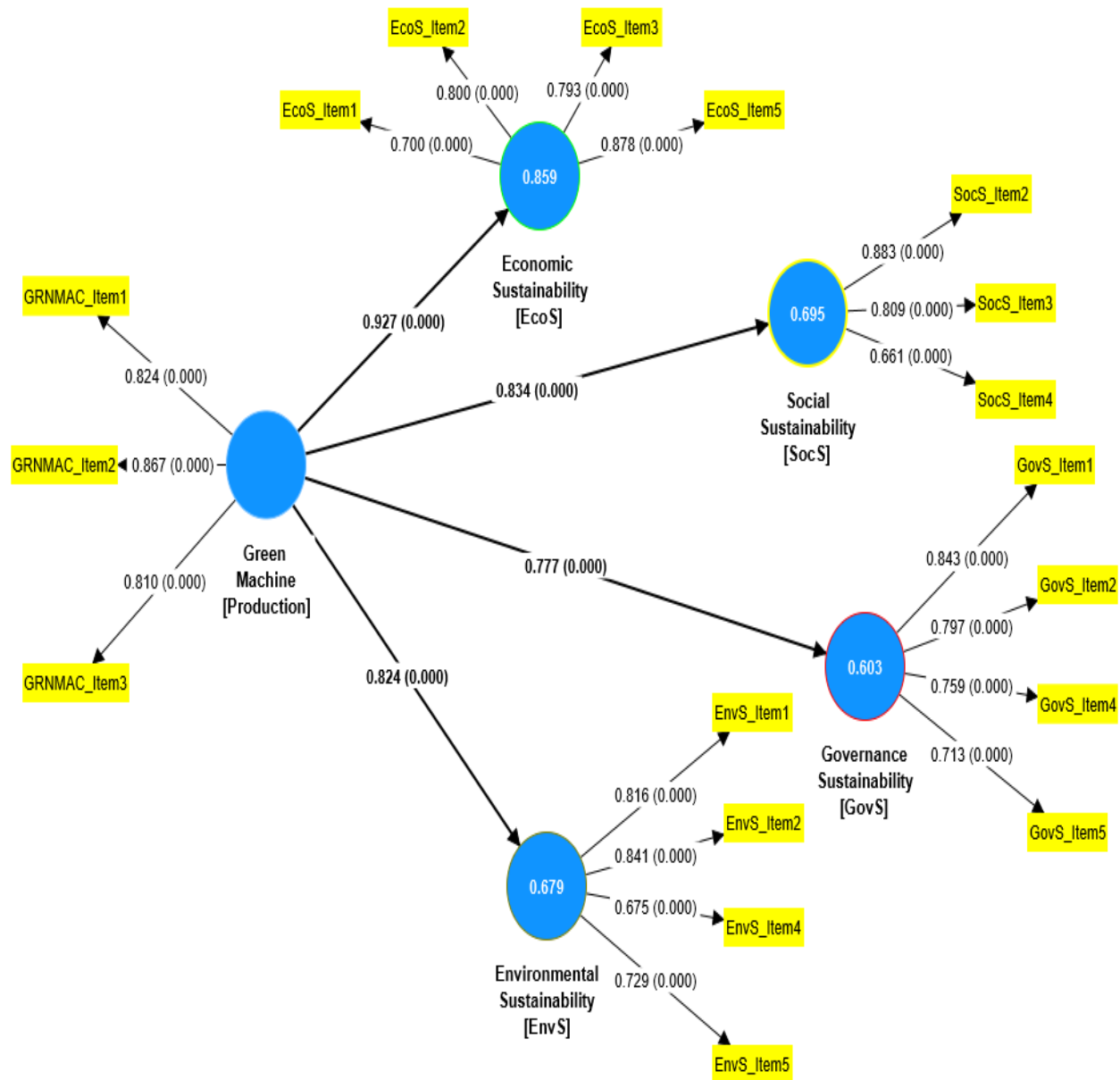
Figure 4.9: Path co-efficient and P values for Green machine and Sustainability (economic, social, governance and environmental) of agribusinesses

Figure 4.8 showcases the structural model employing the Partial Least Squares (PLS) algorithm, illustrating the relationship between green machines [production] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The figure also presents the loading values for each measurement item associated with these constructs. Utilising the PLS Bootstrapping Model, β coefficients and p-values are estimated to provide insights into the significance of the relationships between green machines [production] and the sustainability aspects of agribusinesses in Southwest Nigeria. In Figure 4.9, the p-value is

depicted, indicating the degree of statistical significance. A significance level of 0.05 is adopted as the threshold for determining statistical significance. It is noteworthy that all measurement values related to green machines [production] and the sustainability dimensions of agribusinesses in Southwest Nigeria, as obtained from the research instrument, demonstrate statistical significance at a p-value of 0.05.

Table 4.24: Construct Validity and Reliability for Hypothesis Three

	Factor Loading	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**	**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Green Machine (GRNMAC)			0.873	0.696	0.782	3
GRNMAC1	0.816	0.184				
GRNMAC2	0.874	0.126				
GRNMAC3	0.812	0.182				
EcoS			0.872	0.632	0.807	4
SocS			0.831	0.624	0.703	3
EnvS			0.851	0.590	0.771	4
GovS			0.861	0.608	0.787	4

Fornell and Larcker (1981) established recommended thresholds for assessing the reliability and validity of measurement scales. These guidelines involve multiple criteria. First, factor loadings should surpass the minimum threshold of 0.60. Second, the construct's composite reliability should equal or exceed 0.80. Third, the average variance extracted (AVE) for the construct must be greater than 0.50. Lastly, Cronbach's Alpha should be equal to or greater than 0.70 to ensure the instruments' reliability.

Table 4.24 presents the factor loadings for all measurement items related to green machines [production] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. To evaluate the instrument's validity and reliability, several criteria, including Cronbach's Alpha, average variance extracted (AVE), and composite reliability, were employed. The analysis demonstrates that the factor loading, composite

reliability, AVE, and Cronbach's Alpha criteria were all met, confirming the robustness of the instrument. The study also assessed construct validity by examining both convergent and discriminant validity, providing evidence of the relationships between green machines [production] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Additionally, the analysis employed the variance inflation factor (VIF) to investigate the presence of common method bias (CMB). While a VIF score of one indicates no collinearity issues, researchers typically suggest a VIF threshold of 10. However, some scholars advocate for a more conservative approach with a VIF limit ranging from 2.5 to 5 (James *et al*., 2017; Kock, 2015). Table 4.25 reveals that all VIF values associated with each item in the measurement variables were well below the conservative threshold, confirming the absence of common method bias in the analysis.

Table 4.25: Heterotrait-Monotrait Discriminant [HMDT]

	EcoS	SocS	EnvS	GovS	GRNMAC
EcoS	**0.829**				
SocS	0.748	**0.830**			
	[0.717; 0.827]				
EnvS	0.746	0.743	**0.841**		
	[0.654; 0.831]	[0.640; 0.838]			
GovS	0.728	0.742	0.755	**0.700**	
	[0.578; 0.829]	[0.652; 0.813]	[0.612; 0.840]		
GRNMAC	**0.848**	**0.822**	**0.836**	**0.691**	**0.826**
	[0.655; 0.829	[0.628; 0.833]	[0.747; 0.850]	[0.491; 0.826]	
VIF	**3.110**	**3.083**	**3.28I**	**2.687**	**3.201**

The discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. The analysis demonstrated that all HTMT values significantly differed from 1, as the upper confidence intervals were below the 1 threshold. Additionally, the HTMT values for all constructs remained below the critical value of 0.85, providing further support for discriminant validity. Furthermore, the average correlation between heterotraits and heteromethods was lower than the correlation between monotraits and heteromethods, reinforcing the evidence of discriminant validity. Table 4.25

displays the heterotrait-monotrait discriminant values for green machines [production] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.

Table 4.26: Coefficient value of Hypothesis Three

Variables and Cross Loading	Path Co-efficient (O)	F-square	Std. Dev. (STDEV)	T-Statistics (O/STDEV	P Values
Green Machine → Economic Sustainability	0.927	6.079	0.012	77.174	0.000
Green Machine → Social Sustainability	0.834	2.280	0.033	25.424	0.000
Green Machine → Environmental Sustainability	0.824	2.112	0.026	31.504	0.000
Green Machine → Governance Sustainability	0.777	1.520	0.044	17.751	0.000
Green Machine → Sustainability	**0.841**	**2.998**	**0.029**	**37.963**	**0.000**
Green Machine [GRNMAC]	**R Square (R^2)**		**R Square (R^2) Adjusted**		
Economic Sustainability	0.859		0.855		
Social Sustainability	0.695		0.692		
Environmental Sustainability	0.679		0.675		
Governance Sustainability	0.603		0.599		

Table 4.26 provides the outcomes of the Smart Partial Least Squares (PLS) analysis conducted to assess hypothesis three, which aimed to explore the relationship between green machines [production] and the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The statistical analysis divulges that green machines [production] significantly and positively impact all four dimensions of sustainability among agribusinesses in Southwest Nigeria.

The results unveil that green machines [production] wield a substantial and favourable influence on economic sustainability ($\beta= 0.927$, R2=0.859, t-statistics= 77.174, >1.96, P-value =0.000 <0.05). With a path coefficient of 0.927, a robust strong relationship between green machines [production] and economic sustainability is evident. Furthermore, the R2 value of 0.859 indicates that approximately 86% of the variance in economic sustainability can be attributed to green machines [production].

Moreover, the findings reveal a significant and positive impact of green machines [production] on environmental sustainability (β= 0.824, R2=0.679, t-statistics= 31.504, >1.96, P-value =0.000 <0.05). The path coefficient of 0.824 underscores the robustness of the relationship between green machines [production] and environmental sustainability. The R2 value of 0.679 indicates that roughly 68% of the variance in environmental sustainability is explained by green machines [production].

Similarly, the findings reveal a significant and positive impact of green machines [production] on social sustainability (β= 0.834, R2=0.695, t-statistics= 25.424, >1.96, P-value =0.000 <0.05). The path coefficient of 0.834 underscores the robustness of the relationship between green machines [production] and social sustainability. The R2 value of 0.695 indicates that roughly 69.5% of the variance in social sustainability is explained by green machines [production].

The results also indicate a substantial and positive effect of green machines [production] on governance sustainability (β= 0.777, R2=0.603, t-statistics= 17.751, >1.96, P-value =0.000 <0.05). The path coefficient of 0.777 emphasises a meaningful strong relationship between green machines [production] and governance sustainability. The R2 value of 0.603 suggests that about 60.3% of the variance in governance sustainability can be accounted for by green machines [production].

To evaluate the predictive relevance of the constructs and indicators in the PLS-SEM analysis, effect size was utilised. Additionally, the effect size was determined using the f-square measure. As presented in Table 4.19, the f-square values for EcoS, EnvS, SocS and GovS were 6.079, 2.112, 2.280 and 1.520 respectively. These values indicate a substantial effect size of the sample concerning the constructs under review.

On the other hand, it is noteworthy that among the examined variables, economic sustainability [β = 0.927] exhibited the highest predictive value. Subsequently, social sustainability [β = 0.834] demonstrated the second highest predictive value, while environmental sustainability [β = 0.824] and governance sustainability [β = 0.777] exhibited lower levels of predictive value, in that order. These findings highlight the significance of green machines [production] in fostering economic and social sustainability, emphasising the need for further attention to environmental and governance sustainability aspects in agribusinesses in Southwest Nigeria.

Evaluation of the Model Fitness

For this study, various fit indices were employed to assess the structural equation model's adequacy. These fit indices encompass three key categories: absolute fit measures, incremental fit measures, and parsimony fit measures, following the recommendations of Hu and Bentler (1998) and Hair *et al*. (2017).

Absolute fit measures serve to gauge how well the sample data align with the predefined model expectations. Root Mean Square Residual (RMSR) within the absolute fit measures was used as an indicator of model fit. An RMSR value of 0.08 or less is generally considered indicative of a good model fit (McNeish, An & Hancock, 2017; Maydeu-Olivares, Shi & Rosseel, 2017). In this study, the RMSR values for green machines [production] and sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria were calculated, resulting in values of 0.050, 0.056, 0.053 and 0.051, respectively, all below the 0.08 threshold. Additionally, the Goodness of Fit (GOF) index was used, with a commonly accepted threshold of 0.90, indicating a good model fit (Sharma *et al*., 2005). The Chi-square/Degree of Freedom (CMIN/DF) criterion suggests an acceptable model fit when the hypothetical model yields a value below 3 (Xiong, Skitmore & Xia, 2015).

Incremental fit indices compare the tested results to a baseline model, ensuring that all variables are uncorrelated. Among these measures, the Normed Fit Index (NFI) and Comparative Fit Index (CFI) typically have cutoff values set at 0.90, indicating a good model fit. Green (2016) also suggested a threshold between 0.90 and 0.95. In this study, the NFI values were computed and found to be 0.931, 0.940, 0.958 and 0.931 for the respective dimensions, all closely approaching 1, confirming the model's acceptability.

Parsimony fit indices are crucial for comparing values in alternative models and assessing how well other samples from the same population would fit the structural equation model. The Parsimony Comparative Fit Index (PCFI), based on the CFI, is used to evaluate parsimonious fit. Fornell and Larcker (1981) recommended a threshold of 0.50 for PCFI.

The results of the study indicate that the model fit indices met the critical thresholds, suggesting that the structural equation model aligns well with the data and is deemed fitting for further analysis. The Chi-square/DF, RMSR, NFI, GFI, and CFI values all support the adequacy of the

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model, underscoring its suitability for investigating the relationships between green machines [production] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Table 4.27: Model Fit Index for Individual Initiative and Sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

Model Fit Index	Measures	Abbreviated	Accepted value	Model Value
	The goodness of Fit Index	GFI	≥ 0.90	0.943
Absolute Fit Index	Chi-square/Degree of Freedom	CMIN/DF	< 3.0	2.882
	Root Mean Square Residual	RMSR	< 0.08	0.060
Incremental Fit Index	Comparative Fit Index	CFI	≥ 0.90	0.926
	Normed Fit Index	NFI	≥ 0.90	0.941
Parsimony Fit Index	Parsimony Comparative Fit Index	PCFI	≥ 0.50	0.590

The measurement model analysis has demonstrated that all model fit indices fall within the acceptable range and exceed the recommended cutoff levels, aligning with the guidelines of Fornell and Larcker (2009). Specifically, the Root Mean Square Residual (RMSR) for this model is calculated at 0.060, which is well below the threshold of 0.08. This indicates a strong fit for the RMSR in this model, providing evidence of its goodness of fit. Consequently, the null hypothesis three (H_{03}), which posits that green machines [production] do not have a significant combined impact on the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria, is rejected based on this outcome.

In summary, these results establish that green machines [production] significantly predict the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. This finding aligns with prior research conducted on the sustainability aspects of agribusinesses in the region, reinforcing the importance of green practices in promoting sustainability across various dimensions.

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The data gleaned from the quantitative survey reinforces the qualitative insights derived from the interviews, presenting compelling evidence that the integration of green machinery in production is strongly associated with the sustainability of agribusinesses in Southwest Nigeria. The interviews, encompassing a diverse spectrum of stakeholders, ranging from government officials from the Ministry of Agriculture and the Ministry of Environment to executive members of the All Farmers Association of Nigeria (AFAN), unearthed three predominant themes. These themes shed light on the multifaceted implications of adopting green machinery in agribusiness operations, collectively underscoring its profound impact on sustainability, operational efficiency, and environmental stewardship within the region [See Figure 4.10].
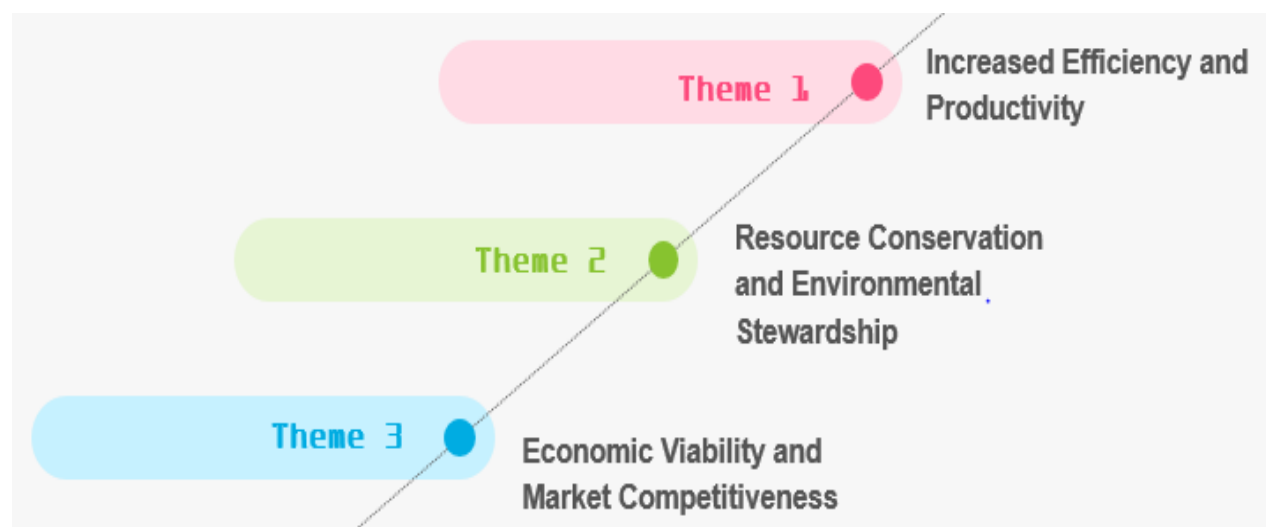
Figure 4.10: **Themes showing multifaceted implications of adopting green machinery in agribusiness operations**

Theme 1: Increased Efficiency and Productivity

Interview Response 1:

"As a farmer in Southwest Nigeria, adopting green machinery in my agribusiness has been a game-changer. These advanced machines, like solar-powered irrigation systems and efficient crop harvesters, have significantly improved our overall productivity. With reduced manual labor and faster processing, we can produce more crops in less time, ensuring a steady and abundant food supply while minimising resource wastage."

Interview Response 2:

"In our agricultural cooperative, the introduction of green machinery has revolutionised our production processes. We've embraced cutting-edge technologies like precision farming equipment and automated sorting machines. This not only optimises our resource utilisation but also enables us to meet market demands more efficiently. By reducing human error and enhancing production speed, we're bolstering the sustainability of our agribusiness in Southwest Nigeria."

Interview Response 3:

"As a representative of the Ministry of Agriculture, I've witnessed the transformative impact of green machinery on agribusiness sustainability in our region. The government's support in providing farmers with access to eco-friendly equipment and technology has led to remarkable improvements in agricultural efficiency. These advancements are crucial for ensuring food security and economic stability in Southwest Nigeria."

Theme 2: Resource Conservation and Environmental Stewardship

Interview Response 1:

"The integration of green machinery in my agribusiness has allowed us to better manage our resources. For instance, precision irrigation systems and automated nutrient application ensure that we use water and fertilisers more efficiently, reducing waste and minimising environmental impact. This commitment to resource conservation aligns with our responsibility to safeguard the environment for future generations."

Interview Response 2:

"Our cooperative's transition to green machinery, such as electric tractors and solar-powered processing units, has significantly reduced our carbon footprint. By embracing renewable energy sources and minimising emissions, we're actively contributing to environmental stewardship in Southwest Nigeria. This not only benefits our local ecosystems but also enhances our agribusiness's reputation as an eco-conscious entity."

Interview Response 3:

"As part of our government's sustainability initiatives, we've seen the positive effects of green machinery adoption on resource conservation. These technologies, such as efficient water pumps and crop management systems, enable farmers to optimise their resource usage. By reducing waste and environmental degradation, agribusinesses are taking a crucial step toward long-term sustainability in Southwest Nigeria."

Theme 3: Economic Sustainability and Market Competitiveness

Interview Response 1:

"The utilisation of green machinery has bolstered the economic sustainability of my agribusiness. For instance, the use of automated packaging and labeling machines has improved the presentation of our products, making them more appealing to consumers. This, in turn, has allowed us to access premium markets and attain higher price points, enhancing our overall profitability."

Interview Response 2:

"In our cooperative, green machinery investments have yielded impressive results in terms of market competitiveness. By adopting state-of-the-art sorting and processing equipment, we can consistently deliver high-quality products. This reliability has garnered trust among consumers and buyers, positioning us as a reliable source for agro-products in Southwest Nigeria and beyond."

Interview Response 3:

"As a government representative, I've observed that the incorporation of green machinery has bolstered the competitiveness of agribusinesses in our region. These advancements enhance product quality and consistency, enabling local producers to compete more effectively in national and international markets. This, in turn, contributes to economic growth and prosperity in Southwest Nigeria."

In conclusion, the convergence of both quantitative and qualitative data underscores the pivotal role that the adoption of green machinery plays in enhancing the sustainability and overall performance of agribusinesses in Southwest Nigeria. These findings provide valuable insights for policymakers, agribusiness owners, and stakeholders, emphasising the importance of continued investment and support for environmentally responsible production methods to ensure a prosperous and ecologically sustainable future for the agro-industry in the region.

4.5.4 Test of Hypothesis 4

H₀₄: **Green measurement does not significantly influence the sustainability of agribusinesses in Southwest, Nigeria**

The fourth hypothesis examined the relationship between green measurements [logistics] and the sustainability (including economic, social, governance, and environmental aspects) of agribusinesses in Southwest Nigeria. To analyse the data, path coefficients, t-statistics, R-squared values, and p-values were employed. Figures 4.11 and 4.12 illustrate how the path coefficient elucidates the direction and strength of the relationship between the variables under investigation. Additionally, the R-squared value offers insights into the degree to which green measurements [logistics] explain variance in the sustainability (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.
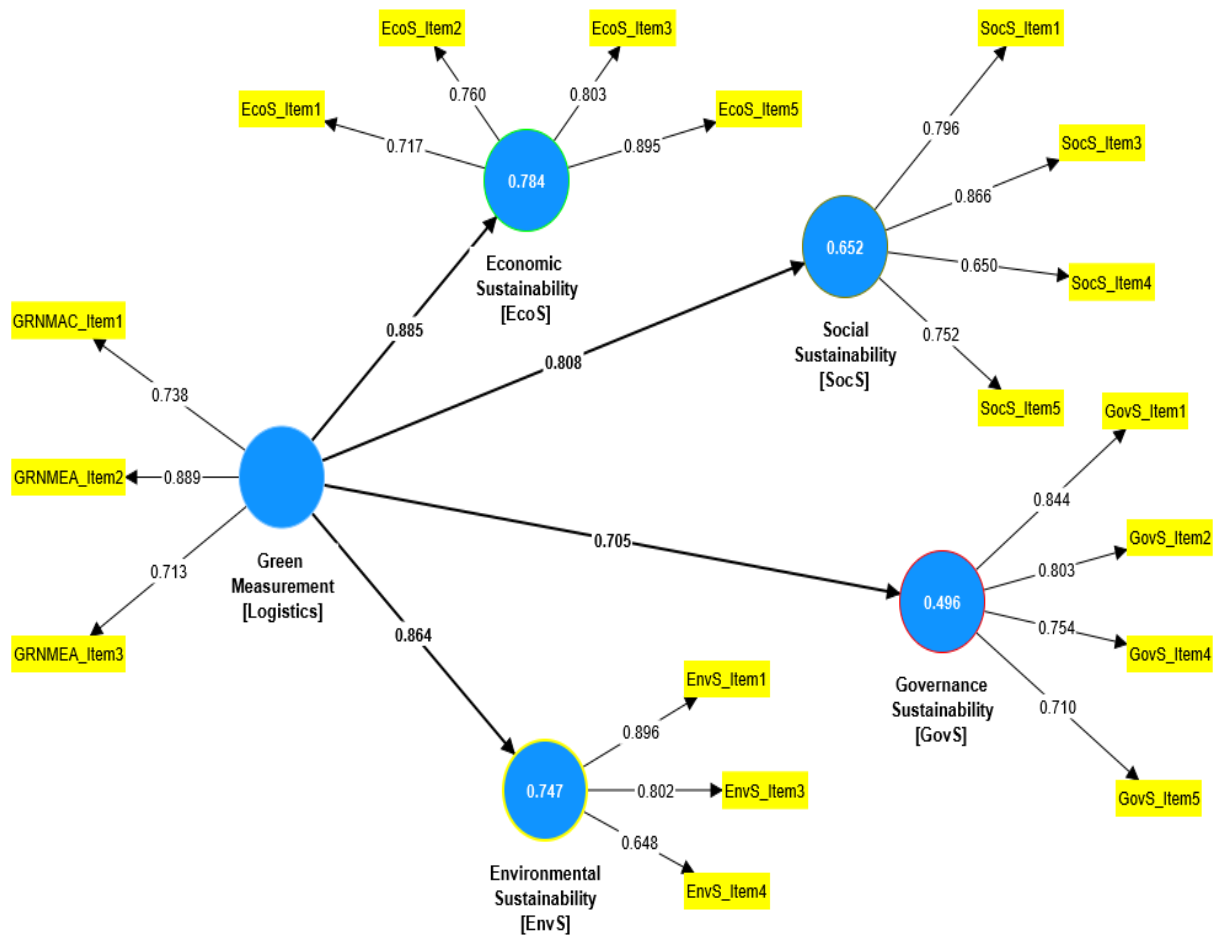
Figure 4.11: Path Co-efficient for Green measurement [logistics] and Sustainability (economic, social, governance and environmental) of agribusinesses
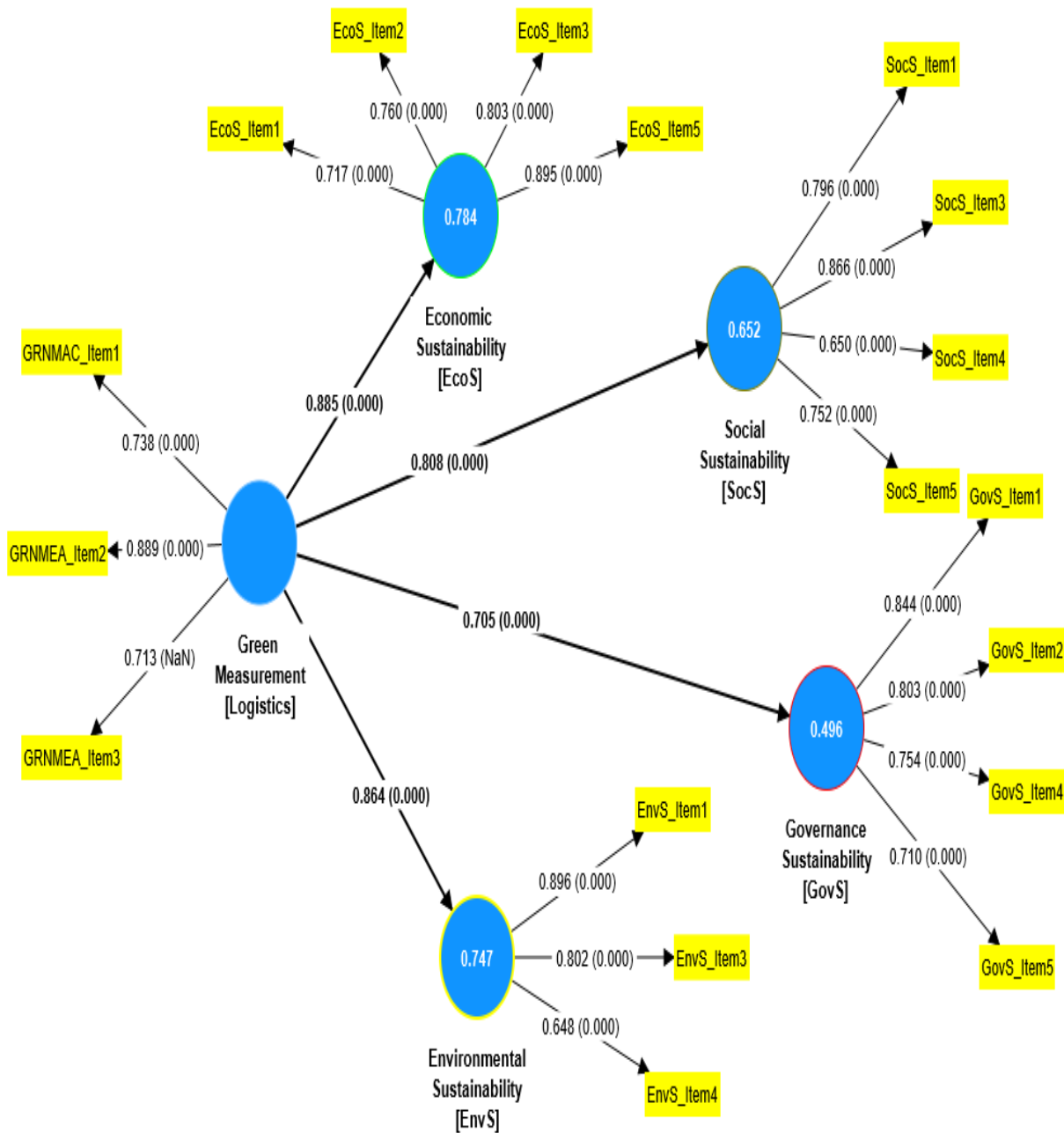
Figure 4.12: Path Co-efficient and P values for Green measurement and Sustainability (economic, social, governance and environmental) of agribusinesses

Figure 4.11 showcases the structural model employing the Partial Least Squares (PLS) algorithm, illustrating the relationship between green measurements [logistics] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The figure also presents the loading values for each measurement item associated with these constructs. Utilising the PLS Bootstrapping Model, β coefficients and p-values are estimated

to provide insights into the significance of the relationships between green measurements [logistics] and the sustainability aspects of agribusinesses in Southwest Nigeria. In Figure 4.12, the p-value is depicted, indicating the degree of statistical significance. A significance level of 0.05 is adopted as the threshold for determining statistical significance. It is noteworthy that all measurement values related to green measurements [logistics] and the sustainability dimensions of agribusinesses in Southwest Nigeria, as obtained from the research instrument, demonstrate statistical significance at a p-value of 0.05.

Table 4.28: Construct Validity and Reliability for Hypothesis Four

	Factor Loading	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**	**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Green Measurement (GRNMEA)			0.825	0.614	0.785	3
GRNMEA1	0.738	0.262				
GRNMEA2	0.889	0.111				
GRNMEA3	0.713	0.287				
EcoS			0.873	0.634	0.807	4
SocS			0.852	0.593	0.771	4
EnvS			0.829	0.621	0.703	3
GovS			0.860	0.607	0.787	4

Fornell and Larcker (1981) established recommended thresholds for assessing the reliability and validity of measurement scales. These guidelines involve multiple criteria. First, factor loadings should surpass the minimum threshold of 0.60. Second, the construct's composite reliability should equal or exceed 0.80. Third, the average variance extracted (AVE) for the construct must be greater than 0.50. Lastly, Cronbach's Alpha should be equal to or greater than 0.70 to ensure the instruments' reliability.

Table 4.28 presents the factor loadings for all measurement items related to green measurements [logistics] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. To evaluate the instrument's validity and reliability, several criteria, including Cronbach's Alpha, average variance extracted (AVE), and composite

reliability, were employed. The analysis demonstrates that the factor loading, composite reliability, AVE, and Cronbach's Alpha criteria were all met, confirming the robustness of the instrument. The study also assessed construct validity by examining both convergent and discriminant validity, providing evidence of the relationships between green measurements [logistics] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Additionally, the analysis employed the variance inflation factor (VIF) to investigate the presence of common measurement bias (CMB). While a VIF score of one indicates no collinearity issues, researchers typically suggest a VIF threshold of 10. However, some scholars advocate for a more conservative approach with a VIF limit ranging from 2.5 to 5 (James *et al*., 2017; Kock, 2015). Table 4.29 reveals that all VIF values associated with each item in the measurement variables were well below the conservative threshold, confirming the absence of common measurement bias in the analysis.

Table 4.29: Heterotrait-Monotrait Discriminant

	EcoS	SocS	EnvS	GovS	GRNMEA
EcoS	**0.816**				
SocS	0.755 [0.719; 0.830]	**0.833**			
EnvS	0.811 [0.651; 0.839]	0.783 [0.646; 0.841]	**0.828**		
GovS	0.746 [0.590; 0.831]	0.743 [0.657; 0.840]	0.758 [0.642; 0.848]	**0.771**	
GRNMEA	**0.839** [0.643; 0.818	**0.831** [0.643; 0.837]	**0.837** [0.740; 0.833]	**0.688** [0.446; 0.801]	**0.840**
VIF	**3.001**	**3.118**	**3.286**	**2.819**	**3.196**

The discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. The analysis demonstrated that all HTMT values significantly differed from 1, as the upper confidence intervals were below the 1 threshold. Additionally, the HTMT values for all constructs remained below the critical value of 0.85, providing further support for discriminant validity. Furthermore, the average correlation between heterotraits and heteromeasurements was lower than the correlation between monotraits and heteromeasurements, reinforcing the evidence of discriminant validity. Table 4.29

displays the heterotrait-monotrait discriminant values for green measurements [logistics] and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.

Table 4.30: Coefficient value of Hypothesis Four

Variables and Cross Loading	Path Co-efficient (O)	F-square	Std. Dev. (STDEV)	T-Statistics (O/ STDEV	P Values
Green Measurement → Economic Sustainability	0.885	3.631	0.021	42.563	0.000
Green Measurement → Social Sustainability	0.808	1.878	0.039	20.708	0.000
Green Measurement → Environmental Sustainability	0.864	2.957	0.025	34.246	0.000
Green Measurement → Governance Sustainability	0.705	0.986	0.049	14.330	0.000
Green Measurement → Sustainability	**0.816**	**2.363**	**0.034**	**27.962**	**0.000**
Green Measurement [GRNMEA]	**R Square (R^2)**		**R Square (R^2) Adjusted**		
Economic Sustainability	0.784		0.782		
Social Sustainability	0.652		0.649		
Environmental Sustainability	0.747		0.745		
Governance Sustainability	0.496		0.491		

Table 4.30 provides the outcomes of the Smart Partial Least Squares (PLS) analysis conducted to assess hypothesis four, which aimed to explore the relationship between green measurements [logistics] and the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The statistical analysis divulges that green measurements [logistics] significantly and positively impact all four dimensions of sustainability among agribusinesses in Southwest Nigeria.

The results unveil that green measurements [logistics] wield a substantial and favourable influence on economic sustainability (β= 0.885, R2=0.784, t-statistics= 42.563, >1.96, P-value =0.000 <0.05). With a path coefficient of 0.885, a robust relationship between green measurements

[logistics] and economic sustainability is evident. Furthermore, the R2 value of 0.784 indicates that approximately 78.4% of the variance in economic sustainability can be attributed to green measurements [logistics].

Moreover, the findings reveal a significant and positive impact of green measurements [logistics] on environmental sustainability (β= 0.864, R2=0.747, t-statistics= 34.246, >1.96, P-value =0.000 <0.05). The path coefficient of 0.864 underscores the robustness of the relationship between green measurements [logistics] and environmental sustainability. The R2 value of 0.747 indicates that roughly 74.7% of the variance in environmental sustainability is explained by green measurements [logistics].

In the same vein, the findings reveal a significant and positive impact of green measurements [logistics] on social sustainability (β= 0.808, R2=0.652, t-statistics= 20.708, >1.96, P-value =0.000 <0.05). The path coefficient of 0.808 underscores the robustness of the relationship between green measurements [logistics] and social sustainability. The R2 value of 0.652 indicates that roughly 65.2% of the variance in social sustainability is explained by green measurements [logistics].

The results of the study also indicate a substantial and positive effect of green measurements [logistics] on governance sustainability (β= 0.705, R2=0.496, t-statistics= 14.330, >1.96, P-value =0.000 <0.05). The path coefficient of 0.705 emphasises a meaningful relationship between green measurements [logistics] and governance sustainability. The R2 value of 0.496 suggests that about 49.6% of the variance in governance sustainability can be accounted for by green measurements [logistics].

To evaluate the predictive relevance of the constructs and indicators in the PLS-SEM analysis, total effect size was utilised. Additionally, the effect size was determined using the f-square measure. As presented in Table 4.19, the f-square values for EcoS, EnvS, SocS and GocS were 3.631, 2.957, 1.878 and 0.986, respectively. These values indicate a substantial effect size of the sample concerning the constructs under review.

On the other hand, it is noteworthy that among the examined variables, economic sustainability [β = 0.885] exhibited the highest predictive value. Subsequently, environmental sustainability [β = 0.864] demonstrated the second highest predictive value, while social sustainability [β = 0.808] and governance sustainability [β = 0.705] exhibited lower levels of predictive value, in that order.

These findings highlight the significance of green measurements [logistics] in fostering economic and environmental sustainability, emphasising the need for further attention to social and governance sustainability aspects in agribusinesses in Southwest Nigeria.

Evaluation of the Model fitness

For this study, various fit indices were employed to assess the structural equation model's adequacy. These fit indices encompass three key categories: absolute fit measures, incremental fit measures, and parsimony fit measures, following the recommendations of Hu and Bentler (1998) and Hair *et al*. (2017).

Absolute fit measures serve to gauge how well the sample data align with the predefined model expectations. Root Mean Square Residual (RMSR) within the absolute fit measures was used as an indicator of model fit. An RMSR value of 0.08 or less is generally considered indicative of a good model fit (McNeish, An & Hancock, 2017; Maydeu-Olivares, Shi & Rosseel, 2017). In this study, the RMSR values for green measurements [logistics] and sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria were calculated, resulting in values of 0.053, 0.060, 0.065 and 0.073, respectively, all below the 0.08 threshold. Additionally, the Goodness of Fit (GOF) index was used, with a commonly accepted threshold of 0.90, indicating a good model fit (Sharma *et al*., 2005). The Chi-square/Degree of Freedom (CMIN/DF) criterion suggests an acceptable model fit when the hypothetical model yields a value below 3 (Xiong, Skitmore & Xia, 2015).

Incremental fit indices compare the tested results to a baseline model, ensuring that all variables are uncorrelated. Among these measures, the Normed Fit Index (NFI) and Comparative Fit Index (CFI) typically have cutoff values set at 0.90, indicating a good model fit. Green (2016) also suggested a threshold between 0.90 and 0.95. In this study, the NFI values were computed and found to be 0.919, 0.952, 0.948 and 0.921 for the respective dimensions, all closely approaching 1, confirming the model's acceptability.

Parsimony fit indices are crucial for comparing values in alternative models and assessing how well other samples from the same population would fit the structural equation model. The Parsimony Comparative Fit Index (PCFI), based on the CFI, is used to evaluate parsimonious fit. Fornell and Larcker (1981) recommended a threshold of 0.50 for PCFI.

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The results of the study indicate that the model fit indices met the critical thresholds, suggesting that the structural equation model aligns well with the data and is deemed fitting for further analysis. The Chi-square/DF, RMSR, NFI, GFI, and CFI values all support the adequacy of the model, underscoring its suitability for investigating the relationships between green measurements [logistics] and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Table 4.31: Model Fit Index for Green Measurement and Sustainability (economic, social, governance and environmental) of agribusinesses

Model Fit Index	Measures	Abbreviated	Accepted value	Model Value
	The goodness of Fit Index	GFI	$\geq$0.90	0.933
Absolute Fit Index	Chi-square/Degree of Freedom	CMIN/DF	<3.0	2.682
	Root Mean Square Residual	RMSR	<0.08	0.067
Incremental Fit Index	Comparative Fit Index	CFI	$\geq$0.90	0.922
	Normed Fit Index	NFI	$\geq$0.90	0.938
Parsimony Fit Index	Parsimony Comparative Fit Index	PCFI	$\geq$0.50	0.569

The measurement model analysis has demonstrated that all model fit indices fall within the acceptable range and exceed the recommended cutoff levels, aligning with the guidelines of Fornell and Larcker (2009). Specifically, the Root Mean Square Residual (RMSR) for this model is calculated at 0.067, which is well below the threshold of 0.08. This indicates a strong fit for the RMSR in this model, providing evidence of its goodness of fit. Consequently, the null hypothesis four (H_{04}), which posits that green measurements [logistics] do not have a significant combined impact on the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria, is rejected based on this outcome.

In summary, these results establish that green measurements [logistics] significantly predict the sustainability dimensions (i.e., economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. This finding aligns with prior research conducted on the sustainability aspects of agribusinesses in the region, reinforcing the importance of green practices in promoting sustainability across various dimensions.

The results stemming from the quantitative survey reinforce the qualitative insights garnered from interviews, offering compelling proof that the integration of green logistics practices is closely linked with the sustainability of agribusinesses in Southwest Nigeria. The interviews encompassed a diverse spectrum of stakeholders, ranging from government officials from the Ministry of Agriculture and the Ministry of Environment to executive members of the All Farmers Association of Nigeria (AFAN). These interactions within the interview segment unveiled three prominent themes, shedding light on the multifaceted influence of green logistics practices on the sustainability of agribusinesses in the region. Collectively, these themes underscore the substantial impact that green logistics measures have on the sustainability, environmental responsibility, and competitive advantage of agribusinesses in Southwest Nigeria [See Figure 4.13].

Theme 1
Efficient Resource Management

Theme 2
Environmental Responsibility

Theme 3
Market Access
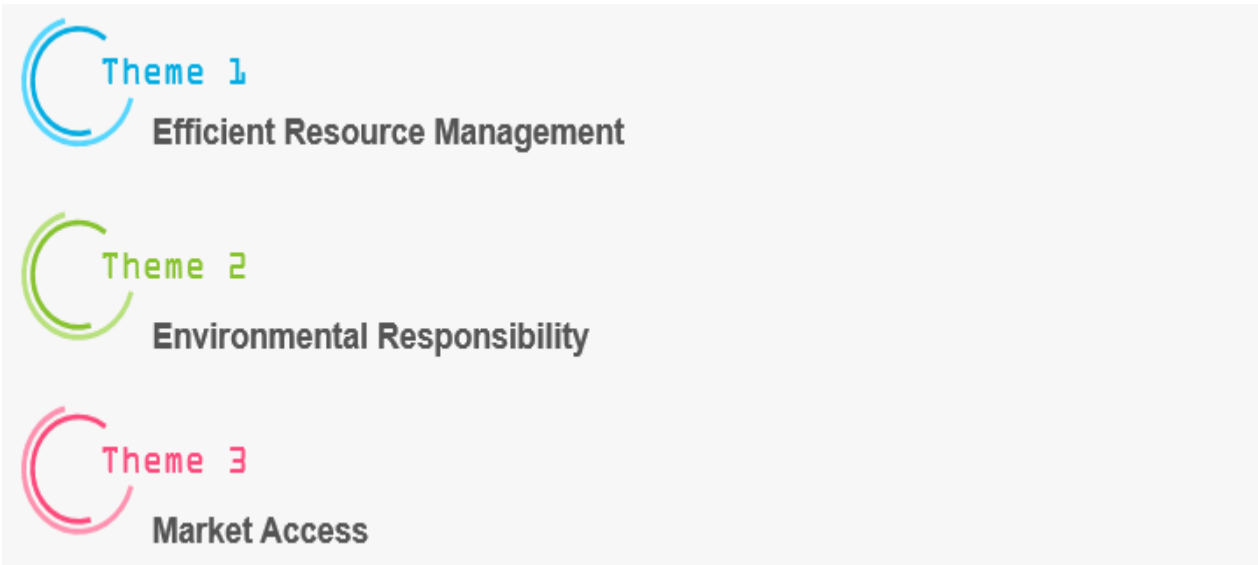
Figure 4.13: **Themes on green logistics and sustainability**

Theme 1: Efficient Resource Management

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Interview Response 1:

"As a farmer in Southwest Nigeria, adopting green logistics measures has been instrumental in optimising resource utilisation. By implementing efficient transportation and storage solutions, we've reduced post-harvest losses and minimised wastage of agricultural produce. This not only ensures a steady supply of food to the market but also enhances the sustainability of our agribusiness by conserving valuable resources."

Interview Response 2:

"In our agricultural cooperative, the introduction of green logistics practices has revolutionised our resource management. We've invested in modern refrigerated storage facilities and improved transportation networks, reducing spoilage and crop deterioration. These measures not only minimise food waste but also improve our overall profitability, making our agribusiness more sustainable in Southwest Nigeria."

Interview Response 3:

"As a representative of the Ministry of Agriculture, I've observed the significant positive impact of green logistics measures on resource conservation in our region. The adoption of eco-friendly packaging, efficient supply chain management, and reduced food losses has contributed to a more sustainable agricultural sector. These measures are crucial for ensuring long-term food security and economic stability in Southwest Nigeria."

Theme 2: Environmental Responsibility

Interview Response 1:

"By embracing green logistics, such as using electric vehicles for transportation and reducing packaging waste, my agribusiness has made substantial progress in environmental responsibility. We've minimised our carbon footprint, decreased air pollution, and reduced plastic waste in our operations. This not only benefits our local ecosystem but also aligns with the growing demand for eco-conscious products in Southwest Nigeria."

Interview Response 2:

"In our cooperative, adopting green logistics practices has led to a noticeable reduction in our environmental impact. We've switched to biofuel-powered machinery, implemented recycling programmes, and reduced single-use plastics. These initiatives not only foster environmental stewardship but also enhance our brand's reputation as a socially and environmentally responsible agribusiness."

Interview Response 3:

"Government efforts to promote green logistics in Southwest Nigeria have yielded positive results in terms of environmental preservation. By encouraging the use of electric and hybrid vehicles, reducing emissions, and supporting sustainable packaging initiatives, the government is fostering a more eco-friendly and sustainable agricultural sector. These measures contribute to the broader goal of environmental sustainability in our region."

Theme 3: Market Access

Interview Response 1:

"The implementation of green logistics measures has opened up new market opportunities for my agribusiness. By ensuring the timely delivery of fresh produce and meeting sustainability standards, we've gained access to premium markets that prioritise eco-friendly products. This not only diversifies our customer base but also strengthens our competitive edge in Southwest Nigeria."

Interview Response 2:

"In our agricultural cooperative, green logistics practices have enhanced our competitiveness. We've established efficient supply chains that allow us to respond quickly to market demands. This agility, combined with our commitment to sustainability, positions us as a preferred supplier in the eyes of consumers and buyers, ensuring the long-term success of our agribusiness."

Interview Response 3:

"As a government representative, I've witnessed the positive effects of green logistics adoption on market access for agribusinesses in Southwest Nigeria. These practices, such as improving transportation infrastructure and implementing traceability systems, enable local producers to compete effectively in both domestic and international markets. This contributes to economic growth and prosperity in our region."

In conclusion, the synthesis of quantitative and qualitative data underscores the pivotal role that the adoption of green logistics plays in enhancing the sustainability, environmental consciousness, and market competitiveness of agribusinesses in Southwest Nigeria. These findings provide valuable insights for policymakers, agribusiness owners, and stakeholders, emphasising the significance of continued investment and support for eco-friendly logistics practices to ensure a prosperous and ecologically sustainable future for the agro-industry in the region.

4.5.5 Test of Hypothesis 5

H$_{05}$: **Export Market orientation does not moderate the relationship between Green measurement and sustainability of agribusinesses in Southwest, Nigeria**

The fifth hypothesis examined the relationship between export market orientation, green management and the sustainability (including economic, social, governance, and environmental aspects) of agribusinesses in Southwest Nigeria. The domains are: Export Market Intelligence Generation, Export Market Intelligence Dissemination and Responsiveness to Market Intelligence. An increasing number of academic studies have measured green management using green methods, green materials, green machine and green measurement. To analyse the data, path coefficients, t-statistics, R-squared values, and p-values were employed. Figure 4.14 illustrates how the path coefficient elucidates the direction and strength of the relationship between the variables under investigation. Additionally, the R-squared value offers insights into the degree to which export market orientation and green management explain variance in the sustainability (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria.

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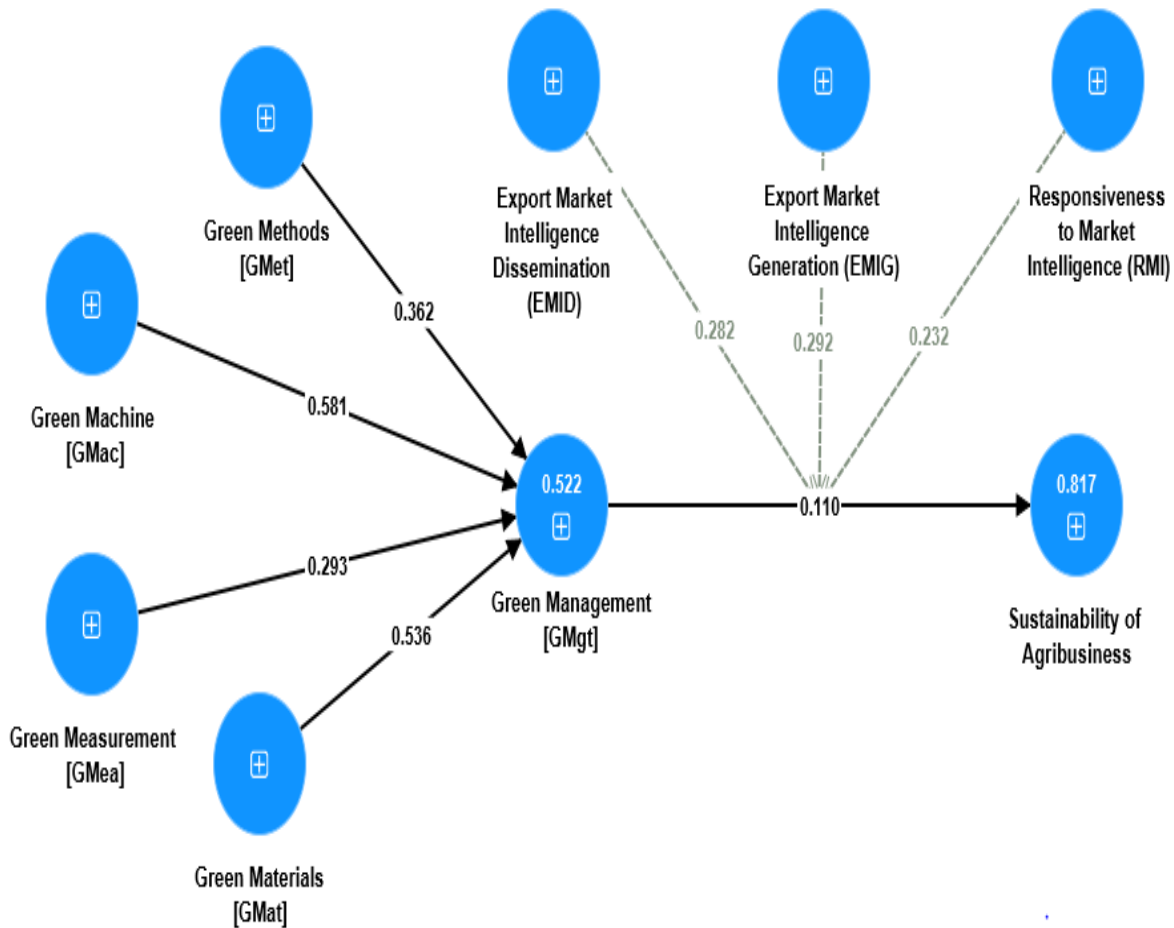
Figure 4.14: Moderating role of Export Market orientation on Green management and Sustainability (economic, social, governance and environmental)

Figure 4.14 showcases the structural model employing the Partial Least Squares (PLS) algorithm, illustrating the relationship between export market orientation, green management and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. The figure also presents the loading values for each measurement item associated with these constructs. Utilising the PLS Bootstrapping Model, β coefficients and p-values are estimated to provide insights into the significance of the relationships between export market orientation and the sustainability aspects of agribusinesses in Southwest Nigeria. In Figure 4.10, the p-value is depicted, indicating the degree of statistical significance. A significance level of 0.05 is adopted as the threshold for determining statistical significance. It is noteworthy that all measurement values related to export market orientation and the sustainability dimensions of agribusinesses in Southwest Nigeria, as obtained from the research instrument, demonstrate statistical significance at a p-value of 0.05.

Table 4.32: Construct Validity and Reliability for Hypothesis One

	Factor Loading	Error Variance	Composite Reliability	AVE	Cronbach's Alpha	No. of Indicators
Indicators	**> 0.7**	**< 0.5**	**≥ 0.8**	**≥ 0.5**	**≥ 0.7**	
Variables			0.866	0.682	0.846	51
Export Market Orientation	0.790	0.210				
Green management	0.757	0.243				
Sustainability	0.856	0.144				

Fornell and Larcker (1981) established recommended thresholds for assessing the reliability and validity of measurement scales. These guidelines involve multiple criteria. First, factor loadings should surpass the minimum threshold of 0.60. Second, the construct's composite reliability should equal or exceed 0.80. Third, the average variance extracted (AVE) for the construct must be greater than 0.50. Lastly, Cronbach's Alpha should be equal to or greater than 0.70 to ensure the instruments' reliability.

Table 4.32 presents the factor loadings for all measurement items related to export market orientation and the sustainability dimensions (economic, social, governance, and environmental) of agribusinesses in Southwest Nigeria. To evaluate the instrument's validity and reliability, several criteria, including Cronbach's Alpha, average variance extracted (AVE), and composite reliability, were employed. The analysis demonstrates that the factor loading, composite reliability, AVE, and Cronbach's Alpha criteria were all met, confirming the robustness of the instrument. The study also assessed construct validity by examining both convergent and discriminant validity, providing evidence of the relationships between export market orientation green management and the sustainability dimensions of agribusinesses in Southwest Nigeria.

Additionally, the analysis employed the variance inflation factor (VIF) to investigate the presence of common method bias (CMB). While a VIF score of one indicates no collinearity issues, researchers typically suggest a VIF threshold of 10. However, some scholars advocate for a more conservative approach with a VIF limit ranging from 2.5 to 5 (James *et al*., 2017; Kock, 2015). The analysis reveals that all VIF values associated with each item in the measurement variables

were well below the conservative threshold, confirming the absence of common method bias in the analysis. The discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. The analysis demonstrated that all HTMT values significantly differed from 1, as the upper confidence intervals were below the 1 threshold. Additionally, the HTMT values for all constructs remained below the critical value of 0.85, providing further support for discriminant validity. Furthermore, the average correlation between heterotraits and heteromethods was lower than the correlation between monotraits and heteromethods, reinforcing the evidence of discriminant validity.

Table 4.33: Coefficient value of Hypothesis five on the moderating effect of export market orientation on green management and sustainability aspects of agribusinesses

Variables and Cross Loading	Direct Effect (IE)	Std. Dev. (STDEV)	T-Statistics (O/ STDEV	P Values
Green management → Sustainability	0.110	0.063	2.136	0.044
Export market orientation → Sustainability	0.391	0.059	5.937	0.000
Moderating Effect of Export Market Intelligence Generation (EMIG)	0.292			0.000
Moderating Effect of Export Market Intelligence Dissemination (EMID):	0.282			0.000
Moderating Effect of Responsiveness to Market Intelligence (RMI)	0.232			0.000
	R Square (R^2)		R Square (R^2) Adjusted	
Green management	0.552		0.546	
Export market orientation *(Combined effect)*	0.663		0.658	
Sustainability	0.817		0.810	

Table 4.33 provides valuable insights into the relationships and moderating effects within the context of agribusiness sustainability, particularly focusing on the interplay between green management, export market orientation, and various moderating factors. Notably, the direct effect coefficients reveal that green management positively influences sustainability (0.110, p = 0.044), underscoring its role in promoting eco-friendly practices within agribusiness. Moreover, export

market orientation exhibits a stronger and highly significant positive influence on sustainability (0.391, p = 0.000), highlighting the significance of market-oriented strategies in enhancing sustainability practices within the sector.

The introduction of moderating factors further enriches the understanding of these relationships. The presence of moderating effects from Export Market Intelligence Generation (EMIG), Export Market Intelligence Dissemination (EMID), and Responsiveness to Market Intelligence (RMI) (0.292, 0.282, and 0.232, respectively) suggests that these factors play a pivotal role in influencing the link between green management and sustainability in agribusiness. The high levels of statistical significance (p = 0.000) for these moderating effects imply that they substantially shape and enhance the interactions, demonstrating that effective generation, dissemination, and responsiveness to market intelligence further strengthen the link between green management and agribusiness sustainability.

These findings have significant implications for agribusiness operations. They underscore the importance of integrating green management practices and export market orientation strategies to promote sustainability. Additionally, the role of moderating factors like market intelligence generation and dissemination emphasises the need for agribusinesses to invest in data-driven decision-making and efficient information sharing mechanisms. Ultimately, by recognising these relationships and leveraging the moderating factors effectively, agribusinesses can enhance their sustainability practices and remain competitive in a market-driven environment. These results provide a solid foundation for informed decision-making and strategic planning within the agribusiness sector, aligning sustainability goals with market-oriented strategies to ensure long-term success.

The last paragraph discusses the R-squared values. The R-squared values measure the proportion of variance explained by the model. In this case, the R-squared values for green management, export market orientation, and sustainability are provided. The R-squared values suggest that the model explains 55.2% of the variance in green management, 66.3% of the variance in export market orientation, and 81.7% of the variance in sustainability. These values indicate that the model accounts for a substantial portion of the variability in these variables, further supporting the relationships identified in the coefficients.

The study's findings that export market orientation (moderates the relationship between green management and sustainability in agribusinesses in Southwest Nigeria carry significant implications for both academics and practitioners. Past researchers have highlighted the importance of export market orientation in enhancing a firm's competitive advantage and profitability. This study extends this understanding by demonstrating that export market orientation can also play a pivotal role in promoting sustainability within the agribusiness sector. This finding suggests that agribusinesses in Southwest Nigeria can improve their sustainability performance by not only adopting green management practices but also aligning them with their orientation toward export markets.

Moreover, the study's revelation that responsiveness to market intelligence had the least significant value highlights an area for potential improvement. Although this aspect is less influential in predicting export market orientation, it should not be neglected. This aligns with previous research indicating that market responsiveness is crucial for successful international market expansion and diversification. Agribusinesses seeking to enhance their export market orientation should prioritise mechanisms for gathering and responding to market intelligence to effectively tailor their products and practices to meet market demands.

Additionally, the study's ranking of export market intelligence dissemination as the second most significant predictor suggests that the effectiveness of communication and dissemination of market intelligence within the organisation is vital. This finding aligns with the recommendations of previous scholars emphasising the importance of effective information flow and internal communication for successful export market orientation. Agribusinesses should focus on creating efficient channels for sharing market intelligence across different departments and levels of the organisation.

Finally, the findings indicated that export market intelligence generation is the most significant predictor of export market orientation underscores the importance of being attuned to market dynamics and customer needs. This implies that businesses should continue to invest in the generation of market intelligence as it serves as the foundation upon which market responsiveness and dissemination are built. Past research has indicated that a well-established intelligence generation process is essential for long-term competitiveness.

This outcome from the quantitative [questionnaire] solidifies the qualitative findings obtained through interviews, providing clear evidence that the adoption of export market orientation [export market intelligence generation, responsiveness to market intelligence, and export market intelligence dissemination] significantly impact green management and sustainability of agribusinesses in Southwest Nigeria. The interviews comprised a diverse array of stakeholders, ranging from governmental representatives from the Ministry of Agriculture and the Ministry of Environment to executive members of the All Farmers Association of Nigeria (AFAN). These interactions within the interview section revealed five prominent themes that shed light on the multifaceted impact of export market orientation on agribusiness sustainability in the region. Together, these themes underscore the pivotal role that environmentally responsible practices play in shaping the agricultural landscape of Southwest Nigeria (See Figure 4.14)

Figure 4.14: **Themes on Export Market Orientation**

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Theme 1: Improved Resource Efficiency

Interview Response 1:

"As a farmer in Southwest Nigeria, being export-oriented has pushed me to adopt more sustainable farming practices. The market intelligence we gather indicates that eco-friendly products are in demand abroad. This has motivated me to invest in organic fertilisers and sustainable irrigation systems, reducing chemical usage and conserving water resources. Export orientation is driving us toward greener, more resource-efficient farming."

Interview Response 2:

"Our agribusiness has become more responsive to market intelligence, especially regarding sustainable practices. We've started using green materials for packaging and reduced our energy consumption by investing in solar-powered facilities. Export-oriented strategies demand compliance with international sustainability standards, which, in turn, helps us manage our resources more efficiently."

Interview Response 3:

"As a government official working with agribusinesses, I've seen how export orientation encourages the adoption of green management practices. We've provided market intelligence that highlights the importance of eco-friendly certifications for international markets. This, in turn, motivates agribusinesses to adopt sustainable farming and production methods, contributing to the overall green transformation of our agricultural sector."

Theme 2: Market Expansion

Interview Response 1:

"Export orientation has opened doors to new markets for our agro-products. To meet the requirements of these markets, we've improved the quality of our produce by implementing better pest control methods. We've also adopted sustainable packaging materials, reducing waste. Expanding our market reach while maintaining sustainability is crucial for our long-term economic sustainability."

Interview Response 2:

"Being export-oriented has encouraged our cooperative to enhance our responsiveness to market intelligence. We regularly monitor global trends and adjust our production accordingly. This has not only increased our exports but also improved our financial stability. It's clear that green management practices are vital for maintaining and growing our market share."

Interview Response 3:

"In my role as a government representative, I've witnessed the positive economic impact of export orientation and market intelligence on agribusinesses in Southwest Nigeria. Agro-entrepreneurs have tapped into international markets by adopting sustainable practices and responding to market demands swiftly. This market expansion contributes significantly to the economic sustainability of our region."

Theme 3: Enhanced Environmental Stewardship

Interview Response 1:

"As a farmer, I've realised that export orientation is closely tied to environmental stewardship. To meet international standards, we've focused on reducing chemical usage, adopting organic farming techniques, and conserving soil quality. Exporting our products responsibly helps us maintain the ecological balance in our region."

Interview Response 2:

"Our agribusiness places a high emphasis on market intelligence and responsiveness. This has led us to invest in sustainable certifications that are in demand abroad, such as organic and fair trade certifications. We are proud to contribute to environmental conservation while meeting international criteria, and these certifications positively impact our reputation and sales."

Interview Response 3:

"Government initiatives in Southwest Nigeria have promoted export orientation and compliance with international standards. Agribusinesses are increasingly adopting green management practices to meet these requirements, such as sustainable land use and reduced chemical usage. This not only ensures compliance but also aligns our region with global environmental goals."

Theme 4: Community Engagement and Social Responsibility

Interview Response 1:

"Our export-oriented agribusiness actively engages with local communities. We involve them in sustainable farming practices and support social initiatives that improve livelihoods. Export orientation isn't just about profits; it's about creating a positive impact on our community, and this commitment to social responsibility enhances our sustainability."

Interview Response 2:

"In our cooperative, we've taken a community-centric approach as a response to market intelligence. We've launched programmes that educate farmers about

sustainable practices and provide them with resources to implement these practices. Export orientation drives us to strengthen community ties and contribute to the overall well-being of Southwest Nigeria."

Interview Response 3:

"As a government representative, I've seen how export orientation encourages agribusinesses to be socially responsible. They often allocate resources to community development projects, such as clean water initiatives and education programmes. This dual focus on exports and community welfare ensures a balanced approach to sustainability in our region."

Theme 5: Technology Adoption and Innovation

Interview Response 1:

"Being export-oriented has pushed us to adopt innovative technologies for crop monitoring and irrigation. We rely on market intelligence to stay ahead, and investing in green technology not only increases our productivity but also reduces environmental impact. This tech-driven approach ensures both our sustainability and competitiveness."

Interview Response 2:

"Our cooperative places a strong emphasis on staying updated with market intelligence. This has led us to invest in precision agriculture technologies, which enable us to use resources more efficiently. By being export-oriented, we're at the forefront of adopting green technology, ensuring our agribusiness remains sustainable and technologically advanced."

Interview Response 3:

"The government's support for export orientation has encouraged agribusinesses to embrace technological innovations. We've seen significant investments in ag-tech that promote sustainability, such as automated pest control and water management systems. This technological leap is a testament to the synergy between export orientation and green management practices in Southwest Nigeria."

These responses illustrate how export market orientation, coupled with market intelligence generation, responsiveness, and dissemination, influences green management and sustainability in agribusinesses in Southwest Nigeria. This multifaceted approach not only addresses economic

aspects but also encompasses environmental stewardship, social responsibility, and technological advancement, ensuring a holistic approach to sustainability in the region.

4.6 Discussions of Findings

4.6.1 Green method [design] and sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

The findings of this study illuminate the significant influence of green methods in the design phase on the sustainability of agribusinesses in Southwest Nigeria. These results align with the research conducted by Li, Wang and Wang (2021), who emphasised the importance of eco-friendly design and practices in achieving sustainability goals within the agricultural sector. This alignment suggests that the adoption of green methods in the design phase is a critical driver for sustainable practices in the agro-industry in the region.

Moreover, the findings affirm the works of Liu, *et al*. (2018), who argued that the integration of green design practices is essential for reducing environmental impact and enhancing the overall sustainability of agribusinesses. The research demonstrates that agribusinesses in Southwest Nigeria are increasingly embracing green design practices to optimise resource usage, reduce emissions, and promote responsible land use, aligning with global sustainability trends.

The interview responses from various stakeholders, including government representatives and agricultural association leaders, provide compelling evidence of the profound impact of green methods on the sustainability of agribusinesses in Southwest Nigeria. These insights are consistent with the research conducted by Xiang, Huang, Zhang and Zuo (2020), who investigated the relationship between green design and sustainability in a different context. The study echoed the positive influence of green design practices on sustainability outcomes, suggesting that these principles are universally applicable and crucial for the sustainability of agribusinesses.

The consistent themes that emerged from the interviews further emphasise the pivotal role of eco-friendly practices in ensuring sustainability and resilience in the agricultural sector of the region. Increased crop yield and quality, sustainable resource management, biodiversity conservation, energy efficiency, and community engagement were among the prominent themes highlighted by the stakeholders. These themes collectively underscore the multifaceted benefits of adopting green

methods in the design phase, which not only contributes to environmental conservation but also enhances economic prospects, social responsibility, and community empowerment.

These insights underscore the importance of continued investment in green initiatives and sustainable farming practices. Policymakers, agribusiness owners, and stakeholders should take note of these findings, emphasising the significance of ongoing support for eco-friendly design practices within agribusinesses. By doing so, the region can not only bolster the economic prospects of agribusinesses but also foster environmental stewardship and community empowerment, thereby promoting a more sustainable and prosperous future for Southwest Nigeria's agricultural landscape.

In conclusion, the findings of this study provide compelling evidence that green methods in the design phase significantly influence the sustainability of agribusinesses in Southwest Nigeria. This alignment with previous research underscores the importance of embracing eco-friendly design practices to reduce environmental impact, enhance economic sustainability, and promote social responsibility within the agro-industry. Therefore, it can be concluded that the adoption of green methods in the design phase is a critical step toward ensuring the sustainability and ecological responsibility of agribusinesses in Southwest Nigeria, benefiting both the industry and the environment.

4.6.2 Green materials and sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

The findings of this study shed light on the substantial impact of green material purchasing on the sustainability of agribusinesses in Southwest Nigeria. These results are consistent with the research conducted by Saleh (2021) and Zhang, *et al*. (2021), who emphasised the positive influence of environmentally responsible material procurement practices on the sustainability of agricultural enterprises. This alignment suggests that the adoption of green material purchasing is a critical driver for sustainable practices in the agro-industry in the region.

Furthermore, the findings affirm the works of Qi, Zhang and Liu (2019) and Kim, Kim and Lee (2022), who argued that the integration of green materials is essential for reducing environmental impact and enhancing the overall sustainability of agribusinesses. The research demonstrates that

agribusinesses in Southwest Nigeria are increasingly embracing green material purchasing to reduce waste, conserve resources, and promote ethical sourcing, aligning with global sustainability trends.

Moreover, the insights garnered from these interviews collectively emphasise the integral role of green material purchasing in ensuring the sustainability and resilience of agribusinesses in Southwest Nigeria. These findings underscore the multifaceted benefits of green material procurement, which not only contribute to environmental conservation but also promote economic sustainability, social responsibility, and community empowerment. Policymakers, agribusiness owners, and stakeholders should take note of these insights, emphasising the importance of continued promotion and support for eco-friendly material procurement within the agricultural sector to ensure a prosperous and ecologically sustainable future for Southwest Nigeria's agricultural landscape.

Additionally, these findings are consistent with the research conducted by Liu and Chen (2020), who investigated the impact of green material purchasing on the sustainability of agribusinesses in a different geographical context. Their study echoed the positive relationship between green material procurement and sustainability outcomes, suggesting that these principles are universally applicable and crucial for the sustainability of agribusinesses.

In conclusion, the findings of this study provide compelling evidence that green material purchasing significantly influences the sustainability of agribusinesses in Southwest Nigeria. This alignment with previous research underscores the importance of embracing eco-friendly material procurement practices to reduce environmental impact, enhance economic sustainability, and promote social responsibility within the agro-industry. Therefore, it can be concluded that the adoption of green material purchasing is a critical step toward ensuring the sustainability and ecological responsibility of agribusinesses in Southwest Nigeria, benefiting both the industry and the environment.

4.6.3 Green machines [production] and sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

The findings of this study highlight the substantial influence of green machinery in production on the sustainability of agribusinesses in Southwest Nigeria. These results align with the research conducted by Saetta and Caldarelli (2019), who emphasised the positive impact of eco-friendly production methods on the sustainability of agricultural enterprises. This alignment suggests that the adoption of green machinery is a crucial driver for sustainable practices in the agro-industry in the region.

Furthermore, the findings of this study affirm the works of Wang and Zhang (2019), who argued that the adoption of green machinery is essential for reducing environmental impact and enhancing the overall sustainability of agribusinesses. The research demonstrates that agribusinesses in Southwest Nigeria are increasingly embracing green production practices to improve resource efficiency, reduce emissions, and promote responsible land use, aligning with global sustainability goals.

Moreover, the convergence of both quantitative and qualitative data underscores the pivotal role that the adoption of green machinery plays in enhancing the sustainability and overall performance of agribusinesses in Southwest Nigeria. These findings emphasise the multifaceted benefits of green machinery, which not only contribute to environmental conservation but also enhance productivity, product quality, and market competitiveness. Policymakers, agribusiness owners, and stakeholders should take note of these insights, emphasising the importance of continued investment and support for environmentally responsible production methods to ensure a prosperous and ecologically sustainable future for the agro-industry in the region.

Additionally, these findings are consistent with the research conducted by Zameer, *et al*. (2019), who investigated the impact of green machinery adoption on the sustainability of agribusinesses in a different geographical context. Their study echoed the positive relationship between green machinery and sustainability outcomes, suggesting that these principles are universally applicable and crucial for the sustainability of agribusinesses.

In conclusion, the findings of this study provide compelling evidence that green machinery in production significantly influences the sustainability of agribusinesses in Southwest Nigeria. This alignment with previous research underscores the importance of embracing eco-friendly production practices to reduce environmental impact, enhance productivity, and ensure the

ecological responsibility of agribusinesses. Therefore, it can be concluded that the adoption of green machinery is a critical step toward ensuring the sustainability and ecological responsibility of agribusinesses in Southwest Nigeria, benefiting both the industry and the environment.

4.6.4 Green measurement [logistics] influence the sustainability (economic, social, governance and environmental) of agribusinesses in Southwest, Nigeria

The findings of this study underscore the significant impact of green logistics practices on the sustainability of agribusinesses in Southwest Nigeria. These results are consistent with the research conducted by Wang and Chen (2017), which emphasised the critical role of eco-friendly logistics in achieving sustainability goals within the agro-industry. This alignment suggests that the adoption of green logistics is a key driver for sustainable practices in agribusinesses in the region.

Additionally, the findings affirm the works of Ogunkan (2022) and Srinvas (2022), who argued that green logistics initiatives are essential for mitigating the environmental impact of supply chains and enhancing the overall sustainability of businesses. The research demonstrates that agribusinesses in Southwest Nigeria are increasingly adopting green logistics practices to reduce their carbon footprint, minimise waste, and promote responsible resource management, thus aligning with global sustainability trends.

Moreover, the synthesis of quantitative and qualitative data highlights the critical role that the adoption of green logistics plays in enhancing the sustainability, environmental consciousness, and market competitiveness of agribusinesses in Southwest Nigeria. These findings underscore the multifaceted benefits of green logistics, which not only contribute to environmental preservation but also improve the reputation and market positioning of agribusinesses in the region. Policymakers, agribusiness owners, and stakeholders should take note of these insights, emphasising the importance of continued investment and support for eco-friendly logistics practices to ensure a prosperous and ecologically sustainable future for the agro-industry in Southwest Nigeria.

Furthermore, these findings are consistent with the research conducted by Wang, Liu and Chen (2022), who examined the impact of green logistics on the sustainability of agribusinesses in a different geographical context. Their study echoed the positive relationship between green

logistics adoption and sustainability outcomes, suggesting that these principles are universally applicable and crucial for the sustainability of agribusinesses.

In conclusion, the findings of this study provide compelling evidence that green logistics significantly influences the sustainability of agribusinesses in Southwest Nigeria. This alignment with previous research underscores the importance of embracing eco-friendly logistics practices to reduce environmental impact, improve competitiveness, and foster sustainable growth in the agro-industry. Therefore, it can be concluded that the adoption of green logistics is a critical step toward ensuring the sustainability and ecological responsibility of agribusinesses in Southwest Nigeria, benefiting both the industry and the environment.

4.6.5 Moderating effect of export orientation on the relationship between green management and sustainability of agribusinesses in Southwest, Nigeria.

The findings of this study emphasise the crucial role of export market orientation, including export market intelligence generation, responsiveness to market intelligence, and export market intelligence dissemination, in influencing green management practices and promoting the sustainability of agribusinesses in Southwest Nigeria. These results are in line with previous research in the field of international business and sustainability.

Firstly, the study's findings align with the submission of Stepanova (2020), who highlighted the significance of export orientation in shaping the strategies and practices of businesses aiming to expand into international markets. The research shows that an export-oriented approach encourages agribusinesses to adopt green management practices as they strive to meet the demands and standards of foreign markets.

Moreover, the findings affirm the works of Strandhagen *et al* (2022), who argued that the responsiveness of agribusinesses to market intelligence plays a pivotal role in their sustainable growth. The study underscores how responsiveness to market intelligence drives agribusinesses in Southwest Nigeria to embrace sustainability practices, such as reducing chemical usage, adopting eco-friendly packaging, and complying with international environmental standards.

Moreover, the study's revelation that responsiveness to market intelligence is also a significant predictor of export market orientation and this underscores the importance of understanding the

market dynamics and customer needs. This aligns with previous research indicating that market responsiveness is crucial for successful international market expansion. Agribusinesses seeking to enhance their export market orientation should prioritise mechanisms for gathering and responding to market intelligence to effectively tailor their products and practices to meet market demands.

Furthermore, these responses from the qualitative findings illustrate how export market orientation, coupled with market intelligence generation, responsiveness, and dissemination, influences green management and sustainability in agribusinesses in Southwest Nigeria. This multifaceted approach not only addresses economic aspects but also encompasses environmental stewardship, social responsibility, and technological advancement, ensuring a holistic approach to sustainability in the region. This approach is consistent with the findings of Stamou and Zopiatis (2018), who emphasised the importance of adopting a comprehensive sustainability strategy encompassing economic, social, and environmental dimensions.

In addition, these findings also corroborate the findings of Raut, *et al*. (2019), who conducted a similar study in a different geographical context. Their research highlighted the positive impact of export market orientation on the sustainability of agribusinesses, emphasising the need for agro-entrepreneurs to align their strategies with global sustainability trends.

Therefore, based on the empirical evidence and alignment with existing literature, it can be concluded that export market orientation, coupled with effective market intelligence practices, significantly influences green management and promotes the sustainability of agribusinesses in Southwest Nigeria. This not only enhances their competitiveness in international markets but also contributes to the broader goals of environmental conservation, social development, and technological innovation in the region. These findings offer valuable insights for policymakers and agribusiness stakeholders in advancing sustainable practices within the industry.

CHAPTER FIVE

CONCLUSION AND RECOMMNEDATIONS

This chapter encompasses a summary of the study's findings, draws conclusions, presents recommendations, outlines specific contributions to knowledge, and acknowledges the study's limitations and suggestions for future research.

5.1 Summary of Findings

The study focused on the interplay between green management practices, export market orientation, and sustainability within the context of agribusinesses in Southwest Nigeria. It aimed to understand how various aspects of green management, including green methods, green materials, green machinery, and green measurement, influence agribusiness sustainability, encompassing economic, social, governance, and environmental dimensions.

The research findings revealed that green management practices play a significant role in shaping the sustainability of agribusinesses in Southwest Nigeria. Green methods, such as sustainable farming techniques and responsible resource management, were identified as pivotal in improving crop yields and quality while minimising environmental impact. Green materials procurement practices were found to reduce waste and enhance resource efficiency, contributing to economic sustainability. Additionally, the adoption of green machinery in production processes improved operational efficiency, while green measurement logistics reduced environmental footprints, enhancing overall sustainability.

Export market orientation, encompassing export market intelligence generation, export market intelligence dissemination, and responsiveness to market intelligence, emerged as a crucial factor influencing agribusiness sustainability. Agribusinesses that actively generated market intelligence and disseminated it effectively were better equipped to respond to market demands, expand their market reach, and remain competitive. This approach not only enhanced economic sustainability but also promoted environmental responsibility by aligning products with global sustainability standards. The study found that export-oriented agribusinesses were more likely to invest in green management practices to meet international market requirements.

Sustainability, the core focus of the study, was examined through economic, social, governance, and environmental lenses. Economic sustainability was observed in agribusinesses adopting green management practices, resulting in increased productivity and competitiveness. Social sustainability was evident in community engagement efforts, where agribusinesses collaborated with local communities to promote sustainable practices, thereby contributing to community empowerment. Governance sustainability was demonstrated by the adherence of agribusinesses to legal and regulatory frameworks while environmental sustainability was reinforced by the adoption of eco-friendly practices throughout the agribusiness supply chain, ranging from farming methods to logistics, reducing the ecological footprint of operations.

In summary, the findings of this study underscore the intricate relationship between green management practices, export market orientation, and sustainability in agribusinesses in Southwest Nigeria. These practices, when effectively integrated, not only enhance economic sustainability but also promote social responsibility, governance accountability, and environmental stewardship. Policymakers, agribusiness owners, and stakeholders should recognise the importance of continued support and investment in green management initiatives and export market orientation to ensure a more sustainable and prosperous future for the agro-industry in Southwest Nigeria. The study emphasises the need for a holistic approach that considers economic, social, governance and environmental sustainability to foster long-term resilience and growth in the agribusiness sector in the region.

5.2 Conclusion

This study has provided valuable insights into the intricate relationship between green management practices, export market orientation, and sustainability within the agribusiness sector in Southwest Nigeria. The findings affirm that green management practices, encompassing green methods, green materials, green machinery, and green measurement logistics, significantly influence the sustainability of agribusinesses in the region.

Green management practices have emerged as key drivers of economic sustainability, enhancing crop yields, operational efficiency, and competitiveness. Agribusinesses adopting eco-friendly farming techniques, responsible resource management, and sustainable procurement practices

have demonstrated improved economic sustainability, positioning themselves favourably in both domestic and international markets.

Export market orientation, including export market intelligence generation, export market intelligence dissemination, and responsiveness to market intelligence, has been identified as a pivotal factor in promoting sustainability. Agribusinesses actively engaged in generating and disseminating market intelligence were better equipped to respond to market demands, expand their market reach, and remain competitive. This approach not only bolstered economic sustainability but also encouraged the adoption of green management practices to meet international sustainability standards.

Sustainability, examined through economic, social, governance, and environmental lenses, was found to be a multifaceted outcome of the integration of green management and export market orientation. Economic sustainability manifested through increased productivity and competitiveness, while social sustainability was evident in community engagement efforts, fostering community empowerment and collaboration. Governance sustainability was visible through the adherence of agribusinesses to legal and regulatory frameworks, while environmental sustainability was reinforced by the adoption of eco-friendly practices throughout the agribusiness supply chain, contributing to resource conservation and reduced ecological footprints.

The study underscores the importance of a holistic approach that considers economic, social, governance, and environmental sustainability to foster long-term resilience and growth in the agribusiness sector in Southwest Nigeria. It highlights the need for continued investment and support for green management initiatives and export market orientation to ensure a more sustainable and prosperous future for the agro-industry in the region.

In light of these findings, policymakers, agribusiness owners, and stakeholders should recognise the integral role of green management practices and export market orientation in shaping the sustainability of agribusinesses. By fostering a culture of sustainability that encompasses economic prosperity, social responsibility, and environmental stewardship, the region can position itself for a more resilient and ecologically responsible agro-industry. This study serves as a foundation for further research and action aimed at promoting sustainable practices within the agribusiness sector in Southwest Nigeria.

5.3 Recommendations

Based on the findings and conclusions of the study regarding the relationship between green management practices, export market orientation, and sustainability in agribusinesses in Southwest Nigeria, the following specific recommendations are proposed:

i.   Agribusiness owners and managers in Southwest Nigeria should prioritise the adoption of sustainable farming practices and green technologies to enhance both the productivity of their operations and the long-term environmental sustainability of the agricultural sector. Embracing eco-friendly approaches, such as organic farming and responsible resource management, not only contributes to increased efficiency but also aligns with global market trends favouring environmentally conscious practices.

ii. Government agricultural agencies, NGOs, and Agricultural Associations should collaborate to provide training, workshops, and incentives to agribusinesses in Southwest Nigeria, encouraging the adoption of sustainable and environmentally friendly farming practices.

iii. Agribusinesses, in collaboration with community organisations and government agencies, should actively engage with local communities and promote social responsibility. Partnerships, skill development initiatives, and support for local infrastructure projects will enhance the social sustainability of agribusinesses.

iv. Government agencies, collaborating with suppliers, should facilitate the procurement of eco-friendly materials such as packaging, organic fertilisers, and sustainable irrigation systems. This aims to ensure the availability and affordability of green materials for agribusinesses.

v.   Financial institutions, with support from government agencies, should encourage agribusinesses to invest in green machinery and technology. Providing financial incentives, subsidies, and access to affordable green technology will improve production efficiency and reduce environmental impact.

vi. Government agencies and industry associations should strengthen efforts to generate market intelligence relevant to international market demands. This involves providing up-to-date information on global market trends, sustainability requirements, and consumer preferences to agribusinesses.

vii. Government agencies, industry associations, and training institutions should collaborate to develop mechanisms for the effective dissemination of market intelligence. Training programmes and online platforms can be established to facilitate the exchange of information, enabling agribusinesses to stay responsive to market dynamics and sustainability standards.

These recommendations involve collaborative efforts among various stakeholders, including government entities, NGOs, financial institutions, suppliers, and agribusinesses themselves. The success of the proposed initiatives relies on the active involvement and cooperation of these key players in the agribusiness sector.

5.4 Contributions to Knowledge

The following are specific contributions made by the study on the relationship between green management practices, export market orientation, and sustainability in agribusinesses in Southwest Nigeria:

i. This thesis contributes valuable insights into the role of green management practices and export market orientation in enhancing the sustainability of agribusinesses in Nigeria. the research offers actionable insights for business owners and managers to integrate sustainable practices into their operations, thus improving their environmental impact and market competitiveness.

ii. The thesis offers a roadmap for agribusinesses to contribute to broader national and global sustainability objectives. The research provides policymakers and marketers with a strategic framework for developing green marketing policies and strategies that are contextually relevant to Nigeria, facilitating better policy alignment and market strategies for sustainability

iii. The thesis offers specific tools and techniques for creating and evaluating green management strategies tailored to the Nigerian agribusiness sector. This practical guidance helps agribusiness managers and owners develop, implement, and assess the impact of their green management strategies, leading to more effective and contextually relevant sustainability practices.

iv. The study lays the groundwork for future research by providing a comprehensive analysis of green management practices within the Nigerian agribusiness context. By highlighting

research gaps and suggesting areas for further investigation, the thesis contributes to the academic understanding of green management theories and concepts, encouraging ongoing exploration and development of new knowledge in this field.

v.   The study proposes a conceptual framework that tests the combined effect of green management and export market orientation on environmental, economic, governance and social sustainability from the Nigerian perspective (See Figure 5.1).

Export Market Orientation

Export Market Intelligence Generation

Export Market Intelligence Dissemination

Responsiveness to Market Intelligence

Green Management

Green Method

Green Materials

Green Machine

Green Measurement

Influencing Factors (Qualitative Research)

- Crop yield and quality
- Energy efficiency and renewable resources
- Cost savings and market competitiveness
- Biodiversity and ecosystem conservation
- Efficient resource management
- Environmental responsibility and stewardship
- Resource efficiency and conservation
- Market access and expansion
- Certification compliance
- Community engagement and empowerment
- Social responsibility
- Technology adoption and innovation
- Economic Viability

Sustainability Performance

Economic Sustainability

Social Sustainability

Governance Sustainability

Environmental Sustainability

Figure 5.1: Modified Schema on Green Management and Export Market Orientation for Agribusiness Sustainability

The presence of Figure 5.1, which displays a modified schema illustrating the interplay between green management and export market orientation within the context of agribusiness sustainability, carries significant implications for the research. The findings from the empirical studies on the nexus between Nigeria's agricultural sector export base and economic growth, as well as the comparative discourse of sustainable finance options for agribusiness transformation in Nigeria and Brunei, have significant implications for the agribusiness in Nigeria. The cointegrating

relationship identified between economic growth, agricultural raw material exports, and food exports underscores the potential for sustainable economic development through agribusiness exports. Additionally, the comparative discourse highlights the need for sustainable finance options to drive agribusiness transformation, emphasising the importance of entrepreneurship and enterprise development. These findings suggest that a strategic focus on green management and export market orientation, as depicted in the modified schema, can play a crucial role in promoting agribusiness sustainability in Nigeria, aligning with the government's efforts to prioritize agricultural development for economic diversification, domestic food security, export revenues, and job creation. Therefore, leveraging these findings and implications can guide policymakers and agribusiness stakeholders in fostering sustainable growth and development in the Nigerian agribusiness sector. This figure serves as a valuable tool for enhancing the dissemination of research findings and is essential for guiding strategies aimed at promoting eco-friendly practices and successful market orientation within the agribusiness sector.

5.5. Limitations

There are two specific limitations of the study on the relationship between green management practices, export market orientation, and sustainability in agribusinesses in Southwest Nigeria:

i.   One significant limitation of the study is its limited generalisability beyond the specific context of Southwest Nigeria. The findings and recommendations are based on data collected from agribusinesses operating in this region and may not be directly applicable to other geographical areas or countries with different socio-economic, cultural, and environmental conditions. The uniqueness of local factors in other regions could lead to variations in the relationship between green management practices, export market orientation, and sustainability.

ii.   The study primarily relies on cross-sectional data collected at a specific point in time. While this approach provides valuable insights into the current state of green management practices, export market orientation, and sustainability in agribusinesses, it may not capture dynamic changes and long-term trends. To gain a more comprehensive understanding of how these factors evolve over time and their lasting impact, longitudinal studies tracking

agribusinesses' practices and sustainability outcomes over several years would be beneficial.

These limitations should be considered when interpreting the study's findings and applying its recommendations to other contexts or when assessing the long-term sustainability trends in the agribusiness sector.

5.6 Suggestions for Further Studies

There are three specific suggestions for further studies in the field of agribusiness sustainability and related areas:

i.   Future researchers can conduct longitudinal studies to track the evolution of sustainability practices in agribusinesses over an extended period. This research can explore how the adoption of green management practices, export market orientation, and compliance with sustainability standards change over time. Examining trends and long-term impacts would provide a deeper understanding of the dynamics of sustainability within the sector.

ii.   Future researchers can undertake comparative studies that analyse the differences and similarities in sustainability practices and outcomes among agribusinesses in various regions of Nigeria or other countries. Such research can help identify regional factors, policies, or cultural influences that shape sustainability strategies and provide valuable insights for tailoring sustainable practices to specific contexts.

iii.   Future researchers can investigate the effectiveness of policy interventions and incentives designed to promote sustainability in the agribusiness sector. Evaluate how government policies, financial incentives, and support programmes impact the adoption of green management practices and export market orientation. Assess the outcomes of policies aimed at encouraging sustainable resource management, eco-friendly production, and compliance with international sustainability standards.

These suggestions for further study aim to deepen our understanding of agribusiness sustainability, identify best practices, and inform policy decisions that can enhance the sector's long-term resilience and environmental responsibility.

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APPENDICES

APPENDIX A (Questionnaire)

Green Management, Export Market Orientation and Sustainability Questionnaire

Dear Respondent,

I am a PhD student in Covenant University carrying out a research on "**GREEN MANAGEMENT, EXPORT MARKET ORIENTATION AND SUSTAINABILITY OF AGRIBUSINESSES IN SOUTHWEST, NIGERIA".** I humbly request that you participate in this study by responding to the information requested in this questionnaire. All information supplied will be used only for academic purpose and will be treated with utmost confidentiality.

Thank you.

AKINOLA Oluseyi Akintunde

SECTION A: BIOGRAPHICAL DATA

INSTRUCTION: Please select the options that most accurately reflect your perception by marking them appropriately.

1. Geographic Location: _____

2. Gender: Male ( )   Female ( ).

3. Age: Below 30 years ( )   31-40 years ( )   41-50 years ( )   51-above ( ).

4. Marital Status: Single ( )   Married ( )   Others ( )

5. Highest Educational Qualification: SSCE ( )   HND/B.Sc. ( )   M.sc/MBA ( )   Others ( )

6. Years of experience in the business: 1-5years ( ) 6-10years ( ) 11-15years ( ) Over 16yrs ( )

7. Nature of your agricultural [export] commodities: (Tick as applied).
      Crops [i.e. cereals, tubers, fruits, vegetables, oil seeds] ( )
      Livestock [cattle, goats, sheep, pigs, poultry] ( )
      Fisheries ( ).
      Forestry [i.e. timber, shea nuts, rubber, honey] ( )
      Agro-Processing [i.e. flour, oil, ethanol, animal feed, and textiles] ( )
      Agro-Allied [i.e. packaging, marketing, distribution] ( )

8. Size of your business: Large ( ) Medium ( ) Small ( )

Section B: Green Management Practices

INSTRUCTION: Please tick appropriately; **SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, or SD-Strongly Disagree,** with the statements below.

NO	ITEM	SA	A	U	D	SD
GREEN METHOD						
1	My company has established ways of improving the quality and amount of crops					
		SA	A	U	D	SD
2	The way we do our business is good for the environment.					
3	The way we operate matches our fundamental beliefs.					
GREEN MATERIAL						
1	We make sure that the resources we use do not cause any damage to the environment.					
2	The materials we use are carefully chosen with the environment in mind.					
3	We buy materials that are good for the environment					
GREEN MACHINE						
1	The machines we use for production do not cause harm to the environment.					
2	We operate our machines with safety in mind					
3	We do not overwork our machines to make them last longer.					
GREEN MEASUREMENT						
1	We regularly check the environmental impact of our business activities.					
2	The transportation methods we use help to minimise harm to the environment					
3	We purchase materials that are environmentally friendly					

SECTION C: EXPORT MARKET ORIENTATION

INSTRUCTION: please tick appropriately; **SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, or SD-Strongly Disagree,** with the statements below.

S/N	Export Market Intelligence Generation	SA	A	U	D	SD
Q1	We take bold decisions standing out among competitors in overseas markets					
Q2	My firm searches for up to-date information about target markets,					
Q3	My firm places special emphasis on export markets rather than on domestic markets					
Q4	My firm gathers market knowledge related to target customers					
Q5	My firm meets the foreign customers' expectations					
Q6	We adapt strategies to address different customers' needs in export markets					
Q7	We develop export sales strategy in achieving superior export performance					
S/N	Responsiveness to Market Intelligence	SA	A	U	D	SD
Q1	My firm takes advantage of opportunities in foreign markets based on market intelligence					
Q2	My firm seeks high levels of export customer responsiveness for their businesses					
Q3	Our firm is more responsive to the export customers' expressed needs					
Q4	My firm regularly collect accurate market information					
Q5	We make better use of the information contained in the consumer reviews feedback					
Q6	We ensure consistent implementation of quality elements based on consumers' expectations					
Q7	Our firm promotes exchange of intelligence within and across departments					
S/N	Export Market Intelligence Dissemination	SA	A	U	D	SD
Q1	We achieve our objectives by exporting our products and brands to foreign markets					
Q2	I collect information on exporting operations					
Q3	I engage in the activities associated with generating information about the firm's export customers' needs					

Q4	I display higher commitment to offering radical product innovations					
Q5	I disseminate information on how the existing products can be modified to suit the export markets					
Q6	I constantly ensure customers' satisfaction by offering more radical product innovations					
Q7	I generate and respond to information in the target market place					
Q8	I display a higher commitment towards rapidly evolving customer needs					

SECTION D: Sustainability

INSTRUCTION: please tick appropriately; **SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree, or SD-Strongly Disagree,** with the statements below.

Economic Sustainability (ECS)		SA	A	U	D	SD
1	I am able to make a profit from my farming activities for 2019-2022 (January to December)					
2	I have access to resources and technologies that help me increase my productivity and income					
3	The prices I receive for my agricultural products are fair and reflect their true value					
		SA	A	U	D	SD
4	I am able to save and invest my profits in my farm or other income-generating activities					
5	I have access to financial services such as credit, insurance, and savings that help me manage risks and grow my business					
Environmental Sustainability (ES)						
6	I use environmentally-friendly techniques and inputs in our agribusiness activities					
7	I implement measures to reduce pollution and waste on my agribusiness activities					
8	I am aware of the environmental impacts of my agribusiness practices.					
9	I participate in environmental programmes and initiatives, such as certification schemes or conservation projects, that promote sustainable farming practices					

10	I collaborate with other farmers, researchers, and stakeholders to develop and implement sustainable agriculture practices					
Social Sustainability (SS)						
11	I engage with and support my local community by participating in events and initiatives.					
12	I provide opportunities for education and training to my employees.					
13	I implement inclusive policies that promote diversity and equality on my farm					
14	I maintain positive relationships with my employees, treating them fairly and with respect.					
15	I have received education or training on socially sustainable agribusiness practices.					
Governance Sustainability (GS)						
16	I maintain accurate records of my farm's financial transactions and operations					
17	I comply with all relevant laws and regulations related to my farming operations					
18	I have implemented policies and procedures to prevent corruption and promote ethical business practices					
19	I ensure that my business operates in a transparent and accountable manner					
20	I engage with and seek feedback from my stakeholders, such as customers, suppliers, and community members					

Thank you for your participation.

APPENDIX B

GREEN MANAGEMENT, EXPORT MARKET ORIENTATION AND SUSTAINABILITY IN THE AGRIBUSINESS SECTOR

I thank you very much for accepting to participate in this study. I want to crave your indulgence to record our session today. This will enable me to analyse this session for the purpose of generalising the results. There are few questions I would like to ask and I will be happy if you can be as open as possible and be confident that your responses shall be kept confidential.

Please introduce yourself

1. How can you describe the nature of green management in the last five years?

   Probing questions:

   (i) How do you strive to make the end-product as sustainable and as possible (green design)?

   (ii) How do you ensure that the procurement of products and services have a reduced effect on human health and the environment (green purchase)?

   (iii) How do you ensure that workers use fewer natural resources, reduce pollution and waste, recycle and reuse materials, and moderate emissions in their processes (green production)?

   (iv) Do you have sustainable policies that aim to reduce the environmental impact of your activities (green logistics)?

2. What motivated you to adopt green management practices (i.e. green design, green purchasing, green production and green logistics)?

3. How do you adjust to changes in the export market?

4. How do you handle the challenges of export market orientation?

5. Do you explore copies strategies?

   Probing question: If Yes/No, why?

6. Do you feel green management and export market orientation have helped your business over time?

   Probing question: If Yes/No, what are they and why?

7. What steps do you take in sustaining your agribusiness?

APPENDIX C –

STRUCTURAL MODELS
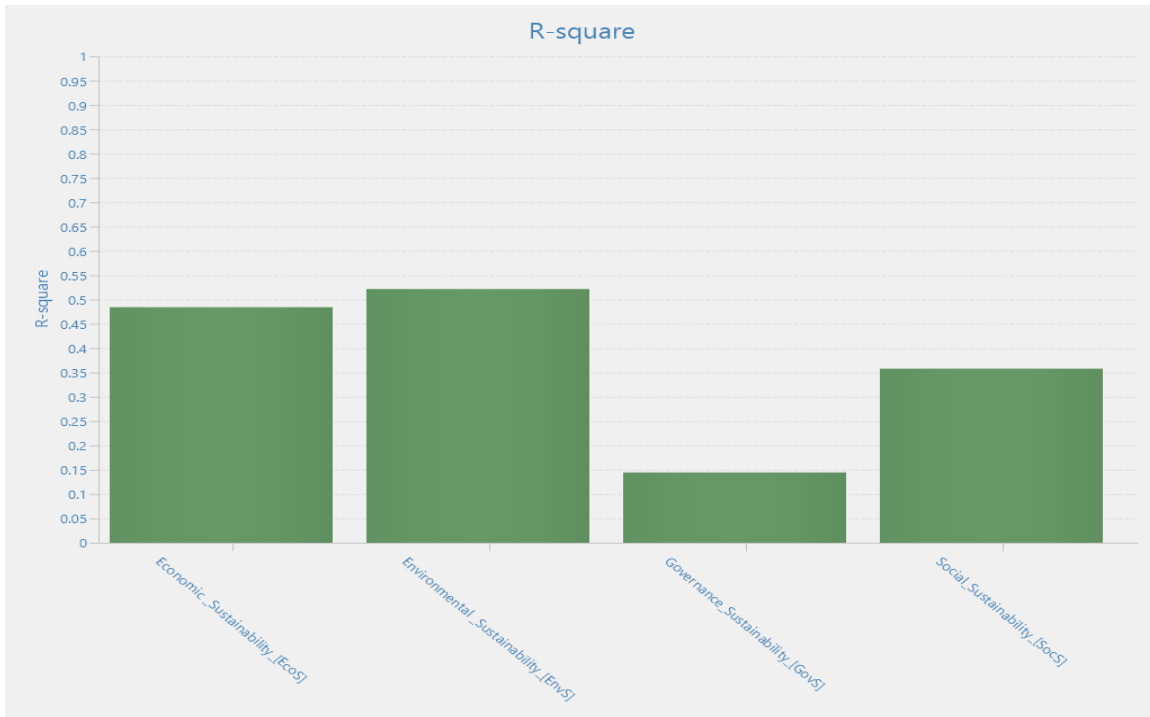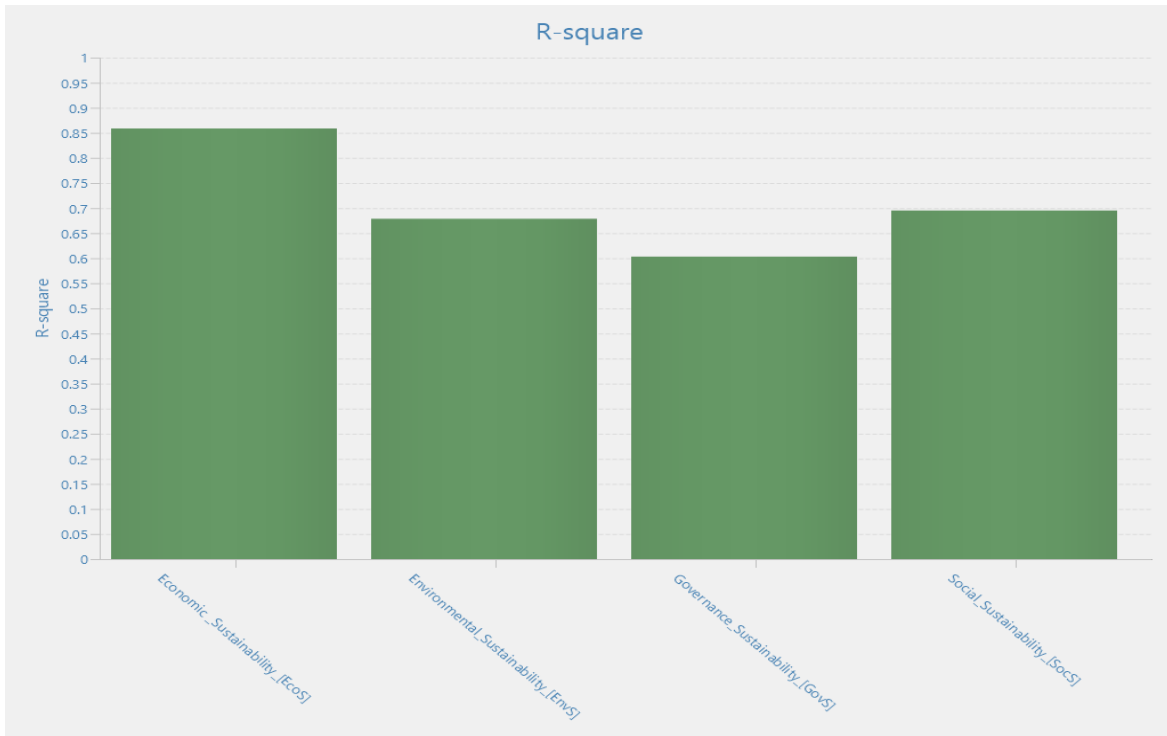

Figure C1: R Square for Green method and Sustainability
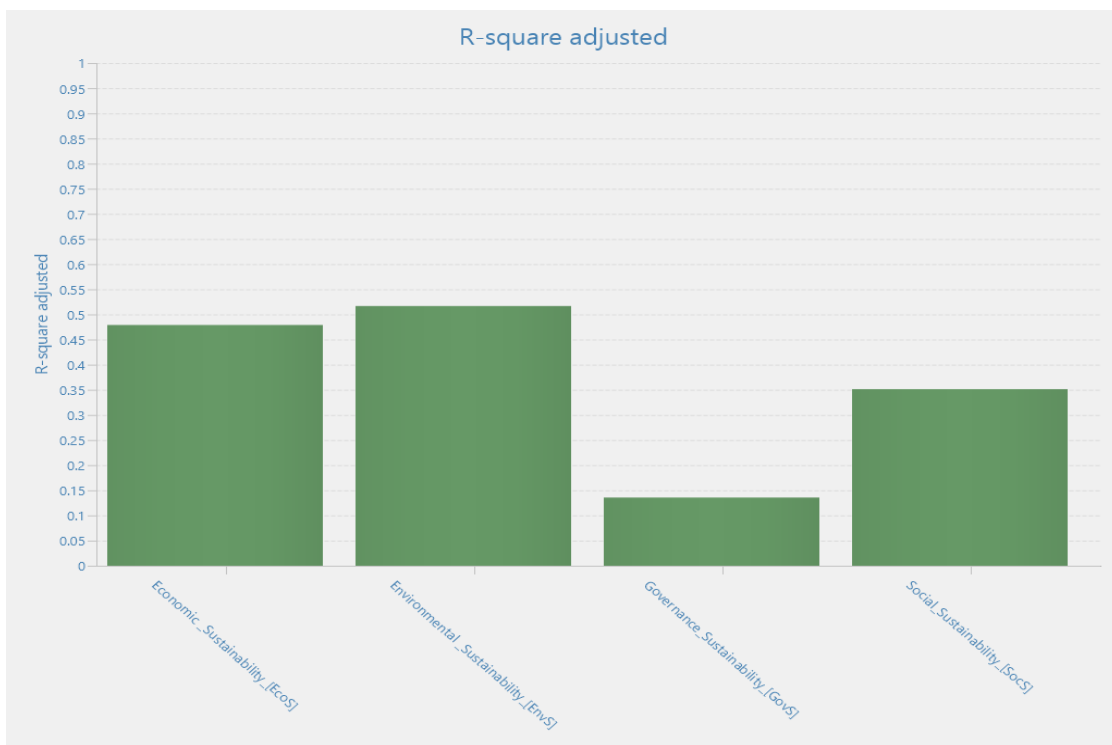
Figure C2: R Square Adjusted for Green method and Sustainability
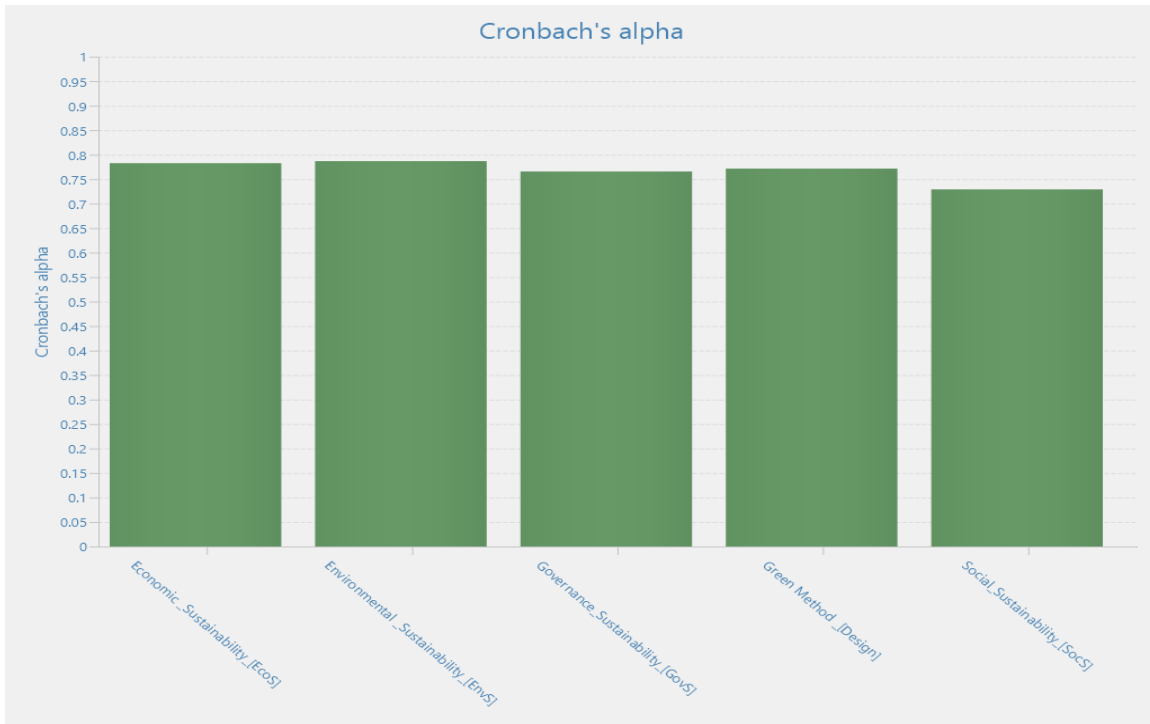
Figure C3: Cronbach Alpha for Green method and Sustainability
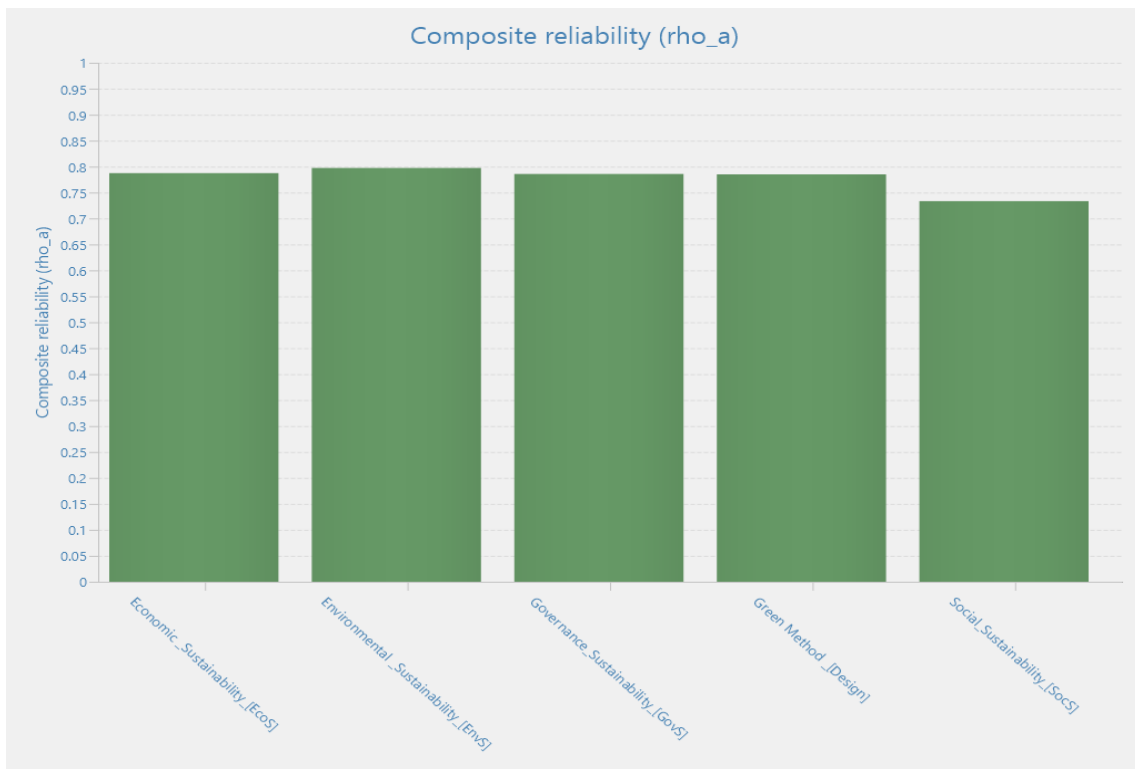
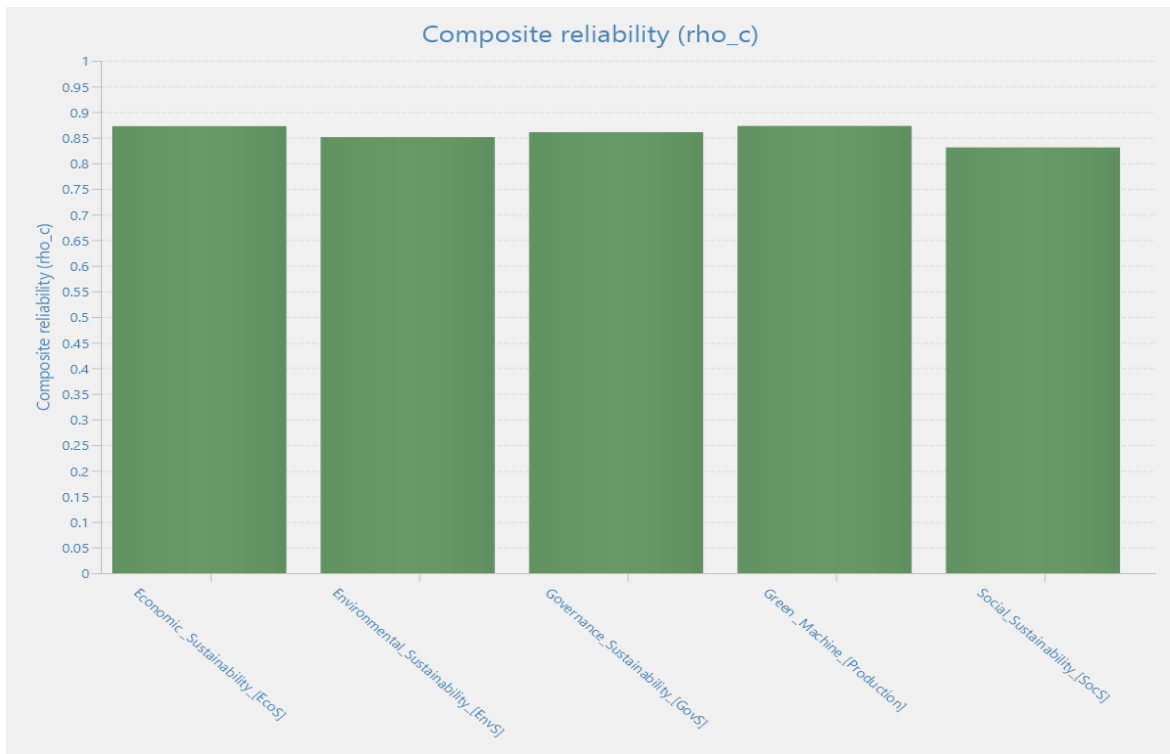Figure C4: Composite Reliability (rho_a) for Green method and Sustainability
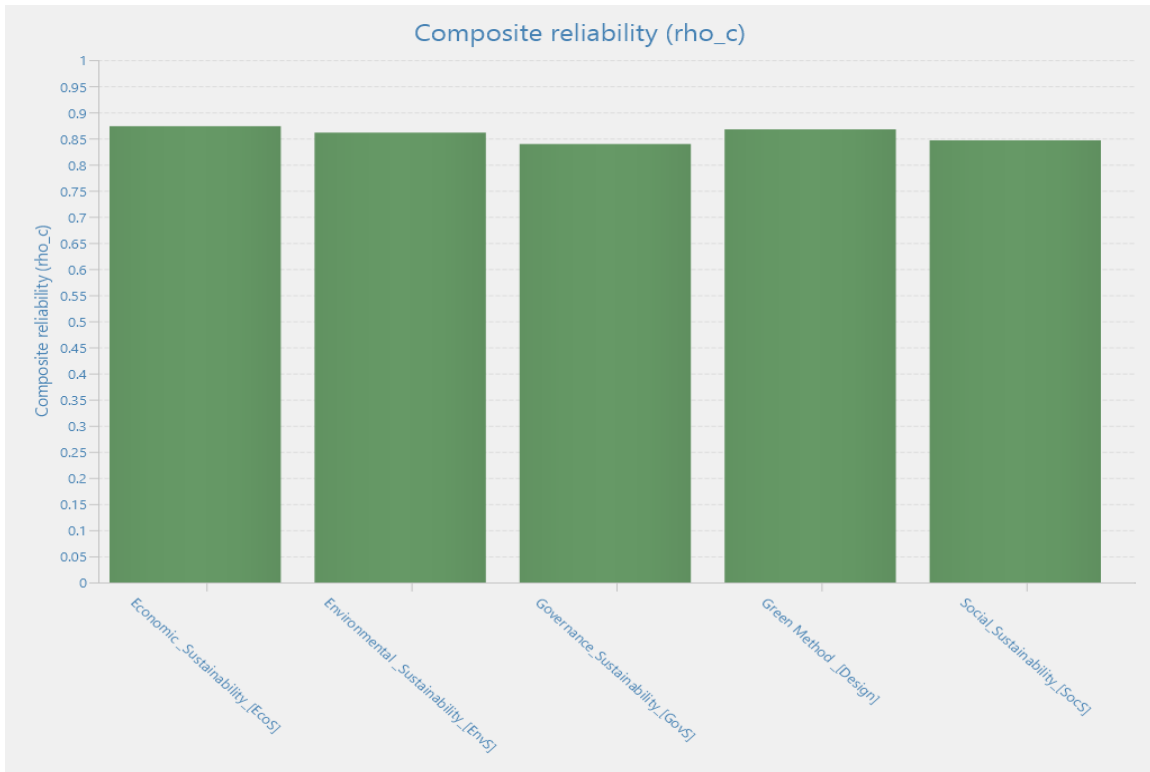
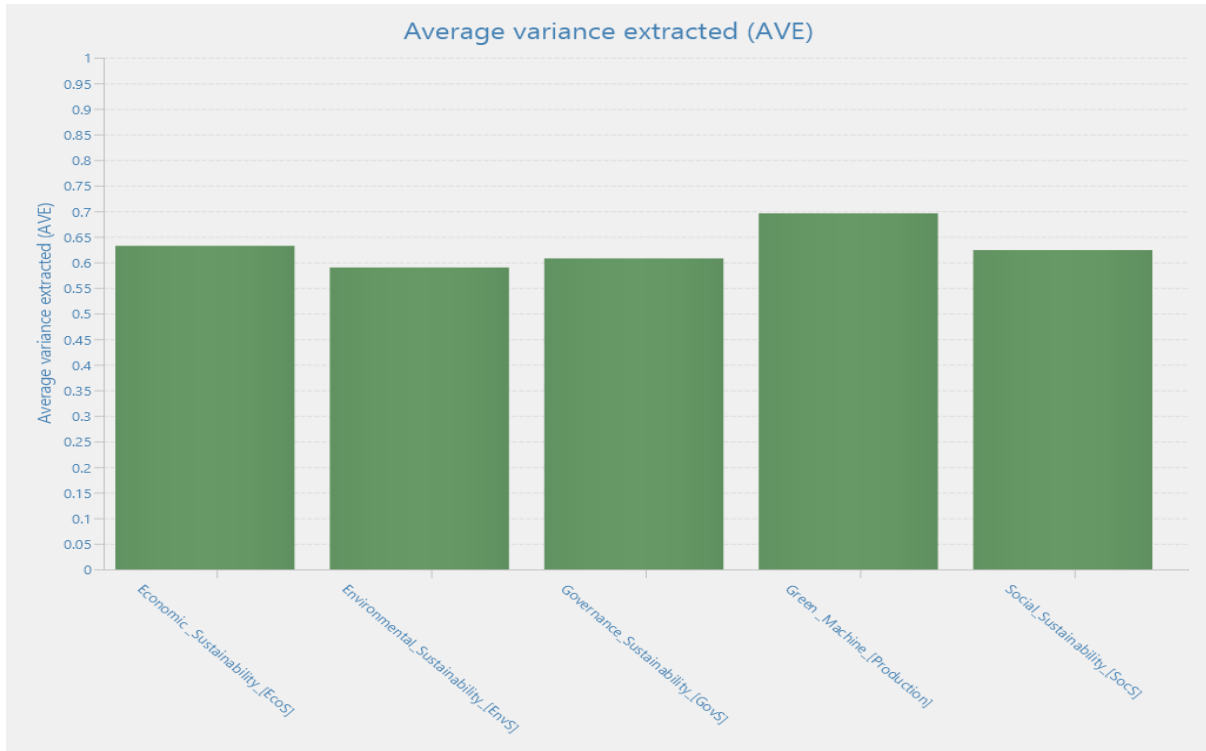Figure C5: Composite Reliability (rho_c) for Green method and Sustainability
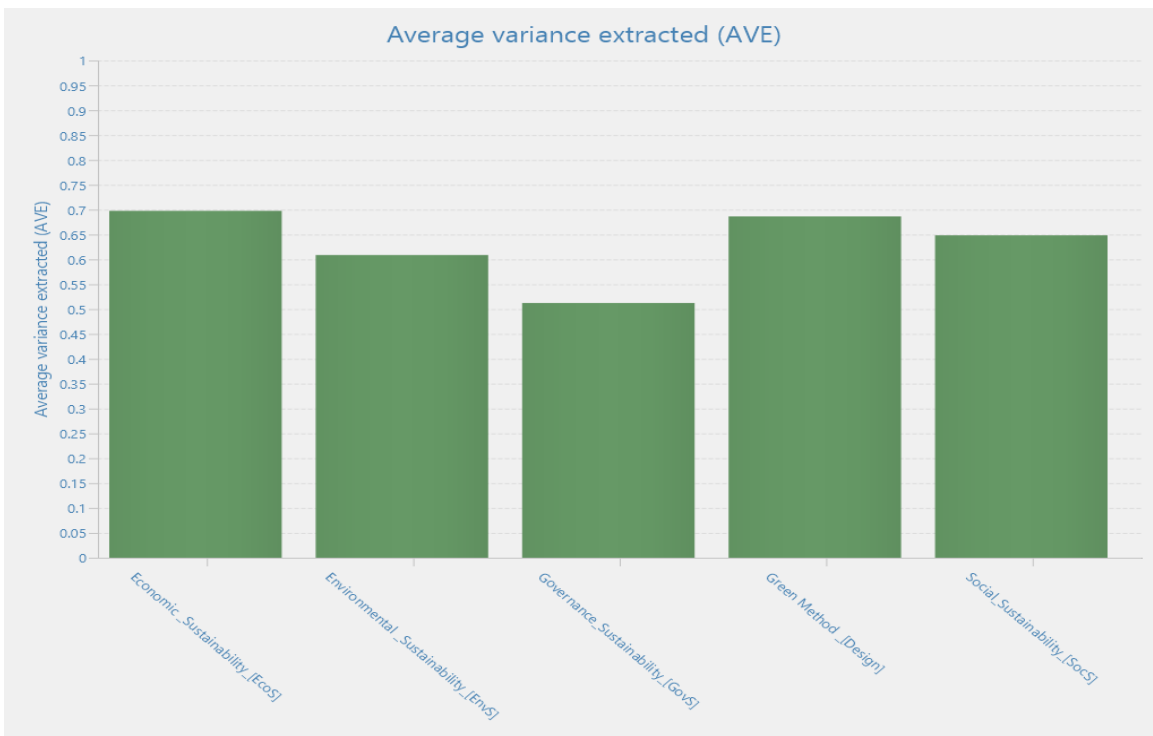
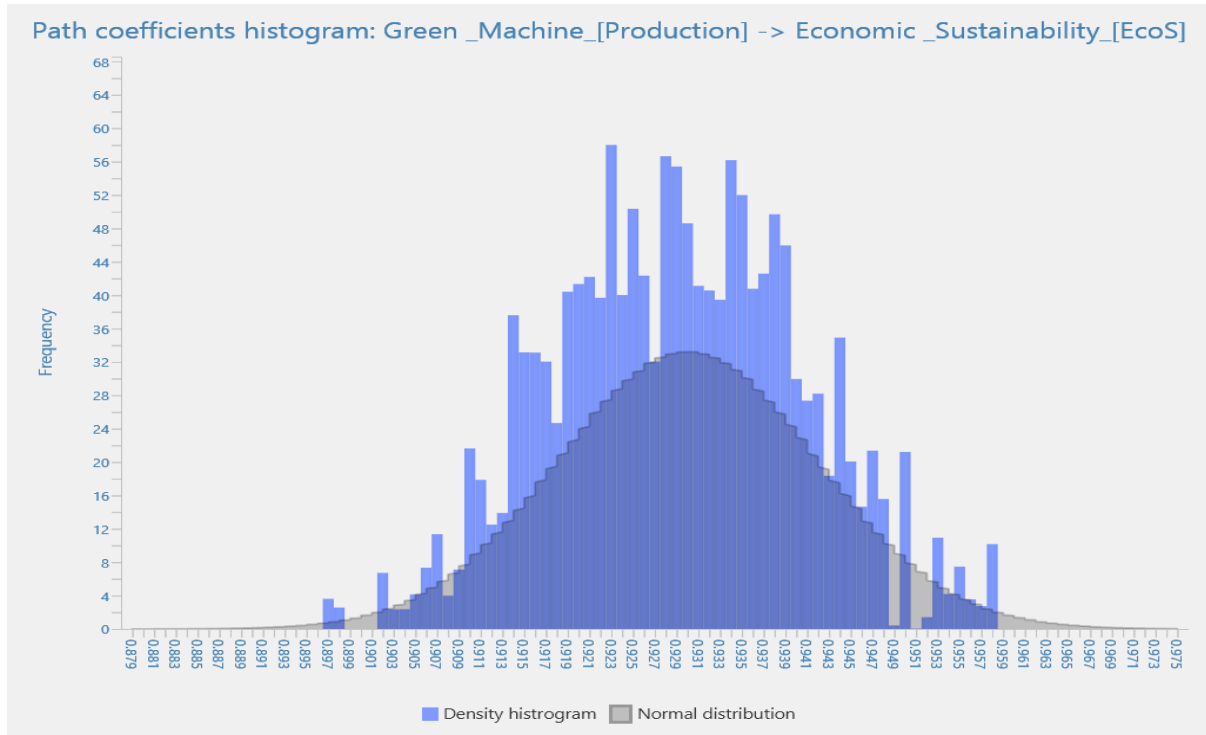Figure C6: Average Variance Extracted (AVE) for Green method and Sustainability

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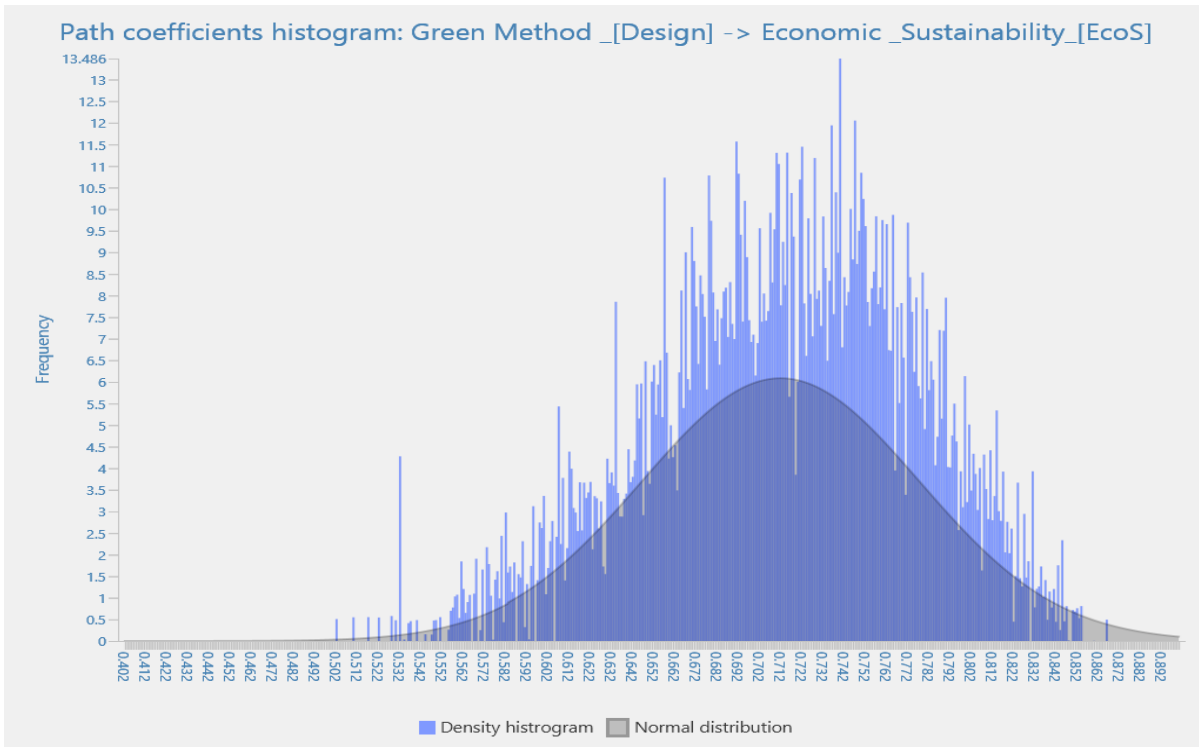
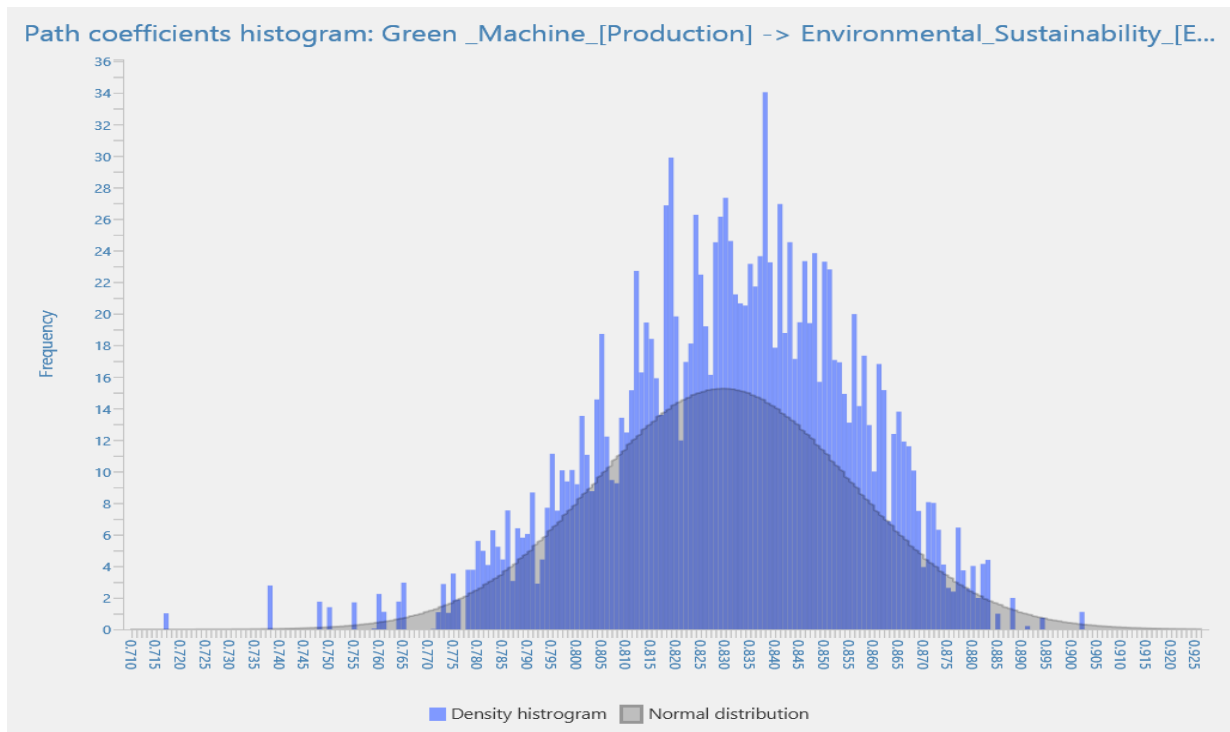Figure C7: Path Coefficients Histogram for Green method and Economic Sustainability
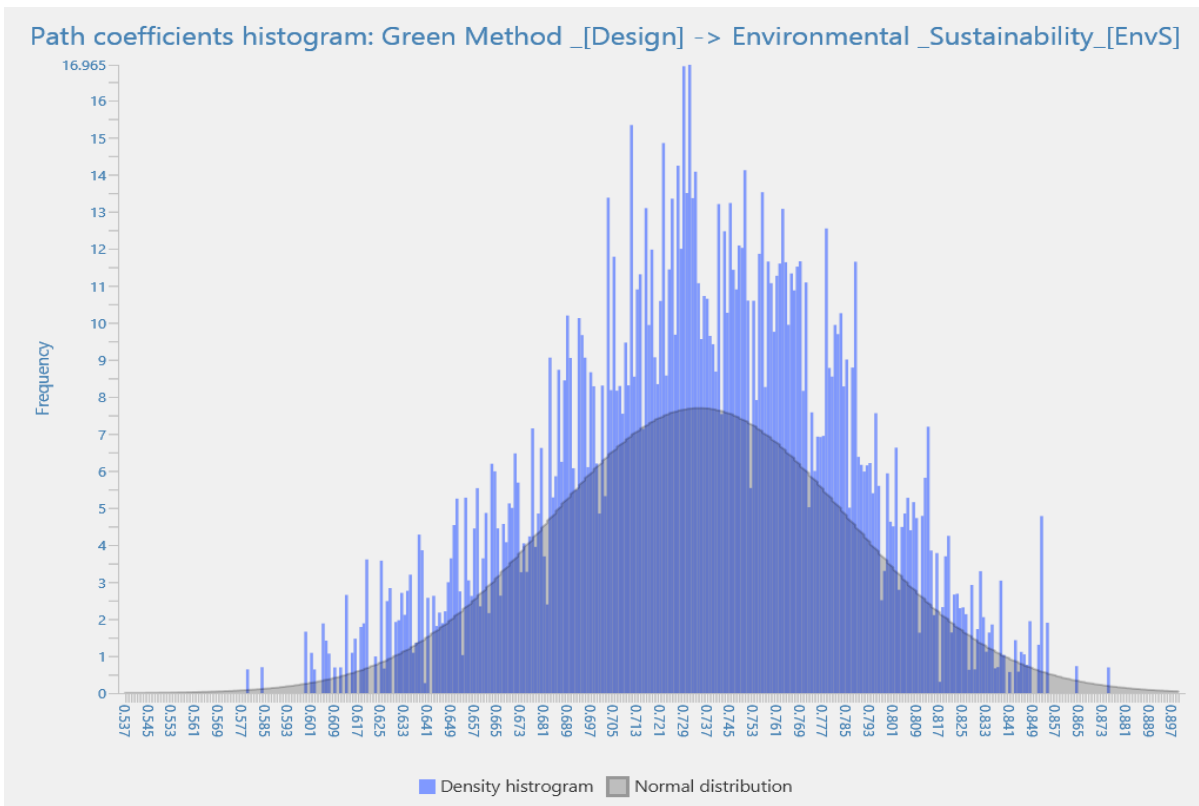
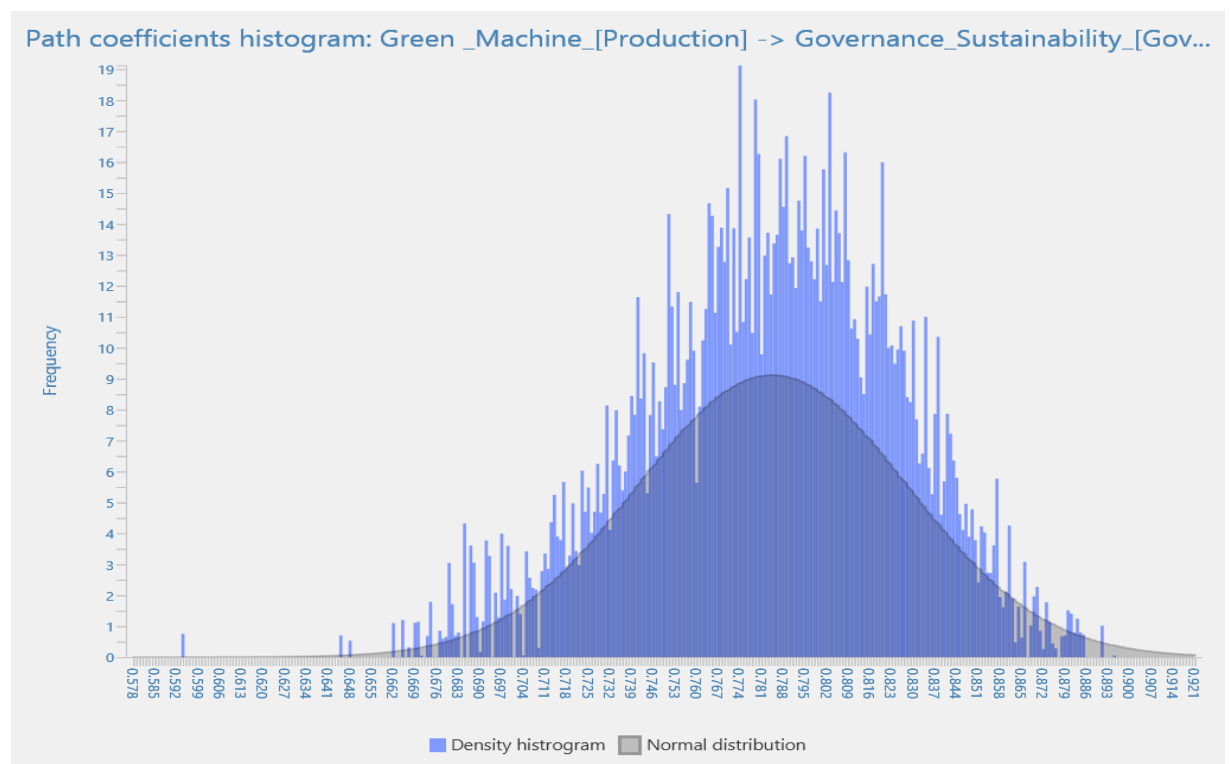Figure C8: Path Coefficients Histogram for Green method and Environmental Sustainability
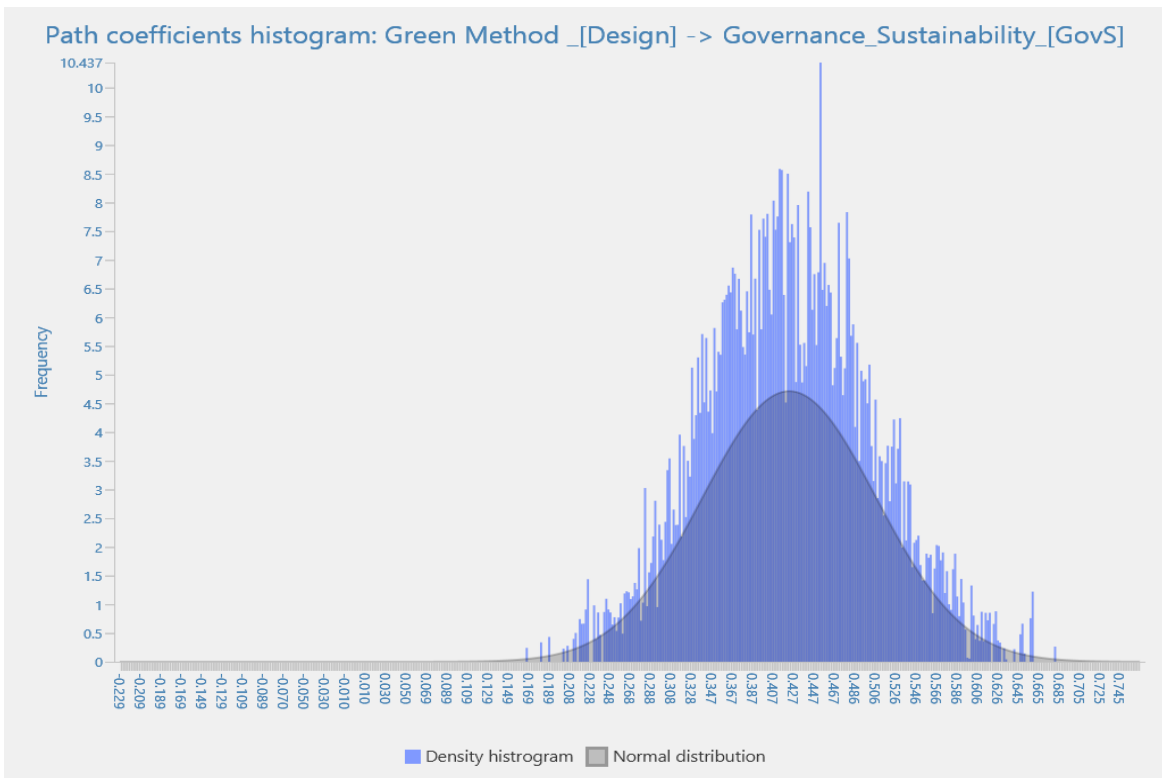
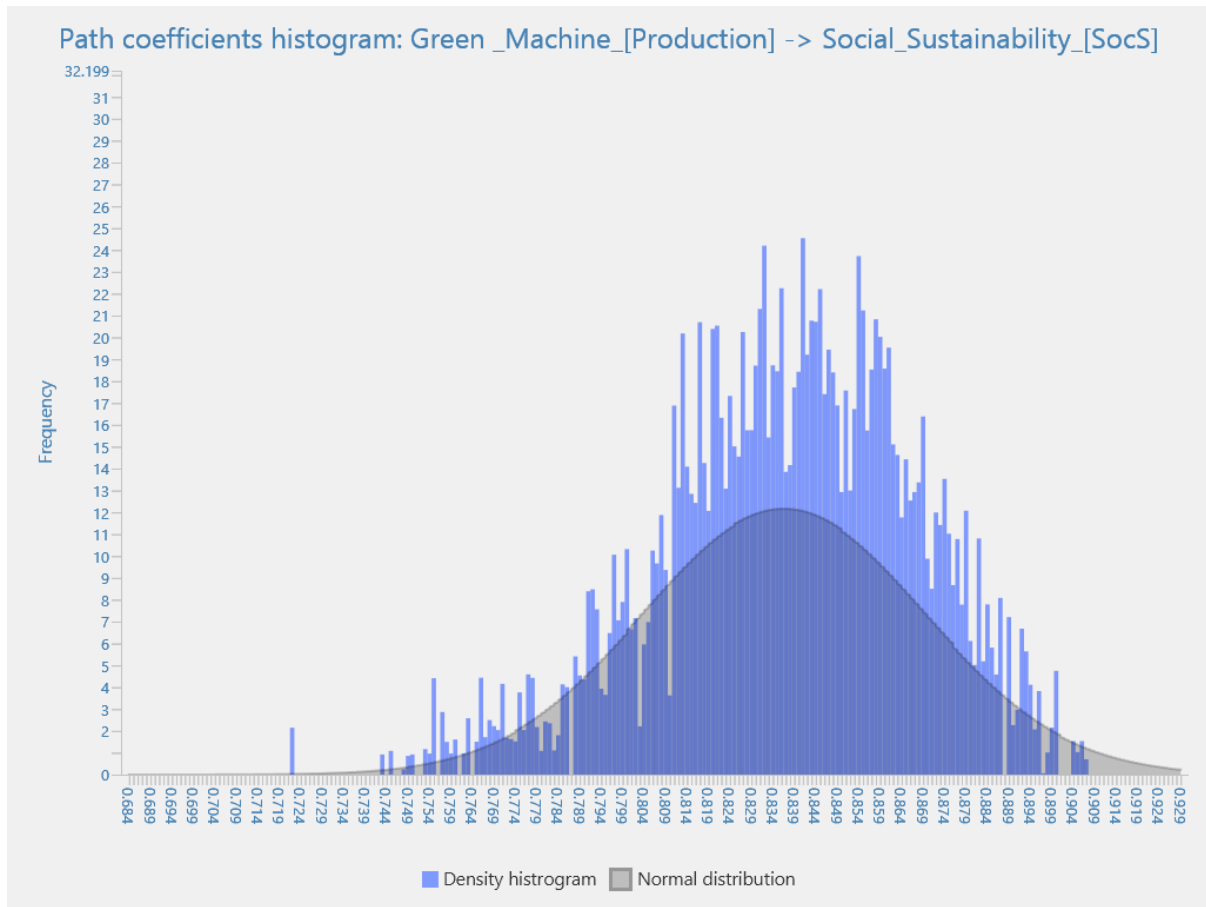Figure C9: Path Coefficients Histogram for Green method and Governance Sustainability
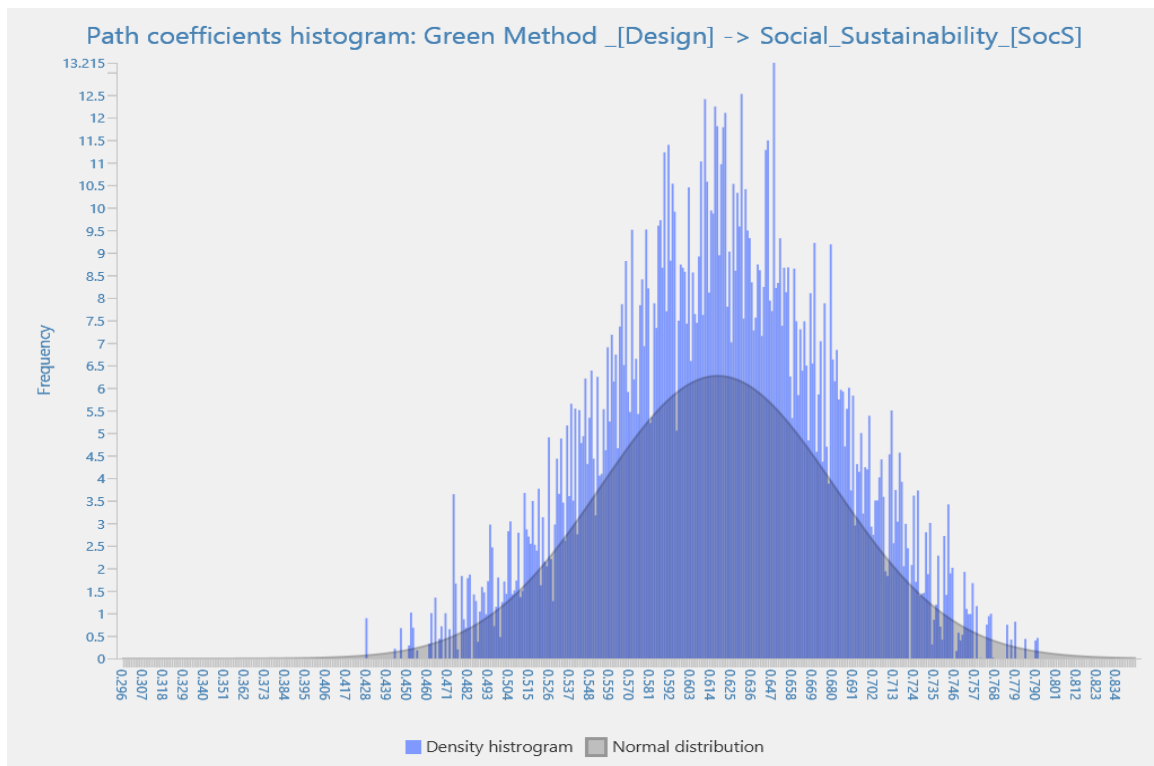
Figure C10: Path Coefficients Histogram for Green method and Social Sustainability

STRUCTURAL MODEL FOR HYPOTHESIS 2
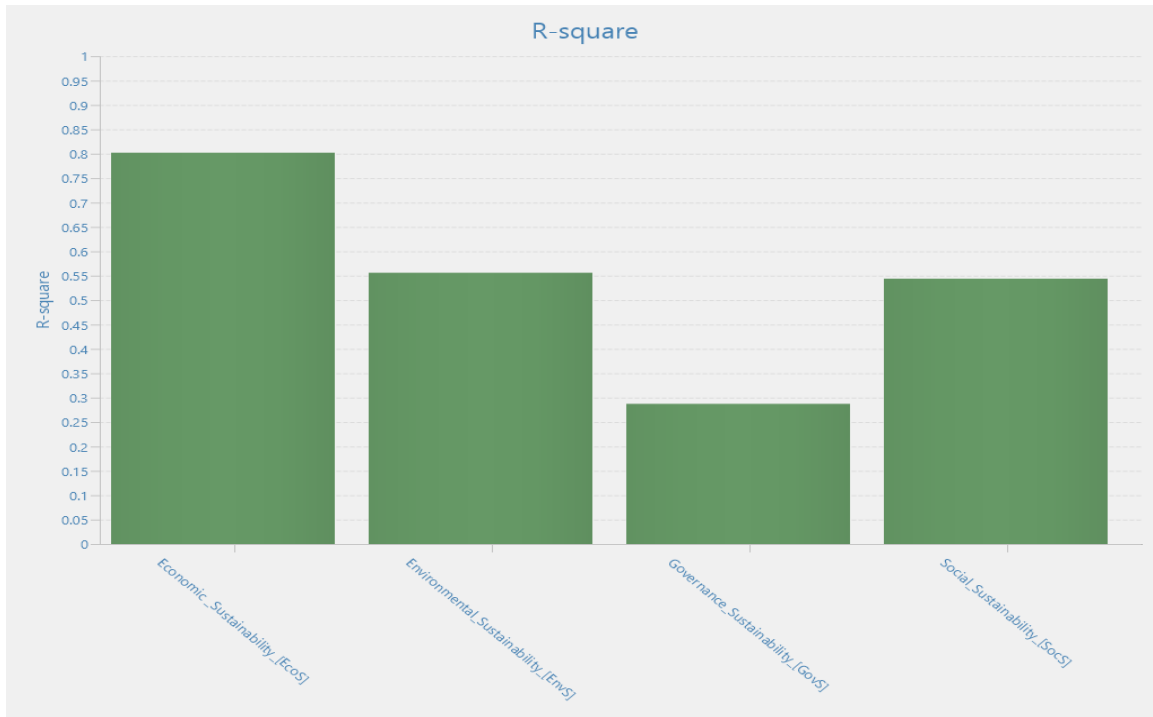
Figure C11: R Square for Green Material [Purchasing] and Sustainability
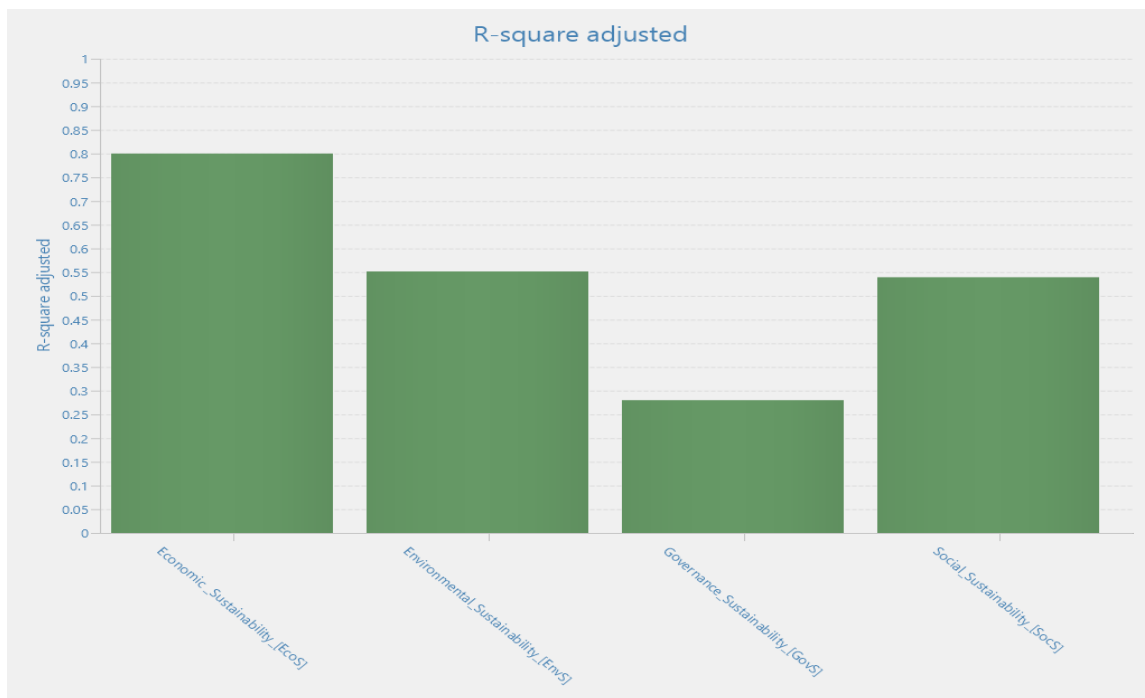
Figure C12: R Square for Green Material [Purchasing] and Sustainability
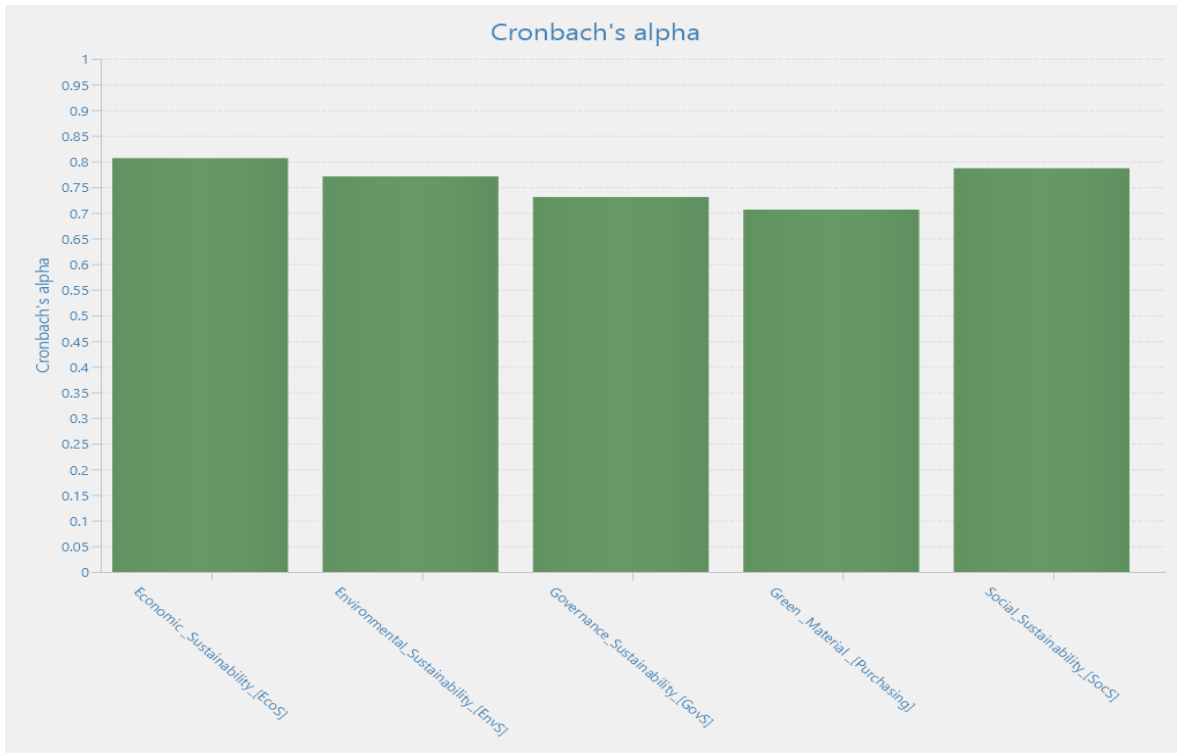
Figure C13: Cronbach Alpha for Green Material [Purchasing] and Sustainability
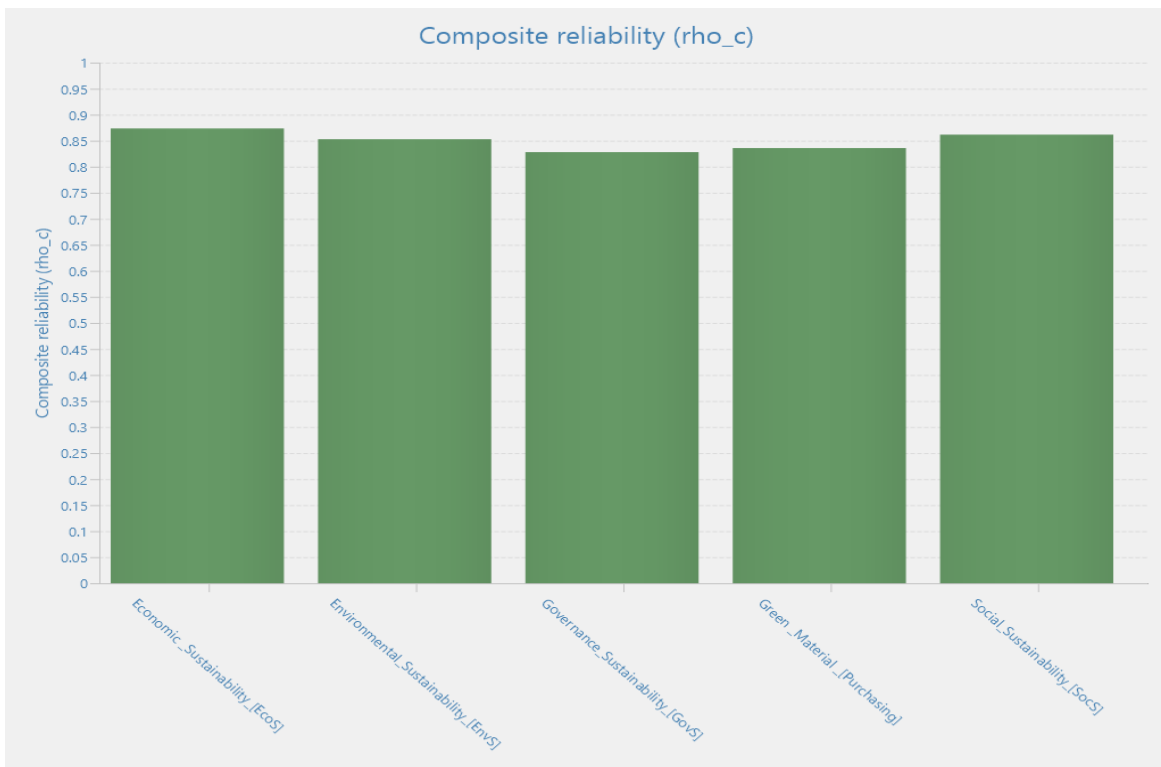
Figure C14: Composite Reliability (rho_c) for Green Material [Purchasing] and Sustainability
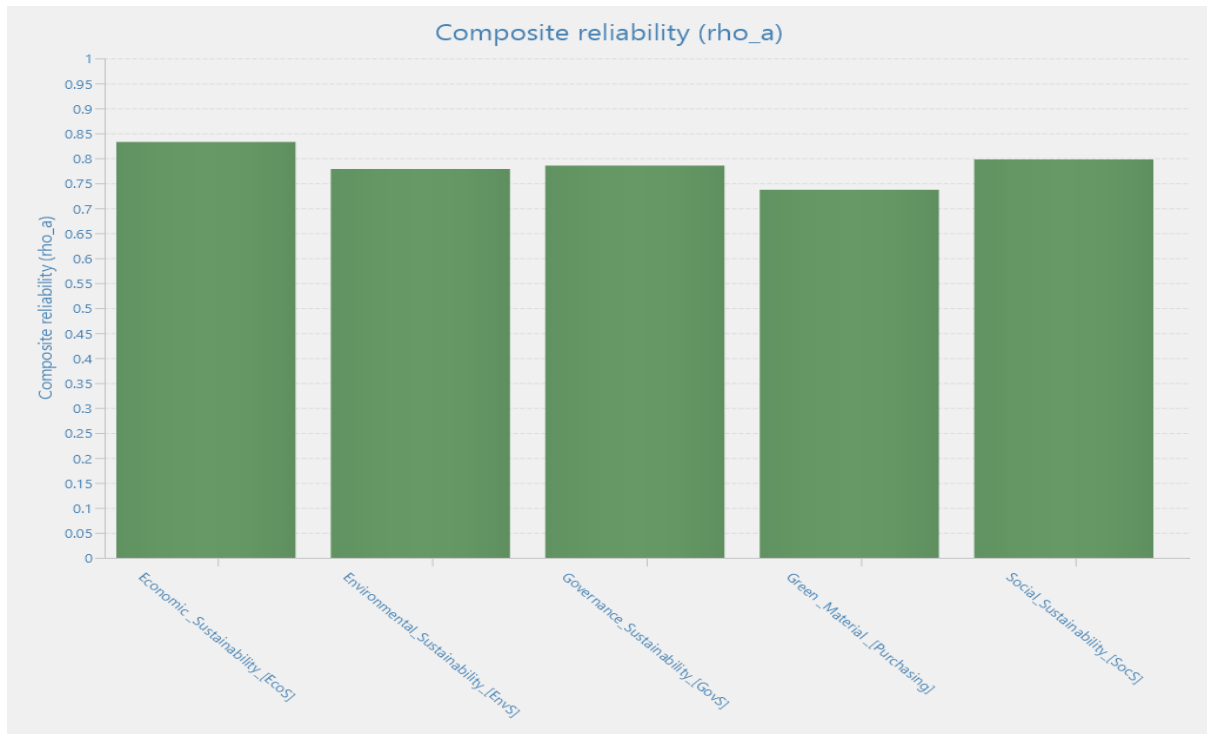
Figure C15: Composite Reliability (rho_a) for Green Material [Purchasing] and Sustainability
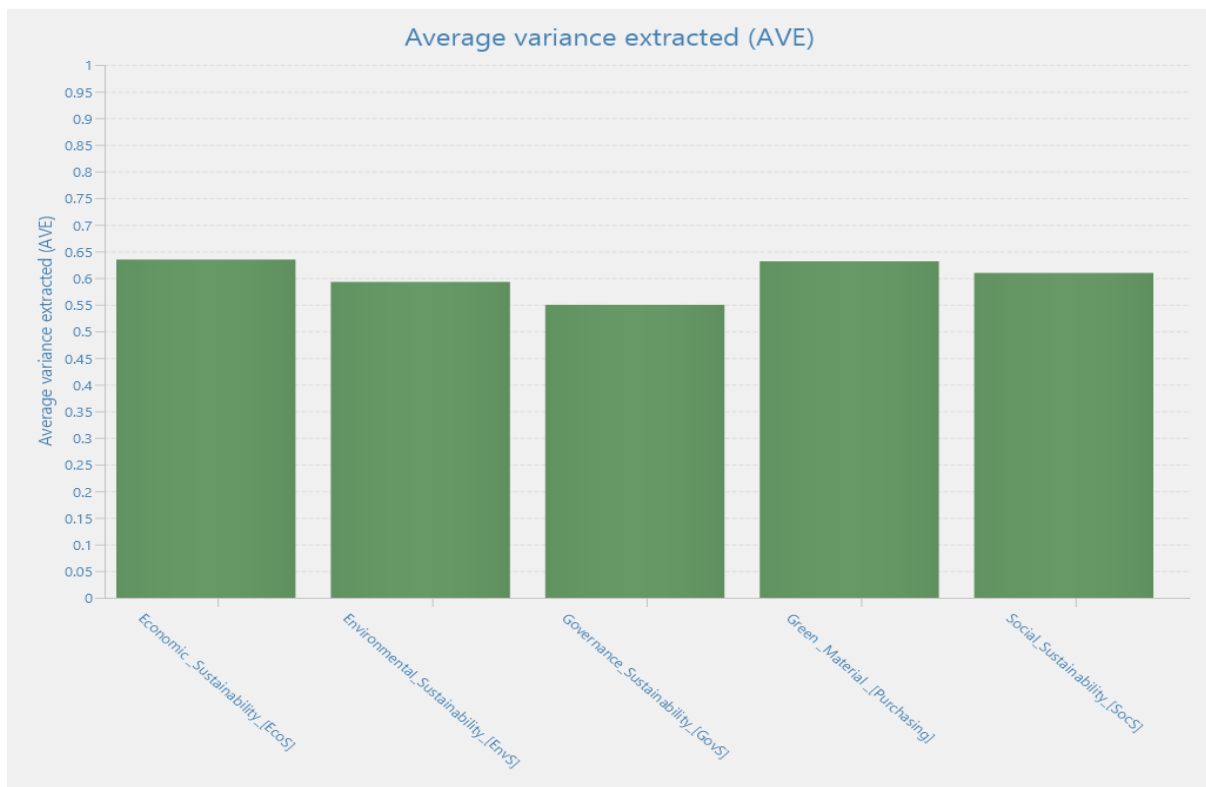
Figure C16: Average Variance Extracted (AVE) for Green Material and Sustainability
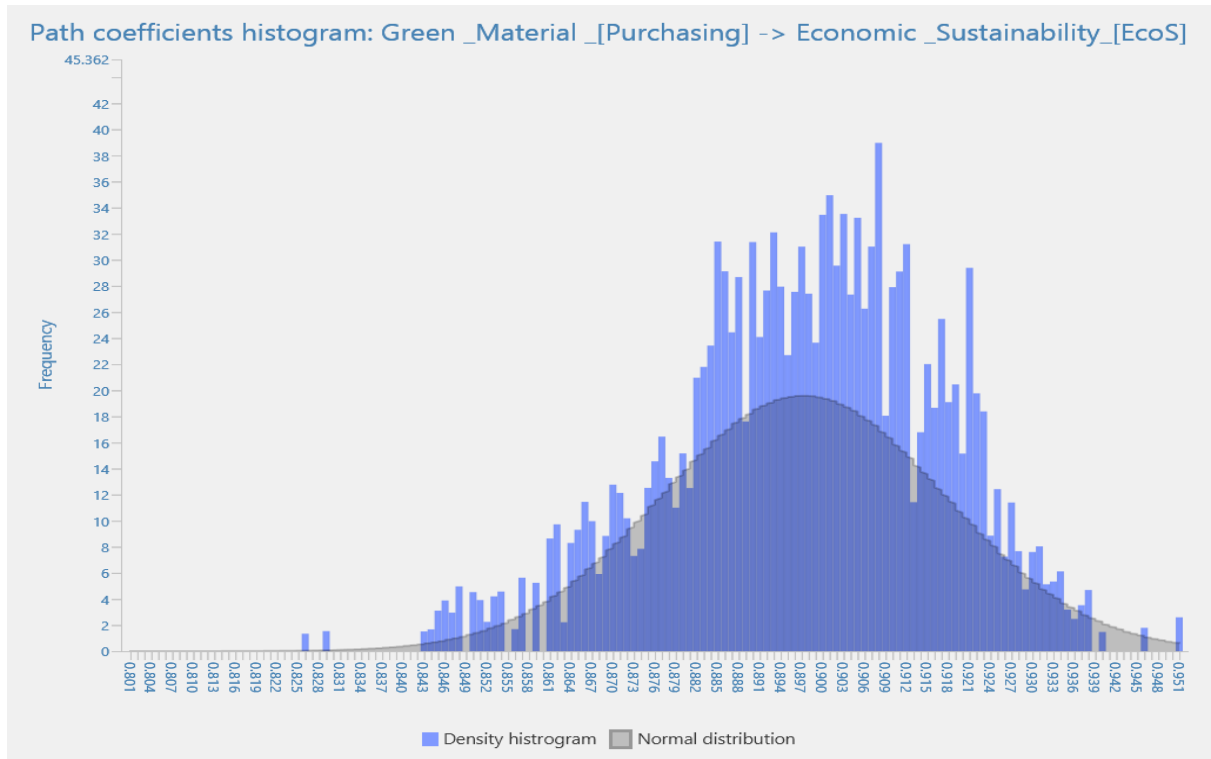
Figure C17: Path Coefficients Histogram for Green material and Economic Sustainability
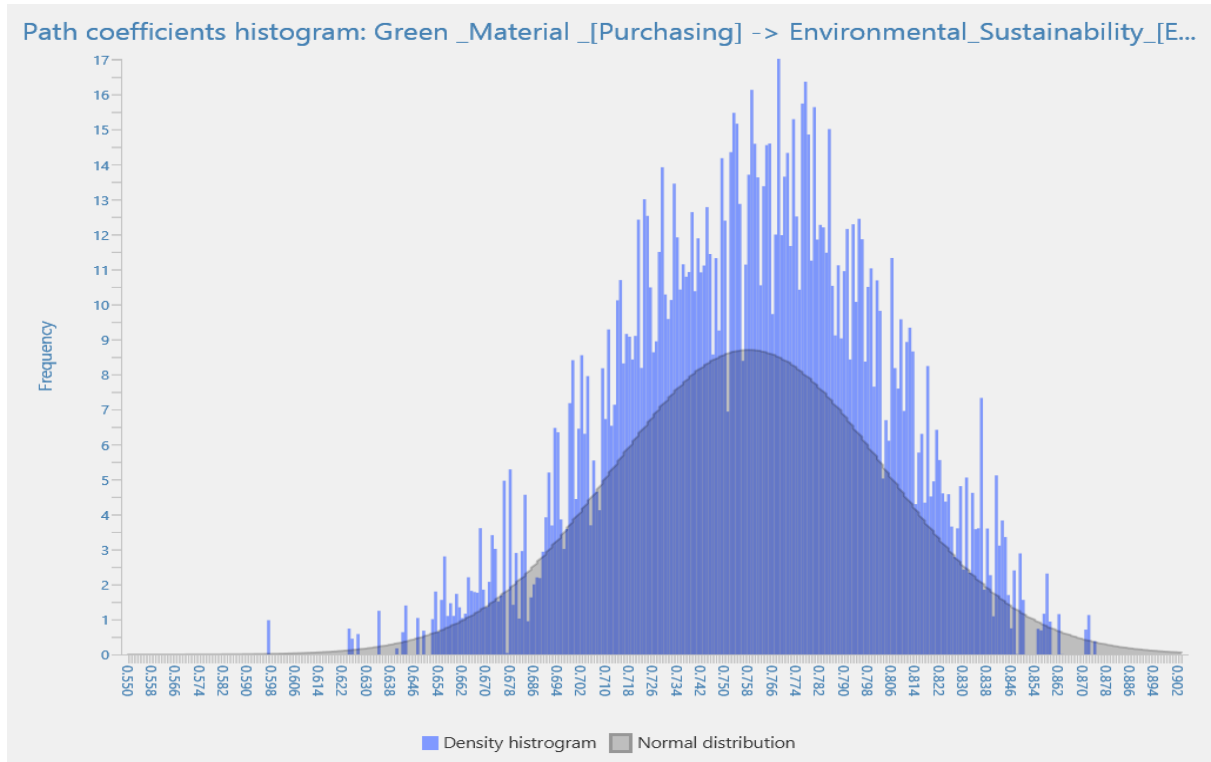
Figure C18: Path Coefficients Histogram for Green material and Environmental Sustainability
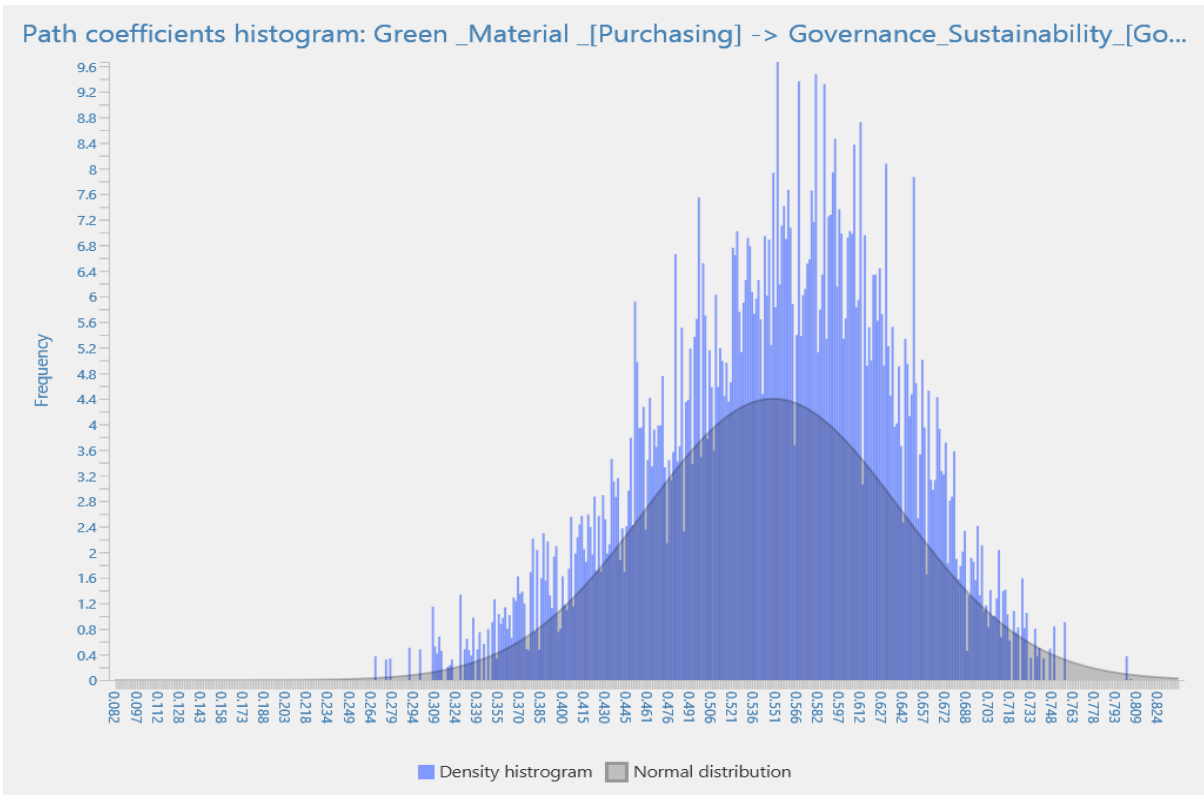
Figure C19: Path Coefficients Histogram for Green material and Governance Sustainability
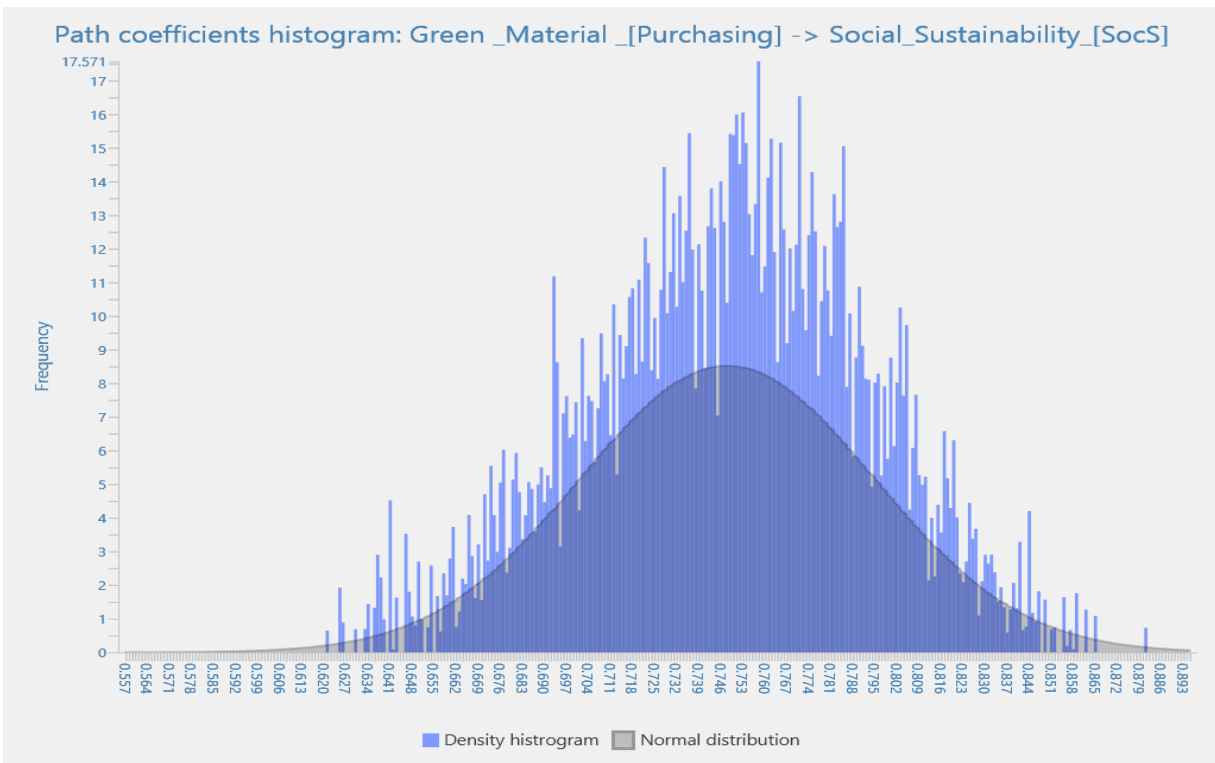
Figure C20: Path Coefficients Histogram for Green material and Social Sustainability

STRUCTURAL MODEL FOR HYPOTHESIS 3

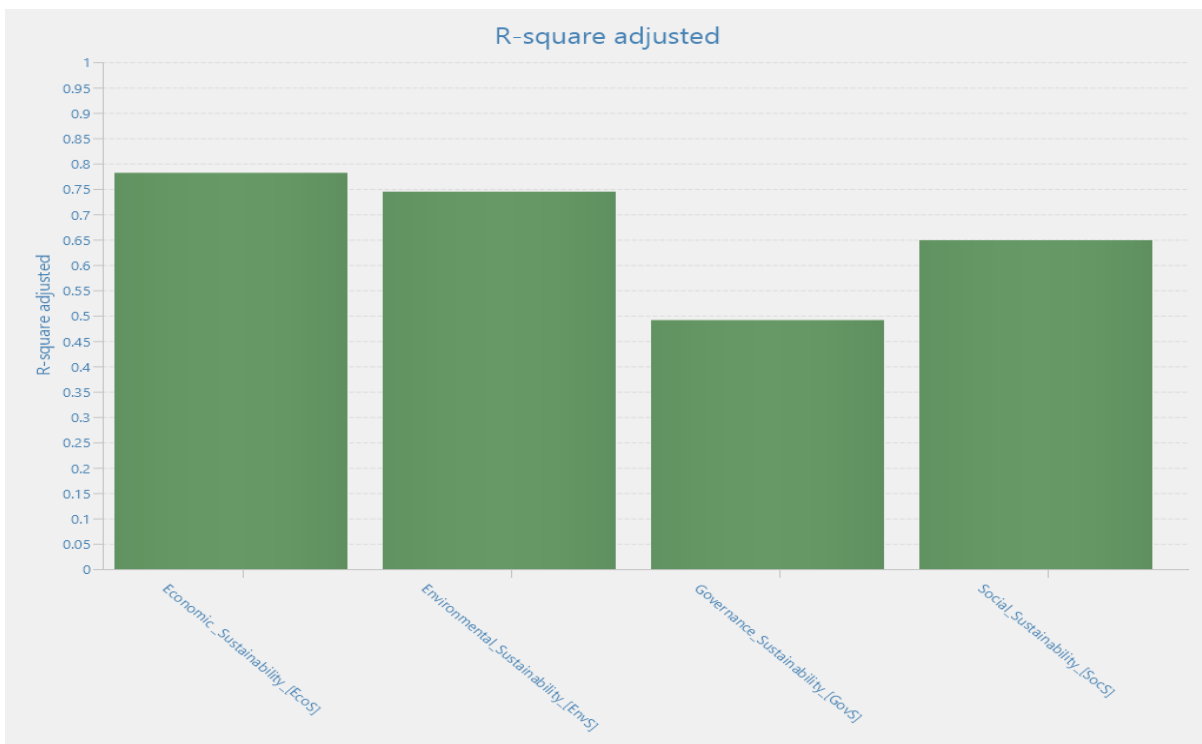Figure C21: R Square for Green Machine [Production] and Sustainability
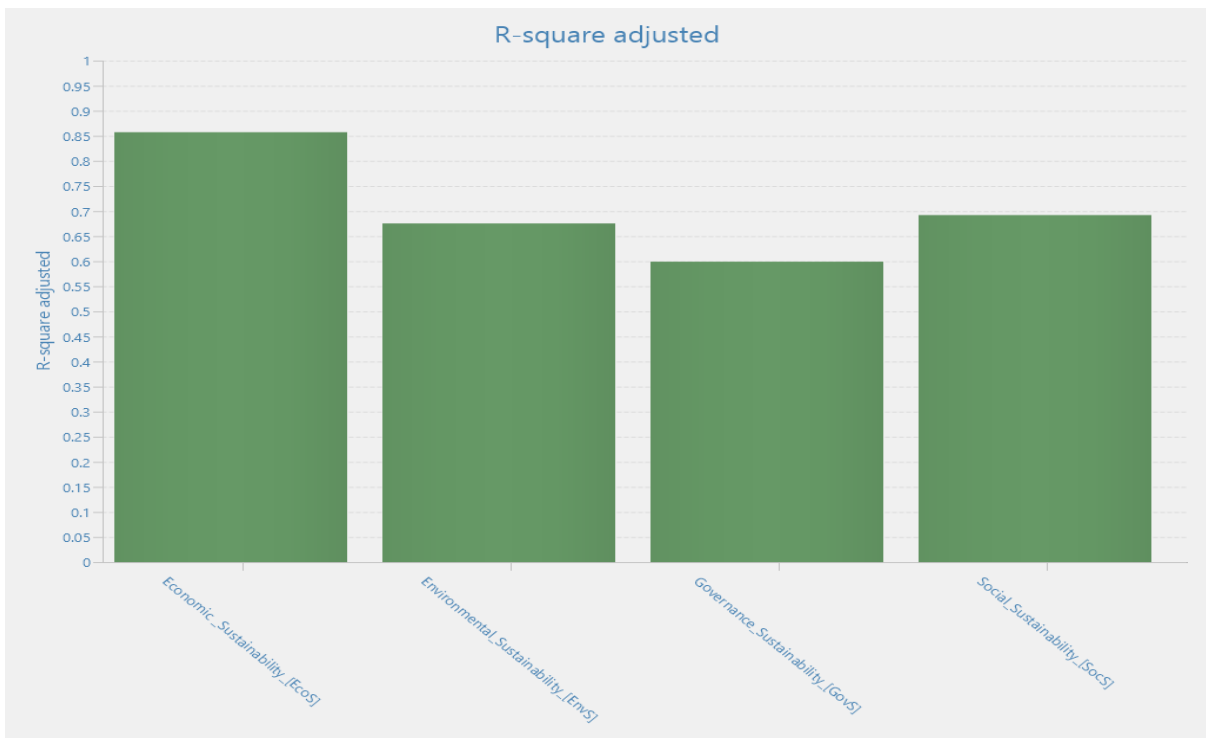
Figure C22: R Square Adjusted for Green Machine [Production] and Sustainability
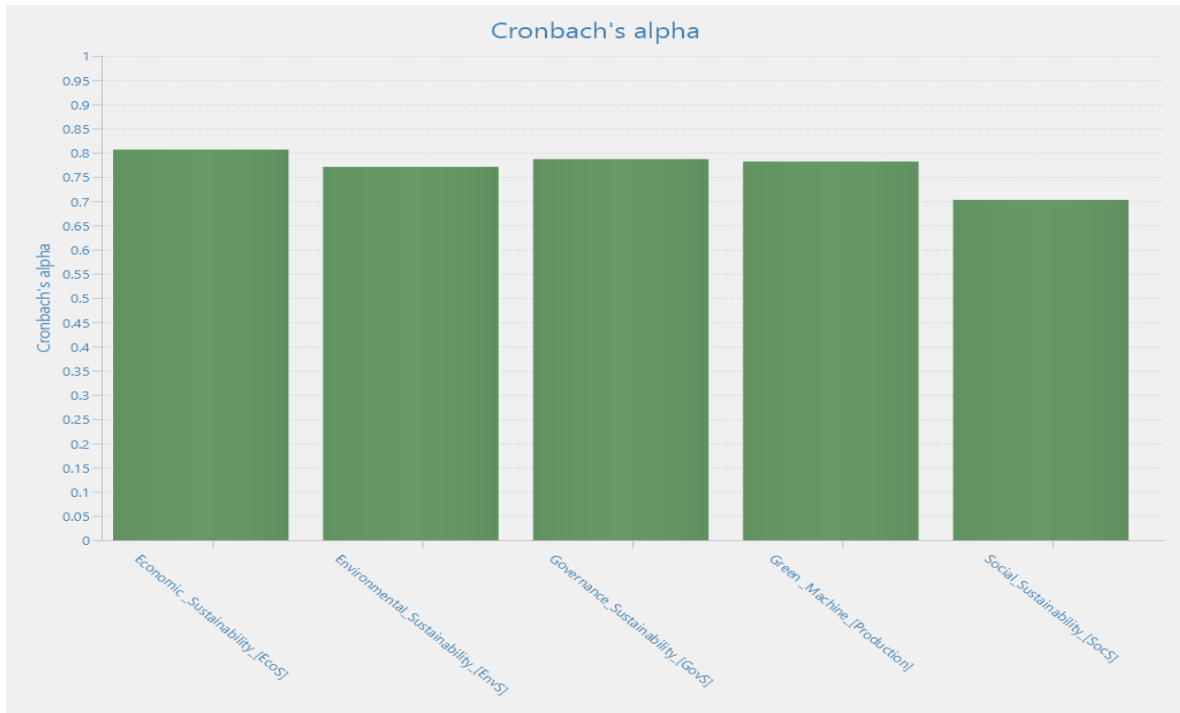
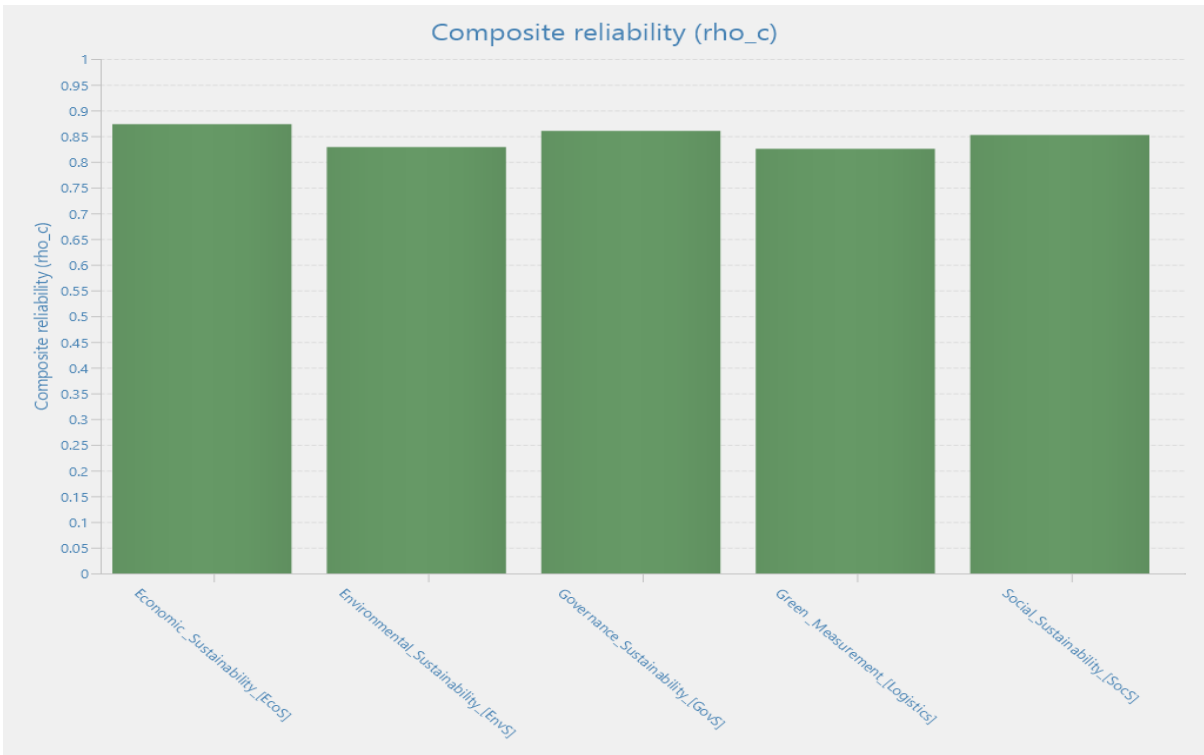Figure C23: Composite Reliability (rho_c) for Green Machine and Sustainability

Figure C24: Composite Reliability (rho_c) for Green Machine and Sustainability

Figure C25: Average Variance Extracted for Green Machine [Production] and Sustainability

Figure C26: Path Coefficients Histogram for Green material and Economic Sustainability

Figure C27: Path Coefficients Histogram for Green material and Environmental Sustainability

Figure C28: Path Coefficients Histogram for Green material and Governance Sustainability

Figure C29: Path Coefficients Histogram for Green material and Social Sustainability

STRUCTURAL MODEL FOR HYPOTHESIS 4
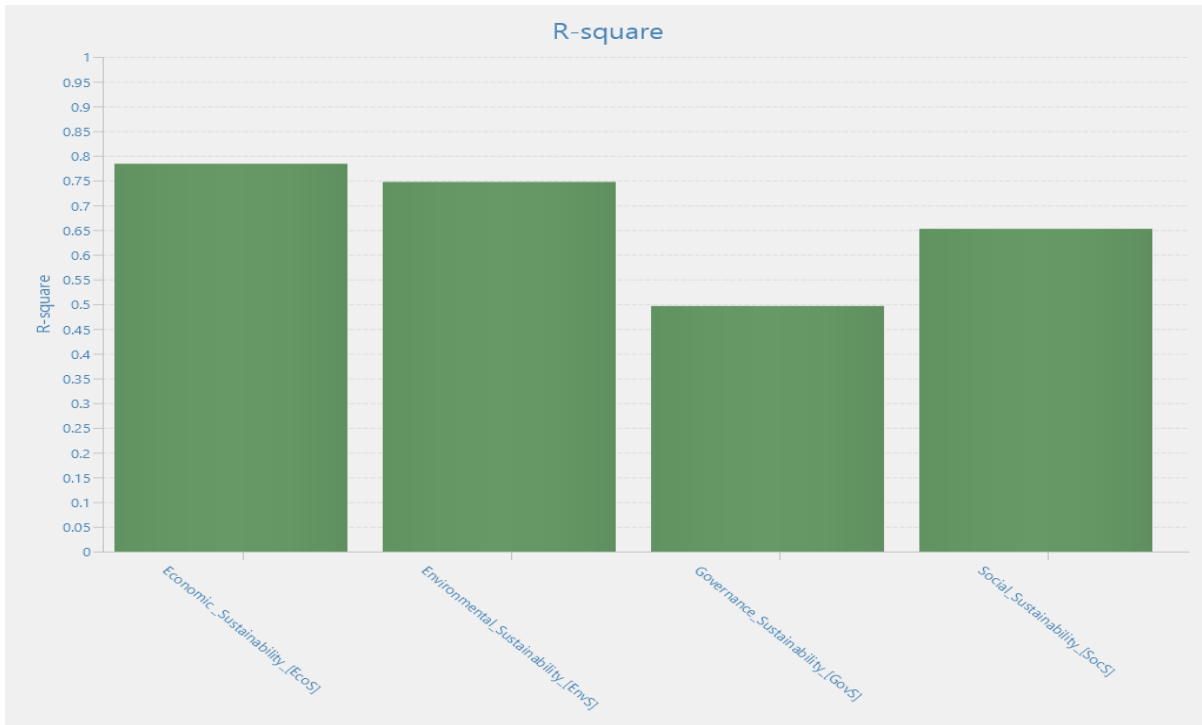
Figure 30: R Square for Green Measurement [Logistics] and Sustainability

Figure 31: R Square Adjusted for Green Measurement [Logistics] and Sustainability

Figure 32: Composite Reliability (rho_c) for Green Measurement and Sustainability
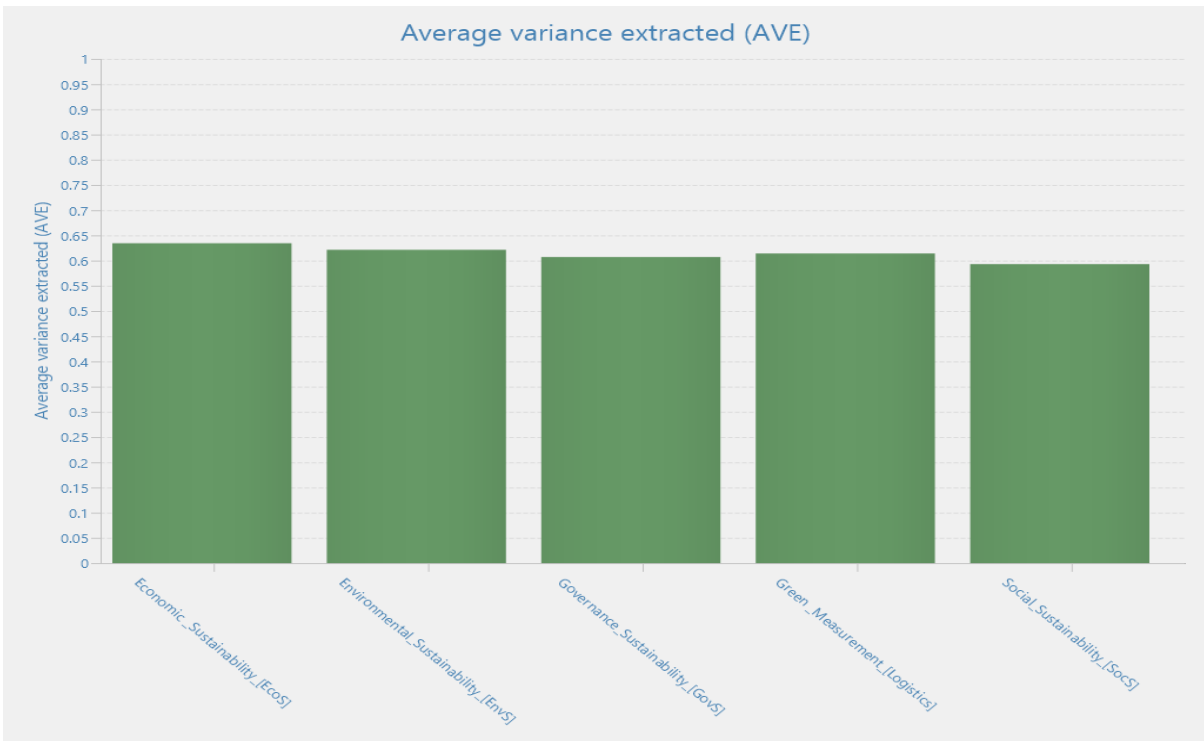
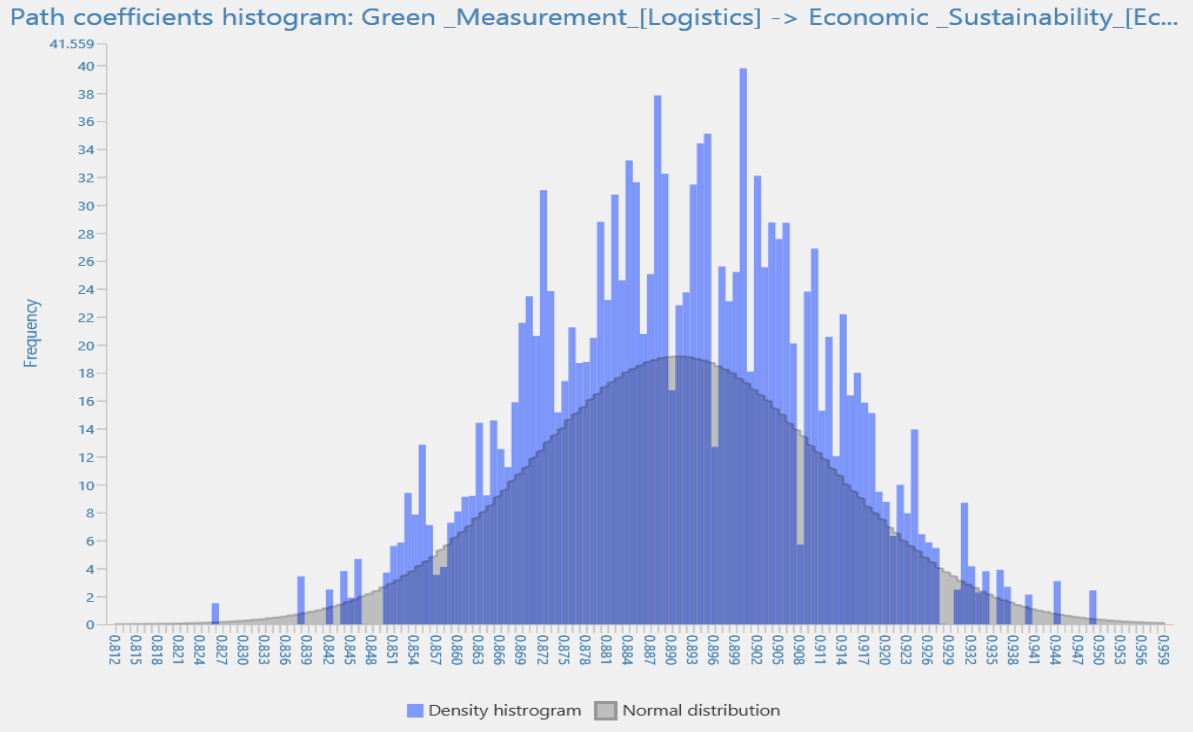Figure 33: Average Variance Extracted (AVE) for Green Measurement and Sustainability

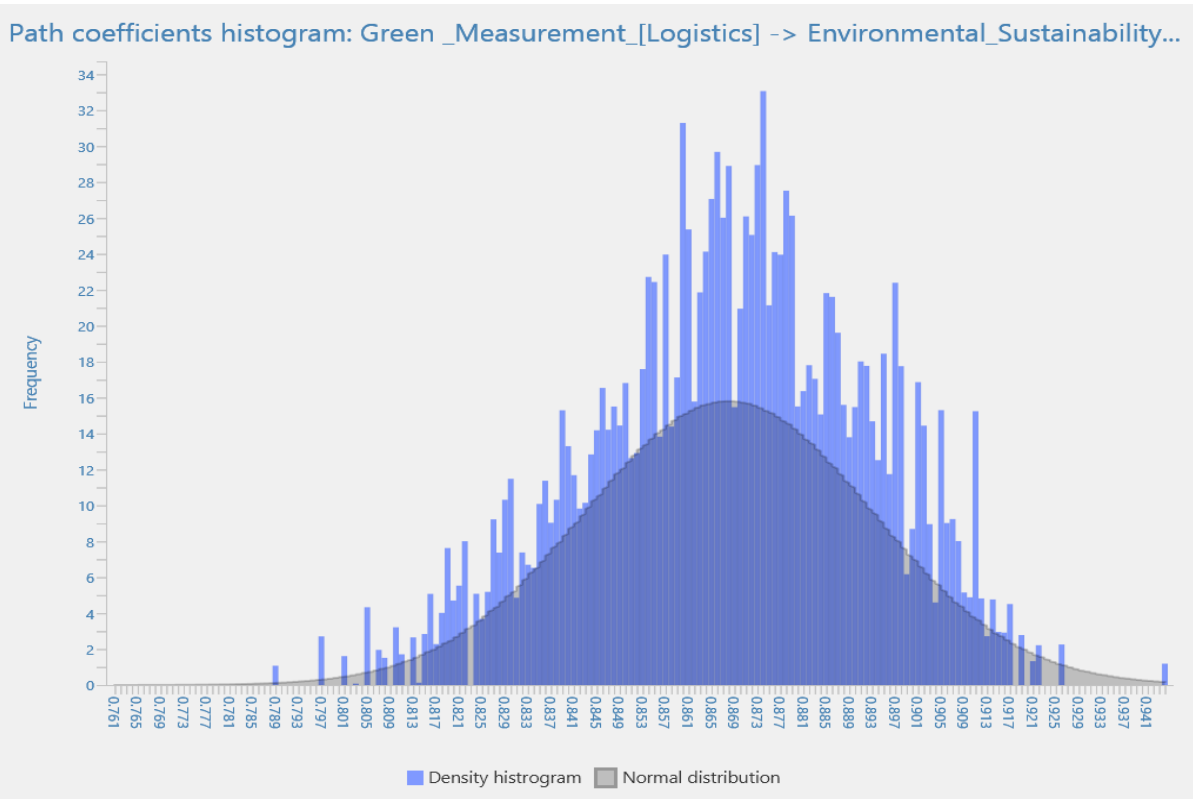Figure C34: Path Coefficients Histogram for Green material and Social Sustainability

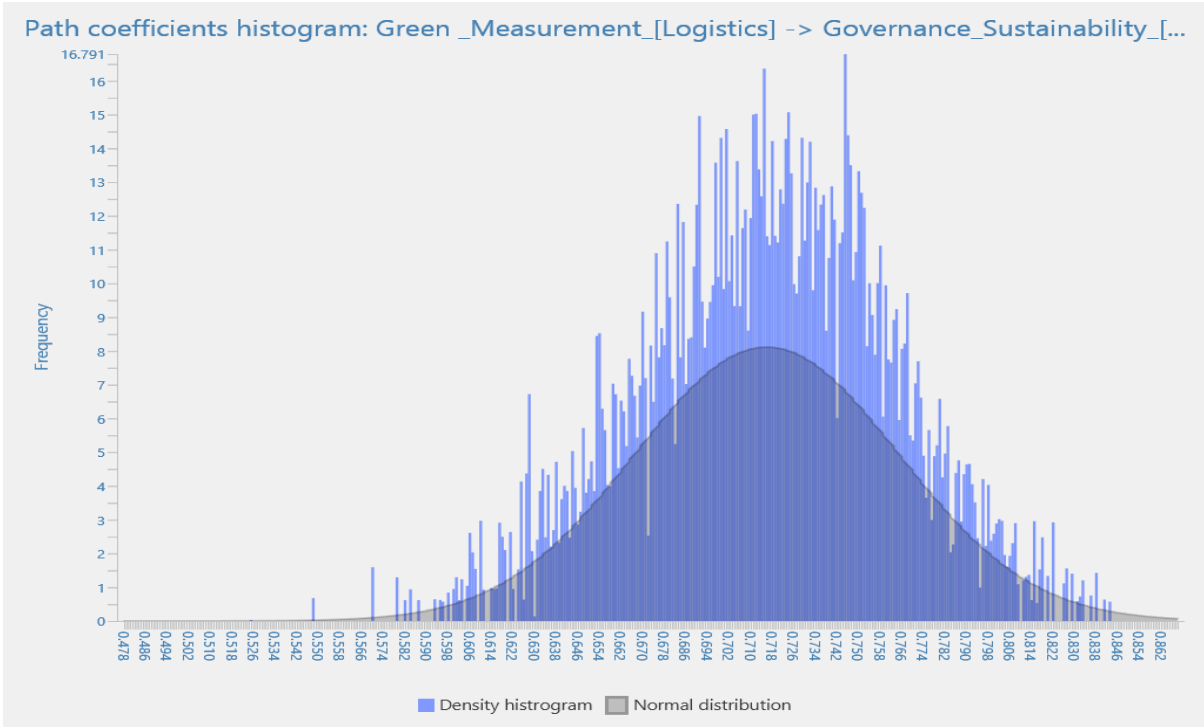Figure C35: Path Coefficients Histogram for Green material and Social Sustainability

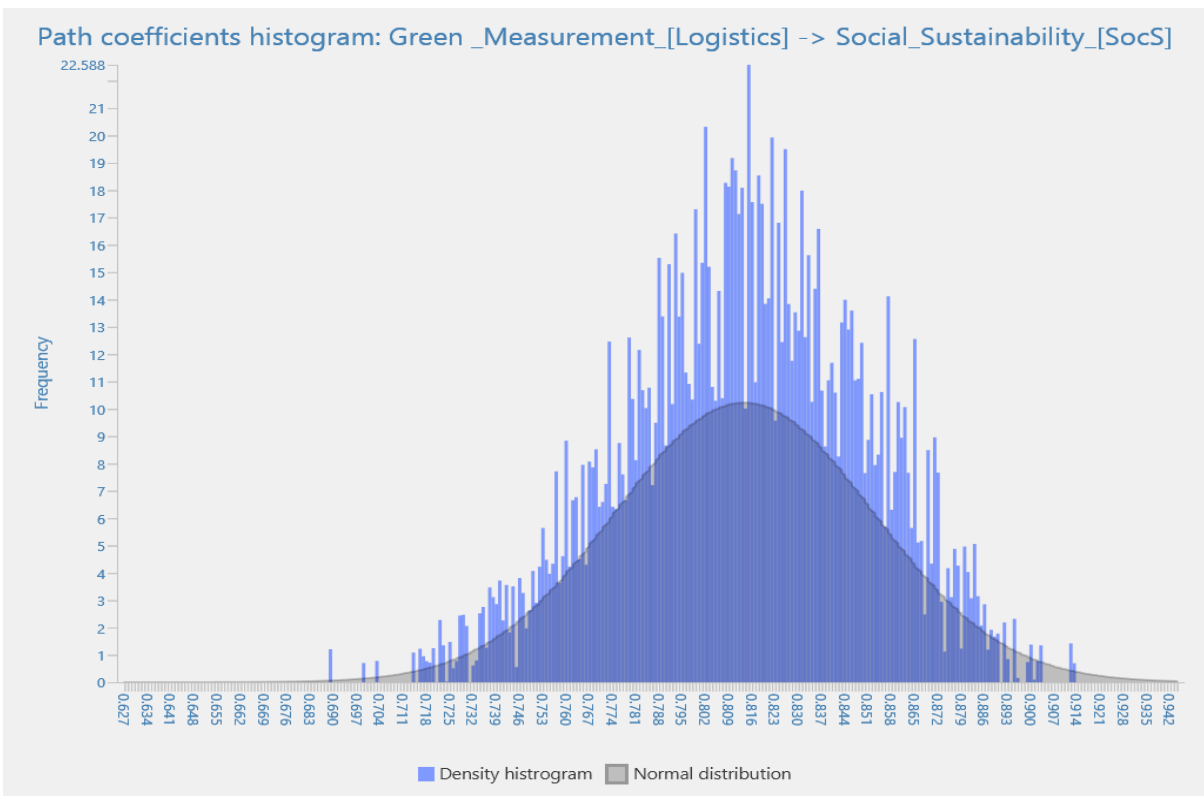Figure C36: Path Coefficients Histogram for Green material and Social Sustainability

Figure C37: Path Coefficients Histogram for Green material and Social Sustainability

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