The perceived impact of green microfinance on the sustainability of small, micro, and medium-sized enterprises in Ghana

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DEDICATION

This PhD thesis is dedicated to my late parents, Mr. Samuel Kingsley Berko and Mrs. Hannah Berko who never lived to witness my academic progression, as well as my beloved wife, Vero, and cherished children: Eugene, Herbert, Daniella, Naana, and Hubert.

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ABSTRACT

The study aimed to analyse the perceived impact of green microfinance on the sustainability of micro, small, and medium-sized enterprises (MSMEs) in the Sunyani and Techiman municipalities in Ghana. The elements of green microfinance used in this study were green credit, micro-savings, microinsurance, and green education. The study was conducted among MSME clients of rural and community banks and credit unions. The study focused on a target population of 5303 MSMEs. The study's sample size was 358 MSMEs, comprising 71 in the agriculture sector, 189 in the service sector, 79 in the manufacturing sector, 13 in construction, and 6 in other sectors. The research employed a quantitative research method to match the study's objectives with its guiding philosophy. Data was collected in person from 358 respondents who were chosen from the MSMEs in the Sunyani and Techiman Municipalities of Ghana using a stratified systematic sampling technique. The proposed research hypotheses were analysed using Smart PLS-SEM. The results revealed a positive and significant relationship between green credit, green education, micro-savings, and environmental performance. The study also demonstrated that green education, micro-savings, and microinsurance have a positive and significant influence on financial performance. Moreover, the study found that green credit and education have a positive and significant relationship with innovativeness. Nevertheless, the analysis revealed no discernible correlation between green credit and financial and social performance, nor between green education and social performance. The study makes a substantial contribution to the existing body of empirical literature on green microfinance. It would also assist the government, Bank of Ghana, microfinance institutions (MFIs) and other policymakers in developing effective policies and strategies to address environmental issues arising from MSMEs. Thus, the study recommends that MFIs and stakeholder institutions improve environmental awareness in their services. The government should create a dedicated green fund that MFIs could access at a favourable interest rate to lend to entrepreneurs for green activities. It is also recommended that the Bank of Ghana revises its Environmental and Social Risk Management policy framework for green financing to give considerable attention to microfinance institutions.

Keywords: Green microfinance, sustainability, MSMEs, microcredit, microfinance institutions.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS/ACRONYMS

AAP	ambient air pollution
ABN	Algemene Bank Nederland
ACCOSCA	The African Confederation of Co-operative Savings and Credit Associations
AMRO	Amsterdam-Rotterdam
APR	annual percentage rates
ASCA	accumulating savings and credit association
ASGM	small-scale and artisanal gold mining
AVE	average variance extracted
BIS	Business Innovation and Skills
BoG	Bank of Ghana
CEA	Country Environmental Analysis
CGAP	consultative group to assist the poor
CO_2	carbon dioxide
COPS	Conference of the Parties
CSFB	Credit Suisse First Boston
CSR	corporate social responsibility
EC	European Commission
ESRM	Environmental and Social Risk Management
EU	European Union
FNGO	Financial Non-Governmental Organisation
GDP	gross domestic product
GEA	Ghana Enterprise Agency
GHAMFIN	Ghana Micro Finance Network
GHG	greenhouse gas
GMF	green microfinance
GPAP	Global Plastic Action Partnership
GSS	Ghana Statistical Service
HAP	household air pollution
HTMT	heterotrait-monotrait ratio of correlations
HVB	HypoVereinsbank
IEA	International Energy Agency

IFC	International Finance Cooperation
IPO	Initial Public Offering
IUCN	International Union for Conservation of Nature
MFIs	microfinance institutions
MLGRD	Ministry of Local Government and Rural Development
MLNR	Ministry of Lands and Natural Resources
MoF	Ministry of Finance
MSMEs	micro, small and medium enterprises
MT	metric tons
NAPAs	National Adaptation Programmes of Action
NBFI	Non-Bank Financial Institutions
NBSSI	The National Board for Small Scale Industries
NDCs	Nationally Determined Contributions
NDVI	normalised differential vegetation index
NGOs	non-governmental organisations
NPP	net primary productivity
OECD	Organisation for Economic Co-operation and Development
PLS-SEM	partial least square structural equation modelling
RCBs	rural and community banks
ROA	return on assets
ROE	return on equity
ROI	return on investment
ROSCAs	rotating savings and credit associations
S&L	savings and loans
SAPs	sustainable agricultural practices
SDGs	Sustainable Development Goals
SEM	structural equation modelling
SMEDAN	Small and Medium Enterprises Agency of Nigeria
SMEs	small and medium-sized enterprises
SPSS	Statistical Package for the Social Sciences
SRMR	standardised root mean square residual
SSA	Sub-Saharan Africa
SWERA	Solar and Wind Energy Resource Assessment
TBL	triple bottom line

UK	United Kingdom
UN	United Nations
UNCED	United Nations Division for Sustainable Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
US	United States
USAID	United States Agency for International Development
VAT	value-added tax
VIF	variance inflation factor
WEF	World Economic Forum
WOCCU	World Council of Credit Unions

OPERATIONAL DEFINITION OF KEY TERMS

Green Microfinance: The provision of both financial and non-financial services to micro, small, and medium-sized enterprises (MSMEs) that prioritize environmental responsibility in addition to social and financial objectives (Khan & Abedin, 2018).

Green microcredit: Small loans extended to micro, small, and medium enterprises (MSMEs) or low-income households that are excluded by traditional banks, aimed at facilitating the adoption of or investment in environmentally sustainable practices, climate change adaptation or mitigation, and other initiatives that directly enhance the environment, including waste management, recycling, agroforestry, and organic production (Forcella, Castellani, Huybrechs, & Allet, 2017).

Green Education: A learning approach that provides MSME owners and managers with fresh insights and perspectives, integrating awareness-raising and communication strategies in fields like environmental preservation, biodiversity conservation, and climate change.

Environmental risk management: A collection of tools, procedures, and measures designed to manage or mitigate the environmental impact of an organisation or its clientele.

Energy efficiency: The methods of managing and controlling the increase in energy consumption. If an entity provides greater services for an equivalent energy input or the same services for a reduced energy input it is considered more energy efficient (IEA). Examples of energy-efficient technology include efficient ovens, refrigerators, and cook stoves.

CHAPTER ONE:

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 **Introduction and background to the study**

Microfinance is broadly acknowledged as a vital strategy for poverty reduction and enhancement of the economic standard of living (Khan, Khan, Violinda, Aasir, & Jian, 2020; Nawaz, 2010Microfinance institutions (MFIs) play a very significant role in the development of a country's economy by making available various financial and nonfinancial services to micro, small, and medium-sized enterprises (MSMEs), the impoverished, and the financially excluded individuals or members of the community. MFIs provide financial services to facilitate the operations of MSMEs that face significant barriers in accessing loans from the orthodox banks (Bali & Rathod, 2019; Berguiga, Adair, & Berguiga, 2019; Bongomin, Woldie, & Wakibi, 2020). With this exemplary role played by microfinance institutions, the debate for microfinance institutions to incorporate environmental priorities into their operational strategies has gathered momentum (Allet, 2014a; Allet & Hudon, 2015a; Mia, Zhang, Zhang, & Kim, 2018).

Green microfinance (GMF) is an evolving research area that seeks to expand the scope of microfinance to include environmental concerns. Contemporary scholars of microfinance continue to advocate for green microfinance which stimulates the concern for environmental responsibility alongside the financial and social goals. Due to MFIs' financial intermediary role mainly geared towards MSMEs, it is believed that MFIs have the capacity to reorient MSMEs to embrace and incorporate environmental issues in their objective setting and operations. Large corporations appreciate the importance to be eco-friendly. However, MSMEs have not yet acknowledged the importance of environmental conservation, which can lead to increased efficiency, lower costs, and profitability, according to Epstein and Roy (2000). There is therefore, the need to have an institutional arrangement to incentivise MSMEs to adopt the TBL framework in their mission, vision and objectives (Nugroho, Utami, Akbar, & Arafah, 2017). Green microfinance providers have proliferated in various global regions, including Bangladesh, Indonesia, Vietnam, Thailand, Cambodia, and Europe, South America, and Africa. Some MFIs have started to adopt new strategies, such as the design of financial products to promote environmentally friendly activities and technologies, the organization of campaigns promoting pro-environmental behaviours, or the screening of loan applications against environmental criteria. In Europe, several MFIs grant credits for renewable energies or energy efficiency and also provide credits for environmentally friendly activities such as recycling, waste management, organic farming, and ecotourism (Forcella & Hudon, 2016). One of the most prominent cases is Grameen Shakti, which has provided solar energy to hundreds of thousands of homes in rural Bangladesh using microcredit (Allet, 2017). Some governments in Africa are implementing legislation to legitimize green microfinance. For instance, Egypt, Tunisia, Cabo Verde (Leite & Sá, 2024), etc., have legislation on green microfinance. Therefore, it is necessary to establish an institutional arrangement that incentivizes MSMEs to incorporate the TBL framework into their mission, vision, and objectives.

Studies such as those of (Adaletey, Almaamari, & Oware, 2022) show that MSMEs contribute immensely to every economy's growth, particularly in job creation, productivity, and poverty alleviation. Globally, according to Arifin, Ningsih, and Putri (2021) and Pandya (2012), MSMEs are well-known for playing a key role in fostering sustainable grassroots economic development. It has been established that close to 95% of businesses across the world are MSMEs, which contribute to about 60% of job avenues in the private sector (Dasaraju, Somalaraju, & Kota, 2020). The United Nations Industrial Development Organisation (UNIDO) has established that MSMEs account for more than 90% of all African registered businesses. The contribution of MSMEs to Ghana's gross domestic product (GDP) increased by 49% in 2012 (Nimako et al., 2013). Adaletey et al. (2022) reveal that MSMEs in Ghana create close to 85% of manufacturing job avenues and contribute nearly 70% to the GDP of Ghana and form approximately 92% of businesses in Ghana.

A thriving MSME sector, according to Abisuga-Oyekunle, Patra, and Muchie (2020), is critical for poverty reduction and economic growth, particularly in Sub-Saharan Africa (SSA). In Ghana the MSME sector plays a pivotal role in employment creation (Kodua, 2019) and poverty reduction. This role was evident in examining surveys done in various African nations by Liedholm and Mead (2005). The review results estimated that a working population of 17 - 27% was employed in MSMEs, which amounts to nearly double that of large corporations and the public sector. Later statistics from the United States Agency for International Development (USAID, 2014) indicated a third or more of the labour force is employed by MSMEs in low-income countries. According to Kawira, Mukulu, and Odhiambo (2019), the small business sector in Kenya provides jobs to over 14.9 million of the population and accounts for roughly 38.8% of the country's GDP. The above statistics suggest that the pivotal achievement of MSMEs in the advancement and progress of emerging economies cannot be downplayed.

Notwithstanding the immense contribution of MSMEs to the advancement of emerging economies, it is commonly known that most MSMEs' operational activities contribute to ecological issues such as species extinction, land degradation, deforestation, poor waste disposal and pollution (Brahmbhatt, Haddaoui, & Page, 2017). These ecological problems have unpleasant financial repercussions on the very existence of the enterprises that cause the environmental imbalance. Similarly, the clients of these MSMEs' quality of life are not spared. Many MSMEs' activities are propelled by financial objectives to the disregard of the environment (Joseph & Kulkarni, 2020; Khalifa & Hantash, 2009; Nejati, Amran, & Ahmad, 2014). In Ghana the activities of some MSMEs involve environmental issues creating direct threats to the wellbeing of the people in the community (S. Srivastava & Pawlowska, 2020).

Some MSMEs employ indigenous material resources to create financial returns to sustain their activities and generate employment (Joseph & Kulkarni, 2020). The activities of most MSME entrepreneurs involve environmental issues, particularly in emerging economies, that directly endanger the community's health and livelihoods (Nugroho et al., 2017). Despite the consequences of MSMEs' activities in the environment, they are not largely concerned (Nugroho et al., 2017). Activities such as indiscriminate logging, charcoal burning, small scale mining, application of weedicides, pesticides and inorganic fertilizer in farming, improper disposal of solid waste into drainages resulting into flooding, wrongful disposal of toxic liquid leading to pollution of waters, and sand winning are ubiquitous in Ghana (Amuah et al., 2024). These activities have dire consequences for the environment and the communities (Gunawan, Asyahira, & Sidjabat, 2020). For instance, credit provided by MFIs for agricultural endeavours is frequently used to purchase pesticides, fertilizers (AfDB & Bank, 2013), and livestock, as well as to engage in activities that cause serious ecological consequences (Barbosa, Azevedo, & Rodrigues, 2019). The chemical substances present in pesticides and fertilizers are known to cause problems to human health. Application of chemical fertilizers and pesticides has resulted in several environmental and water pollution problems. The principal sources of exposure to these substances are food, water, and the environment, all of which have direct or indirect implications for human health (Dhankhar & Kumar, 2023). GMFIs promote environmental consciousness and offer loans for organic pesticides and fertilizers. It seems that the individual activities of MSMEs to generate income have an insignificant effect on the environment, but cumulatively, the impact is enormous (D. Singh, Khamba, & Nanda, 2018).

Because climate change threatens life on earth, anthropogenic environmental challenges have a severe impact on the finances of individuals, households, and MSMEs (Satterthwaite et al., 2018). The necessity of being environmentally conscious has acquired acceptance on a global scale. Therefore, it is not unexpected that the Conference of the Parties (COPs) has been held by the United Nations (UN) for about 30 years ago, with the main goal being the mitigation of climate change and the global resolution of environmental injustices. Developing nations face a substantial peril from climate change, as it leads to the destruction of dwellings due to flooding and the devastation of crops caused by drought (Mirza, 2003).

In 2009, developed nations made a committed to raise $100 billion each by 2020, to provide support to vulnerable nations in their efforts to alleviate the adverse consequences of climate change (Somaratne, 2017). However, as of November 2021, this pledge has not been fulfilled (Roberts et al., 2021). This should serve as a wake-up call for developing countries to prioritise the creation of their Nationally Determined Contributions (NDCs) with reduced reliance on wealthy nations. Therefore, developing nations must formulate their own innovative domestic strategies to lessen the effect of climate change within their respective territories. The phrase "Nationally Determined Contributions (NDCs)" describes the national plans and strategies aimed at extenuating the impact of climate change.

In light of this context, certain funders and experts in microfinance argue that MFIs have the potential to promote environmentally conscious behaviours among their clients who operate MSMEs (Allet, 2012).

Existing research highlights the challenge of obtaining financing from traditional banks as a fundamental issue MSMEs face. MSMEs in Ghana face capital constraints, hindering their ability to survive and grow (Agyapong, 2020; Amoah & Amoah, 2018; Aryeetey et al., 1994). MSMEs' access to loans can be affected by the age and size of the organization. MSMEs at the early stage of operation encounter challenges in accessing credit due to informational asymmetries (Wajebo, 2022). The longer a firm exists, the greater its capacity to manage risks, which in turn increases creditors' confidence in extending loans (Gupta, Saini, & Chaddha, 2018) Older firms have strong relationships with financial institutions, resulting in superior access to loans compared to newer enterprises (Mersha & Ayenew, 2017). Eniola (2018) identifies age variables, membership composition, company size, and education as factors influencing small enterprises' decisions between formal and informal financing sources.

The main sources of MSMEs financing include retained earnings, informal savings, lending associations, and money lenders. The microfinance idea was introduced in Ghana in the 1970s to offer financial assistance to MSMEs, in response to their various challenges including credit.

MSMEs' main source of credit is MFIs that provide financial services to support the activities of MSMEs which seldom qualify for loans from the orthodox banks (Bali & Rathod, 2019; Berguiga et al., 2019; Bongomin et al., 2020). With this exemplary role played by MFIs, the debate around MFIs to incorporate environmental concerns into their operational strategies to contribute to MSMEs' transformation to sustainability has gathered momentum (Allet, 2014a; Allet & Hudon, 2015a; Mia et al., 2018).

Microfinance previously had two primary objectives: social impact and financial sustainability (Allet, 2014). Modern experts in microfinance persist in promoting the concept of GMF, which emphasises the importance of environmental responsibility along with social and financial objectives. MFIs need to consider the "triple bottom line" (TBL) paradigm while providing services to their clients (Allet, 2014). Allet (2014) defines the TBL as a business concept that entails firms monitoring and evaluating their social and environmental influence and financial performance, rather than merely prioritising profit generation. Majid and Koe (2012) classify the TBL framework into three categories, referred to as the "3Ps," which encompass considerations for profit, people, and the planet. Sachs et al. (2019) found that the adoption of green finance by MFIs positively correlates with the socially responsible behaviour of MSMEs, while simultaneously enhancing their overall quality. Given that, MSMEs are the least regulated, dispersed, and mostly unregistered businesses in Ghana (Agyapong, 2020), there is a compelling need to institute creative and convincing strategies to influence MSMEs to be more environmentally sensitive.

1.2 Statement of the Research Problem

Ghana launched its Environmental and Social Risk Management (ESRM) policy framework for green financing in November 2019. The policy for green financing is primarily focused on the commercial banks which mainly deal with large scale enterprises that are easily regulated by responsible government institutions. Unlike the large-scale enterprises, MSMEs are dominantly financed by MFIs and are not stringently regulated. The extant literature reveals that microfinance institutions in several regions such as Southeast Asia (Bangladesh, Indonesia, Vietnam, Thailand, Cambodia, etc.), Europe, South America, etc., have incorporated environmental concerns in their objectives and operations in an attempt to impact the environmental orientation of MSMEs (Mia et al., 2018).

The influence of microfinance on MSMEs' long-term growth has been established by extant literature but research is scarce in Ghana that seeks to examine microfinance and MSMEs’ financial, social, and environmental performance concurrently. Research indicates that environmental risk is one of the most significant global challenges (Wright & Nyberg, 2017). The environmental problems are largely human-induced and the measures to mitigate environmental consequences are significantly directed at large companies to the neglect of MSMEs (Singh & Misra, 2021). It is well recognised that MSMEs promote economic expansion and growth, generating employment opportunities, and facilitating the innovation of novel products, poverty alleviation and improved standard of living.

Notwithstanding the immense contribution of MSMEs to the advancement of emerging economies, most MSMEs' operational activities contribute to ecological issues (Brahmbhatt, Haddaoui, & Page, 2017). In Ghana, most MSMEs activities lead to environmental problems such as species extinction, land degradation, deforestation, poor waste disposal, and pollution. These MSMEs are in close proximity to the environment (Joseph & Kulkarni, 2020), but they are somewhat less sensitive to ecological causes. According to Yadav et al. (2018), in Europe, MSMEs account for 60 to 70% of aggregate pollution. Ghana's annual total air pollution is anticipated to have cost on average 4.2% of GDP in 2017, or about US$2.5 billion (Linear, 2020), and this could be largely attributed to various activities of MSMEs (Darko et al., 2022). These environmental problems can impact MSMEs repayment capacity and thereby increase the risk of default for the MFIs (Fenton et al., 2017b). Therefore, it is necessary to establish an institutional arrangement that incentivizes MSMEs to incorporate the TBL framework into their mission, vision, and objectives.

MFIs are the main source of microloans and other financial services, such as savings, microinsurance, remittances, and non-financial services, for the owners of MSMEs. Because MFIs primarily serve MSMEs as financial intermediaries, they are considered capable of guiding MSMEs in adopting and integrating environmental considerations into their goals and operations (Huybrechs et al., 2019; Sachs et al., 2019; Mia et al., 2018; Allet, 2017). However, there is a dearth of studies on green microfinance and the sustainability of MSMEs in Ghana. Therefore, the fundamental question lies in how green microfinance contributes to the sustainability of MSMEs in Ghana. This study therefore sought to examine the perceived impact of green microfinance on MSMEs’ financial, social, and environmental performance concurrently in Sunyani and Techiman Municipalities.

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1.3 Objectives of the study

1.3.1 Primary objective

The study's primary objective was to investigate the perceived impact of green microfinance on MSMEs' sustainability in Ghana.

1.3.2 Secondary objectives

The secondary objectives stated below were designed to address the study's main purpose:

i. To examine the perception that entrepreneurs in the Sunyani and Techiman Municipalities have of green microfinance.
ii. To investigate the impact of green microfinance on MSMEs' financial performance in Sunyani and Techiman Municipalities, Ghana.
iii. To investigate the impact of green microfinance on MSMEs' social performance in Sunyani and Techiman Municipalities, Ghana.
iv. To explore the impact of green microfinance on the environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana.
v. To examine the impact of green microfinance on innovative practices of MSMEs in Sunyani and Techiman Municipalities, Ghana.
vi. To investigate the moderating effect of business age and size on the financial, social and environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana.

1.4 Research questions

The study was guided by the following research questions:

i. What are the perceptions of entrepreneurs in the Sunyani and Techiman Municipalities about green microfinance?
ii. To what extent does green microfinance impact the financial performance of MSMEs in the Sunyani and Techiman Municipalities, Ghana?
iii. How does green microfinance impact the social performance of MSMEs in Sunyani and Techiman Municipalities, Ghana?
iv. What impact does green microfinance have on the environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana?
v. How does green microfinance impact the innovation of MSMEs' operations in Sunyani and Techiman Municipalities, Ghana?

vi. How do business age and size moderate the financial, social and environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana.?

1.5 Study hypotheses

In accordance with the aims of the research, the hypotheses that are formulated are as follows:

H1a: Green credit positively and significantly impacts MSMEs' financial performance.

H1b: Green education positively and significantly impacts MSMEs' financial performance.

H1c: Microsavings positively and significantly impact MSMEs' financial performance.

H1d: Microinsurance positively and significantly impacts MSMEs' financial performance.

H2a: Green credit positively and significantly impacts MSMEs' social performance.

H2b: Green education positively and significantly impacts MSMEs' social performance.

H2c: Microsavings positively and significantly impact MSMEs' social performance.

H2d: Microinsurance positively and significantly impacts MSMEs' social performance'

H3a: Green credit positively and significantly impacts MSMEs' environmental performance.

H3b: Green education positively and significantly impacts MSMEs' environmental performance.

H3c: Microsavings positively and significantly impact MSMEs' environmental performance.

H3d: Microinsurance positively and significantly impacts MSMEs' environmental performance.

H4a: Green credit positively and significantly impacts MSMEs' innovativeness.

H4b: Green education positively and significantly impacts MSMEs' innovativeness.

H4c: Microsavings positively and significantly impact MSMEs' innovativeness.

H4d: Microinsurance positively and significantly impacts MSMEs' innovativeness.

H5a: Business age moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

H5b: Business size moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

1.6 Rationale of the study

Microfinance has served as a stop gap measure since the middle of the 1970s for MSMEs' access to credit (Onyango, 2018; Tambunan, 2018; Wyman, 2017). Microfinance provides MSMEs with credit and other financial services such as microsavings, microinsurance, and remittances, including non-financial services such as training, workshops, coaching, and education on financial management, green education (environmental awareness, and hygiene). According to García-Moritán (2020), Singh et al. (2018), Mukherjee (2018) and Atiase (2017), credit is one of the fundamental challenges that confronts MSMEs. Therefore, institutions rendering microfinance services are the mainstay of MSMEs. On the other hand, MSMEs play various significant roles in every economy, particularly in job creation, growth, productivity, and poverty reduction (Adaletey et al., 2022). In view of this, governments over the world show keen interest in the financial, social and environmental sustainability of MSMEs by instituting entrepreneurship enhancement and development programmes to foster the sustainability of MSMEs. Despite the contributions of MSMEs in the area of employment generation, economic growth, poverty reduction, productivity etc., there is the downside of MSMEs (Brahmbhatt et al., 2017) which research is almost silent on. That is the impact of MSMEs' operations on the ecosystem. MSMEs' activities in the environment can have negative consequences for the livelihood of the people in the catchment communities who directly or indirectly serve as clients of the MSMEs. For instance, if water bodies become polluted as a result of MSME activities, drinking the water or consuming products from the polluted water endangers the lives of the people and this ultimately affects the turnover of MSMEs (Aggarwal & Dow, 2012). It is evident that there is a nexus between the performance of MSMEs and their impact on the environment. However, research has not been extensively focused on the TBL to investigate the impact of green microfinance in mitigating environmental impacts in SSA (Mia et al., 2018, Huybrechs et al., 2019) and especially Ghana. Meanwhile, there is significant amount of research on challenges faced by MSMEs (see García Moritán, 2020, Singh et al., 2018 Mukherjee, 2018 & Atiase, 2017), and on marketing and performance of MSMEs (see Wójcik-Karpacz et al., 2021, Riswanto, 2019, Afifah & Najib, 2018). In recent years, unprecedented attention has been accorded environmental concerns. There is effort to drastically reduce the emission of greenhouse gases (GHG) and global warming.

Although microfinance programmes often stimulate the economic operations of MSMEs (Agyapong, 2020), there is limited knowledge on its impact on financial, social and environmental performance in sub-Saharan African countries. Empirical investigations have not yet yielded sufficient evidence from sub-Saharan Africa. Therefore, despite the recent focus on analysing the situation in developing nations (Farghly et al., 2018), research on sub-Saharan African countries is still extremely scarce. A comprehensive presentation of studies from Africa is essential to provide more understanding of the role of green microfinance in promoting financial, social and environmental performance.

In light of the numerous initiatives undertaken by countries on the continent to advance environmental sustainability, such as the clamouring for the establishment of green business activities, it is crucial to examine green microfinance in order to influence the strategies employed to drive the growth of environmentally friendly local enterprises on the continent, particularly Ghana. This study aims to provide a comprehensive understanding of how green microfinance institutions influence the financial, social and environmental practices, and overall resilience of MSMEs in Ghana.

The researcher selected Ghana as the study's context due to its abundance of Microfinance Institutions (MFIs) and the prevalence of environmental issues, primarily caused by MSMEs, which require special attention (Srivastava & Pawlowska, 2020). MFIs in Ghana play a crucial role in the nation's clean and sustainable development, primarily by leveraging their network to raise environmental awareness and provide green loans to MSMEs for investments that prioritize ecological sustainability. Additionally, Ghana is a developing nation with a high rate of inefficient traditional energy generation and consumption, which endangers the economy, the environment, and public health (Darko et al., 2022). Lastly, MSMEs are crucial to Ghana's economy, and to support sustainable economic growth, it is necessary that they consider the financial, social, and environmental aspects of sustainability when conducting business.

1.7 The study's significance and contributions

Despite the wonderful contributions of MSMEs, there is the downside of MSMEs which research is almost silent on. Addressing environmental problems leads to inventions that result in cleaner air, better jobs, the restoration of nature, and, at the same time, economic progress. There is therefore the need to explore new and far-reaching strategies to mitigate environmental risks as well as enhancing the sustainability of MSMEs to propel economic advancement and progress, job generation and poverty alleviation.

Whereas there is significant research on MSMEs, there is scarcity of research in Ghana and SSA on the impact of MSMEs' activities on the environment and the ability of green microfinance to influence the MSMEs to be more environmentally conscious. The researcher intends to fill this gap that exists in Ghana and Sub-Saharan Africa.

The academic literature acknowledges the positive impact of MFIs on job generation, economic growth, and poverty alleviation. However, the field of green microfinance lacks sufficient empirical studies (Mia et al., 2018; Huybrechs et al., 2019; Allet & Hudon, 2015). The present research that was undertaken possesses the capacity to provide a significant contribution to the current corpus of empirical literature pertaining to green microfinance. Policy makers can employ the results of this study to guide the formulation of efficacious policies designed to foster environmental sustainability. The findings of this study could serve as a foundation for the development and execution of policies pertaining to MSMEs.

The study's findings are expected to assist policymakers in incorporating the overall environmental impact of MSMEs activities into their policy development. The implementation of such laws would provide benefits not just for the nation as a whole, but also for micro, small, and medium enterprises, as it would strengthen their sustainability by mitigating self-imposed risk factors. MFIs would equally benefit from such policies since the credit extended to MSMEs would be invested in sustainable businesses, thereby reducing loan defaults. This will result in the overall economic expansion of the nation, as MSMEs form the basis for the continuous growth and advancement of the economy.

In Ghana, a significant concern confronting policymakers in the realm of industrial growth pertains to the mitigation of environmental repercussions associated with MSMEs, which serve as the fundamental pillar of the economy and contribute substantially to employment opportunities and revenue generation. The study will also benefit stakeholders of MSMEs. These entities encompass non-governmental organisations (NGOs), bilateral organisations, and microfinance institutions. For instance, microfinance organisations may find the report to be a useful starting point for their training initiatives. This is due to the possibility that the study's findings will aid in the revision of their operating rules and the creation of MSMEs-specific training initiatives. Microfinance organisations might find it beneficial to evaluate their lending rules and add suitable environmental concern clauses. This could potentially aid microfinance institutions and other enterprises involved in financing MSMEs in developing initiatives that effectively address the financial needs of MSMEs as a whole, with a specific focus on the context of Ghana.

This study will also benefit MSMEs. The study's findings would demonstrate the influence of implementing the triple bottom line framework on the sustainability of MSMEs. Managers and owners would benefit from understanding the significance of investing in environmentally friendly initiatives to enhance their performance. The study's findings highlight the significance of microfinance institutions in promoting environmentally sustainable practices among MSMEs, hence mitigating their environmental footprint.

This study aims to provide the government with recommendations regarding potential actions or policies that might be implemented to mitigate the environmental impacts associated with MSMEs. The study offers decision-making assistance to the government in formulating regulations about green microfinance in Ghana. Additionally, it allows the government to discover innovative strategies for addressing environmental issues caused by MSMEs. This thesis is distinctive as it is an empirical study that evaluates the capacity of microfinance institutions to impact the involvement of MSMEs in environmentally sustainable practices in SSA, specifically focusing on Ghana.

1.8 Synopsis of Research Methodology

This section provides a concise overview of the methodology utilised to accomplish the research objectives. The study utilised a quantitative research design to assess the statistical significance of the proposed hypotheses. A cross-sectional survey study was adopted. The population of the study comprised MSME owners and managers who take credit facilities from some selected microfinance institutions in Sunyani and Techiman. The sample frame of 5,303 MSME owners and managers was obtained from the database of the selected microfinance institutions. A stratified systematic sampling technique was used to select a sample of 358. In contrast, a stratified sampling technique was utilised to choose four rural and community banks and four credit unions to gather data from the participants in the municipalities of Sunyani and Techiman.

This research employed survey questionnaires as a means of data collection, as the respondents had limited time available at their work places. The questionnaires were distributed to the participants in person to get the necessary data. The demographic details of the study participants were covered in the first section of the survey. The part two of the survey focused on the participants' general perceptions regarding how green microfinance elements influence the overall long-term viability of the respondents’ firms. The third section focused on assessing the perceived impact of green microfinance elements on the financial performance of respondents' businesses. The fourth section of the questionnaire assessed the perceived impacts of green microfinance elements on the environmental performance of the firms under investigation. The fifth section examined the influence of green microfinance elements on the social performance of the firms of participants, whereas the sixth section looked at the impact of green microfinance elements on the innovativeness of MSMEs.

The researcher employed descriptive statistics to analyse the demographic features of the participants, as well as their perceptions of green microfinance. Cronbach alpha, composite reliability, and discriminant validity were used to assess the data validity and reliability, to make sure that the test results consistently met their intended aims. This study employed the partial least square method of structural equation modelling (PLS-SEM) to empirically test the associations between the elements of green microfinance and financial performance, social performance, and environmental performance as well as innovativeness relating to the hypotheses proposed by the research model. A two-step technique, as recommended by Chin (1998), was employed to perform the PLS-SEM analysis. The assessment of the variables' validity and reliability in the proposed research model was conducted as part of the measurement model. The causal links between the variables in the hypothesised model were analysed after confirming the suitability of the measurement model. The process of data entry and analysis was conducted with IBM Statistical Package for the Social Sciences (SPSS) version 23. The SmartPLS version 4 software was employed for structural equation modelling (SEM) throughout the evaluation of the study model.

1.9 Delimitation of the study

This study explicitly examined the correlation between green microfinance and the financial, social, and environmental performance of Ghanaian MSMEs. The research objectives and questions were formulated with the aim of examining the effects of various components of green microfinance on the financial, social, and environmental performance of MSMEs. Additionally, the study sought to explore the potential moderating influences of business age and size on these relationships. Nevertheless, it is important to acknowledge that this study's scope is restricted to MSMEs that are affiliated with domestic microfinance institutions in Ghana. Consequently, the findings may not be applicable to MSMEs affiliated to foreign microfinance institutions operating in Ghana. Moreover, the research does not include the perspectives of MFIs, an important component in comprehending the larger context of green microfinance. In general, the delimitation of the study seems to be suitable and pertinent to the research subject.

1.10 Structure of the thesis

This thesis is divided into seven chapters. In Chapter one, a comprehensive introduction is given to the background information and the problem statement is presented. In Chapters two and three, a thorough examination of the pertinent theoretical and empirical literature is presented. Chapter four provides an overview of the methodology utilised in the research. Chapter five encompasses the examination and display of data, while Chapter six entails the examination and interpretation of the study findings. Chapter seven focuses on providing a concise overview, drawing conclusions, and offering recommendations.

Below are the details of the various chapters:

Chapter One discusses the introduction and overview of the study. It gives the overview of the situation the researcher envisaged that necessitated the conduct of the research, that is the rationale for the study. The gap in research to be filled is elucidated. The problem statement as well as the objectives of the research and research questions are equally discussed

Chapter Two focuses on theoretical literature underpinning the study. The theories relevant to microfinance, green microfinance and performance of MSMEs are extensively reviewed. The literature review synthesises ideas that have been established in the area of the study.

Chapter Three reviews empirical literature on microfinance/green microfinance and performance of MSMES. Empirical literature was reviewed on green microfinance in relation to the financial, social and environmental performance of MSMEs. In the course of the reviewed, the methodologies employed in the green microfinance research are discussed.

Chapter Four explains the method for the study The research strategy and technique are discussed in depth in this chapter. It includes the research design, data gathering sources and procedures, study population, and sampling technique. This chapter also covers the instruments that were used to gather data as well as the procedures for ensuring the tools' validity and reliability. In addition, this chapter explains the strategies employed in data analysis and presentation.

In **Chapter Five**, the focus is on the analysis of data and the subsequent presentation of the results. The analysis of the results offers valuable insights on the hypotheses made in the study.

Chapter Six discusses the study's results and evaluates their alignment with the existing literature review. This assessment aims to determine whether the research questions have been addressed and the research objectives have been achieved.

Chapter Seven summarises the findings, along with conclusions and recommendations derived from the findings. The conclusions presented in this chapter were derived from the analysis of the study's results. The implications of the findings are explained. In addition, recommendations are made for green microfinance practices to be adopted by microfinance institutions in Ghana.

1.11 Chapter summary

The present chapter explored the role of microfinance institutions in promoting environmental consciousness among MSME owners and managers, hence leading to the formulation of the statement of the problem. Additionally, it examined the background to the prevailing environmental challenges arising from MSMEs in Ghana. The statement of the problem was followed by the development of objectives and the corresponding research questions and hypotheses of the study. The chapter further elucidated the rationale, significance of the investigation, synopsis of the research methodology, delimitation and structure of the thesis. The subsequent chapter delves into the theoretical foundations that underlie the study, as well as the contextual ideas that bear relevance to the study.

CHAPTER TWO

THEORETICAL LITERATURE REVIEW AND CONTEXTUAL CONSIDERATIONS

2.1 Introduction

This chapter reviews the theoretical literature supporting the study including the contextual issues of the study. Specifically, extant literature is reviewed on the concept of microfinance, the triple bottom line framework, green finance, micro, small and medium enterprises, overview of sustainability, green microfinance and MSMEs' sustainability.

2.2 Theoretical literature review

First, an analysis is conducted on the key theories about microfinance, green microfinance, and sustainability. Subsequently, a conceptual framework for the study is established. This is informed by the pertinent literature that has been reviewed. Though numerous theories have been put forward over time to examine the sustainability of micro, small, and medium firms, a thorough review of the extant literature on microfinance and environment management (green microfinance) indicates that the theories propounded by Muhammed Yunus in the 1970s and John Elkington in the mid-1990s are the basic underlying theories of green microfinance as found in the works of Allet and Hudon (2015b), Allet (2014b), Abedin and Khan (2018). Consequently, the theoretical models of microfinance proposed by Yunus and the sustainability model propounded by Elkington are discussed in this chapter. The review focuses on the microfinance theory and the triple bottom line framework.

2.2.1 Microfinance theories and concept

The microfinance theory was first advocated by Professor Muhammad Yunus in the 1970s (Mia, Lee, Chandran, Rasiah, & Rahman, 2019). This theory asserts that the poor are capable of using credit to engage in economic activity to generate enough income to pay back a loan and its associated interest under appropriate conditions, and to stabilise income, smoothen consumption, protect against risk, acquire assets and alleviate poverty, resulting in economic development. In a later study conducted by Hulme and Mosley (1996), they argue that the notion that credit and other financial services play a crucial role in driving economic growth and enhancing income levels remains a prominent factor in various development initiatives, including microfinance. Hulme and Mosley (1996) reference a substantial body of research findings that demonstrate a robust and favourable association between economic growth and the proportion of investments in the economy. This concept is precisely what motivates microfinance. It is believed that providing microfinance services to those individuals who cannot meet the credit criteria of conventional banks will result in higher incomes for the impoverished and ultimately lead to a reduction in poverty (Hulme, 1997).

According to El-Solh (1999), microfinance is not capable of generating income on its own, but it should be seen as a crucial factor in the development of micro-enterprises. MFIs are widely recognised for their significance in providing financial support to MSMEs. These enterprises are significant in fostering the expansion of the private sector, which is considered a key driver of economic development especially in developing nations transitioning from state-led economies to market-driven ones. According to El-Solh (1999), there are dual hypotheses formulated to underpin microfinance interventions at the macro-level: economic resources and human resources. Microfinance facilitates the creation of novel micro-enterprises, so promoting the effective utilisation of labour and capital as production elements. Consequently, it contributes to economic expansion and, eventually, fosters sustainable development. A notable resemblance exists between the human resources theory and the economic theory. Given the widely acknowledged fact that microfinance requires a significant amount of manual effort, making it easier for people to access microfinance is expected to culminate in the building of new skills and the enhancement of existing ones. This, in turn, will improve the capacity of impoverished individuals to create money and have better lives.

Again, the economic factor emerges as the most prominent among the theories that underpin the concept of microfinance. Impoverished individuals are allocated financial resources that they allocate towards income-producing endeavours, hence earning profits. The outcome of this should be a positive feedback loop: credit stimulates higher levels of production and incomes, enabling increased consumption and savings, and subsequently leading to additional investment (Meyer, 2002). However, access to credit by low-income earners, the poor, and the vulnerable has been an immemorial canker (Corrado & Corrado, 2017; Khan, Khan, Violinda, Aasir, & Jian, 2020; Zhang & Posso, 2019). This group of people are debarred from getting credit from the traditional banks due to lack of collateral and inability to fulfil other credit requirements.

As a result, the poor rely on family and friends, neighbours, traders, rotating savings and credit associations and to greater extent on money lenders for credit (Ademola Abimbola et al., 2020) to embark on entrepreneurial activities. The interest rates charged by the money lenders were usurious, sinking the poor deep into the pit of poverty. To curtail the plight of the poor, the concept of microcredit evolved to provide small loans to MSMEs owners and the economically active poor who did not have access to credit from the orthodox banks. Microcredit involves the provision of small or micro loans to the MSMEs owners/managers or the financially excluded individuals with little or no collateral. The microfinance concept is schematically represented in Figure 1.

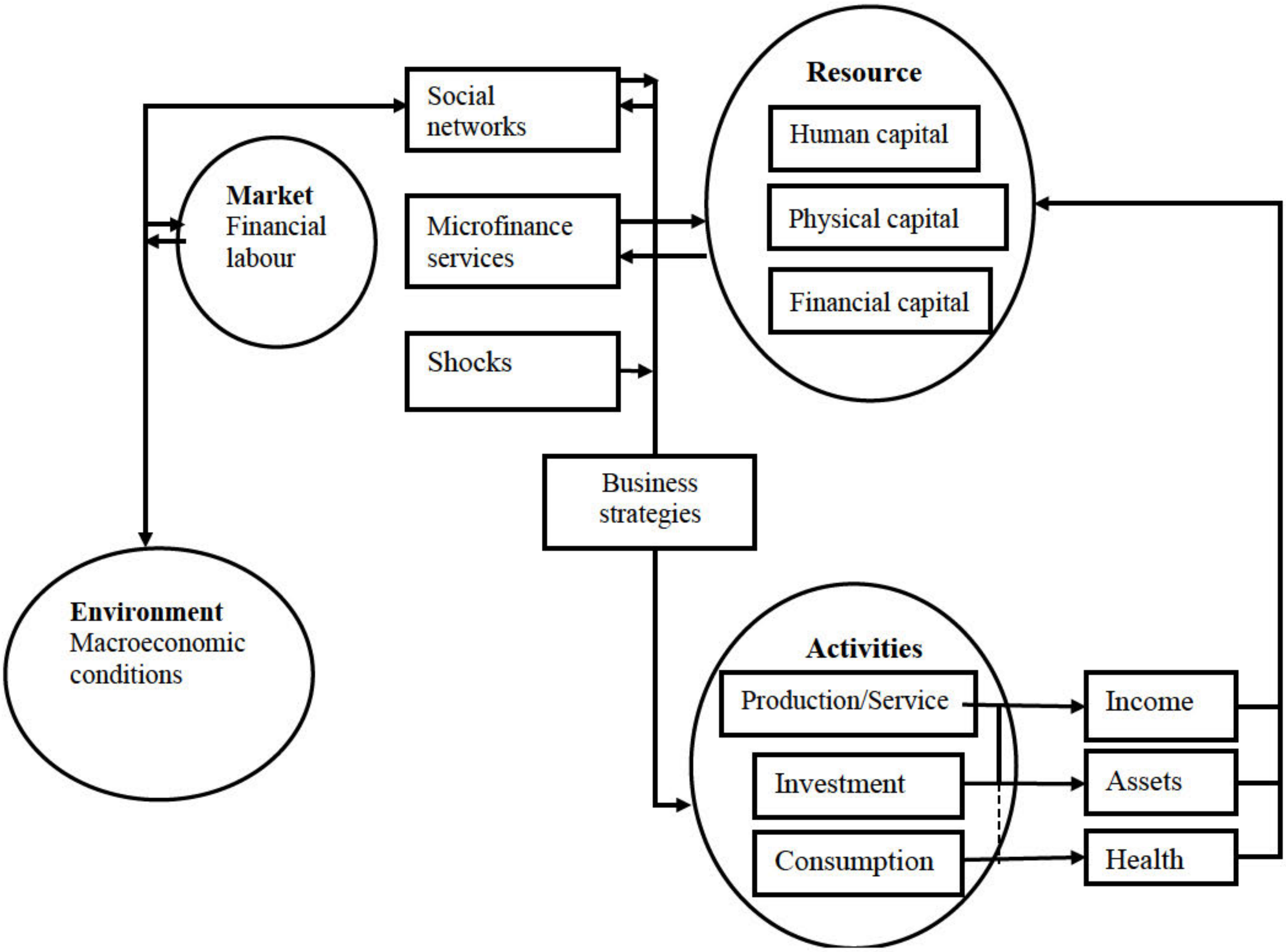

Figure 1: Microfinance and small businesses relation
Source: Adapted from Nghiem (2005)

The microfinance concept evolved from microcredit by adding deposits/savings, insurance, money transfer and other supporting services (BEN, 2012; Chibba, 2009; Cosgrove, 2021; Kyereboah-Coleman & Osei, 2008; Obaidullah, 2008; Pearce, 2011; Rhyne & Otero, 2006). Microfinance is a vehicle that provides a broad array of banking-like services in the form of small loans, micro deposits, remittances and microinsurance to the economic active poor, micro-entrepreneurs or low-income earners (Cosgrove, 2021; Ledgerwood, Earne, & Nelson, 2013; Moyo, 2020).

Following from the above discussion, it is envisaged that microfinance encompasses a broader spectrum of financial services unlike microcredit which is limited to provision of small credits or loans (Quaye, Abrokwah, Sarbah, & Osei, 2014). In accordance with the aforementioned criteria, in the context of this study, microfinance is defined as the provision of small-scale loans, savings, insurance and education, coaching and training services to the economic active poor and MSMEs. MFIs are the institutions that offer these kinds of small services.

MFIs are regarded as a development tool to help people get out of poverty by giving the poor easy access to loans and associated services. According to Tchuigoua (2014), microfinance institutions support the traditional banks by providing the poor, low-income earners, and MSMEs relatively easy means of obtaining credit and other allied services. The justification of providing the much needed loans to low income people and MSMEs stems from the principle that access to credit by the poor and MSMEs significantly impacts positively on their income producing capacities (Bongomin et al., 2020).

MFIs contribute significantly to the mobilisation of savings and the offer of credit to the low-income earners and MSMEs by providing the appropriate facilities. Empirical researchers have established that MFIs services have immensely enhanced the economic activities of the individuals who cannot meet the credit criteria of conventional banks (Mago, 2014; Nawaz, 2010; Odoom, Fosu, Ankomah, & Amofa, 2019), alleviated the micro business funding constraint (Tchuigoua, Durrieu, & Kouao, 2017), and uplifted them to a higher economic status. Additionally, microfinance organisations usually offer social and commercial services like literacy instruction, health-related education, financial management training, and bookkeeping training.

The microfinance concept gained extreme prominence in finance literature when Professor Yunus successfully demonstrated that the poor are creditworthy if the appropriate approach is adopted (Morduch, 2000). Yunus is of the view that access to credit is not just a right but a fundamental human right (Morduch, 2000). According to Zainuddin and Yasin (2020), the microfinance prominence reached a crescendo at the time Professor Yunus won a Nobel Peace Prize in 2006. MFIs disburse credit in relatively small amounts to MSMEs and the poor to engage in economic activities. The poor then invest the small loans in economic activities, earn income in order to repay the microloan in instalments and progressively extricate themselves from the tentacles of poverty (Odoom et al., 2019; Hulme, 1997).

Microcredit varies from traditional bank credit in that the loans involved are small and there is no tangible collateral required. Also, the target groups are poor, and unorthodox methodologies are employed. The methodologies include: granting credit to groups, absence of grace period and short span of time between repayment periods, repayment in small instalments, continuous upgrading of loan, peer pressure, and joint liability or social collateral (Venittelli, 2022). The group lending technique is built on social collateral and reduces the challenges associated with knowledge asymmetry (Venittelli, 2022), that is adverse selection and moral hazard, by utilising social capital. Therefore, microfinance provides suitable alternative credit compared to money lenders who charge exorbitant interest rates. In another leg, it provides access of credit to MSMEs who hitherto were deemed as unbankable and totally ignored by the conventional banking system due to lack of collateral and largely as a result of information asymmetry.

2.3 Microfinance methodologies

The microfinance concept has generated two viewpoints among researchers and academia. The dichotomy stems from the appropriate and more acceptable approach to provide financial services to the poor and the vulnerable and coupled with what the substantive objective of microfinance is. This has generated profound debate in the microfinance literature culminating into two viewpoints. The financial market (institutionalists) and the direct credit approach (welfarists) (Brau & Woller, 2004). While both strategies strive to reduce poverty, they each have a distinct idea of how microfinance can be given to help the poor live better lives (Bangoura, 2012). To put it in another way, there has been a lot of discussion on the best approach to deliver microfinance among various groups, including academics, researchers, and practitioners. In general, two perspectives, that is the "institutionalist perspective" and the "welfarist perspective"—have been at the centre of this developing issue (Bisen, Dalton, & Wilson, 2012).

2.3.1 The institutionalist approach

From an institutionalist point of view, MFIs cannot reduce poverty until they establish financial robustness and long-term survival of their operations (Bangoura, 2012). From the financial market standpoint, it is argued that MFIs must possess the capacity to generate profit alongside their ability to meet operational and financial expenses in order to achieve financial sufficiency and long-term survival (Bangoura, 2012).

According to the financial market viewpoint, MFIs must supply financial services effectively and efficiently in order to be viable and sustainable. Their primary goal is to address the "missing gap" caused by the collapse of the loan industry due to excessive transaction costs. Institutionalists contend that donor agencies' natural attraction to microfinance is what truly drives the industry's growth. Institutions of microfinance that are well-managed give confidence to donor organisations to provide support to organisations that are able to provide financial services to their clients in a manner that is progressively cost-effective over a period of five to ten years, until the clients reach a point where they are financially self-sufficient (Wright, 2001). According to Copestake (2007), the institutionalist perspective posits that organisations should not solely focus on enhancing the welfare of the impoverished and generating financial gains, but should also place a high priority on the strengthening of an organisation's brand and goodwill through its commitment to corporate social responsibility (CSR). The provision of microloans through this approach is believed to have the potential to stimulate consumption, modify attitudes towards entrepreneurship, and generate employment opportunities (Fernando, 2004; González, 2007). According to institutionalists, the attainment of financial sustainability for MFIs is not just accomplished through the development of direct profits, but also through the utilisation of several other benefits. According to Krauss and Walter (2009), investing in microfinance might provide conventional banks with the opportunity to diversify their portfolios with minimal risk during periods of economic uncertainty.

Given the number of impoverished households and the demand for microloans, the institutional view on microfinance is characterised by claims that an effective method for reducing poverty must be implemented on a large scale. For this vast scale, financial resources that much exceed those provided by conventional NGOs and humanitarian donors are necessary. The institutionalists instead advocate a strategy in which the most profitable microfinance organisations draw the greatest funding to expand their businesses, serve more customers, and ultimately lessen or eradicate most poverty by serving as models of excellent practice (Ayayi & Sene, 2010). Since the microfinance organisations are capitalist businesses, they aim to maximise profits. Given the limited availability of financial services for the majority of impoverished individuals, institutionalists argue that the incorporation of the microfinance sector into the existing financial system is a novel approach that can effectively serve this group (Bangoura, 2012). The proponents of this technique want to establish microfinance enterprises within a market-based framework in order to create sustainable microfinance systems and grow credit (Bangoura, 2012). Every microfinance institution should strive for optimal production and efficiency, alongside ensuring financial stability.

Nevertheless, it is important to acknowledge that in order to attain financial sustainability, the MFI should strive for financial autonomy. The successful implementation of this initiative necessitates extensive intervention, which is contingent upon financial resources that surpass the capacity of the aforementioned donors. However, the sole means of acquiring the necessary financial resources is through the utilisation of private sources, such as savings, debt, equity, and others (Bangoura, 2012).

Nonetheless, it should be recognised that the MFI should pursue financial independence in order to establish financial sustainability. This calls for extensive intervention, which, as was previously stated, depends on financial resources above and beyond those that can be provided by donors. However, the only way to obtain the necessary funds is through private sources, such as savings, debt, equity, etc. (Bangoura, 2012). A prosperous institution is typically capable of providing the stringent management, transparency, and efficiency needed to access private financing. In order to attain financial self-sufficiency, institutionalists have undertaken substantial endeavours to build a collection of "best practices." These practices encompass several strategies aimed at enhancing efficiency, including management of systems, prudent finance and accounting measures, marketing and others (Bangoura, 2012).

The institutionalists have worked hard to create a set of "best practices" that increase efficiency in areas like systems administration, finance and accounting, marketing, service delivery, etc. in order to achieve financial independence (Bangoura, 2012). According to CGAP, (2004), the objective of microfinance is to establish a long-term opportunity for persons who are economically disadvantaged in developing nations to acquire a variety of financial products. These products are made available by a variety of financial and non-financial entities, such as non-governmental organisations (NGOs) and other microfinance institutions, through user-friendly processes such as group lending. Yet, if microfinance is incorporated into formal financial systems, financial services should be made available to the poor in order to realise large-scale and sustainable microfinance (CGAP, 2004). The consequence is that offering financial services to the underprivileged is necessary for large-scale, sustainable microfinance. Institutionalists argue that the value contributed by donors of financial resources is derived from their unique capacity to promote innovation through research and development, establish networks, enhance transparency and competition among providers of retail financial products, and contribute to the development of capacity at various levels (CGAP, 2004). In order for MFIs to accomplish their goals of achieving financial independence and reaching out to the impoverished, the emphasis is placed on extensive technical engagement rather than solely relying on substantial cash resources (CGAP, 2004). There are at least two considerations that institutionalists consider when evaluating the effectiveness of subsidised credit initiatives. First, subsidised credit can all too frequently result in "mistargeting," which is a term that refers to the practice of focusing on the wrong people, or the transfer of scarce funds to families that are not as poor but have the connections and influence to do so, depriving the poorest (Gibbons & Meehan, 1999). Secondly, because MFIs may raise money more affordably from donors than from deposits, it is more likely that subsidised credit initiatives will restrict the mobilisation of savings at interest rates that are acceptable. For the MFI and its clients, though, mobilising savings makes sense. Savings mobilisation, in relation to debt and equity, offers MFIs a very inexpensive supply of cash for re-lending as well as a group of clients with whom they may establish ongoing relationships and, as a result, gain a deeper understanding of the end market.

The institutionalist strategy has come under fire for the following reasons. Notwithstanding the enthusiasm for microfinance, (Lewis, 2008) reports that a growing number of experts believe the industry has lost its way and has moved away from its purported social aim of eradicating or lowering poverty to the generation of a profit. According to experts, microfinance does not reach the poorest people, or the poorest people are purposefully excluded from participating in microfinance programmes (Stewart, Van Rooyen, Dickson, Majoro, & De Wet, 2010).

The objections highlight the association between sudden spikes in cost of borrowing and a propensity to lend huge loan amounts to borrowers with greater financial stability; these observations suggest a more extensive change in objective. These entities pertain to prominent commercial MFIs globally, which function with the primary objectives of reducing poverty for their clientele and earning profits for their investors. Compatamos, a prominent non-profit microfinance company in Mexico, underwent a transformation into Compartamos Banco, a major bank in the country, after its 2007 Initial Public Offering (IPO) generated more than $450 million. According to Lewis (2008), Compartamos' social mission has been undermined by this behaviour. Due to this rationale, it is common for clients of Compartamos to pay annual percentage rates (APR) exceeding 100%. MacFarquhar (2010) posits that the exorbitant interest rate charged by Compatamos has been identified as the primary cause of the excessive lending rates observed in the Mexican banking sector.

2.3.2 The Welfarist approach

The credit-driven method, also referred to as the Welfarist approach to microfinance delivery, perceives microfinance as a comprehensive initiative aimed at mitigating poverty and vulnerability, while concurrently advancing the welfare and well-being of individuals living in poverty (Bangoura, 2012).

This strategy promotes providing non-financial services to micro-entrepreneurs in addition to financial items (Bangoura, 2012). According to the social welfare method, MFIs can function without achieving financial independence and also should not pursue financial independence at all costs. This is due to the fact that their social mission would unavoidably become muddled in their haste to achieve financial success and hence financial independence. An ideological shift in microfinance's purpose towards financial performance could potentially impede progress towards eradicating poverty and fostering innovation. According to Bangoura (2012), social investors who deposit funds into microfinance institutions do so with a dedication to effecting positive change in the ongoing fight against poverty, as opposed to being solely motivated by personal financial gain.

The criticisms surrounding microfinance highlight the underlying economic principles, like freedom of choice and market dynamics, that institutionalists use to justify its commercialisation. However, welfarists argue that this very economic-based commercialisation of microfinance has resulted in the exclusion of the poor, particularly the most impoverished individuals, from the financial system (Sinclair, 2012 & Bennett, 2009). The welfare method primarily focuses on the demand side, which refers to the clients. According to Congo (2002), there is support for the idea of funding microcredit programmes in order to reduce costs for MFIs and facilitate the provision of loans at affordable and equitable interest rates.

According to Brau and Woller (2004), microfinance institutions' primary objective is to alleviate poverty, hence stimulating economic expansion and societal progress. However, complete financial autonomy is not regarded by them as a prerequisite for achieving their social mission. Various approaches can be employed to assist the impoverished, such as providing individual loans, establishing solidarity groups like Grameen banks, forming solidarity groups in Latin America, and establishing self-sufficient village banks (Ledgerwood, 2000). Brau and Woller (2004) contend that the welfarist strategy is characterised by a definite emphasis on reaching the most impoverished individuals, while also recognising the imperative to address global poverty on a significant level and pursue improved financial independence.

Microfinance organisations claim that eradicating poverty will boost economic development and social advancement, but they do not see complete financial independence as a requirement for achieving their social purpose (Brau & Woller, 2004). Ledgerwood (2000) identifies several strategies that might be employed to provide assistance to impoverished individuals, including individual loans, solidarity groups and autonomous village banks. Brau and Woller (2004) assert that the welfarist strategy demonstrates a clear dedication to prioritising the welfare of the most impoverished individuals, while also acknowledging the imperative to address global poverty on a large scale and pursue enhanced economic autonomy. Welfarists refute the claim made by institutionalists that increasing interest rates has a negligible impact on the demand for loans from impoverished individuals (Morduch, 2000).

In addition, proponents of welfare express concern that the intention to establish and define optimal techniques may result in the imposition of an inflexible structure on microfinance, which could hinder innovation and trial and error in the creation of novel products and distribution approaches for the extremely impoverished (Brau & Woller, 2004). Finally, it is important to note that welfare experts hold a differing perspective about the prioritisation of programmes by donors. They argue that in order to receive donor priority, programmes should attain or strive to achieve financial self-sufficiency, irrespective of the programmes' actual effectiveness. According to Morduch (2000), it is said that while most projects targeting the extremely impoverished now depend on subsidies and are expected to continue doing so in the future, just 5% of microfinance organisations are projected to achieve financial self-sufficiency. Nevertheless, this does not suggest that individuals with extreme poverty lack creditworthiness. According to Brau and Woller (2004), there is no justification for the eventual depletion of contributors' support if the social benefits surpass the societal costs.

The welfarist perspective, which is generally identified as the initial purpose of the microfinance movement, places more emphasis on procedures that allow microfinance institutions to serve the very poor than institutionalists do on the breadth of outreach (Bisen et al., 2012). Advocates of the welfare concept argue that MFIs that consistently receive subsidies can be deemed as institutionally sustainable (Bisen et al. 2012).

The following reasons have led to criticism of the welfareists' strategy. First, according to Bangoura (2012), the participants aim to maximise the welfare of the poor, while at the same time, seeking to maximise profit. Unfortunately, this belief was prevalent in the 1980s, and as a result, a large number of microcredit programmes or institutions failed (Bangoura, 2012).

Second, the welfarist strategy has received harsh criticism for being subjective, expensive, and methodologically problematic (Bangoura, 2012). The strategy has a sustainability and viability issue brought on by subsidies, poor reimbursement rates, and escalating operating costs.

With regards to the ultimate objective of MFIs, there are essentially two schools of thought which are the Welfarist and Institutionalist points of view. While institutionalists maintain a strong belief that MFIs should prioritise financial sustainability, even if it means assisting the impoverished, welfarists assert that the primary objective of establishing MFIs is to serve the impoverished. Consequently, welfarists propose that MFIs should prioritise outreach efforts (Tsegaye, 2009, cited in Wassie, Kusakari, & Sumimolo, 2019). According to Postelnicu and Hermes (2018), reported by Wassie et al. (2019), offering financial services to the poor is allegedly too expensive, hence focusing on outreach will compromise the MFI's sustainability and financial performance (Wassie, et al., 2019). The aforementioned suggests a disagreement between the social and financial purposes of MFIs. The two major approaches are silent on the third bottom line, that is the environmental perspective. The TBL therefore integrates the two bottom lines (economic and social) as well as the third bottom line (environment).

2.4 The triple bottom line theory

Another theory underpinning this research is the triple bottom line (TBL) framework. This theory was propounded by John Elkington in 1994 to espouse the importance of companies to account for their environmental responsibilities together with their financial and social performance (Srivastava, Dixit, & Srivastava, 2022). Elkington (1994) held the view that businesses should produce three different reports. These reports involved the conventional report of corporate financial performance, that is the "bottom line" indicating the financial performance of the firm. In addition to this there should be a report that measures how socially responsible an organisation has been throughout its operations and how environmentally accountable the company has been (Hindle, 2008). The CSR Green Paper described the TBL framework as the concept of assessing the sustainability of a business depending on its aggregate influence on financial success, eco-friendly attributes and social investment (Commission of the European Communities, 2001).

Savitz (2006) explained that the concept of TBL encompasses the significance of sustainability by quantifying the influence that the operations of an organisation have on the world. This influence encompasses not only the profitability and shareholder values of the organisation, but also its social, human, and environmental capital. All of these ideas lay a significant emphasis on sustainable development that does not solely concentrate on achieving one particular goal.

The idea of triple bottom line encourages businesses to focus not only on the financial gains that accrue to them, but equally the effect of their operations on the environment and society that can be increased or decreased when evaluating their operations (Shou, Shao, Lai, Kang, & Park, 2019). Along with this, it is assumed that, despite businesses' dedication to creating value, they also engage in activities that undermine some ideals. The term "triple bottom line" refers to the comprehensive assemblage of philosophies, issues, and procedures that a firm must adopt in order to maximise economic, social, and environmental value while minimising any negative repercussions that may come from its activities. The idea behind the TBL is that a company needs to evaluate its performance in terms of how it affects different groups of people, including the immediate community as well as government but not limited to employees, suppliers and customers with whom the firm has direct business dealings.

In addition to the financial performance metrics commonly utilised in a number of firms, the TBL includes environmental and social performance metrics. Environmental performance typically refers to how many resources (such as energy, land, and water) a company utilises in its operations and the spinoffs from their operations such as air emissions, chemical residues, waste generation, etc. Generally, a firm’s social performance is described as the firm’s impact on the communities where it operates. A company engages in sustainable environmental protection methods as a way of demonstrating its ecological responsibility for the planet's natural ecosystem (Gast, Gundolf, & Cesinger, 2017). This is demonstrated, among other things, by the reduction of air, water, and soil contamination. This also entails recycling and segregation of waste, the use of suitable materials and substances, the installation of filters, and the construction of sewage treatment facilities.

Svensson, Vento-Tormo, and Teichmann (2018) observed that the triple bottom line concept is very important for a company's long-term success because it supports the idea that companies are co-responsible for their impact on sustainable socioeconomic development when they use TBL goals. Very few, if any, businesses or organisations fully adopt the TBL (Allet, 2012). For businesses to fully understand and use the TBL concept, the first step is to make sure employees are aware of and committed to the TBL (Pan, Sinha, & Chen, 2021). This is because it is the employees who decide whether the TBL concept is practicalised or stays as a theory.

Firms can stay in business as long as they act responsibly, follow models of sustainable business activities, and actively manage how their actions affect society and the law. It is true, then, that in order to build strong MSMEs, there is the need to look for business activities that are socially responsible, good for the environment, and profitable at the same time (Hernández, Yañez-Araque, & Moreno-García, 2020).

Traditionally, the principal objectives of businesses focus on financial performance and to some extent social performance (Pava & Krausz, 1996). The theory of triple bottom line proposes that businesses and not-for profit entities are required to widen the scope of their objective to encapsulate environmental concerns. Thus, business entities' objectives must involve the concern for profit, people and the planet, together referred to as "3Ps" Many academics have defined the TBL in various ways. The TBL, according to Krajnc and Glavič (2005), is "the creation of goods and services using non-polluting processes and systems that conserve energy and natural resources, are economically viable, safe and healthy for employees, communities, and consumers, and are socially and creatively rewarding for all working people." Similarly, in the view of Savitz (2006), the TBL is a method of assessing the influence of an organisation's economic, social, human, and environmental capital. The TBL framework is depicted in Figure 2.

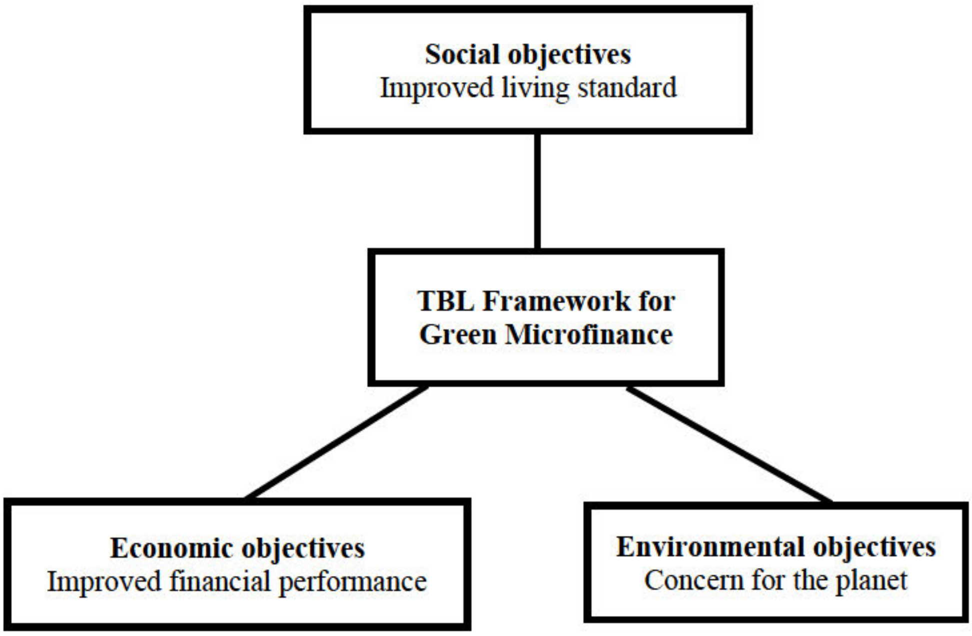

Figure 2: Triple bottom line framework of green microfinance

Source: Developed by the researcher from literature

2.4.1 Triple bottom line sustainability viewpoint

Sustainability is a term that is becoming more and more crucial for governance and policy discussion because issues like climate change, biodiversity loss, diminishing material availability, and satisfying energy consumption requirements must be addressed (Xie, Nozawa, Yagi, Fujii, & Managi, 2019). As said before, there are several ways to understand sustainability, from a multi-generational philosophical stance to a multifaceted expression for company management. Although it was formerly thought of as a societal issue, corporations are paying more attention to sustainability (Xie et al., 2019).

Business executives are facing new problems as a result of increasing public expectations, which are also changing how society and business interact. The possibility of greatly increased shareholder involvement, together with an increase in competitiveness from manufacturing and trade across the globe, have made managerial environments highly more challenging than years back. Over the past ten years, information has become considerably more accessible and moving at a faster rate. The result is the emergence of an energised group of people forming civil society organisations, who are developing the set of demands facing modern business executives in support of others who have interest in the operations of the company such as consumers, communities, employees, and governments. As a result, business organisations are emphasising sustainability more than ever, which entails focusing not only on financial performance but also on social, and environmental performance simultaneously. As highlighted by Colbert and Kurucz (2007), a significant number (68%) of the leading 250 businesses of the Fortune 500 companies issue their report in accordance with the TBL framework.

Importantly, the Elkington's (1994) TBL approach argues that a focus on just one short-term aspect of economic sustainability is not necessary for a corporation's and its environment's long-term success. Instead, the three aspects of sustainability—profit (economic), planet (environment), and people (social) —must be prioritised. Elkington argues that the three facets of sustainability are also interconnected and have various and varied effects on one another. Consequently, it is impossible for a firm to fully distinguish between its financial sustainability and its social and environmental sustainability (Elkington, 1994). Elkington (1994) also stresses the significance of partnerships and cooperation among business, governments, and NGOs in order to achieve the TBL approach.The TBL framework, which sets minimal standards for performance in the environmental, economic, and social dimensions, is a key idea that aids in operationalising sustainability among the diverse understandings of sustainability (Elkington, 1994). The sustainability elements have also been organised by Dyllick and Muff (2016) as the economic, natural, and societal situations. Additionally, this sustainable viewpoint is given in literature using sustainability's defining characteristics of the planet, people, and profit (Armanda, Guinée, & Tukker, 2019; Bos-Brouwers, 2010; Dyllick & Muff, 2016; Van Marrewijk, 2003). According to proponents of this sustainability perspective, organisations which consider economic (profit) issues as well as social (people) and environmental (planet) concerns add more value in the long term and run less risk than those that simply consider financial and profit-related concerns.

The TBL strategy for sustainability has drawn flak for being challenging to put into practice. Even if the notion has produced a variety of effects in practice, it is still widely accepted in the corporate environment. However, many businesses, especially in North America, continue to feel that economic sustainability would suffer as a result of the expenditures incurred as they place more focus on social and environmental resilience (Carter & Rogers, 2008; Nidumolu, Prahalad, & Rangaswami, 2009). Figge and Hahn (2005) offer yet another perspective on the TBL, viewing Elkington's three perspectives as types of economic capital. They contend that whereas financial markets frequently concentrate primarily on economic capital, businesses actually need a variety of capital sources. In addition, when different types of capital are taken into account, it is easier to see how an organisation is related to the long-term value it generates.

The one-dimensional economic focus on sustainability in financial markets, however, has not changed, and Figge and Hahn provide no suggestions in this regard. The failure of some firms to connect their business strategy to sustainability initiatives is the main reason why some of their attempts to promote social and environmental sustainability fail to succeed (Porter & Kramer, 2006). They further contend that businesses must view social performance as generating shared value and not as damage control mechanism. The next section discusses green microfinance which promotes financial, social and environmental sustainability (Allet, 2014a).

2.4.2 Green microfinance

Green microfinance (GMF) is a novel approach (Abid & Kacem, 2018) with minimal attention in Sub-Saharan Africa including Ghana. GMF adds environmental concerns to financial and social objectives of microfinance, moving from the double bottom line to triple bottom line framework (Allet, 2014a). GMF aims to influence microfinance institutions' decision-making and behaviour, as well as the behaviour of MSMEs who are primarily MFI clients (Huybrechs, Bastiaensen, & Forcella, 2015). GMF either proscribes the extension of credit to support non-eco-friendly activities or vigorously design loan products to enhance pro-environmental business activities to mitigate MSMEs' susceptibility to environmental problems. These aims of GMF lessen the environmental impact of business actions, assist in reducing monetary risk, improving standard of living, and/or conserving and natural resource restoration (Huybrechs et al., 2015) It is believed that an MFI has the financial capacity and ability to impact its clients (MSMEs) to engage in activities that preserve the environment. Furthermore, GMF renders MFIs liable for the activities they finance. Therefore, GMF institutions tend to integrate environmental concerns into their missions which reflect in their credit policies. One significant connection between microfinance and the environment, as posited within the realm of GMF, is the influence exerted by MFIs on the environment through the actions of their clientele (Allet & Hudon, 2015). This influence can potentially contribute to either environmental deterioration or restoration across several levels. (Allet & Hudon, 2015, Allet, 2014, García-Pérez et al., 2020 & Ashraf, Rizwan, & Huillier, 2022). At the level of MSMEs, the implementation of agricultural methods may lead to adverse consequences, such as soil infertility (Ramprasad, 2019) and deforestation. Personal health of MSME employees and the community can also be affected as a result of air, water and waste pollution (Gunawan et al., 2020).

The environmental consequences extend beyond the local community and have a worldwide influence, manifesting in the form of greenhouse gas emissions (Adamo, AL-Ansari, & Sissakian, 2021; Shahidullah & Haque, 2014) and alterations to biodiversity (Huybrechs et al., 2015). As a result, GMF is interconnected with other areas such as credit risk management, MSMEs' financial performance, food sufficiency, access to affordable energy, health, climate change adaptation and mitigation, rural development, social mission, and so on. Green MFIs also examine and establish procedures and strategies for mitigating the possibility of environmental deprivation caused by MSMEs' operations, as well as supporting more resilient investments, risk transfer via microinsurance, and determining the modalities for supporting MSMEs' activities (Huybrechs et al., 2015). MFIs offer microcredit to MSMEs, typically accompanied by additional non-financial services like technical support. The provision of financial resources enables MSMEs to participate in specific economic endeavours, hence influencing the socioeconomic conditions of the community. Hence, the economic activities of MSMEs are also influenced by the environmental factors and the accessibility of naturally endowed resources. Environmental imbalances and the resulting effects, be it sanitation problems, land degradation, pollution, flooding, or climate change can significantly affect the repayment ability of MSMEs. Consequently, this can raise the likelihood of default for MFIs (Kapitsa, 2020).

2.5 Contextual considerations and concepts

2.5.1 Green finance concept

Green finance (GF) is considered as one of the cardinal pillars needed to effectively support sustainability globally and especially in Sub-Saharan Africa (SSA). "Green finance" is described by Höhne, Khosla, Fekete, and Gilbert (2012) as funds invested into eco-friendly ventures, programmes for sustainable growth, and laws enacting a sustainable economy. GF, according to a 2017 report by the IFC, is the "financing of projects that sustained the environment." Three primary categories of green financial products exist: retail finance, encompassing green loans; asset financing, comprising carbon funds and green subsidies; and company finance, encompassing green investments and green bonds. (Soundarrajan & Vivek, 2016). Green credit's emergence benefits financial development, which sees a drop in its environmental flaws (X. Xu & Li, 2020). In other words, financing constraints for businesses may be impacted by green credit, which may therefore have an impact on the financial health of businesses. Without significantly influencing the output or consumption of non-energy products, green investments seek to reduce pollution (Ren, Hao, & Wu, 2022). Thus, it may be done with the purpose of either cutting costs or increasing revenue (Antonietti & Marzucchi, 2014; Miroshnychenko, Barontini, & Testa, 2017). When it comes to resolving external environmental challenges, the green subsidy is more economically effective than instruments based on the market (Lin, Zeng, Ma, & Chen, 2015). Xie, Zhu, and Wang (2019) suggest that subsidies provided for environmentally friendly activities increase the levels of innovations that result in sustainable environmental development. Also, according to Zhou, Tang, and Zhang (2020), companies can issue green bonds to raise funds for their green projects and to enhance their environmental performance. This is because there is a chance that the release of a green bond is likely to garner a number of investors, which will boost the volume of stock market transactions.

GF is gaining importance in the financial industry due to measures to safeguard banks and society from an unanticipated future financial crisis caused by environmental issues, public agitations, and corruption (Zhixia, Hossen, Muzafary, & Begum, 2018). Moreover, the paradigm of banking services is changing from the existing tradition to emphasise the reorientation of businesses to produce goods and provide services that are environmentally friendly (Dikau & Volz, 2021). The "equator concept" was introduced in 2003 to aid the green revolution. Since then, global awareness of the "equator principle" based on the GF system has increased. By refusing to support economic ventures that have detrimental environmental effects, the "equator principle" tries to encourage banks to persuade their clients to choose environmentally favourable projects. This was due to the fact that several banks involved in project funding had been the targets of public campaigns run by NGOs and civil society groups accusing the banks of supporting and profiting from projects with detrimental social and environmental effects. These campaigns are intended to damage the reputation of the banks and, in doing so, to persuade customers and staff to take actions that will ultimately affect a bank's bottom line.

Ten banks started the "equator principle" effort; these ten banks are among the more exposed banks. These financial institutions are ABN AMRO Bank in the Netherlands, Barclays in the UK, Citigroup in the US, Calyon in France, CSFB in Switzerland, HVB Group in Germany, Rabobank Group in the Netherlands, The Royal Bank of Scotland, WestLB in Germany, and Westpac Banking Corporation in Australia. In the first year of the start of the initiative, 15 additional banks joined.

In December 2017, during the Paris "One Planet Conference", major central banks and banking industry participants once more promised to back the initiative of GF (Park & Kim, 2020). Also, the World Bank in 2015 declared to stop granting money to entities or nations that place a low priority on environmental preservation (Gomez-Echeverri, 2022; Urban & Wójcik, 2019). Interestingly, numerous financial institutions across the globe are yet to demonstrate a preparedness to offer financial services and products that support green financing, despite the significance of these accords. As a result, green funding has not yet been broadly embraced in many regions of the world. Its global issues include a lack of generally acknowledged standards for legislation, high risks, and a limited scope and dimension. Ghana has made efforts to move toward a green economy, as seen by the adoption of a number of green economy-related legislation and measures, although the country has not yet made any appreciable advancements in that direction.

The negative impacts of conventional banking credit models on the local and global ecology are the cause of the rising support for green financing. Since the Paris Climate Accord was signed in 2015, there has been an upsurge in amount of pressure on governments worldwide to enact legislation to protect the environment and reduce the consequences of climate change and its adaptation. International and regional institutions like the IMF, World Bank, G20 and EU are putting increasing pressure on their members and trading partners to implement green finance concepts in their financial systems (Campiglio et al., 2018). Ghana agreed to and endorsed the roadmap for a green economy paradigm, and began developing sustainable banking rules in 2015, and completed it in 2019.

When, for example, unanticipated ecological processes limit a project's lifespan, environmental risks may directly affect project returns. Likewise, social risks, such as local opposition to unpopular projects, may cause delays in project construction and regular operations. So, these environmental and social concerns represent a considerable financial risk to lenders, especially considering that project finance agreements state that lenders have no recourse outside of the project's own earnings. Credit risks are inevitably higher in these arrangements because the collateral is less than in typical credit transactions, and there is a clear correlation between the project's social and environmental hazards and the lenders' credit risks.

These initiatives ignore MFIs, which assist the operations of MSMEs, in favour of conventional major banks. This can be explained by the fact that these banks fund large infrastructure projects, which frequently involve significant environmental and social risks and have far-reaching effects. It may also be because people have forgotten that MSMEs, particularly in SSA, have a significant cumulative impact on the environment. The concept of "green finance" sparked a lot of public interest when the G20 summit took place in 2016 (Dikau & Volz, 2021). For businesses to be encouraged to make investments that are environmentally beneficial, GF, which includes monetary support for substantial environmentally friendly projects, is worthwhile.

GF has gained more traction in the field of finance as well as in the banking sector in recent times. According to Ziolo, Filipiak, Bąk, and Cheba (2019), the level of interest shown in green finance is to protect society against the effects of funding projects that pose threats to the environment and protect the banks that fund such projects. Globally significant central banks and participants in the banking industry made commitments to assist the promotion of eco-friendly financial products at a summit in Paris in 2017 (Dikau & Volz, 2021). Furthermore, according to the World Bank, it would stop giving financial support to institutions and nations that give little consideration to sustainable environment (Zhang et al., 2019). Furthermore, numerous banks have acknowledged a change in their long-term business plans to adopt environmentally friendly products, including Société Générale and Deutsche Bank. L. P. Hansen (2022), Al Breiki and Nobanee (2019) and Hacking (2019) claim that the goal of these banks is to avoid sponsoring persons and organisations that have an adverse impact on the environment. Some central banks have formulated policies, rules and regulations to govern pro-environmental financial dealings in the banking industry, including the Chinese Central Bank (He, Zhang, Zhong, Wang, & Wang, 2019). Interestingly, many banks globally are yet to demonstrate their preparedness to offer financial products focused on green financing, despite the significance of these accords. The lack of globally unified regulations, considerable risks, and constrained scope and dimensions are just a few of the issues it encounters. The domestic government funding of green initiatives in Sub-Saharan Africa, particularly in Ghana, is severely insufficient, necessitating the assistance of private institutions, donors, and international organisations.

2.5.2 Green business opportunities in Ghana

The zeal of governments across the globe, donors and international organisations to mitigate climate change and its negative externalities is more manifested now than ever. Individual countries have outlined their internal strategies to address environmental problems to reduce their carbon footprints (Mohammed, Selim, Hassan, & Syed, 2017; Robinson, Tewkesbury, Kemp, & Williams, 2018). Sarkar, Qian, Peau, and Shahriar (2021) and Gawusu et al. (2022) contend that for successful climate adaptation and mitigation, it is crucial for businesses to transition from the conventional business practices to the adoption of environmentally friendly business models. Thus, businesses should move from “traditional” to “green”. A “green” enterprise seeks to benefit the environment and community (Naim, 2021). It creates and implements business plans that go above and beyond legal requirements and exhibit a commitment to a bright future. An eco-friendly job, business or economy contributes to protecting and restoring the natural environment, and reduces the harm caused to it (Sharma et al., 2021). A green job is also productive, fair and secure. The concept of green business practices evolved as a result of increasing awareness (Høgevold et al., 2014) and concern of individuals, communities, organisations and government regarding the increase in pollution, carbon emissions and deteriorating environmental conditions (Bocken, Boons, & Baldassarre, 2019).

The opportunities for green businesses in Ghana are widely spread over agriculture and forestry, waste management, energy, and transportation (Duku, Gu, & Hagan, 2011). Agriculture plays a major role in water pollution. The traditional farming practice by smallholder farmers has transitioned into a perceived modernised farming where farms discharge a significant amount of agrochemicals, and drug residues into water bodies (Mateo-Sagasta, Zadeh, Turral, & Burke, 2017). Ghana's water resources are completely unmanageable due to the rapidly increasing levels of pollution caused by leachate from chemical fertilizers, pesticides, fungicides, herbicides, and insecticides used in agriculture (Yeleliere, Cobbina, & Duwiejuah, 2018). This is an impetus for sustainable agricultural practices (SAPs) based on priority climate action initiatives. Smallholder farmers must embrace SAPs, which combine aspects of the green and agronomic revolutions, in order to deaccelerate the undesirable consequences caused by increased farming (Maré, Zahonogo, & Savadogo, 2022). Enhanced seeds, irrigation, drought-resistant crop varieties, and compost fertilizer, greenhouse farming, beekeeping and processing, organic pest control and soil and water conservation practices are some of the components of SAPs (Nyasimi et al., 2017). This provides an array of entrepreneurial opportunities to MSMEs to create products and provide services to sustain the activities of farmers and enhance the quality and yield of their produce which have a ripple effect on the physiological well-being of society and financial standing of the farmers.

As the water bodies in the country continue to be contaminated by toxic chemicals from illegal small-scale mining (Emmanuel, Jerry, & Dzigbodi, 2018) and farming activities, it renders unwholesome species and threatens the existence of aquatic species. Fish is a delicacy in Ghana (Afoakwah, Osei, & Effah, 2018; Antwi, Kuwornu, Onumah, & Bhujel, 2017) and constitutes close to 60% of animal protein consumption (Adom, Sekyere, & Yarney, 2019; Lauria et al., 2018; Onumah, Quaye, Ahwireng, & Campion, 2020; Tobey, Normanyo, Osei, Beran, & Crawford, 2016). Fish available in Ghana consists of 47% harvested fish, 18% imports, partly 3% farmed fish (Rurangwa, Agyakwah, Boon, & Bolman, 2015) and 32% déficit (Mantey, Mburu, & Chumo, 2020). Mantey et al, (2020) note that the annual 32% deficit translates into a shortfall of about half a million metric tons of fish and fishery products, and there is high demand for fish. As a result, the price of fish in Ghana is comparatively high (Antwi et al., 2017), for instance a kilo of tilapia sells between $2.50 to $3.0. The above analysis provides huge business opportunities for MSMEs in aquaculture. There are several fish farming types that MSMEs can engage in such as rearing fish in farm ponds, and concrete and tarpaulin tanks.

Energy generation contributes immensely to GHG emission in Ghana (Abokyi, Appiah-Konadu, Tangato, & Abokyi, 2021; Diawuo, Scott, Baptista, & Silva, 2020; Kwakwa, 2021) and it is now necessary to switch to renewable energy from fossil fuels. It is therefore time MSMEs redirect their focus and invest in eco-friendly energy production. According to studies, Ghana's use of renewable energy as a percentage of total energy consumption has plummeted during the previous ten years, while its use of fossil fuels has remained high (Kwakwa, 2020).

More CO_2 emission from energy sources is caused by the burning and use of dirty, non-renewable fossil. For instance, coal burning accounted for more than 0.3°C of the rise in average yearly global surface temperature in 2018, which was 1°C higher than pre-industrial levels. For this reason, there has been a strong push for nations to move to more eco-friendly and renewable energy sources. It was discovered in 2018 that using nuclear and renewable energy helped reduce CO_2 emissions by 25% relative to energy consumption (International Energy Agency [IEA], 2019). Utilising renewable energy ensures a steady supply of energy, encourages the wise use of natural resources, and generates employment. Once more, the development of renewable energy lowers the level of CO_2 emissions, and it is not much impacted by the changes in currency rates. Furthermore, the negative health effects linked to air pollution released by burning fossil fuels are lessened by the use of renewable energy (Dewees, 2013). The extant literature reports that income and price are among the key determinants of consumption of renewable energy such as wind power, solar power and biomass. Thus, for MSMEs to succeed in the energy business they need financial support to employ innovative technologies to produce renewable energy at a lesser cost. In order to meet the electricity demands of its people and to take the lead in cutting down carbon dioxide emissions and fighting climate change, Ghana must enhance its usage of renewable energy. To fulfil Sustainable Development Goal 7 (SDG 7) of the United Nations, which calls for ensuring that everyone has access to dependable, cheap, and modern energy services, a coterie of MSMEs in clean energy ventures needs to be strategically incentivised. This is pertinent because the country still has a lot of untapped potential for renewable energy. The government established a goal of 10% in the electricity mix by 2020 in order to turn these renewable potentials into actual energy. A bill on renewable energy was presented to parliament by the government in 2010 as a medium to long-term solution. Increasing the contribution of contemporary renewable energy sources in power generation to 10% is one of the primary objectives of the Strategic National Energy Plan I and the Renewable Energy Law (Act, 832). Unfortunately, less than 2% of the electricity mix was made up of renewable energy as of October 2018. As mentioned earlier, Ghana has substantial yet untapped renewable energy assets (Bugaje, 2006).

The solar energy potential in Ghana is estimated at 35 EJ (exajoules) (Agyekum, 2020). MSMEs can enhance the growth and usage of eco-friendly energy sources and improve the present power supply level by scaling-up solar power generation targeting residential structures and non-residential facilities such as hotels and small businesses. This involves investing in solar-powered irrigation systems pumping and spraying equipment and many more. This means that in Ghana, solar energy is an incredibly attractive and developing renewable energy source because of environmental and socioeconomic aspects (Kuamoah, 2020). Nevertheless, the solar sector is currently mostly stagnant because of financial constraints and Ghana's historical linkages to the energy sources market remains fairly stagnant owing to budget constraints and conventional attachment to energy sources. To further reduce the emission of CO_2, solar powered means of transport need to be looked at.

Garbage-to-energy is another sustainable option for MSMEs because more than 60% of Ghana's total waste is organic. Once more, there is opportunity for Ghana to use compost more frequently. According to Thomson (2014), there are compelling reasons for Ghana to enhance its bioenergy output because doing so will promote farmer and community self-sufficiency, cleaner fuels, and the potential to close the nutrient-cycle. Wind energy is still a possible source of energy, even though it might not always be the most practical choice during the period of electricity deficit. The Solar and Wind Energy Resource Assessment (SWERA) National

Report estimates Ghana's gross wind resource potential to be 5640 MW, which is more than enough (Essandoh, Osei, & Adam, 2014).

2.5.3 Overview of sustainability

The exigencies of the current world order have catapulted the word "sustainability" into unprecedented prominence in the discourse of academics, researchers and policymakers (González-Torres, Rodríguez-Sánchez, Pelechano-Barahona, & García-Muiña, 2020; Patterson et al., 2017). This could be connected to the public's increased concern over global warming and its purported repercussions. In addition, Carter and Liane Easton (2011) contend that there is an increase in understanding and awareness of the consumption of energy and associated costs, the scientific determination of climate variations, and the potential financial impacts that ecological and social sustainability may have on businesses. It is in this light that Haseeb, Hussain, Kot, Androniceanu, and Jermsittiparsert (2019) posited that all businesses must incorporate sustainability into all their business strategies, objectives and aspirations.

The significance and practicality of sustainability in a corporate context are topics of continuing discussion (Lubberink, Blok, Van Ophem, & Omta, 2017). One alternative definition of business sustainability is "the construction of robust enterprises that incorporate financial, environmental, and social systems" (Bansal, 2005). Many claim that business sustainability can generate long-term value for the stakeholders involved through proper management of an enterprise's financial and environmental risks and upholding the tenets of social responsibilities (Camilleri, 2017; Li, Liao, & Albitar, 2020; Yang, Evans, Vladimirova, & Rana, 2017). According to Li et al. (2020) and Pojasek (2007), for businesses to be sustainable, they must strive to meet present-day needs of the organisation and its stakeholders and at the same time preserving, enhancing, and protecting the interest of future generations by safeguarding the environment, social, and economic resources. In a broader sense, business sustainability refers to an organisation's capacity to adjust over time to both internal and external shocks (Ortiz-de-Mandojana & Bansal, 2016; Song, 2022) by being intimately linked to sound social, economic, and environmental systems.

The demand for firms to perform better in managing their operations has increased as a result of intense worldwide competition. This is made much more difficult by the fact that every improvement endeavour now takes into account a wider variety of variables. This is shown in efforts to incorporate sustainability principles into all levels of businesses' goals, objectives, and aims

Dyllick and Muff (2016) explained that businesses are starting to put more emphasis on the need to contribute to society in both social and environmental ways while still remaining financially profitable. Scholars have long connected this idea of sustainability to the TBL, which aims to coordinate the social, environmental, and financial results of a corporation (Braccini & Margherita, 2018; Correia, 2019; Hussain, Rigoni, & Orij, 2018). As a result, monitoring organisations' progress toward sustainability and measuring their level of sustainability are becoming crucial requirements. Sustainability explicitly requires that businesses have the long-term ability to meet certain functional requirements

Research on sustainability has mainly focused on large businesses, whereas MSMEs have received less attention. Given the significance of small businesses to national and global economy, this is somewhat unexpected. For instance, they comprise over 92% of all businesses in Ghana and are responsible for around 70% of the country's GDP. Additionally, MSMEs are essential to promoting the Sustainable Development Goals (SDGs) promulgated by the United Nations (UN) due to their combined effects on the financial, social and ecological aspects.

2.5.3.1 Definition and concept of sustainability

The multidimensional nature of sustainability has resulted in heterogeneous definitions in literature. Some people's interpretations of the phrase were constrained, while others demonstrated that it can only be understood by taking into account a wide range of interrelated factors that collectively define what sustainability entails. For example, existing scholarly works on operations management often focus primarily on the ecological aspects of sustainability, neglecting to consider its social components (Baumgartner & Ebner, 2010; Hill, 2001; Seuring, 2013). Additional research, such as the study conducted by Carter and Rogers (2008), incorporated several business elements such as risk management, transparency, strategy, and culture, alongside the economic, social, and environmental aspects of sustainability. According to the aspects the authors tried to explore, the research discovered various sustainability definitions. Business and Sustainable Development: A Global Guide, published in 1992, for instance, stated that "business enterprises' sustainability means adopting business strategies and activities that meet the needs of the enterprise and stakeholders today, while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future."

Likewise, Shrivastava (1995) defined sustainability as "providing the opportunity to reduce the long-term risks related with resource depletion, variations in energy costs, product liabilities, pollution, and waste management". However, the most well-known definition of sustainability was contained in the Brundtland World Commission report published in 1987, which defined sustainability as "the development that meets the demands of the present generation without jeopardising the ability of future generations to meet their own needs" (Brundtland, 1987). From another angle, sustainability can be defined as the ability to preserve an entity, outcome, or method through time. Sustainable activities do not deplete the natural resources they rely on. Such activities may include financial investment, agriculture, or forest management. This study aligns with the various definitions of sustainability that abound in literature, encapsulating the concern for profit (financial), people (social), and planet (environment).

2.5.3.2 **Sustainability models**

Though there are several sustainability models in literature, this sections explains the models of Cato (2012b) and Closs, Speier, and Meacham (2011) that are closely linked to this study.

2.5.3.2.1 Molly Scott Cato's green economics paradigm model

According to the green economics paradigm (Cato, 2012a), social interactions are a natural part of how the economy functions. Moreover, human activity is constrained within the bounds of the environmental carrying capacity, in accordance with the concept of strong sustainability (Ayres, 2008 & Van den Bergh, 2010). As a result, while focused on sustainability goals, the boundaries of the environment place restrictions on both economic growth and quality of life advancements (Barrett & Scott, 2001). The economy is a component of society, which is nested within the environment, as seen in Figure 3 below. According to this perspective, the environment is a limiting factor for both the economy and society.

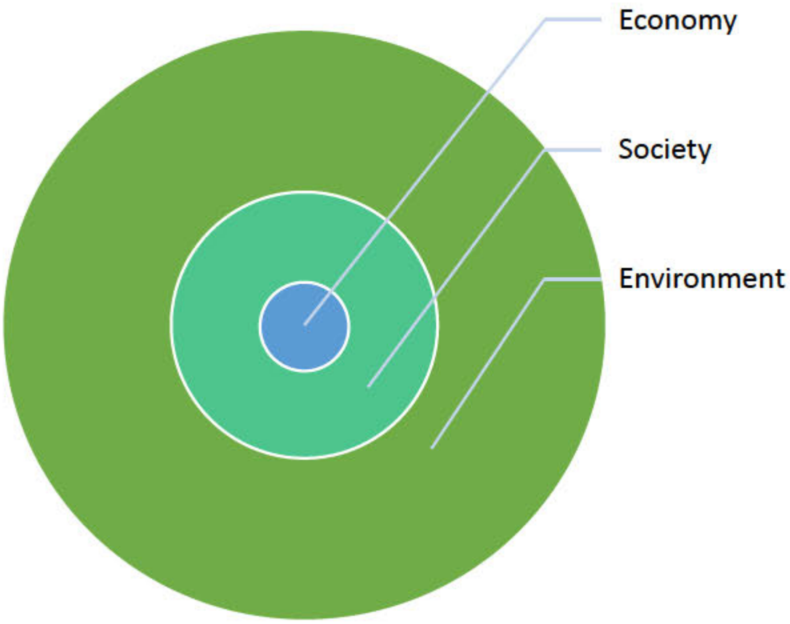

Figure 3: Green economics sustainability model
Source: Cato (2012b)

Taking into account everything said above, the suggested model hinges on the supposition that assessing sustainability performance based on environmentally connected factors as the primary influencing players can provide a fair representation for sustainability. This presumption is based on a concept that Kuan, Ho, Wang and Chen (2013) also brought up. As a result, it can be considered that environmental variables are the main determinants determining the challenge and capacity of the organisation independently when evaluating the sustainability performance of a corporation.

2.5.3.2.2 Sustainability model by Closs, Speier and Meacham

The sustainability model developed by Closs et al. (2011) has the environment, economic, education and ethics as the key elements. These dimensions are presented in Figure 4 on the next page. The authors' study, which served as the foundation for creating their model, found that the environmental component considers environmental sustainability, which is influenced by external regulations, many of which elicit the responses necessary to address environmental challenges. They added that these regulations are included in organisational solutions that aim to cut back on usage, conserve resources, and implement efficient business procedures.

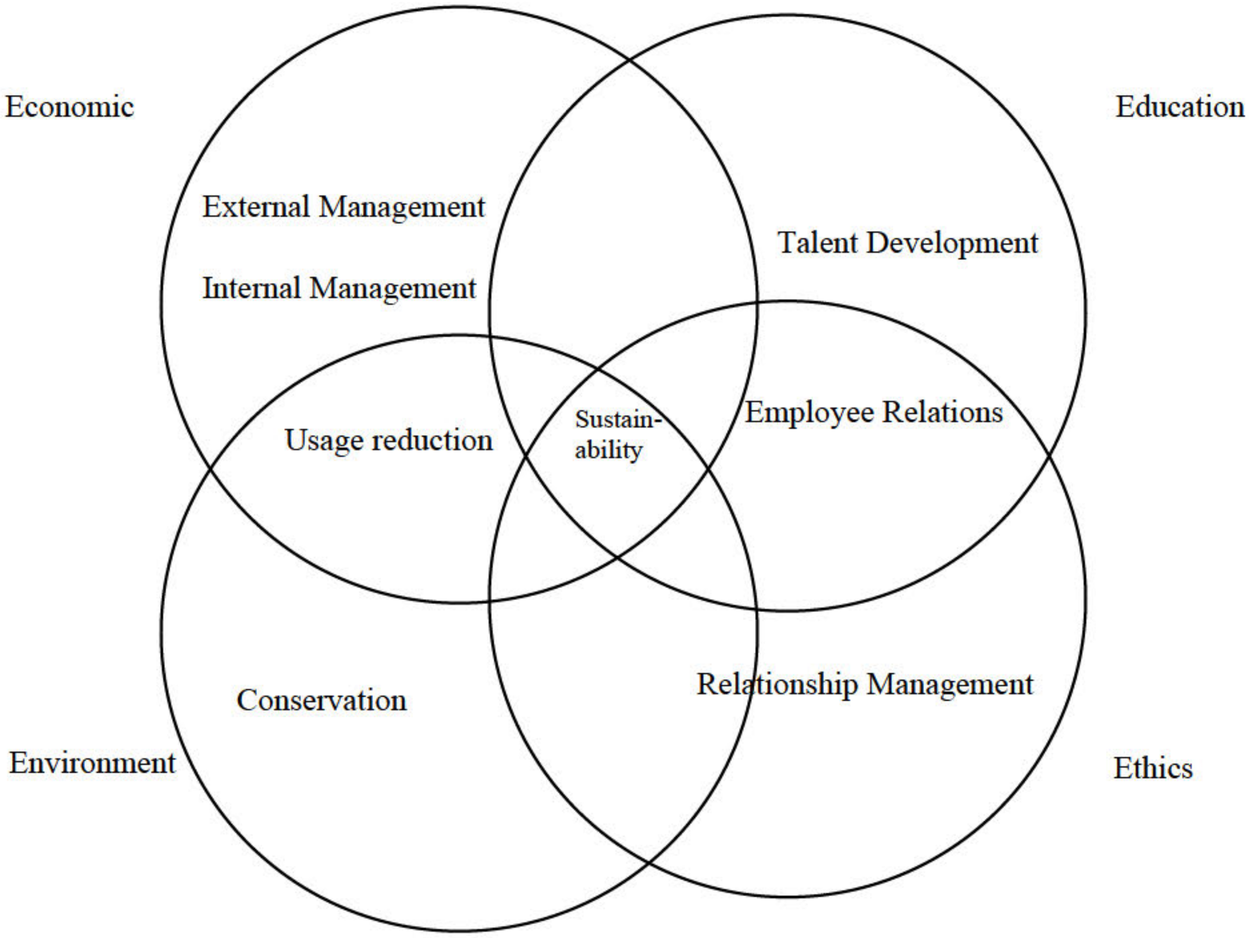

Figure 4: Closs, Speier and Meacham's sustainability model

Source: Closs et al. (2011)

The focus of the educational component of sustainability is on assuring talent development through training to eventually replace present staff. Additionally, it involved employing sustainable business strategies, such as supplier training and sustainable operations. The effective management of employee relationships necessitates the instruction of individuals on achieving a harmonious equilibrium between their professional and personal lives, hence promoting safety and sustainability.

The ethical aspect examines corporate social responsibility, such as those involving employee relations, community involvement, and business management techniques. Implementing a code of conduct supports managing relationships with employees, which is crucial, particularly for businesses with international linkages where child labour, fair pay and work conditions are considered very pertinent. These rules of conduct aid in laying the groundwork for the organisation's code of conduct. Another factor is community relationships, where workers are urged to strengthen their ties to the area through charitable work and volunteerism. Once again, good business management practices promote the need for moral behaviour, which may be ingrained in an organisation through many strategies like procuring and using harmless material and creating safe and environmentally friendly products for customers.

Lastly, the economic viewpoint highlights the imperative for firms to enhance their value while reducing supply chain costs. It is proposed that sustainability should be assessed from an internal and external standpoint. The internal methods must possess durability. However, the organisation's essential sustainability goals cannot be achieved through internal sustainability, as it is contingent upon effective supplier management. Therefore, achieving sustainability necessitates the careful equilibrium of financial, social and environmental dimension of firm activities.

2.6 Micro, small and medium enterprises' involvement in sustainability: The role of microfinance

The microfinance literature is replete with studies that attest to the traditional role played by MFIs in supporting MSMEs to improve their financial and social performances. With the current global focus on preserving the environment, microfinance scholars, donors and international organisations advocate for the adoption of the TBL principle by MSMEs to incorporate environmental concerns into their objectives and strategies. Allet (2012) contends that MFIs in less developed countries play an important role in environmental protection.

The small-scale activities carried out by MSMEs in developing nations have environmental dangers that directly endanger the populace's health and way of life. MSMEs with limited resources are among MFIs' clientele. The owners and/or management of MSMEs typically lack education and understanding, which makes them unconcerned with environmental issues and, occasionally, directly responsible for environmental harm (Brahmbhatt et al., 2017). In connection with this issue, some experts and funders have recently asserted that MFIs could play a role in encouraging pro-environmental practices among their clients who are micro- and small-business owners (Allet, 2012). MFIs are a part of the financial market system, which functions effectively when there is good communication among its constituent parts. Ledgerwood and Gibson (2013) state that the private sector, the public sector, civil society, as well as consumers, are all participants in the financial market system. For MFIs, achieving the TBL (in particular the environmental dimension) depends on all participants in the financial market system contributing appropriately and consistently to sustainable development.

The function of MFIs to encourage MSME owners to adopt the triple bottom line concept is anchored in the perspectives of financial and non-financial services rendered by MFIs.

2.7 Micro, small and medium enterprises and anthropogenic environmental consequences

MSMEs are recognised as imminent players in the development of countries across the globe by contributing to employment avenues, economic growth, innovation and new product design. On the other hand, the impact of MSMEs on the environment cannot be underestimated. The number of MSMEs outstrips that of large companies (Ayyagari, Beck, & Demirguc-Kunt, 2007) and putting together their effect on the environment is enormous. Gomes and Pinho (2023) indicate that in the European Union (EU) there are close to 23 million SMEs and they contribute to a significant 63% of the overall carbon footprints of companies. The report further states that the SMEs provide approximately 100 million job opportunities and contribute to over 50% of Europe's GDP. As elaborated by Yadav, Gupta, Rani, & Rawat (2018), in Europe SMEs account for 60 to 70% of aggregate pollution, and they constitute nearly 99% of the companies (European Commission, 2014).

In Africa the situation is not different. UNIDO reports that MSMEs make up more than 90% of all African enterprises that are registered and provide more than 80% of job avenues whereas the measure of MSMEs' environmental footprint is considered to be significant. MSMEs feature in all sectors of the economies in Africa and this is a manifestation of the key role they play in propelling the economic and social development and growth in Africa. MSMEs in Ghana create close to 85% of manufacturing job avenues and contribute nearly 70% to the GDP of Ghana and also form approximately 92% of businesses in Ghana (Adaletey et al., 2022). Ghana is endowed with a wealth of natural resources, but has difficulty in the management of the abundant resources (P. A. O. Henri, 2019). In contrast to advanced countries, where environmental issues have been a top priority on the national development plan immediately after the Conference on the environment in Stockholm in 1992, the situation is dissimilar in emerging nations. Ghana was placed 151st position with a score 32.07% in an environmental performance assessment by Yale University research that evaluated 178 nations comprising developing and developed nations (Ahinful, 2018). This result demonstrates that the nation's environmental performance score for the previous ten years was below expectations, falling short by 45.88% (Ahinful, 2018). The country did not do well, and the ranking shows that poor environmental management has been going on for years. This also shows how poorly many countries in SSA are taking care of the environment.

During colonial rule and the first few years of independence, Ghana did not focus much on the management of the environment (United Nations Division for Sustainable Development [UNCED], 1992). The quest to provide infrastructural projects to accelerate the country's growth did not consider the environmental repercussions. This resulted in years of harm to people and the ecology that were not properly monitored (Betey & Essel, 2013). It is thought that the way the country is developing right now puts a lot of stress on the environment. Ten percent of GDP is lost because of improper environmental management. This shows about 6% increase over the last estimate, which was made in 1988 and was 4% of GDP (United Nations Environment Programme [UNEP], 2012). It indicates that the nation's efforts to reduce poverty and raise the standard of living have not been based on a sustainable strategy. What the country has accomplished is associated with environmental and social challenges. About 69% of the land surface area is at risk of moderate to severe erosion because of bad environmental practices like logging, mining, and farming. The average rate of forest loss between 2011 and 2012 was 1.37% per year (United Nations Development Programme [UNDP], 2015), which made it hard for the country to meet Millennium Development Goal 7 in 2015. Environmental problems that confront Ghana include: air and water pollution, solid waste, agricultural land degradation, and deforestation and small-scale mining.

2.7.1 Air and water pollution

Some MSMEs engage in activities that contribute to air pollution, the biggest environmental danger in Ghana (Linear, 2020). Ghana experiences household air pollution (HAP) and ambient air pollution (AAP). An earlier study conducted by Stanaway et al. (2018) indicates that the age-standardised air pollution mortality rate is 105 per 100,000, which includes both ambient and home air pollution (AAP and HAP) (Stanaway et al., 2018). Around 16,000 Ghanaians die prematurely each year, with 8,500 of those deaths occurring in urban regions and 7,600 in rural ones. Air pollution accounts for 8% of all deaths (Stanaway et al., 2018). Ghana's annual total air pollution is anticipated to have cost on average 4.2% of GDP in 2017, or about US$2.5 billion (Linear, 2020).

Ghana's air pollution could be largely attributed to various activities of MSMEs (Darko et al., 2022). Some entrepreneurs engage in small transport business such as taxi cab or "trotro" services. "Trotro" is a kind of mini-bus that commutes people from one location to another which is a relatively short distance at a much lower fare. Most of these commercial vehicles are old and rickety which emit toxic smoke from the exhaust into the air (Uka, Belford, &

Elebe, 2021). Dwellers in the communities where these commercial vehicles operate inhale toxic fumes. Other categories of MSMEs' activities that add up to air pollution include: fish smoking, brick manufacturers, bakers, e-waste scrap collectors, street food vendors, and slash and burn small farm holders (Essumang, Dodoo, & Hadzi, 2010; Weyant et al., 2022). Many of the aforementioned MSMEs continue to depend on solid fuels such as charcoal and wood as their source of energy (Brahmbhatt et al., 2017). For instance, fish smokers, brick manufacturers, bakers, and street food vendors rely on wood as an energy source, thereby releasing soot into the air. According to Agbavitor (2018), to recover copper, steel, and other valuable metals, scrap dealers burn things like electrical wires, alternators, refrigerator coils, old electronic parts, radial tires, and more. This releases highly toxic chemicals into the air. Most road networks in the country are untarred or unpaved producing a lot of dust into the air.

Water pollution in Ghana is very high and MSMEs cannot be left off the hook. Studies show that many of the country's water pollution sources are anthropogenic (Darko et al., 2022). The threat that MSMEs engaged in illicit mining pose to the quality of river bodies is worrisome. The release of wastes, made up of hazardous substances like cyanide, mercury and other organic chemicals into water bodies causes water contamination from MSMEs' mining operations (Obiri-Yeboah et al., 2021). The combination of these chemicals may produce high-acid effluent that could trickle into subsurface water or flow into surface water bodies, endangering the neighbouring people, particularly those who rely on such sources of water for drinking and other household uses (Obiri-Yeboah et al., 2021). Another issue is the leakage of heavy metal oxides, such as lead and zinc oxides from illegal mining, which can occasionally leak into water bodies (surface and underground) and endanger aquatic life and the communities who depend on these resources (Duncan, 2020).

Illegal mining by MSMEs is a worry because it could hurt the quality of rivers in Ghana. The mining activities of MSMEs pollute water when they dump effluents into bodies of water. These effluents contain toxic chemicals like cyanide and mercury (Duncan, 2020) and other organic chemicals used to process mineral ores (Obiri-Yeboah et al., 2021). When these chemicals are mixed, waste that has acid contents can be made, which can leak into underground water or flow into the environment (surface water bodies), putting people in the area in danger, especially those who depend on these water bodies for drinking and other household uses (Obiri-Yeboah et al., 2021). Another worry is the leaking of heavy metal oxides, like lead and zinc oxides, which sometimes get into the environment and, more specifically, seep into surface and underground water sources, putting aquatic life and the people who depend on them in danger (Duncan, 2020).

Mateo-Sagasta et al. (2017) observed that agriculture also plays a major role in water pollution. The traditional farming practice by smallholder farmers has transitioned into a perceived modernised farming where farms discharge significant amounts of agrochemicals, and drug residues into water bodies (Mateo-Sagasta et al., 2017). Ghana's water resources are completely unmanageable due to the rapidly increasing levels of pollution caused by leachate from chemical fertilizers, pesticides, fungicides, herbicides, and insecticides used in agriculture (Yeleliere et al., 2018). Another activity of MSMEs that contributes to water pollution (underground and surface waters) is auto-repairing (Wiafe, Ofosu, & Ahima, 2014). Wiafe et al. (2014) pointed out that the activities undertaken by auto mechanics spill oil (petrol, diesel, engine oil) each day. These oils infiltrate and subsequently percolate into the sub-surface causing a portion to be washed by rainwater into drainage and eventually lands in river bodies. This phenomenon has the potential of introducing oil traces to the groundwater system especially in the unsaturated zone.

2.7.2 Solid waste

Another debilitating challenge is managing solid waste in Ghana. According to the World Economic Forum (WEF) (2021), Troutman and Asiedu-Danquah (2017) and Miezah, Obiri-Danso, Kádár, Fei-Baffoe and Mensah (2015), over 3,000 metric tons (MT) of plastic garbage are produced daily in Ghana, amounting to 1.1 million MT annually. In their estimation, plastic makes up 86% of Ghana's waste, or 2,500 MT per day or 1 million MT annually and is poorly managed. The entire system of waste management creates over 3,000 MT of municipal garbage per day. About 14% of this garbage is collected properly; whereas 38% is dumped in open areas earmarked as local refuse dumps; containers placed at vantage points in the communities take up 24%; 9% is discarded carelessly; 11% is burned openly; and 4% is buried (Ghana Statistical Service [GSS], 2013).

The use of plastics by some MSMEs is substantial. Sachet water manufactures use plastics to package water, and fish mongers, bakers, street food venders, eateries, restaurants and retailers of assorted products all use plastics to serve clients. Due to the lack of an efficient waste management system, a greater number of MSMEs and households indiscriminately dump their waste, including plastics (Cobbinah, Addaney, & Agyeman, 2017; Immurana, Kisseih, Yakubu, & Yusif, 2022; Tweneboah Kodua & Asomanin Anaman, 2020). The consequence of this act is severe pollution, which has spread to virtually every Ghanaian village over the last 20 years (Troutman & Asiedu-Danquah, 2017). Plastics used in packaging account for the growing accumulation of improperly disposed waste, which degrades the environment and fuels disasters such as flooding and outbreak of cholera and other diseases. Plastics that are indiscriminately dumped end up in stormwater drains, rivers, streams, and ultimately the ocean (Troutman & Asiedu-Danquah, 2017). Ghana's annual contribution to marine debris is estimated to be between 92,000 and 260,000 MT, which works to 1 to 3% of aggregate worldwide production (Troutman & Asiedu-Danquah, 2017). Troutman and Asiedu-Danquah (2017) believe that in the absence of significant action, the input of marine debris is expected to exceed 350,000 MT per annum by 2025. This is supported by the assertion by the WEF (2021) that if pragmatic measures are not adopted, the number of plastics will surpass the number of fish in the sea. It is estimated that out of the approximately 1.1 million MT of plastics waste created in Ghana, about 5% is gathered to undergo recycling (WEF, 2021).

To stem down the menace of plastic waste, Ghana is engaging in public-private partnerships to step up national efforts to drastically reduce plastic pollution. It is therefore not surprising that Ghana was the first African country to partner with the Global Plastic Action Partnership (GPAP) in 2019.

During the commencement of the Ghana-GPAP partnership, the President of Ghana, Nana Addo Dankwah Akufo-Addo, expressed a commitment to accomplish the goal of achieving zero plastic leakage into Ghana's ocean and waterways. He stated that Ghana would make every effort possible to serve as an example for other nations in the region and on the African continent on challenges relating to the management of plastic waste. To achieve this objective, more resources need to be channelled into plastic waste management.

2.7.3 Electronic waste

Another type of solid waste that has far-reaching consequences for both the environment and human life is electronic waste. According to Amoyaw-Osei et al. (2011). Ghana produces 171,000 MT of electronic trash per year, of which 90 to 95% is treated. Out of e-waste a lot of precious metals such as silver, gold, palladium, aluminium, and copper are recovered, allowing those in need to survive. It is estimated that e-waste recycling and related operations contribute \$105-268 million to Ghana's economy, with the informal sector performing the majority of these activities (Prakash, Manhart, Amoyaw-Osei & Agyekum, 2010).

Inadequate e-waste processing can harm the environment and human health by releasing hazardous chemicals such as dioxins and dioxin-like compounds (Dai et al., 2020), as well as other dangerous heavy metals such as copper, nickel, and mercury. A study by Imre-Lucaci, Fogarasi, Imre-Lucaci, and Fogarasi (2021) explained that lead, a neurotoxin, is present in significant amounts in cathode ray tube glass, is used in older computer displays and televisions. Lead contaminates groundwater and soil. Lead, tin and copper from computer circuit boards, as well as persistent organic pollutants, which are released into the ecosystem, may accumulate in human beings, animals and plants (Daum, Stoler & Grant, 2017). To extract the copper from the polyvinyl chloride insulation of wire cables, the cables are burned, resulting in air pollution and various of negative health effects, including problems with the cardiovascular and pulmonary systems in foetuses and young children. Carcinogens, dioxins that cause immunological, endocrinological, and dermatological illnesses as well as impede sexual, hormonal, emotional, and physical development, are commonly released during metal recovery (Fujimori et al., 2016). Harmful and harmless garbage is dumped carelessly at unregulated or unorganised disposal sites or in the open. Some portions of land contain moderate to high amounts of metals, such as lead and copper, which are dangerous for infants and aquatic environments (Akortia, Olukunle, Daso & Okonkwo, 2017). The Country Environmental Analysis (CEA) of Ghana, quantified in financial terms the effect of mercury and lead exposure from used lead-acid batteries. The cost of sickness and the defect of IQ in young persons was projected to cost Ghanaian society US$440.00 million per annum, which translates to 0.75% of GDP of 2017.

2.7.4 Agricultural land degradation and deforestation

MSMEs' activities such as illegal logging, farming, small scale mining, quarrying and sand winning contribute immensely to loss of woodlands. The forest provides financial and physiological benefits to countries in general and forest inhabitants in particular. The people who live in forests rely on the timber and other forest resources (Pandey, Tripathi, & Kumar, 2016). Even though the nation's forest reserves were created to preserve the remaining biodiversity and to help the environment, deforestation still takes place in these forest reserves despite the supposed protection of such forests. Deforestation increased at an annual rate of 0.7% from 1990 to 2000, 0.5% from 2001 to 2005, 0.4% from 2006 to 2010, and 0.6% from 2010 to 2015 (Acheampong et al., 2019). The International Union for Conservation of Nature (IUCN Standards and Petitions Subcommittee, 2010) looked at how Africa's vegetation changed between 2005 and 2010, and they found that the rate of deforestation was much higher, at 3% per year (Standards & Group, 2006).

According to Appiah et al. (2009) and Tsai et al. (2019), the primary factors contributing to deforestation in the nation are the excessive exploitation of natural resources and the poor utilisation of land. Several activities contribute to the growing deforestation including mining and slash-and-burn farming, which are considered the most dominant (Appiah et al., 2009; Sonter, Barrett, Moran & Soares-Filho, 2015). Deforestation and forest degradation in Ghana have been attributed to, among other things, an increase in agricultural activities, illicit logging and mining, population expansion, and ineffective regulations, as suggested by Kyere-Boateng and Marek (2021). Deforestation affects the economy and the environment (Arshad, Robaina, Shahbaz, & Veloso, 2020). According to studies, annual losses of forest amount to around 2.6% of the agriculture sector's GDP (Damnyag, Tyynelä, Appiah, Saastamoinen, & Pappinen, 2011). Additionally, the loss of trees has a detrimental impact on local residents' livelihoods, which entirely depend on the forest (Appiah et al., 2009; Islam & Hyakumura, 2019; Rahman & Alam, 2016). The destruction of ecosystems, including soil erosion and biodiversity loss, is also connected to forest loss (Rey Benayas & Bullock, 2012; Wenhua, 2004). Also, forests' decline is diminishing the size of carbon sinks, which contributes to 17.4% of the emission of world's GHGs (Raihan, Begum, Mohd Said, & Abdullah, 2019; Solomon, 2007). Deforestation has significant implications for various aspects, including carbon sequestration, the distribution of species and forests, and hydrological regimes. Efforts are being made worldwide to control deforestation by regulating land use and land cover.

According to the World Bank (2020) country environmental analysis report, the annual deforestation rate of Ghana was roughly 3.51% from 2001 to 2015, resulting in annual losses exceeding 315,000 hectares. Within this era, over 4.6 million hectares of land were lost to deforestation, with 3.98 million ha (more than 84%) of that land being open forest and 745,326 ha (7%) being closed forest. The report further indicated that southwestern Ghana and the Transition zones noted for dense forest saw the majority of deforestation from 2001 to 2010. Still, from 2013 to 2015, the Savannah Zone (northern Ghana) saw a significant increase in forest loss, increasing the annual average forest loss to over 500,000 ha/year (Ministry of Lands and Natural Resources [MLNR], 2017). This is in contrast to closed canopy forest loss, which indicates the extension of anthropogenic activities into forest reserves. Open forest loss frequently implies an encroachment of the forest for agriculture, signalling farmland development to the detriment of the forest (World Bank, 2020). The Country Environmental

Analysis report explained that each year, deforestation costs Ghana $400 million, or 0.7% of its GDP in 2017.

In relation to resources such as gold, crude oil and cocoa, timber now contributes very little to the national economy, despite being a major foreign exchange earner in the 1990s and 2000s. The lumber industry's deteriorating strength over time is a warning sign About two decades ago, the forestry industry provided over 100,000 jobs to people. The Ghana Timber Millers Organisation contends that the decline in timber resources has resulted in the closure of approximately 100 businesses since the early 2000s, accounting for 80% of all previously operational businesses and resulting in the loss of 75,000 jobs.

In Ghana, land degradation has been worse during the past 20 years. This is corroborated by the net primary productivity (NPP) and the normalised differential vegetation index (NDVI), two indicators of vegetation health. Land degradation is worsening in the country, particularly in the Bono, Bono East, Ahafo, and Ashanti regions, as evidenced by the declining NPP, a measure for land degradation (Barbier & Hochard, 2016).

2.7.5 Small-scale mining

Most significant forests around the world are known to have been harmed by mining activities, particularly in Africa where unlawful mining is pervasive (Mwitwa, German, Muimba-Kankolongo, & Puntodewo, 2012; Nti, 2020; Zipper et al., 2011). Boakye, Odai, Adjei and Annor, (2008) in their studies catalogued illegal lumbering, illiteracy and an increase in population as the major drivers of deforestation, whereas in the work of Obodai, Adjei, Odai and Lumor, (2019). and Awotwi et al. (2019) they settled on illegal mining as the major trigger of deforestation.

Small-scale and artisanal gold mining (ASGM) contributes to poverty eradication and national prosperity. Despite their contribution to employment and poverty reduction, their impact on the environment is devastating. In 2016, ASG miners' gold output increased to 39% of Ghana's 120 MT of gold, from approximately 12% in 2004 (Ministry of Finance [MoF], 2018). As a result of rising unemployment, low agricultural production, and high gold prices since 2010, ASGM production has shot up considerably. However, galamsey was responsible for a significant percentage of this growth. The number of people employed in Ghana's gold industry is unknown, but it is likely to be quite high, and is estimated to lie between 0.5 million and 1.1 million people, comprising direct and indirect employment (see McQuilken & Hilson, 2016 & Hilson, Hilson, & Pardie, 2007), signifying that the artisanal gold miners provide jobs to 4 to

8% of the working population in Ghana. Approximately half of the workforce engaged in ASGM-related activities are women (McQuilken & Hilson, 2016).

Though galamsey is common across the country, there is no accurate record on it due to the clandestine nature of the activities. The increase of galamsey activities is so alarming that Owusu-Nimo, Mantey, Nyarko, Appiah-Effah, and Aubynn, (2018) discovered over 7,000 galamsey activities in over 300 communities in the Western Region alone, with an average of 24 operations per location. When illegal mining occurs quickly and without control, it causes deforestation and biodiversity loss, soil erosion, and air and water pollution. Galamsey poses a serious threat to rivers in Ghana where the artisanal mining activities cause high turbidity, increased sediment loading, and heavy metal contamination, which disrupts fisheries and aquatic habitats and jeopardises potable water availability. Food security issues have arisen because of farmland degradation in galamsey areas, resulting in the high price of foodstuffs (Bansah, Dumakor-Dupey, Kansake, Assan, & Bekui, 2018). The coexistence of cocoa and gold is particularly tense, and galamsey is most likely a factor in the cocoa plant's declining health and productivity (Snapir, Simms, & Waine, 2017; Boateng, Nana, Codjoe, & Ofori, 2014). When mercury is applied in the extraction of gold by those involved in galamsey, it pollutes people, the environment, water, and the land.

The activities of galamsey operators have high financial and economic implications for government and households. The cost of providing water rises as towns are forced to drill additional wells and water treatment plant maintenance costs rise. Because of the damage caused by gold processing and earthmoving equipment, land reclamation is costly. According to Mantey et al, (2020), the Western Region alone would require US$250 million to rebuild the galamsey-damaged lands and water bodies. The above analysis clearly demonstrates that MSMEs' activities have an immense impact on the environment and on human existence and threaten the very survival of MSMEs themselves, and therefore, this requires a well thought-through measures and strategies to arrest the situation.

2.8 The role of microfinance in MSMEs' action in sustainability: Financial services perspective

MFIs render two categories of services, financial services and non-financial services. The current discussion looks at how the financial services contribute to the sustainability of MSMEs. Thereafter the effect of MFIs' non-financial services on sustainability of MSMEs is analysed. The role MSMEs' play in employment creation, product development, innovation, poverty alleviation and economic growth in developing countries cannot be underestimated. Studies show that close to 95% of businesses across the world are MSMEs that contribute to about 60% of job avenues in the private sector (Ayyagari et al., 2007; Mulder, 2020; Ssempala, James, & Ntege Ssebaggala, 2018). In Ghana, MSMEs account for about 92% of businesses and generate roughly 70% of the country's GDP (Ayyagari et al., 2007). Notwithstanding the immense contribution of MSMEs to the advancement of emerging economies, it is commonly known that most MSMEs' operational activities contribute to ecological issues such as species extinction, land degradation, deforestation, poor waste disposal and pollution (Brahmbhatt et al., 2017) which have received global attention.

Consequently, the Paris Agreement set go-getting standards for universal climate action to sustain businesses and livelihoods. The need therefore exists to devise appropriate measures to reorient MSMEs to engage in sustainability efforts to improve their resilience as well as that of society at large (Schaer & Kuruppu, 2018). Due to MFIs' financial intermediary role mainly geared towards MSMEs, it is believed that MFIs have the capacity to reorient MSMEs to embrace and incorporate environmental concerns in their objective setting and operations (Nugroho et al., 2017).

Until recently, microfinance had dual missions, namely social and financial. But contemporary scholars of microfinance continue to advocate for green microfinance which stimulates the concern for environmental responsibility alongside the social and financial objectives. This suggests that in rendering services to the numerous clients of MFIs, the MFIs should not be oblivious of the "triple bottom line" framework (Allet, 2014a). On the other hand, microfinance plays a significant role by making available several financial services to MSMEs, the impoverished, and the financially excluded (Aladejebi, 2019; Shah & Hingu, 2022; Yeboah, 2017). Microfinance enterprises offer credit, savings, insurance and remittances as financial services to support the activities of MSMEs (Gyimah & Boachie, 2018). The sustainability of MSMEs in Ghana is hampered by inadequate funding, low insurance uptake, and inadequate savings (Agyapong & Attram, 2019; Muriithi, 2017; Oduro & Nyarku, 2018), all of which hurt their capacity to remain viable. According to García Moritán (2020), Singh et al. (2018), Mukherjee (2018) and Atiase (2017), access to credit is one of the fundamental challenges that confront MSMEs. It is challenging for MSMEs to get external financing in debt and equity (Boadi et al., 2017). Strict financing requirements prevent small businesses in Ghana from surviving and growing (Amoah & Amoah, 2018; Naab & Bans-Akutey, 2021; Quartey, Turkson, Abor, & Iddrisu, 2017; Sallem, Nasir, Nori, & Kassim, 2017). The literature generally agrees that MSME owners have a difficult time getting financing.

Because of their small size, MSMEs face particular challenges such as high compliance cost. Other barriers are the lack of adequate managerial skills, small market share, environmental risks and financial resources. Another challenge is the lack of developed and accessible enterprise development services, such as those that deal with marketing, technological development, and entrepreneurship (Ridwan Maksum, Yayuk Sri Rahayu, & Kusumawardhani, 2020). MSMEs are unable to pay for the services because they lack the resources to learn about them and to appreciate them. Therefore, the operators in the sector tend to have poor skill levels.

The proponents of GMF aim to influence microfinance institutions' decision-making and behaviour, as well as the behaviour of MSMEs who MFI clients are (Huybrechs et al., 2015). GMF seeks to promote the growth of eco-friendly and resilient social advancement, generate environmentally friendly works, and advance green approaches to effectively tackle issues that devastate the environment by offering credit on favourable terms to small businesses, entrepreneurs, or groups of persons who engage in environmentally friendly operations (Abdur Rouf, 2012). The financial services provided by green MFIs include, as Allet (2012) also stated, granting of credit for green operations in line with eco-friendly objectives, providing microcredit to fund green innovations, or providing education on eco-friendly actions. Because microfinance clients actively contribute to environmental devastation but are unaware of it due to their low levels of education, there is a direct connection between MFI services and environmental protection.

As emphasised earlier, green microfinance either proscribes the extension of credit to support non-eco-friendly activities or vigorously designs loan products to enhance pro-environmental business activities to mitigate MSMEs' susceptibility to environmental problems. These aims of green microfinance lessen the environmental impact of business actions, assist in reducing monetary risk, improve standard of living, and/or conserving and natural resource restoration (Huybrechs et al., 2015). Omondi and Jagongo (2018) highlight that access to finance, savings mobilisation, and financial skills substantially impact MSMEs' success. Aladejebi (2019) suggests that savings, credit and training positively impact financial performance of MSMEs.

Numerous studies have demonstrated the positive effects that better business environment management can have on small-scale businesses, including waste reduction, cost savings, increased customer satisfaction, increased employee commitment, improved products, closer ties with the public, and competitive advantage (Orogbu, Onyeizugbe, & Chukwuma, 2017). According to research, businesses that can demonstrate their concern for the environment through a range of operational business practices will be able to improve their competitiveness (Leonidou, Christodoulides, Kyrgidou, & Palihawadana, 2017) Planning, funding, and carrying out climate change adaptation measures have historically been seen as solely falling under the purview of the central government. It is estimated that the amount of funding required o mitigate environmental problems in developing countries will significantly raise to $ 500b by 2050 which significantly exceeds the financial resources of the state. Therefore, government partnership with the private organisations including MFIs is considered key to constructing sustainable environment (UNEP, 2016).

MFIs' financial services such as loans and savings facilities aid MSMEs to lessen most of the operational challenges. According to a study conducted by UNEP and the international insurance company AXA, the increasing prices of inputs and insurance as well as wellbeing of workers are the remarkable implications of environmental risk on MSMEs in developed and emerging countries. There have also been documented detrimental effects on building materials, transportation, market access, demand for firms' goods and services, and industrial processes (AXA Group, 2015). Moreover, it has been discovered that climate change has an impact on access to raw materials, corporate efficiency and competitiveness, production and supply chain movements, and employee absenteeism. Further, environmental problems put MSMEs at risk due to employee migration and cascading impacts including infrastructure destruction, societal upheaval, and increasing demand of resources like water. Increasing insurance costs and greater regulation are some of the more indirect effects (Berkhout, Hertin, & Arnell, 2004). Aside from the direct repercussions of environmental risks on MSMEs, their inability to mitigate these impacts has a significant negative influence on societies by raising unemployment levels and lowering wealth, which in turn causes or exacerbates socioeconomic issues in the community as a whole.

Knowing the threats that environmental issues pose to the MSME sector and making the necessary investments in adaptation will help MSME actors to "climate-proof" their operations while also reducing the problems caused by the environment on the economy. MSMEs often have limited financial capabilities to address definite environmental problems to their activities, which therefore makes it appropriate for MFIs to intervene.

Finally, MSMEs often prioritise more urgent, immediate short-term challenges as well as profit-maximising aims and objectives in their enterprise operations, which is a significant impediment to their engagement in adaptation and resilience-building (Linnenluecke, Griffiths, & Winn, 2013). Because of this, their business planning cycles are substantially shorter than those of larger organisations, and they have less access to capital for adaptation. This can all be summed up by positing that MSMEs' ability to operate and grow is in danger without proper access to funding, insurance and savings facilities.

2.8.1 The role of green microfinance in MSMEs’ action in sustainability: Non-financial services perspective

MFIs offer non-financial services to their clients which complements the financial services. MFIs render non-financial services to MSMEs, the impoverished, and the financially excluded (Aladejebi, 2019; Shah & Hingu, 2022; E. Yeboah, 2017). Non-financial services like education on financial literacy, environmental awareness personal hygiene, sanitation, managerial and technical training, pre-loan training and advisory services are frequently included in microfinance programmes as support services provided to MSMEs (Gyimah & Boachie, 2018; Okibo & Makanga, 2014; Peprah, 2018; Swapna, 2017).

According to Kusi, Opata, and Narh (2015), many MSME owners and managers are untrained or have little managerial expertise. The sustainability of MSMEs in Ghana is hampered by financial illiteracy and poor managerial abilities (Agyapong & Attram, 2019; Muriithi, 2017; Oduro & Nyarku, 2018), all of which have an adverse effect on their capacity to remain viable. Small business owners or managers commonly develop their management style by engaging in experimentation and refinement. Consequently, their managerial approach probably has a greater inclination towards intuition than analysis, prioritising immediate obstacles over long-term ones, and displaying a conceptual inclination towards opportunism rather than strategic thinking (Franco, Haase, & António, 2020). While this method initially serves as the MSME's most valuable resource by promoting innovation, it may pose challenges when faced with challenging decisions. According to Atkinson (2017), a consequence of inadequate managerial abilities is the lack of preparedness among MSME owners to effectively navigate shifts in the company landscape and strategise essential technical advancements. The majority of individuals who oversee MSMEs are from the general populace. Therefore, the operators in the sector tend to have poor skill levels and lack formal education. Thus, they might not be well-equipped to perform managerial duties for their businesses (Atkinson, 2017).

Microfinance's micro-enterprise investment training assists clients in managing their businesses and reducing transaction-related risks (Irene, Charles, & Japhet, 2015). The sustained expansion of MSMEs is aided through microfinance education and training. A wider set of performance goals is covered by sustainable business growth, including social and environmental capital in addition to financial resources (Putri, Ridloah, & Wijaya, 2020). Sustainable business growth is defined as an organisation's suitable rate of expansion that boosts its stock of financial, social, and environmental capital, or at least one of these, without lowering any of these capital stocks (Fernando, Jabbour, & Wah, 2019). Recent studies such as those of Fernando et al. (2019), Putri et al., and Evans et al. (2017).have shown that in order to maintain long-term organisational performance, sustainability should be incorporated at a strategic level. If this is done, it will help businesses overcome obstacles like those faced by expanding businesses (Evans et al., 2017).

The restricted ability of MSMEs to obtain funding is partly due to their lack of expertise in financial management, which includes failing to record transactions and produce regular financial reports (Atkinson, 2017; A. Gunawan & Safira, 2022). Financial literacy has a significant impact on MSMEs' economic and financial health. According to Yanto, Baroroh, Hajawiyah, and Rahim (2022), financial literacy is a prerequisite for MSME owners to be able to make sound financial decisions, which is also a crucial component of business continuity (Ullah, Mohsin, Saboor, & Baig, 2020). Tuffour, Amoako, and Amartey (2022) suggest that as a source of knowledge, financial literacy has an impact on the viability of MSMEs. The sustainability of MSMEs in both advanced and emerging countries is strongly correlated with financial literacy (Yanto et al., 2022).. Financial literacy aids MSMEs in adjusting to and profiting from changes in the business environment (Yanto et al., 2022). MSMEs owners with higher financial literacy, perform better because they have a better understanding of strategic financial concerns, while MSMEs with lower financial literacy frequently make financial management mistakes (Yanto et al., 2022). Owners of MSMEs who are financially literate are better able to choose the most lucrative and perhaps successful investments (Calcagno, Alperovych, & Quas, 2020).

The viability of MSMEs depends on their capacity to get loans and acquire the aforementioned skills offered by microfinance banks. Nugroho et al. (2017) suggest that microfinance institutions educate and raise awareness among MSMEs on the need to adopt sustainable business practices. Microfinance institutions educate and create awareness largely focusing on the financial and social aspects of MSMEs' business with less attention on the environmental dimension (Nugroho et al., 2017). Microfinance providers need not limit their education and awareness programmes to only the economic and social strands of small business but include the environmental management skills. The use of green technologies, eco-friendly packaging materials and designs, energy-efficient equipment, the use of clean energy sources like solar, organic farming, solar powered irrigation, refraining from illegal logging, adhering to environmental standards, and making socially responsible investments are just a few examples of how microfinance providers can encourage MSMEs to adopt environmentally friendly practices. These practices would lead to a sustainable economy.

Green management methods have not been widely used in MSMEs' operational procedures (Putri et al., 2020), whereas Ghana has a high number of MSMEs, where the mortality rate is also rising as the number increases annually. Therefore, it is crucial for MSMEs in Ghana to be able to learn about green management techniques. According to Wielgórka (2016), industry is expected to benefit from green management in order to fulfil its social obligations to the society and protect the environment, in addition to helping it increase profits. As a result, environmental education should be incorporated into microfinance's non-financial services to encourage MSMEs to be environmentally responsible.

2.9 Benefits of MSMEs going green

Numerous studies that include those of Orogbu et al., (2017), Leonidou et al., (2017).and Putri et al., (2020) have demonstrated the positive effects that better business environment management can have on small-scale businesses, including waste reduction, cost savings, increased customer satisfaction, increased employee commitment, improved products, closer ties with the public, and competitive advantage (Orogbu et al.,, 2017). According to Leonidou et al., (2017) research, businesses that can demonstrate their concern for the environment through a range of operational business practices will be able to improve their competitiveness. Similarly, MSMEs that implement a green culture throughout all of their business operations can improve their firm's ability to compete (Gürlek & Tuna, 2018). The ability of MSMEs to offer green marketing services might intensify customer purchasing decisions (Putri et al., 2020). If a company can show that it is committed to protecting the environment, this can affect the company's marketing strategy by maintaining and growing market share and differentiating its enterprise from rivals.

The available research (Farghly, Saleh, Youssef, & Bary, 2018; Brahmbhatt et al., 2017; Xu & Zia, 2012) indicates that MSMEs frequently focus more on economic gains, although they might gain more from having a deeper grasp of social and environmental implications. As a result, MFIs must take the lead in fostering MSMEs' understanding of environmental issues by: 1. Delivering pertinent information and direction on the advantages and methods of going green; 2. Offering training and skill development; 3. Offering green loans with favourable conditions; 4. Working with the government to improve MSMEs' access to innovation and technology as well as their ability to compete internationally. Additionally, Atela, Gannon, and Crick (2018) contend that microfinance organisations can work with MSME owners to share best practices to help other MSMEs go green. Moreover, to develop knowledge and capacity to support future green MSMEs, MFIs might work with universities and pertinent government officials.

As a result, discussions about the importance and possible contributions of MSMEs to reduce environmental problems are receiving traction on international agenda, and there is general agreement about the possibility of greater MSMEs’ involvement in safeguarding the environment. While many global sustainability policies, such as the Sendai Framework on Disaster Risk Reduction, do not prioritise MSMEs, other initiatives like the National Adaptation Programs of Action (NAPAs) (Pauw & Pegels, 2013) now make it clear that the MSME sector needs to be more resilient to natural calamities. A significant portion of the UN SDGs can be achieved with the help of resilient and effective MSMEs. Although businesses are starting to take mitigation steps (such as increasing energy efficiency, water efficiency, insurance services, and better seeds), they do not regard environmental risks mitigation and adaptation as routine business (Allet, 2017). Although there is scanty research on MSMEs’ adaptation participation, Linnenluecke and Smith (2018) draw the conclusion that there is scarcity of information about the explicit drivers, obstacles, and results of these organisations' sustainability efforts.

To conclude, MSMEs often have limited technical and financial capabilities to address definite environmental problems to their activities. MSMEs either do not consider environmental problems as a risk factor comparable to, say, lack of finance, or, if they do, they often lack access to sufficient environmental knowledge and experience to effectively foresee and prepare for risks (AXA Group, 2015). Additionally, a number of cognitive and psychological constraints affect how MSMEs perceive climate change as well as their own capacity for adaptation and control over company continuity. Building the resilience of MSMEs consequently requires a vital component: changing attitudes, cultural values, and norms

(Kuruppu, Mukheibir, & Murta, 2014), which calls for more education, training and awareness creation.

2.10 Technical and conceptual definitions of MSMEs

MSMEs are viewed as independent enterprises with a modest market share and are run by their owners or co-owners (Afful-Koomson & Fonta, 2015; Kadarisman, 2019). These enterprises operate on a smaller scale than is typical for their sector.

The definition of MSMEs varies across different countries (Esubalew & Raghurama, 2017; Mehrotra & Giri, 2019) as well as from institution to institution (Agyapong & Arthur, 2018; Verma, 2019). It is therefore extremely difficult to come by one universally accepted definition of small businesses. According to Samantha (2018), Peprah, Abdulai, and Agyemang-Duah (2020) and Nadyan, Selvia, and Fauzan (2021), the criteria normally used to define MSMEs include: number of employees, the enterprise's turnover, assets and market share. Esubalew and Raghurama (2020) posit that the heterogeneous definitions of MSMEs are attributed to the diversity of enterprises involved. What exactly an MSME is depends on who defining it.

Heterogeneity of definitions of MSMEs abound in literature. For instance, according to the World Bank, SMEs are enterprises that have up to 300 workers or that have revenue not exceeding $15million. The European Union (EU) classifies an enterprise as micro if it has less than 10 employees, an enterprise with employees below 50 is considered small, and an enterprise having workers below 250 is referred to as medium enterprise (Gibson & Van der Vaart, 2008). International Finance Corporation (IFC) describes micro-enterprises as entities that employ below 10 people, the total value of their assets is not up to $100,000 and the yearly turnover is below $100,000. Businesses with a workforce falling within 10 and 49 are considered as small whereas medium enterprises employ 50 to 300 workforces. It further states that to be classified as small enterprise, total assets should be $100,000 or more but less than $300,000. To qualify as a medium enterprise, total assets should have a value of $300,000 and above but below $15million and having annual sales values same as that quoted for total assets above (Shi & Michelitsch, 2013).

The United Nations Development Programme (UNDP) gives a wider definition that SMEs are enterprises that employ not more than 200 workers, but contrary to this, the African Development Bank pegs the upper limit at 50 workers.

While MSMEs in China can employ up to 3000 individuals (Mahajan, 2020), SMEs in Vietnam are limited to no more than 300 people (Loan, 2018). The cut-off point for SMEs in Norway is 100 workers (Johansen, 2017). Ferraz and Pereira (2017) state that in both the United States and Canada, an SME is any company with more than five but less than 500 people and less than $50 million in annual gross revenues. A microbusiness is one with fewer than five employees. In Belgium, an SME is defined as an organisation with at least 100 employees (Buyl & Roggeman, 2019). According to the fundamental statute of SMEs in Japan, an SME is any company with a capital of up to 50 million yen and no more than 300 employees. The Indonesia Agency for Small and Medium Enterprises describes small businesses as all household or cottage businesses that employ fewer than 10 full-time employees without using machinery or a motive power, and medium-sized businesses are those that employ between 10 and 50 employees without using a motive power.

In South Africa, MSMEs are termed as SMMEs (small, medium, and micro) enterprises. According to the International Leadership Development Programme (ILDP) (2014), the amended National Small Business Act (2003 and 2004, NSB Act), an SMME is a registered enterprise with less than 250 employees. The NSB Act further has a more specific definition of SMMEs in South Africa. The NSB Act describes a small enterprise as one with employees not exceeding 50. Medium businesses employ at most 100 or 200 workers depending on the sector of activity, be it service, manufacturing, construction and mining, and micro-enterprises refer to businesses that employ a maximum number of five employees and have total annual sales below the value added tax (VAT) registration threshold, which amounts to R150,000 per annum. It further explains that micro-enterprises are usually not formally registered. This covers small home stores (spaza shops), home-based businesses and taxis operations.

According to Kenya's Ministry of Industrialisation, Trade and Enterprise Development, MSMEs are businesses that have employees ranging from one to 99. Using the number of employees criterion, micro-enterprises employ less than 10 workers; small enterprises employ 10-49 employees whereas medium scale establishments employ 50-99 employees. When the focus is on annual turnover, enterprises with annual turnover below KES 1 million are deemed to be micro. Enterprises that have an annual turnover of KES 1million and above but below KES 5 million are considered to be small and businesses with an annual turnover of KES 5 million to KES 10 million are considered to be medium sized (Ministry of Industrialisation, Trade and Enterprise Development, 2020).

In Nigeria, the Federal Government's MSMEs agency, the Small and Medium Enterprises Agency of Nigeria (SMEDAN), uses a similar definition but extends the upper limit of the number of employees for medium enterprises to 199. To reflect the reality on the ground, SMEDAN has carved out a group of businesses below micro level referred to as nano enterprises. A nano business is that which is operated by one person and has an asset value of less than N 100,000.

2.10.1 Definition of MSMEs in Ghana

There is a large number of MSMEs in Ghana and the definitions given by various official institutions are not in unison. The upper limit of employees used by institutions that define MSMEs fail to converge. International definitions of MSMEs frequently include organisations that are much bigger than those in Ghana. This is a reflection of the Ghanaian economy's modest size, among other reasons. Employment is the main factor considered in determining the size of an organisation in Ghana. The organisation's fixed asset value is another criterion used to define micro, small, and medium firms. For instance, the Ministry of Local Government and Rural Development (MLGRD) classifies a business that has one and not exceeding nine employees as a small business, a medium business employs 10 up to 20 workers, and a large business employs more than 20 people. According to the Ghana Statistical Service (GSS) (2016), micro-enterprises are businesses that employ one to five people in the service as well as in the manufacturing sectors or having total fixed assets, not including land and buildings, that do not exceed \$10,000. On the other hand, small businesses employ six up to 29 employees or have a total fixed assets value under \$100,000, medium-sized businesses have 30 up to 99 workforces, whereas large businesses employ a minimum of 100 workers. The Venture Capital Fund Act 2004 (Act 680) classifies an SME as an enterprise that employs fewer than 100 workers and having a total fixed asset, valued at not more than \$1 million.

Micro-enterprises, as defined by the National Board for Small Scale Industries (NBSSI), are characterised by having a workforce of one to five employees and possessing total fixed assets valued at less than \$10,000, excluding land and buildings. Small businesses are defined as enterprises that employ between 6 and 29 individuals or possess fixed assets valued at less than \$100,000, excluding land and buildings. Large firms typically employ 100 or more individuals, whereas medium-sized businesses typically have a workforce ranging from 30 to 99 personnel. In order to ensure uniformity in the creation of support systems and incentives, monitor progress, and for efficient research activities, the government of Ghana needed to provide a standardised definition for MSMEs that would be adopted by all institutions throughout the country. It is in this light that the Ghana Enterprise Agency (GEA, 2021a) has prescribed a definition for MSMEs to be adopted by all institutions in Ghana. This latest definition by the Ghana Enterprise Agency (GEA), previously known as NBSSI, describes a micro-enterprise as a business that has permanent employees of one and a maximum of 5, turnover of an amount less or equal to GH¢150,000 or assets of an amount less or equal to GH¢150,000. Small enterprises are those with permanent employees of six and maximum of 30 and turnover of fixed amount of GH¢150,006 to 6,000,000 or assets of a fixed amount of GH¢150,006 to 6,000,000. Enterprises that employ 31 up to 100 permanent workers are referred to as medium sized. They have a turnover of fixed amount of GH¢6,000,006 to 18,000,000 or assets of a fixed amount of GH¢6,000,006 to 18,000,000. The current research adopted this definition as it is currently the nationally prescribed definition for research activities and data collection relating to MSMEs.

Various countries have different yardsticks for defining MEMEs. Table 1 illustrates the heterogeneity of MSME definitions in some countries.

Table 1: Classification of MSMEs in different jurisdictions

	Number of Employees			Turnover		
	Micro	Small	Medium	Micro	Small	Medium
EU	< 10	< 50	< 250	$3m	$13m	$67m
USA	0	<100	<500	0	0	0
Egypt	1 to 4	5 to 14	15 >	0	0	0
South Africa	< 20	50-99	100-200	<R150k	R2m to R4.5m	R4.5 to R50m
China	0	<300	300 >	0	<Y30	Y30 >
Kenya						
Nigeria	Less than 10	10 to 49	50 to 199	Up to N20m	Above N20m to N100m	>N100m<=N500m
Ghana	Up to 5	6 to 30	31-100	<=GH¢150 k	GH¢150.006k- GH¢6m	GH¢6.006m – GH¢18m

Source: Author's compilation from literature review

2.10.2 Micro, small and medium-sized enterprises' access to finance

One of the debilitating hiccups impeding the survival and growth of MSMEs in Sub-Saharan Africa is the financing quagmire. According to García Moritán (2020), Singh et al. (2018), Mukherjee (2018) and Atiase (2017), access to credit is one of the fundamental challenges that confronts MSMEs. According to studies by Boadi, Dana, Mertens, and Mensah (2017) and Harvie (2010), the theory underlying the existence of financing gaps for enterprises and the problem of access to capital by firms in general can both be linked to Stiglitz and Weiss's (1981) theory of imperfect information in capital markets. It is challenging for MSMEs to get external financing in the form of debt and equity (Boadi et al., 2017).

According to Harvie (2010), there is a gap when certain types of businesses that need funding consistently cannot get it notwithstanding their preparedness to pay higher interest rates. This is a sign of market failure, especially when profitable lending prospects are involved. A company is financially constrained when it has access to potentially lucrative investment possibilities but lacks the resources to take advantage of them (Tambunan, 2018 & Wajebo, 2022). However, this idea does not differentiate between actual and imagined gaps. If a company's risk profile is significantly higher than the extent at which investors are ready to provide capital at a particular rate in a competitive market, funding may be refused. Desalegn (2021) claims that supply-side or demand-side variables may be to blame for the financing gap. The supply-side restrictions examine the willingness of potential financial providers to provide funds to MSMEs under terms and conditions that are agreeable to them. If acceptable sources of financing are not offered at terms and conditions that are favourable to creative MSMEs, then supply-side limitations take precedence. Therefore, according to Mittal and Raman (2021), the lack of financial support from core or mainstream institutions like banks is to blame for the financing gap. If entrepreneurs fail to take advantage of available financing options due to a lack of quality projects or strong business plans, demand-side constraints will result (Organisation for Economic Co-operation and Development [OECD], 2004). It could also be due to entrepreneurs' reluctance to use available capital due to concerns about diluting the managerial powers of their enterprises, preferences, perceptions, and strategic growth objectives, all of which may reduce or increase the severity of funding limitations.

According to Zavatta (2008), there are other factors at play when it comes to MSMEs' difficulties obtaining outside funding. Due to the fact that businesses also choose their financing, demand-side limits may also exist. Despite the numerous loan programmes offered by banks and the government, MSMES are hesitant to apply for bank credits out of fear that their businesses would be taken away if they failed to meet the terms of the agreement, provide collateral security, meet the high cost of credit, and receive credits late (Esubalew & Raghurama, 2021; Etemesi, 2017) Huyghebaert and Van de Gucht (2007) discovered that business owners that place a high value on individual control benefits better manage their loan stock. This equally applies to equity financing as business owners are frequently unwilling to give up some of their company's ownership to outsiders (Zavatta, 2008). Additionally, Ebiringa (2011) posited that these businesses should organise their initial capital to lessen the risk of possible early failure. This helps firms to lessen their reliance on bank debt, especially short-term bank loans. Huyghebaert, Van de Gucht, and Van Hulle (2007) came to the conclusion that these findings support the hypothesis that banks adhere to stronger liquidation standards than suppliers.

Access to external financing may be hampered by inadequate knowledge of the financing choices accessible to MSMEs or by a lack of general information. MSMEs are frequently unaware of the proper kind of financing they require or other options to secure funding from banks (Abor, 2016; Alfred & Xiao, 2013; Atkinson, 2017). For instance, according to a CBR poll (2008 cited in Business Innovation and Skills [BIS], 2012), just 20% of UK SMEs were aware of a local provider of venture capital. According to BIS (2012), demand-side market failures may be particularly severe in enterprises looking for equity financing because many MSMEs lack knowledge about how equity financing operates and where to find it. According to Karajkov (2009), the demand-side issues that significantly affect the current state of access to risk finance include a lack of awareness, education, and interest on the part of businesses. According to Karajkov's (2009) analysis, it has become increasingly clear that a greater number of entrepreneurs are unaware of the numerous financing choices that are accessible, which has led to a focus on the demand-side of the investment paradigm.

Access to financing can also be influenced by managers’ perceptions of MSMEs. If there are perceived problems, entrepreneurs can decide against seeking outside funding. There may be two reasons for this: either they believe their application will be rejected, in which case there is no use, or they believe they lack the knowledge and a solid credit history that banks want. It could happen that business owners from particular groups, like women or ethnic minority, mistrust bankers and think that there is institutional prejudice in financial institutions (Deakins, Whittam, & Wyper, 2010). Deakins et al. (2010) cited an Allinson report for the Small Business Service that stated: "If people do not present themselves to a financial institution in the first place, because of self-selection and possibly supported by a belief in a myth, then the institutions' rates of granting loans may be quite high - that they are meeting demand."

The literature has identified various demand-side characteristics as factors impacting the barriers affecting access to external credit. Quartey et al. (2017) assert that the age and size of a corporation have an impact on the sources of finance. According to Sari and Rahmantika (2021), Anthony Abiodun Eniola (2018), and Abiodun Anthony Eniola (2018), firm characteristics and entrepreneurial traits can have an impact on how MSMEs choose to finance their business. Firm characteristics can include things like the firm's size, age, and accessibility to marketing materials and financial data. Olawale and Asah (2011) also referred to the influence firm and entrepreneurial traits have on MSMEs' access to financing. Additionally, Mole, North, and Baldock (2017) divided the elements influencing access to financing into information preparedness, firm characteristics, and characteristics of the entrepreneur. According to Ingólfsson (2011), demand-side factors offer an alternate explanation for the capital structure of businesses. He conducted a study on the analysis of funding restrictions and their implications on Danish SMEs' aspirations for internationalisation. The firm-related issues were looked at in the context of demand-side financing limitations. It was discovered that subjective influences can change a firm's propensity to apply for outside financing.

2.10.3 Micro, small and medium-sized enterprises sector in Ghana

Micro, small and medium-sized (MSMEs) are important to Ghana's economic development by providing disadvantaged populations such as women, young people, and low-skilled workers with job opportunities (Atkinson, 2017). MSMEs are typically registered as sole proprietorships and require lower capital because they are more labour-intensive than larger businesses (Tulung & Lengkong, 2021). MSMEs are engaged in a wide range of commercial activities. According to Agyapong (2020), MSMEs primarily work in manufacturing or retail trading. The number of MSME activities that occur in the retail trading sector differs greatly between rural and urban locations.

In Ghana, MSMEs can be classified as either urban or rural businesses (Abor & Quartey, 2010). MSMEs can also be divided into formal and informal businesses. The former have paid employees, registered offices, and are registered businesses (Abor & Quartey, 2010). The latter, however, primarily consist of family units, lone artists, and women working in food vending and similar industries. The main pursuits in this industry are soap and detergents, textiles, clothing and tailoring, leather, village blacksmiths, tin-smiting, ceramics, timber and mining, beverages, food processing, bakeries, wood furniture, electronics repairs, agro-processing, chemical-based goods, and mechanic works (Abor & Quartey, 2010).

MSMEs are the main industrial players in Ghana and have a lot of potential for speeding the economic growth required for wealth creation and poverty alleviation (Adaletey et al.. 2022).

MSMEs make up around 92% of enterprises in Ghana, are responsible for 85% of manufacturing employment, and are responsible for roughly 70% of GDP (Adaletey et al., 2022). Though statistics from Ghana's Registrar General's office show that almost 90% of registered firms are MSMEs, there is no specific information on the number of MSMEs in Ghana that is currently accessible (Amoah & Amoah, 2018). The author posits that this phenomenon can be attributed, in part, to the prevalence of unregistered informal sector activities among the bulk of MSMEs. The UNCTAD Report (2005) asserts that the statistics pertaining to MSMEs are inadequate due to several factors, such as the absence of a universally accepted definition, the elevated expenses associated with conducting industrial surveys, and the prevalence of unregistered MSMEs in Ghana that persist in operating outside the formal economy.

It has been determined that management control and ownership cannot be separated in MSMEs. According to Biney (2018), it is difficult to separate SMEs' ownership from their control in Ghana. The fact that most MSMEs in Ghana produce their goods or provide their services to local clients is another crucial aspect of these businesses (Setyawati, Suroso, Adi, Adawiyah, & Helmy, 2020). However, only a few of these MSMEs are able to market their goods internationally (Setyawati et al., 2020). Ackah and Vuvor (2011) previously noted that this is mostly due to the significant financial needs for engaging in foreign trade as well as the inadequate educational attainment, training, and responsiveness of some MSME owners. Moreover, most of these MSMEs function with no technological proficiency (Ackah & Vuvor, 2011). A 2005 study conducted by Aryeetey and Ahene regarding the evolving regulatory landscape for MSMEs and their performance, it was found that MSMEs in Ghana typically originate as tiny enterprises and eventually disband as small businesses, without experiencing any noticeable improvement in employment or productivity. Aryeetey and Ahene (2005) proposed that it is imperative to allocate greater focus on SMEs in Ghana, intending to enhance their prospects for growth and advancement.

2.10.4 Categories of microfinance institutions in Ghana

MFIs have been classified as formal, semi-formal and informal institutions that offer microfinance services to the underserved and disadvantaged small businesses. The Bank of Ghana (BoG) has regulatory authority over financial intermediation and credit activity. The regulatory framework established by the Non-Bank Financial Institutions (NBFI) Law as revised by Act 918 (2008) and the Banking Law as amended by Act 2016 (ACT 918) allows for a tiered system of authorised financial services and regulations that govern them.

Rural and community banks (RCBs), savings and loans (S&L) companies, finance houses, some commercial and development banks make up the formal providers of microfinance services. Formal providers of MFI are incorporated under the Companies Act 2019 (Act 992), as amended, giving them legal identities as limited liability companies. The Bank of Ghana (BoG) then grants them licences under the Banks and Specialised Deposit-taking Institutions Act, 2016 (ACT, 930), or the Financial Institutions (Non-Banking) Act 2008 (ACT 774) to provide financial services under Bank of Ghana regulation. The Banking Law applies to RCBs, but they are not permitted to conduct foreign exchange activities. Their local catchment region serves as their main source of clients, and they have a far lower minimum capital requirement. The BoG authorises, registers, and supervises their operations.

Rural banks are public institutions whose ownership is vested in the local communities albeit BoG owns some shares in them. In the Banking Law, RCBs are regarded as unit banks. Rural banks are only allowed to conduct business within a specific geographic area and may only provide limited banking services, such as loans and checking, savings, and time deposits. Furthermore, rural banks mostly do not adopt a pool voting system but rather one shareholder, one vote arrangement, which makes the control structure in terms of voting and ownership of rural banks mimic those of credit unions. In contrast, the S&L Companies are privately owned, registered, and authorised in accordance with the NBFI Law. They are only permitted to offer a few specific financial services, like loans, savings accounts, and time/fixed deposits. A minimum of GHS 1,000,000 is required as initial capital for rural banks, of which at least 75% must be in liquid cash resources to support operations. The initial capital requirement for S&L companies is GHS15,000,000, which is far less than the standards established for commercial and development banks.

Credit Unions, Cooperatives, Financial Non-Governmental Organisations (FNGOs), and Susu Associations are some of the semi-formal providers of microfinance. These institutions are formally registered. FNGOs are registered as non-profit making businesses limited by guarantee. Their emphasis on eradicating poverty allows them to penetrate disadvantaged consumers quite deeply using microfinance approaches, albeit typically on a small scale. Since they lack an authorisation to accept public deposits, they must use outside (often donor) monies to provide microcredit.

Credit Unions are registered under the Law on Cooperatives to only take deposits from and lend money to their members. They are governed by the Credit Union Supervisory Board, appointed by the government. They must also be registered with and granted a licence by the BoG by the NBFI Law. Even though credit unions are subject to NBFI Law and Bank of Ghana licensing, the BoG has granted the top body, Ghana Cooperative Credit Union Association, permission to continue to oversee the societies on its behalf under the Co-operative Credit Union Regulations, 2015 (LI 225).

Many NGOs provide small loans and other non-financial services to their clientele with no oversight regulations by governmental organisations. A lot of NGOs that provide small loans are a part of the Ghana Micro Finance Network (GHAMFIN), an umbrella organisation that provides staff development programmes, encourages the growth of organisational capacity, and educates members on best practice standards and guidelines for effective management control and sustainability. On the other hand, informal providers of microfinance include moneylenders, Rotating Savings and Credit Associations (ROSCAs), and susu "clubs" that mix savings and credit and are run by a single individual. In addition, unsecured loans from friends and family, Self Help Groups, and trade creditors are included. The Moneylenders Ordinance of 1957 required moneylenders to obtain licences from the police; however, this rule has since been repealed, and moneylenders are now required to apply for licences from the BoG. Most of the time, the Bank of Ghana does not register or regulate this set of microfinance companies, and legal documentation is infrequently involved.

The bulk of informal microfinance providers are susu collectors, who collect monies regularly, often on a daily basis as savings of primarily female traders and proprietors of micro and small companies. Operators of susu are actually not key participants in the loan-making process when it comes to the overall savings they manage and collect. Yet, the women who operate small enterprises and sell their wares at markets at times receive small loans from their susu collectors against their predetermined susu contributions over a specified period of time. The susu collectors are able to grant small loans to their clients due to financial support from the financial institutions such as RCBs, Credit Unions and some traditional banks where they deposit the susu collected. There are suggestions that the credit component of individual susu collectors was developed in response to growing competition among susu collectors for petty traders and micro-entrepreneurs' money. The susu club is an adaptation of the susu collecting system, in which the members who are mostly female market vendors and owners of small businesses go to a designated location on a specific agreed day or days in a week to deposit their contributions with the susu operator who oversees the susu club. The setup makes it possible for a susu collector to safeguard the savings deposits of a much larger clientele. In order to enhance their credibility, a number of individual susu collectors have joined an umbrella association, the National Association of Susu Collectors. This association has taken steps to establish accreditation and identification procedures for their members as well as a means of deposit protection for the clients of their collector-members who might otherwise defraud them of their money. Susu clubs and individual collectors are neither registered with any government body nor are they even allowed to function as clubs. Susu clubs have a larger clientele base than individual susu collectors. Whereas susu clubs can provide services to clients numbering from 400–500, individual susu collectors may attend to 150–200 clients.

Informal microfinance providers include: money lenders, rotating savings and credit associations (ROSCAs), accumulating savings and credit associations (ASCAs) traders, and input suppliers. Though there are several microfinance institutions in Ghana, this study focused on rural banks and credit unions because these are the dominant microfinance institutions with large patronage in the study area.

2.11 Rural and Community Banks

When idea of rural and community banking was first conceived, farmers and traders had limited access to bank credit, particularly in rural areas. Rural banks were expected to prosper under this novel business model focused on community empowerment, community ownership, and community involvement in governance (Palazzo, Deigh, Foroudi, & Siano, 2020). Rural and community banks are considered formal microfinance providers. The 1970s saw the beginning of rural banking. Before the establishment of rural and community banks, money lenders, traders, and "susu collectors" operating out of the informal sector served as the primary financial intermediaries in rural communities. The rural poor did not receive financial services from commercial banks. As a result, the rural poor depended on money lenders, who charged high interest rates for their financial services. It became apparent that the current formal financial institutions, created with the intention of displacing the allegedly detrimental informal operators, particularly moneylenders, were not able to address the demands of the rural poor. Rural banks were founded to provide an avenue for the low-income people to have access to credit at reasonable interest rates as compared to money lenders and also to receive other financial and non-financial services. In July 1976, the first rural bank in Ghana was established at Agona Nyarkrom in the Central Region.

A rural bank is a locally owned and operated financial institution. Rural banks can only to conduct business within a specific geographic area and may only provide limited banking services, such as loans and checking, savings, and time deposits. Furthermore, rural banks mostly do not adopt a pool voting system but rather one shareholder, one vote arrangement; therefore, semblance is in the control structure in terms of voting and ownership of rural banks and credit unions. Rural banks were purposefully founded to mobilise rural savings, provide loans and other banking services to rural people, be a tool for rural development, and contribute to national development.

In 1981 the 31 rural banks that were in operation established the Rural Bankers Association to represent and promote the interests of RCBs as they became increasingly prevalent. Later, the name was changed to the Association of Rural Banks (ARB), Ghana. Later, on July 2, 2002, Apex Bank for rural banks was founded to offer member institutions essential banking and non-banking services. In comparison to typical banks, RCBs have a greater reserve requirement, which is set at 43% of total deposits. The 8% reserve requirement for RCBs must be satisfied by primary reserves, a 5% deposit with the ARB Apex Bank, and a 30% secondary reserve. As a result, rural banks currently require 43% of their assets to be liquid. The reserve requirement is subject to review by the BoG. The total number of rural and community banks in the country as at December 2022 was 145. The BoG oversees and regulates the RCBs.

RCBs have played a significant role in the financial sector by inculcating the habit of savings in the low-income earners and extending credit to same. Though the consolidated assets and liabilities of RCBs are infinitesimal as compared to the traditional banks, the impact of their contribution to MSMEs is enormous. According to the BoG, RCBs' total assets at the close of 2018 was GH¢4,144.18 million. Loans and advances form the second largest proportion of the total assets after bills and bonds. Loans and advances for 2018 were GH¢1,340.81million representing 32.35% of the total assets (Bank of Ghana fourth quarter report. 2018). In 2019 total assets increased by 13.13% from GH¢4,144.18 million in 2018 to GH¢4,688.32 million. Again in 2019, loans and advances increased by 11.81% from GH¢1,340.81million to GH¢1,499.16 million. There was a significant improvement in total assets in 2020, and at the close of 2020, total assets amounted to GH¢6,170.90 million as against GH¢4,144.18 million in 2019, representing an increase of 31.62%. Loans and advances amounted to GH¢1,688.80 million constituting 27.37% of 2020 total assets (Bank of Ghana fourth quarter report. 2020). Furthermore, in 2020 there was an increase of 12.65% in loans and advances, from GH¢1,499.16 in 2019 to GH¢1,688.80 million.

Mobilisation of deposits by RCBs in recent years has kept on improving. In 2018, total deposits amounted to GH¢3,354.13 million. In 2019, the total deposits increased to GH¢3,908.99 million, reflecting an increase of GH¢554.86 million or 16.54%. In 2020, deposits mobilised by RCBs improved remarkably amounting to GH¢5,353.10 million as compared to the 2019 figure of GH¢3,908.99 million, denoting an increase of GH¢1,444.11 million or 36.94%.

Table 2 and Table 3 present a summary of the consolidated assets and liabilities of RCBs from 2018 to 2022.

Table 2: Rural banks' consolidated assets and liabilities (GH¢' million): 2018–2020

Assets	**2018**	**2019**	**Change**	**2019**	**2020**	**Change**
Cash Holdings & Balances with Banks	542.03	683.21	26.05	683.21	870.5	27.41
Bills and Bonds	1,600.41	1,829.60	14.32	1,829.60	2,894.50	58.20
Loans and Advances	1,340.81	1,499.16	11.81	1,499.16	1,688.80	12.65
Other Assets	660.93	676.34	2.33	676.34	717.2	6.04
Total Assets	**4,144.18**	**4,688.32**	13.13	**4,688.32**	**6,170.90**	31.62
Liabilities						
Total Deposits	3,354.13	3,908.99	16.54	3,908.99	5,353.10	36.94
Shareholders' Funds	504.01	431.02	-14.48	431.02	377.2	-12.49
Other Liabilities	286.04	348.32	21.77	348.32	440.6	26.49
Total Liabilities	**4,144.18**	**4,688.32**	13.13	**4,688.32**	**6,170.90**	31.62

Source: Bank of Ghana quarterly statistical bulletins (2018, 2019 & 2020,)

Total assets of RCBs amounted to GH¢6,758.8 million in 2021, representing a growth of 9.53% at the end of 2021 as indicated in Table 3. Total assets of RCBs constituted 3.6% of the banking system assets at the end of 2021. According to the BoG data, deposit mobilisation by the RCBs further improved in 2021. Total deposits of RCBs increased by 11.66% to GH¢5,977.2 million at the end of 2021, from GH¢5,353.1 million recorded for 2020.

Despite the huge number of the populace served by RCBs, the data demonstrates that in recent years the total assets of RCBs have not gone beyond 4% of that of conventional banks. The proportion of RCBs' total assets to that of conventional banks was 4% for 2018, 3.6% for 2019 and 4%, 3.7% and 3.8% representing 2020, 2021 and 2022 respectively. The level of RCBs deposits at the end of 2022 constituted 5.4% of total private sector deposits of the banking system, falling from the recorded 2021 proportion of 5.57%. RCBs registered an increase in deposits in 2020 which constituted 5.7% of private sector deposits mobilised through the banking system as compared to 5.3% recorded in 2019. In 2018, RCBs' deposits share constituted 5.7% of deposits mobilised through the banking system. The above analysis suggests that RCBs mobilize as little as 5% of deposits of the banking system. In view of this it is crucial for RCBs desirous of going green to seek for alternative sources for green finance.

Table 3: Rural banks' consolidated assets and liabilities (GH¢' million): 2020–2022

Assets	2020	2021	Change	2021	2022	Change
Cash Holdings & Balances with Banks	870.5	869.4	-0.13	869.4	1,401.35	34.81
Bills and Bonds	2,894.50	3,128.20	8.07	3,128.20	4,025.05	9.84
Loans and Advances	1,688.80	2,050.30	21.41	2,050.30	2,367.87	13.81
Other Assets	717.2	710.9	-0.88	710.9	753.83	5.25
Total Assets	**6,170.90**	**6,758.80**	**9.53**	**6,758.80**	**8,548.10**	13.77
Liabilities						
Total Deposits	5,353.10	5,977.20	**11.66**	5,977.20	7,527.26	13.19
Shareholders' Funds	377.2	389	3.13	389	473.77	17.26
Other Liabilities	440.6	392.6	-10.89	392.6	547.07	19.13
Total Liabilities	**6,170.90**	**6,758.80**	**9.53**	**6,758.80**	**8,548.10**	13.77

Source: Bank of Ghana quarterly statistical bulletins, (2020, 2021 & 2022)

The loans and advances portfolio of RCBs amounted to GH¢2,050.3 million in 2021, indicating a growth of 21.41%, from GH¢1,688.8 million recorded at the end of 2020. By the close of 2022, the loan portfolio grew to GH¢2,367.87 million, recording an increase of 13.81%. Similarly, deposits grew by 13.19% to stand at GH¢7,527.26 million from the 2021 deposits amount of GH¢5,977.20 million.

2.12 Credit unions

The concept of credit unions began over a century ago. According to D. McKillop and Wilson (2011), credit union had its root in Germany as far back as 1846 and thereafter replicated across the globe. The first name that comes to mind when studying the evolution of credit union globally is a German called Friedrich Wilhelm Raiffeisen (Mangan, 2009). His father was a German church minister. He was moved by what happened to small farmers in the 1846–1847 famine. According to the literature, small farmers needed loans to escape poverty but were unable to obtain them from the traditional banks and were instead forced to turn to moneylenders who charged outrageous interest rates. These farmers were persuaded by Raiffeisen to organise tiny cooperatives, combine their savings, and turn them into loans in order to take control of their own future. Raiffeisen concluded that the farmers' money had been wiped out by the hunger. They had significantly more credit needs than they could afford to save. He persuaded the area's wealthier residents to contribute their resources in order to help the impoverished. He ensured that the rich did not take control of decision-making. There were equal voting rights among the rich and poor, keeping control in the hands of the majority poor. Raiffeisen spent nearly two decades to establish and operate the cooperative credit union. The success of this project served as the model for thousands of disadvantaged people-owned credit cooperatives. From Germany, it was mimicked across Europe, USA, Canada, and Latin America (Mangan, 2009).

Cooperative societies are distributed worldwide, providing essential services that would be impossible to obtain otherwise. In developing nations, cooperatives like credit unions have been incredibly successful at assisting people to support themselves in locations and communities where private and other corporate assets do not see significant revenue and success (Gupta, 2006). D. G. McKillop and Wilson (2015) pointed to the fact that in 2013 there were 56,904 credit unions across 109 countries with approximately 207.9 million members. Credit unions have been successful in solidifying their position as significant economic models on a global scale. They have a major effect on the national economy in various countries (D. G. McKillop & Wilson, 2015). The prime objective of credit unions is to serve their members while also strengthening the social capital of the area in which they operate. The idea behind credit unions is that people with shared interests form social groups, mobilise funds regularly, and after a defined period (usually six months), members in need of loans can apply with reasonable interest rates (Tetteh, Baffoe, Boateng, & Teye, 2021). Credit unions are small, non-banking financial cooperatives whose members control and manage them by pooling their savings. In addition to receiving loans with fair interest rates, members are offered other financial services (Tetteh et al., 2021).

In Ghana, the majority of credit unions operated mostly in rural areas where residents engaged in small and micro economic activities (Adusei & Appiah, 2011; Dunford, 2009; Sarfo, 2018). People in this sector of the economy often made relatively little money. The credit unions in these rural locations assisted the locals with saving money and/or encouraged them to do so through workshops and education (Adusei & Appiah, 2011; Dunford, 2009; Sarfo, 2018). The first credit union in Ghana was founded in Jirapa, in the northern part of Ghana, precisely in the Upper West Region, in 1955 by a Catholic priest named Father Peter Poreku Dery. It adopted the 1846-developed German idea. According to the World Council of Credit Unions (WOCCU), Ghana was the first country in Africa to operate a credit union. Farmers, traders, processors, and non-agricultural workers who were members of the credit union were encouraged to practise thrift and save money for worthwhile projects that would enhance the socioeconomic conditions of the community. The African Confederation of Co-operative Savings and Credit Associations (ACCOSCA), with its headquarters in Nairobi, Kenya, oversees the activities of all African Credit Unions.

Most credit unions operated under the auspices of religious and other organisations, such as churches and educational or community organisations. Due to this, people in remote areas became eager to entrust the operators with their money. As a result, the employees of the aforementioned unions became members of other credit unions that were established and run at workplaces. Another benefit that aided credit unions in their work was the ability of their members to save money locally and have the chance to obtain loan facilities under circumstances that will be in their favour when a need arises (Amoah, Ohene-Asare, Bokpin, & Aboagye, 2018). Credit unions give their members the chance to obtain credit facilities at fair interest rates and better terms than those provided by the traditional banks as well as flexible repayment terms. Several credit unions also offer their members training in credit management, poverty alleviation, and investment counselling services that some financial institutions do not offer (Amoah et al., 2018). Credit unions benefit their members and the community in diverse ways and encourage thrift. They encourage their members to regularly save so that they can accumulate a fund or pool of funds for their advantage as well as the benefit of their dependents. Furthermore, credit unions teach their members the value of saving money. According to credit unions, it is essential to instil the habit of regular saving into people for them to develop holistically.

Credit unions also impart a greater sense of responsibility in people. Being accountable puts Prudential Financial management in the spotlight, which controls members' spending patterns on their own. More crucially, a credit union provides its members with a source of credit. Loans at a just and reasonable interest rate are available to credit union members. When credit union members pool their funds quickly, a sizable amount of savings is mobilised, which improves the administration of loans to members at favourable interest rates. The community's most vulnerable members can obtain loans and savings accounts through a credit union. The wellbeing of the communities where credit unions operate is also promoted by them. This promotes the holistic development of everyone in a community, regardless of class.

2.13 Complementarity of microfinance institutions' financial and non-financial services

To boost productivity and promote organisational efficiency, most MFIs merged financial and non-financial services. MFIs offer both financial and nonfinancial services that complement each other to support MSMEs' sustainability. According to CGAP, (2004), microcredit is not always the solution; the poor who have no means of repayment must first find alternative forms of assistance before they may use loans. Among other things, they recommended that in many situations, training programmes and other non-financial services would be more effective instruments for reducing poverty. This finding demonstrates the significance of the non-financial services offered by microfinance institutions in facilitating the functioning of these institutions and enhancing the performance of MSMEs. The rationale behind advocating for a synergistic approach to microfinance is grounded in the concept that human development and poverty alleviation arise not solely from the availability of financial resources, but also from the provision of vital services that empower individuals living in poverty to enhance their standard of living.

It is conceivable that MFIs' financial and non-financial services work in concert to improve MSMEs' performance. The micro-enterprise investment training provided by microfinance helps clients manage their enterprises and lower transaction-related risks (Irene et al., 2015). By microfinance education and training, MSMEs' steady growth is facilitated. The inability of MSMEs to manage their finances effectively, which includes failing to record transactions and generate regular financial statements, limits their capacity to access capital (Atkinson, 2017; A. Gunawan & Safira, 2022). The economic and financial well-being of MSMEs is significantly impacted by financial literacy. According to Yanto et al. (2022), financial literacy is a prerequisite for MSME owners to be able to make sound financial decisions, which is also a crucial component of business continuity (Ullah et al., 2020). The viability of MSMEs depends on their capacity to get loans and acquire the necessary skills microfinance enterprises offer to manage their businesses. Thus, owners of MSMEs who are financially literate are better able to choose the most lucrative and perhaps successful investments (Calcagno et al., 2020) to reap sufficient returns to pay back their loans and make savings. A culture of savings that is inculcated into MSME owners through the non-financial services of MFIs assists them in procuring new technology, seize future business opportunities, and pay their short-term debts when they are due (ATTOM, 2016). Small business operators have inadequate risk management skills and knowledge (Panigrahi, 2012), so most MFIs link insurance as a condition for credit and also educate MSMEs about the importance of insurance in business.

This is crucial because microinsurance serves as a tool for transferring risk, a means of support during shocks and other types of natural disasters, offering comfort and loss protection (Navare & Handley-Schachler, 2018). In the view of Mukhtar (2013), microinsurance provides financial protection for small business owners and the vulnerable who sustain losses during their operations. It also gives them peace of mind. Microinsurance also allows credit and savings to be used more effectively to expand business to create more jobs (Ime & Ikechukwu, 2017). The environmental awareness campaign together with provision of credit assists MSMEs to adopt green technologies, eco-friendly packaging materials and designs, energy-efficient equipment, the use of clean energy sources like solar, organic farming, solar powered irrigation, refraining from illegal logging, adhering to environmental standards, and making socially responsible investments.

Financial and non-financial services complement each other in the sense that non-financial services maximise the benefits derived from the former. Financial services also enhance the capacity of MSMEs to further develop managerial skills and competences leading to better management of financial resources. The financial and non-financial services provided by microfinance institutions are depicted in Figure 5. As seen in the diagram, the provision of financial services is not conducted in isolation, but rather in conjunction with the non-financial services provided by microfinance firms.

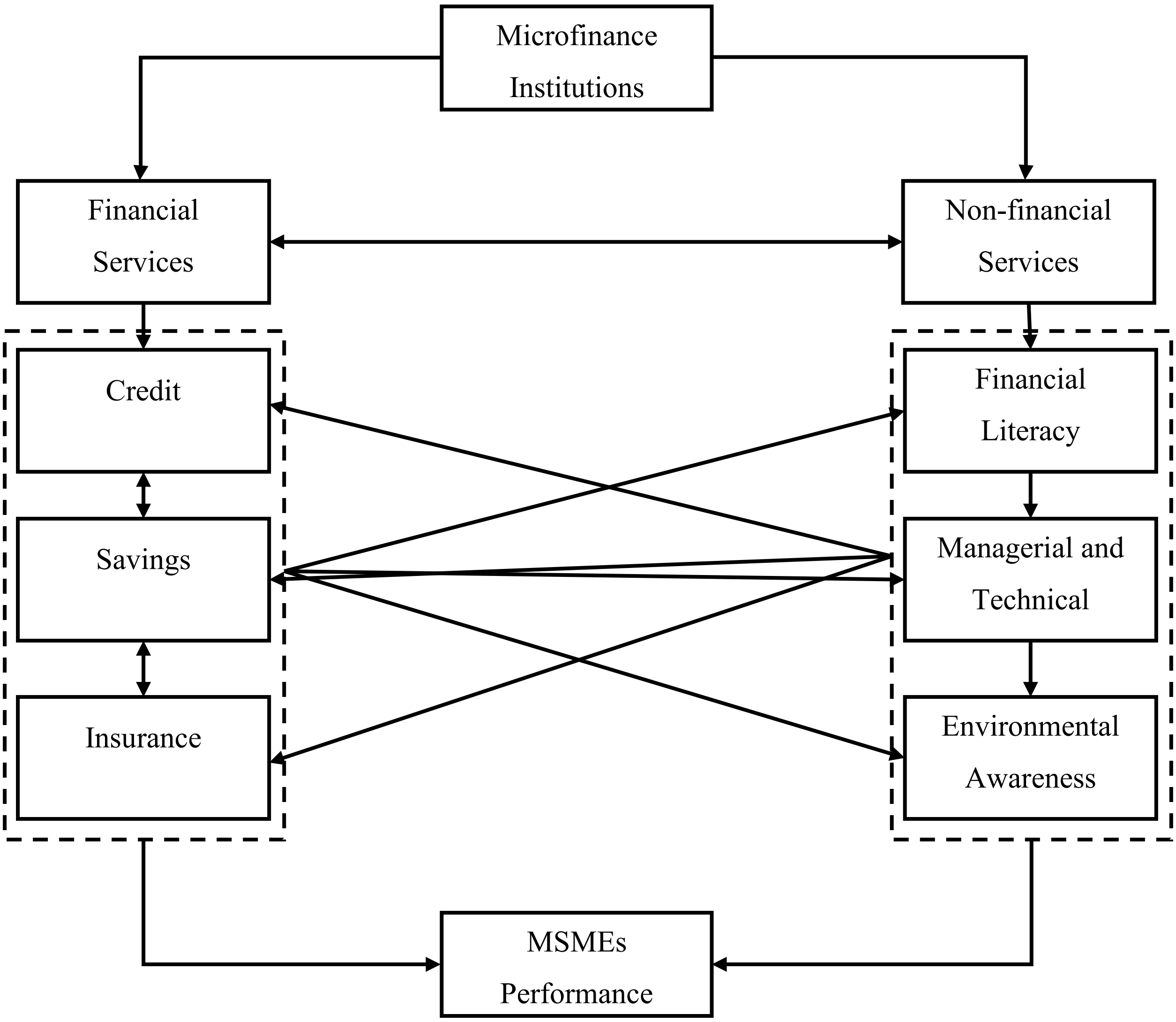

Figure 5: The nexus between microfinance institutions' financial and non-financial services

Source: Researcher's own construct from literature review

2.14 Factors that drive MSMEs to adopt green operations

MSMEs constitute over 92% of all businesses (Adaletey et al., 2022) scattered across the length and breadth of Ghana and they are mostly unregistered and least regulated (Agyapong, 2020). The expansion of small businesses strengthens the economy of emerging countries. Meanwhile their cumulative activities have dire consequences for the environment and this has generated a clarion call for MSMES to adopt the TBL approach. The TBL framework promotes sustainability. Scholars have long connected this idea of sustainability to the TBL, which aims to coordinate the social, environmental, and financial results of a company (Braccini & Margherita, 2018; Correia, 2019; Hussain et al., 2018). The TBL viewpoint highlights the conceptual and strategic orientation of businesses working to achieve balanced resource use and regeneration (Amui, Jabbour, de Sousa Jabbour, & Kannan, 2017; Maheshwari, Samal, & Bhamoriya, 2020). Though such an idea of a business outcome may sound practical for TBL, it calls for significant adjustments from businesses, including alignment of their business practices, cultures, and employee pools, a necessity for any company dedicated to sustainable endeavours (Kumar, Meena, & Difrancesco, 2021). The motivations for following green practices, the value of fostering a positive outlook in employees, and the alignment of human resources with TBL framework objectives have all been thoroughly discussed in literature. According to studies, large firms understand the advantages of being environmentally friendly, as opposed to MSMEs, who have yet to see how environmental protection may boost productivity, cut expenses, and raise profitability (Petitjean, 2019). The question therefore is, do the MSMEs that adopt green operations do so for different motivations? Therefore, it is important to identify the drivers or motivators that lead MSMEs to embrace green business practices or environmental management. Numerous studies have looked into the factors that influence businesses' or organisations' decisions to practice environmental management throughout the past 20 years. The adoption of green operations by businesses has been linked to numerous factors.

In the view of Melissen, Koens, Peeters, and Nawijn (2019), one of the paramount motivations for a firm to go green is the owner/manager orientation towards sustainability. In MSMEs environment, the owner/manager is the pivot around whom all activities revolve. He/she directs the line of activities and pulls the employees along a particular path to either embrace green practices or otherwise. Melissen et al. (2019) further claim that in order to manage all three dimensions of sustainability as outlined by the TBL framework, management must establish a clear strategic direction, foster employee trust, and communicate explicitly about its commitment to sustainability.

Other prior research, such as Céspedes-Lorente, De Burgos-Jiménez, and Álvarez-Gil, (2003). has identified legislation triggered by pressure from stakeholders as another motivational factor. Elijido-Ten (2017) and Buysse and Verbeke (2003) both acknowledge economic motivations. Leadership was regarded by Aragón-Correa and Rubio-Lopez (2007) as a motivator. Organisational context was identified by D'Amato and Roome (2009), Hemingway and Maclagan (2004), López-Rodríguez (2009), and Rok (2009), while Mostovicz et al. (2009) considered ethics, among other things. Bansal and Roth (2000) created the ecological responsiveness model to analyse the driving forces behind manufacturing companies adopting green practices. Fifty-three industrial companies in Japan and the UK participated in the study.

The study found three primary triggers: social responsibility, strategic and economic rewards (competitiveness), and legitimation, which was defined as stakeholder pressure. The researchers noted that the three ecological responsiveness motives can be mixed and connected. Their collective effect may inspire a business to practise environmental management. They found that business decisions are "largely driven by concerns for legitimacy, less by competitiveness, and even less by ecological responsibility" (Bansal & Roth, 2000). The findings of this study are supported by other research conducted by Céspedes-Lorente et al. (2003) and Williamson, Lynch-Wood, and Ramsay (2006), which also identified legislation and business performance as the main factors influencing ecological responsiveness in their respective samples of manufacturing businesses. Additionally, González-Benito and González-Benito (2005) interviewed 186 manufacturing organisations and discovered that enterprises driven more by economic competitiveness than social duty tend to make deeper environmental changes. The findings above are substantiated by other research, including those conducted by Céspedes-Lorente et al. (2003) and Williamson et al. (2006). These studies demonstrate that rules and firm performance are the primary determinants of ecological responsiveness within their respective samples of manufacturing enterprises. Bansal and Roth (2000) recognised social responsibility as the third factor in their model. It alludes to a company's concern for its social duties, ideals, and the greater good. Instead of acting in its best interests, the company becomes environmentally friendly (Smith, 2003). The motivation is more moral than the legitimation and competition motivations (Bansal & Roth, 2000).

A study was undertaken by Qamar, Ahmad, Oryani, and Zhang (2022) to determine what factors MSMEs in Pakistan should consider when adopting and promoting solar energy technology. Data were acquired by the researchers through a literature review and a questionnaire. Data analysis was done using partial least square path modelling (PLS-SEM). The findings showed that the top three motivating reasons are: 1. The firm's scale; 2. Perceived simplicity of use of solar energy technology, and perceived reliability of solar energy; 3. The perception of the cost associated with solar energy technology, and the perceived level of competition pressure. The effect size and path coefficients indicate that perceived solar energy technology price, MSMEs' energy cost intensity, and enterprise size are the most influential factors. On the other hand, a lack of technical knowledge about solar energy technology, customer preferences, and the use of eco-labels and green stickers have a lesser impact.

The entrepreneur's orientation toward perceived comparative environmental advantage was another factor in identifying green business drivers. The desire of MSME clients and the perception of MSMEs as environmentally friendly are further variables (Qamar et al., 2022).

Agarwal, Agrawal, and Dixit (2020) conducted a study to establish the factors that induce green manufacturing to create environmentally friendly products. The study also offered suggestions for the order of steps that manufacturing organisations should take. They employed the expert opinion to extract 11 factors that motivate green manufacturing. The technique was then used to classify and categorise 11 drivers into cause-and-effect groups. Seven experts were interviewed to calculate the average matrix, including three from business and four from academia who knew green manufacturing, marketing, and other related fields. The study's findings revealed 11 crucial factors for green manufacturing. The drivers were sequenced as follows: 1. green purchasing strategy; 2. economic benefits; 3. governmental legal requirements; 4. the need to conserve resources; 5. public pressure; 6. customer awareness; 8. competitiveness; 9. social responsibility; 10. demand for eco-friendly products; and 11. competitor pressure and support (Agarwal et al., 2020).

There is increasing demand on MSMEs to adhere to labour, environmental, and governance norms as they attempt to integrate into global value chains. Nevertheless, the majority of MSMEs must overcome numerous obstacles before implementing sustainability standards in their business practices. According to studies (Allet, 2014b, 2017; Shahidullah & Haque, 2014), micro-entrepreneurs may engage in activities that pose a danger to the environment in terms of pollution or unsustainable resource use. Certain industries such as leather tanning, brick making, metal working, textile dyeing, small-scale mining, charcoal production, food processing, crop farming, animal husbandry, fishing, etc., are abound with environmental consequences. Environmental consequences can directly threaten the lives of micro-entrepreneurs, as well as those of their family members and the communities in which they live (Nugroho et al., 2017). Natural resource contamination or overuse can result in a direct loss of inputs for their numerous activities as well as a missed opportunity to generate cash (Endris & Kassegn, 2022), loss of a risk-coping strategy since poor households frequently use natural resources as a safety net in case of shocks or greater susceptibility to natural disasters.

Additionally, irresponsible environmental practices can directly endanger people's lives and health (Nugroho et al., 2017). When chemicals, equipment, or trash are used or managed improperly, serious health and safety risks can result, endangering the micro-entrepreneur, his family, and even the neighbouring communities in the event that air, soil, or water is contaminated. (Nugroho et al., 2017).

Considering the concomitant ramifications of MSME activities and the effect on the three dimensions of sustainability, scholars of microfinance, policymakers, donor agencies and international organisations posit that MFIs could help foster environmentally friendly attitudes among their clients who run micro and small enterprises (Allet, 2012) by re-orienting MSMEs to ‘green’ their operations. MSMEs are under increasing pressure to adhere to labour, environmental, and governance norms as they work to integrate into global value chains. However, Qamar et al. (2022) suggest that MSMEs may view becoming green as being particularly expensive.

The majority of businesses today are battling the twin demands of promoting long-term corporate growth while operating in fiercely competitive marketplaces and the requirement to reduce the negative effects of their operations (Jansson, Nilsson, Modig, & Hed Vall, 2017). Aziz et al. (2018) added emphasis to this problem and described how organisations today balance preserving their financial viability with upholding their commitment to sustainability. MFIs are thought to have the ability to reorient MSMEs to accept and incorporate environmental considerations in their aim setting and operations because their financial intermediary role is primarily focused on MSMEs.

Nugroho et al. (2017) claim that when MFIs incorporate environmental concerns into the products they give to their customers, MSMEs will be more likely to adopt eco-friendly processes and/or products. For instance, the infusion of environmental considerations to their credit policies, providing education and creating environmental awareness (Allet, 2014b). In this situation, MFIs must determine the environmental hazards that their clients face and educate them on how to mitigate those risks. To do this, they must build new procedures and learn new skills. Like many other industries, the microfinance industry has begun to consider its environmental impact in recent years (Allet, 2017). A rising number of MFIs are also aiming for an environmental bottom line in addition to their financial and social goals. Nugroho et al. (2017), Allet (2017) and Allet and Hudon (2015b) draw attention to the fact that these "green" MFIs employ a variety of tactics, including screening loans in accordance with environmental standards, providing microcredit to support clean technology, and educating their customers about environmentally friendly behaviours.

Allet (2014b) contends that mitigating environmental problems could aid microbusiness owners in boosting production and seizing chances. MSMEs could reduce inefficiencies in the manufacturing process as part of environmental management by employing energy-efficient technologies, such as better cook stoves, solar dryers, and energy-saving light bulbs, as well as minimising or recycling wastes, among others. All of these production process enhancements not only reduce environmental degradation but also enable MSMEs owners to save money. Additionally, environmental awareness can enhance working conditions, boost productivity, and boost earnings (Xie, Nozawa, Yagi, Fujii, & Managi, 2019). Moreover, implementing green practices might inspire MSMEs owners to investigate fresh market opportunities with a definite added value, such as waste management and recycling, agroforestry, solar panel installation and maintenance, etc. Allet (2017) asserts that programmes for green microfinance that assist MSMEs in identifying and managing environmental risks and opportunities may benefit them on a triple bottom line basis, including the environment (reduction of environmental risks), the social (enhanced employee welfare, improved health conditions), and economic aspects (improved efficiency, and new business opportunities). Therefore, encouraging MFIs to go green can help MSMEs become more aware of the environment. According to Watson, Wilson, Smart, and Macdonald (2018), in order to advance their sustainability agenda, businesses must leverage relationships with their major stakeholders, including consumers, employees, investors, and the local social community.

The above discussions illustrate that there are variety of factors that induce MSMEs to adopt environmentally friendly activities including government regulations, commitment of the owner to environmental sustainability, the quest to make economic gains, green microfinance services, competition, reputation, size of the organisation, public pressure, customer awareness, social responsibility, and demand for eco-friendly products.

2.15 Chapter summary

This chapter began with the theories that underpin the study. Specifically, microfinance theory and concept, the triple bottom line framework and green microfinance were explained. Furthermore, the chapter lucidly elaborated on the contextual dynamics of the study. The contextual aspects that were highlighted included an overview of sustainability, sustainability models, the concept of green finance, green finance opportunities in Ghana, the complementarity of microfinance institutions' financial and non-financial services and an overview of MSMEs.

The ensuing chapter presents the empirical literature, conceptual framework and the hypotheses that guided the study. It examines previous works conducted by other researchers in the domain of the current study and analyses the findings and conclusions drawn. This has contributed to the identification of gaps which formed the basis of this research, as well as the significance of the research. The chapter ends by presenting the conceptual framework that guides the study.

CHAPTER THREE

EMPIRICAL LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

3.1 Introduction

This chapter reviews the work done by researchers in the fields relevant to the study and also presents the hypotheses and conceptual framework that guided the study. In addition, it brings to the fore well-established evidence and conclusions underpinning the study.

3.2 Green microfinance and financial performance of micro, small and medium-sized enterprises

The term "financial performance" refers to how well a firm is doing financially in terms of solvency, liquidity, return on assets, return on capital employed, and profitability over a certain period of time (Ertuğrul & Karakaşoğlu, 2009). How well a firm earns income, manages its assets, obligations, and the financial interests of its stakeholders and investors is determined by its financial performance (Mahrani & Soewarno, 2018; Mirza & Javed, 2013). It is often referred to as the results of the actions or activities taken by organisation members to assess how successfully an organisation has met its goals (Ho, 2008). The survival of a firm in the market is strengthened by its enhanced financial performance (Devie, Liman, Tarigan, & Jie, 2020). According to Kaydos (2020) and Venkatraman and Ramanujam (1986), the concept of business performance is often narrowly defined and focuses on the utilisation of straightforward financial measures that are believed to represent the achievement of the organisation's economic objectives. Venkatraman and Ramanujam (1986) designated this limited segment of the performance construct as financial performance and contended that it has been the prevailing paradigm for empirical research conducted by scholars in the business field. The authors observed that in academic research, the financial performance construct is commonly defined and measured using various accounting ratios such as ROA, ROE, ROI or market-based indicators such as Sharpe, Treynor, Jensen's alpha, Tobin's Q. Meanwhile, the objective financial measures may not be applicable in most of the MSMEs as they do not keep appropriate accounting records. Sequel to this, certain scholars have implemented the financial performance concept by utilising the subjective perspective of knowledgeable participants (Chatterjee, Kumar, & Dayma, 2019; Sigo, 2020; Singh, Darwish, & Potočnik, 2016).

Although limited research utilises subjective measures to assess a firm's financial performance, existing studies indicate that these measures can be considered valid indicators, particularly in situations where objective measures are not accessible. This is particularly relevant for MSMEs and not-for-profit organisations (S. Singh et al., 2016). Fabio (2015) contends that green microfinance places financial strain on microfinance institutions due to the costs associated with promoting environmental initiatives. He asserts that external donors must offer sufficient financial assistance to sustain costs related to environmental protection. Allet and Hudon (2013) posit that larger microfinance institutions (MFIs) and those registered as banks are more favourably positioned to evolve into green microfinance institutions. Moreover, more established MFIs typically exhibit superior environmental performance, particularly in offering green microcredit and non-financial environmental services. Research acknowledges that the implementation of green microfinance by MFIs fosters environmental, social, and economic benefits essential for the sustainable development of MSMEs (Rouf 2012). The essential function of green microfinance is to promote economic development and investment by enhancing environmental quality and social inclusion (Abid & Kacem, 2018). Conversely, Allet and Hudon (2013) found that financial performance exhibits no significant correlation with environmental performance, indicating that 'green' microfinance organisations are neither more nor less profitable than their counterparts.

A company’s operation capacity is significantly influenced by the availability of funds, which impacts various aspects such as the selection of technology, access to markets, and availability of vital resources. These factors, in turn, play a crucial role in determining the viability and success of a firm (Cantamessa, Gatteschi, Perboli, & Rosano, 2018). According to Cantamessa et al. (2018), acquiring funding for the initiation or ongoing operation of a firm is a significant challenge encountered by entrepreneurs, particularly those operating within the MSMEs sector. The limited availability of finance poses a significant obstacle to the establishment and expansion of firms within the SME sectors. It is therefore expected that financial services provided by microfinance institutions can enhance the performance of MSMEs by providing appropriate saving products. Ratnawati (2020) examined the effects of financial inclusion on the performance of MSMEs in Malang, Indonesia. Financial intermediation and capital access served as mediators. The study was conducted with 100 MSMEs. The information was gathered using the simple random sampling approach. The data was collected using questionnaire. The researcher adopted a multivariate analysis employing partial least squares (PLS) regression to analyse the data. Measurement dimensions were constructed for financial inclusion. The variables for financial inclusion were financial intermediation, access to capital, and MSMEs’ performance. Increases in major market share, workforce growth, sales growth, and profit growth were used to evaluate MSMEs' performance. The study showed that the greater the

MSMEs' ability to access financial services, the better their performance. This shows that MSMEs' performance is influenced by their access to financial and non-financial services.

Based on data gathered from 365 respondents comprising microfinance stakeholders, clients and officers, Uddin et al. (2021) examined MFIs' profitability resulting from green microfinancing in Bangladesh. The results highlight a positive correlation between green microfinance and profitability of MFIs. In a study conducted by Omondi and Jagongo (2018) to examine the impact of microfinance services on financial performance of MSMEs in Kenya, it was found that finance availability, savings mobilisation, financial skills, and role modelling have a substantial impact on MSMEs' success in Kenya. These findings were corroborated by Aladejebi (2019). Aladejebi (2019) conducted research to evaluate the influence of microfinance banks on the growth of SMEs in Lagos, Nigeria. The information was gathered using a 5-point Likert scale from owners of SMEs who had accounts with microfinance banks. The study revealed that savings, credit and training positively impact financial performance of MSMEs. According to the author, savings positively impact financial performance as the interest given by microfinance banks is higher than that of conventional banks, thus, encouraging savings by MSMEs. The study also revealed that the loan processing period is faster than that of commercial banks and again, the owners who had received training from the microfinance banks exhibit a high level of managerial skills that impact positively on financial performance.

Likewise, Lakuma, Marty, and Muhumuza (2019) established that financial access boosts the growth of Uganda's MSMEs. They pointed out that MSMEs are more credit constrained. The researchers used data from the 2013 World Bank Enterprise Survey (WBES) in respect of Uganda, to investigate the impact of finance on business growth. Previous research conducted by Obadeyi (2015) examined the impact of microfinance banking and development on MSMEs in Nigeria. The author concluded that though microfinance plays a vital role in MSMEs' development, it cannot solve all developmental challenges. It also revealed that there are a lot of untapped business opportunities in agriculture, and micro and small-scale enterprises for microfinance banks to consider. An earlier study by Wanambisi and Bwisa (2013) found that the amount of loans to MSMEs has a significant and favourable impact on MSME performance in Kenya. In a wider scope, Farghly, Saleh, Youssef, and Bary (2018) analysed MSMEs' business growth in Egypt in terms of the TBL sustainable growth performance components (financial, social, and environmental), and the impact of microfinance programmes on MSMEs' sustainable growth. They used structured and semi-structured interviews, as well as a questionnaire, to collect primary data. The target population included Egyptian entrepreneurs, MSME managers, and personnel in charge of financial operations in MSMEs. To analyse the data and evaluate the research hypotheses, the researchers used structural equation modelling (SEM). The findings of the study showed that microfinance has a favourable impact on MSMEs' financial, social, and environmental performance.

Microfinance also plays a significant role in agriculture as confirmed by Nuhu, Inusa, Ama, and Sano, (2014) who investigated how microfinance affects crop yield in Ghana, focusing on the East Mamprusi District. The results showed that microfinance credit has a significant impact on crop production. The study's findings indicate that a GH¢1 (one Ghana Cedi) increment in microcredit provided to farmers is associated with a crop yield increase of over one-third (0.314) of a bag. This finding demonstrates that microcredit exerts a substantial influence on agricultural productivity. It is evident in the above literature that microfinance positively impacts the financial performance of MSMEs.

3.3 Green microfinance and environmental performance of micro, small and medium-sized enterprises

The study of MFIs' contribution to mitigate the effect of anthropogenic environmental issues has been escalating in recent times. The growing interest in this area has prompted several scholars to undertake more studies in microfinance and environmental performance or growth. Green microfinance is a relatively new concept in the field of finance. Allet, (2017) and Archer and Jones-Christensen (2011) averred that very few MFIs incorporate green microfinance policies in their financial products. Archer and Jones-Christensen (2011) reached this conclusion by studying the prevalence of "green microfinance" in 40 microfinance enterprises sampled in Asia. They further concluded that some MFIs might disregard the natural environment which could compromise the health and livelihoods of the community they serve. In a related study, Mia et al. (2018) asserted that MFIs that adopt green policies better protect the environment. Forcella and Hudon (2016) pointed out that green microfinance in Europe is motivated by MFI size, investors' interest in environmental performance and also the interest of donors. Again, he argues that extending credit of a higher value to MSMEs fosters an improvement in environmental protection. It is believed that microfinance institutions have the potential to play a significant role in mitigating the ecological implications of MSMEs. A study conducted by Mia et al. (2018) in South-East Asia examined the contribution of MFIs to environmental sustainability, specifically focusing on the reduction of greenhouse gas (GHG) emissions in the agriculture sector. The findings of the study indicated that variables such as the number of borrowers, the number of outstanding loans, and the average loan amount relative to gross national income per capita were negatively associated with GHG emissions. Consequently, these factors were found to have a positive influence on environmental greening efforts. Regression analysis was conducted in this study using panel data from 274 microfinance institutions in South-East Asia. Meanwhile, Huybrechs, Bastiaensen, and Van Hecken (2019) assert that the inquiry into the extent and manner in which green microfinance contributes to social-ecological transformation at the grassroots level has thus far received insufficient attention. The authors propose that additional research is required to delve deeper into the possibilities of green microfinance in facilitating the advancement of sustainability-oriented changes.

Of late, there has been a noticeable trend in development practice wherein microfinance institutions have begun to incorporate environmental considerations into their operational framework, alongside their financial and social aims. However, there is limited knowledge regarding the specific attributes of institutions engaged in environmental management. Allet and Hudon (2015b)'s study aimed to determine the features of microfinance institutions engaged in environmental management. The research utilised a sample of 160 MFIs from various regions across the globe. The researchers reached the conclusion that MFIs of greater scale and those that are registered as banks exhibit superior performance in terms of environmental policy implementation and environmental risk assessment. The authors additionally contend that MFIs with greater maturity exhibit superior environmental performance, namely in the provision of green microcredit and non-financial services with an environmental focus. According to the findings of Allet and Hudon (2015b), there is no significant correlation between financial performance and environmental performance. This implies that microfinance institutions that prioritise environmental sustainability, sometimes referred to as "green" MFIs, do not exhibit higher or worse levels of profitability compared to other MFIs (Allet & Hudon, 2015b).

García-Pérez et al. (2020) investigated the relationship between MFI operations and their activity in fostering sustainability in MSMEs by utilising MIX Market sustainability data. It was a cross-country study that traversed Europe, Asia, Africa, America, Oceania and the Caribbean. The researchers adopted a content analysis approach to analyse the collected data. Findings from the study reveal that the impact of microfinance on environmental performance is different in the various countries considered in the study.

Abdur Rouf (2012) compared the credit systems of Grameen Bank in Bangladesh with the Alterna Savings credit programmes in Canada, as well as their influence on the local economy and environment in Toronto. The results indicate that in both Bangladesh and Canada microfinance positively impacts environmental performance.

Shahidullah and Hague (2014) explored the environmental impacts of six green-microcredit-based microenterprises in rural southern Bangladesh. The aims, business processes, financial viability, social benefits, and impact on local environmental resilience were all considered when evaluating these institutions. According to the study, the majority of these businesses were found to be sustainable, current environmental regulations compliant, and have sufficient profit margins to ensure long-term existence.

Using a case study and participatory research approach, Shahidullah and Hague (2014) studied the modality and operations of the green microfinance strategy of a microfinance enterprise based in two different locations in Bangladesh. The study's main goal was to evaluate the environmental challenges faced by green microfinance-assisted businesses and regular microcredit-assisted businesses, as well as to calculate their GHG emissions. The findings show that microenterprises that obtain loans from MFIs and use green techniques produce fewer greenhouse gases than those who use traditional strategies. As a result, the study backs up the claim that green microfinance has a favourable impact on environmentally friendly activities.

3.4 Green microfinance and social performance of micro, small and medium-sized enterprises

Large and small firms have realised that their role in the economy and society cannot be reduced to only profit and market share. They must also take responsibility for social and environmental issues in communities where they operate.

MSMEs' social performance is multidimensional, involving employees, customers, and the community (Martínez-Martínez, Madueño, Jorge, & Sancho, 2017). The problem is that each of these stakeholder groups has different expectations about what a company's key objectives should be. A socially responsible firm exhibits high integrity and transparent relations with clients, business partners, and competitors, but also demonstrates a caring attitude toward the welfare of its customers and communities, and provides the same development openings for its workers through participation in diverse training and workshops to enhance their skills on the job (Raza, Rather, Iqbal, & Bhutta, 2020). Projects and eco-friendly initiatives such as donations to charities, and provision of education/health facilities are among the local community's expectations. MSMEs may engage in socially responsible activities either through the firm's strategy to enhance its performance or as a result of compliance with regulatory policy (Sung Kim & Oh, 2019). According to Jain, Vyas, and Chalasani (2016), the idea of MSMEs to engage in social activities is still philanthropic and non-institutionalised. It has been established that MSMEs do not have well-organised and planned CSR activities (Lee, Herold, & Yu, 2016).

Finance is at the heart of every firm's activity as it facilitates every business endeavour (Dörry & Schulz, 2018). A study by Wiklund and Shepherd (2005) concluded that access to microfinance boosts small firms' ability to smooth their processes and achieve high financial and social performance. These findings were supported by Maranto-Vargas and Rangel (2007), that credit is certainly a significant stimulant to MSME operations. MSMEs therefore should use credit effectively to enhance business activities to achieve greater performance. Access to credit can stimulate social performance and innovative activities (Memon, Yong An, & Memon, 2020). Financial resources protect a firm from unexpected losses and obstacles, and provide the firm opportunity to react to emerging business situations timeously (Zampetakis, Gotsi, Andriopoulos, & Moustakis, 2011).

Likewise, Memon et al. (2020) contend that access to credit allows SMEs to devote resources to socially responsible activities that result in higher and more efficient output. According to Khattak, Anwar, and Clauß (2021), the decisions of firms to invest in social activities hinge largely on their financial situation and the perceived accrued benefits. .Although access to funds is not the sole factor that stimulates social investment by MSMEs, empirical literature attests to its significant role. Following from the above empirical studies, this study predicts that access to credit could be a contributory factor to Ghanaian MSMEs' decision to engage in social investment.

3.5 Microinsurance and sustainability of micro, small and medium enterprises

All firms need to implement risk-reduction methods in order to manage a variety of hazards and maintain their operations (Bhaskara & Filimonau, 2021; Neise & Diez, 2019). Hirawati and Sijabat (2020) asserted that risk cannot be isolated from MSME operations because it is connected to all business pursuits. Risk is what insurance is concerned with (Sun, 2021). Risk is therefore viewed as a potential aspect of business that can happen at any time (Hirawati & Sijabat, 2020). However, MSMEs have higher rates of failure than large enterprises because they are more susceptible to the many perils to which businesses are exposed (Aladejebi, 2020;

Navare & Handley-Schachler, 2018; Shafi, Liu, & Ren, 2020) and this contributes to the high failure rates of MSMEs. Therefore, it is important for MSME owners to take strategic precautions against the potential crystallisation of risk factors. According to Teece, Peteraf, and Leih (2016), using insurance products and services is the best strategy to handle uncertainty in business operations.

According to studies (Chakraborty & Kr Das, 2019; Samantha, 2018; Susan, 2020), insurance has been a successful tool for organisations to manage risk. A study by Panigrahi (2012) on the advantages of a strong risk control plan for small enterprises in India revealed that MSMEs can use risk mitigation as a helpful method to increase the sustainability and longevity of their businesses. The findings also showed that the small business sector's risk management practices are less developed as a result of inadequate skills and knowledge in risk-related issues. More specifically, insurance serves as a tool for mitigating risk, offering comfort and loss protection. Activities that assume, transmit, or to some extent reduce risk can all be used to manage it. Access to proper insurance protection can help low-income people and small businesses thrive sustainably by providing funds to replace machinery lost or damaged due to disasters or burglary (Easterly, 2000)). It can lessen how personal and societal catastrophes affect the accumulation of assets, offering a way out of the poverty cycle that engulfs every new generation. To safeguard assets and minimise losses, insurance is a crucial component of any corporate operation. MSMEs can use insurance as a helpful approach to increase the viability and sustainability of their businesses (Panigrahi, 2012). Insurance serves to safeguard the company from the negative financial effects of losing properties and lives, as opposed to physically defending them. According to Jarzabkowski et al. (2019), an organisation suffering losses would be able to bounce back and rebuild by using the reimbursement received from insurance companies.

Additionally, Abdul Manab and Ahmad (2014) suggest that the benefit of using insurance in a business is to protect against losses and enhance the chances of securing loans from banks. Thus, it is crucial to confirm that the insurance cover chosen is appropriate. There is a plethora of studies that back up the idea that insurance has a significant impact on the long-term viability of MSMEs (Chakraborty & Kr Das, 2019; Samantha, 2018; Susan, 2020), hence MSMEs owners must include insurance in their business practices. Navare and Handley-Schachler (2018) suggest that microinsurance serves as a social safety net, a tool for risk reduction, and a means of support for MSMEs during shocks and other types of natural disasters.

Usually, the conditions for insurance plans are made largely with large enterprises in mind, making it difficult for MSMEs to get insurance cover. Microinsurance, according to Navare and Handley-Schachler (2018), was created to mitigate risk for MSMEs and the disadvantaged. In the view of Mukhtar (2013), insurance for MSMEs is regarded as one of the most effective ways to lessen MSMEs' exposure to the effects of property loss, disease, theft, violence, disability, fire, and other dangers. Mukhtar (2013) emphasises that microinsurance provides financial protection for small business owners and the vulnerable who sustain losses during their operations, as well as peace of mind for the fortunate subscribers.

Kajwang (2022) avers that by giving low-income people, companies, and farmers access to funds after occurrence of disaster, smoothing their consumption, and funding rehabilitation, microinsurance may end the cycle of poverty. MSMEs and households with insurance are therefore more creditworthy (A. K. Chatterjee & Wehrhahn, 2017; Collier & Babich, 2019); microinsurance can also encourage MSMEs to invest in earning assets and crops with greater risk yields (De Bock, Carter, Guirkinger, & Laajaj, 2010; J. Hansen et al., 2019; Mukhtar, 2013). According to Mukhtar (2013), if insurers give lower rates to reward risk-reducing behaviours, microinsurance might promote investment in disaster mitigation.

Therefore, it can be argued that microinsurance serves as an efficient risk transfer mechanism and essential component of a comprehensive catastrophe risk management plan. Due to MSMEs' thin profit margins, illness or sickness has a severe impact on the company's finances. Again, a study by Navare and Handley-Schachler (2018) highlighted the importance of microinsurance as a financing mechanism to guard MSME owners against negative financial consequences in the event of illnesses or poor health. Microinsurance, according to Ime and Ikechukwu (2017), allows credit and savings to be used more effectively to create jobs.

Anoke, Nzewi, Agagbo, and Onu (2021) used a sample size of 248 women entrepreneurs who were holders of an insurance policy with either a traditional insurance company or a microinsurance firm to examine the impact of microinsurance services on the performance of women MSME operators in Nigeria. Regression was utilised to examine the formulated hypotheses, while a questionnaire was employed to collect data for the study. According to the study, microinsurance, credit provision, and savings have a considerable impact on the growth of women's businesses. The study concluded that microinsurance services help foster sustained entrepreneurship growth.

In a similar study, Agboola and Epetimehin (2021) looked at the effect of microinsurance and micro-pension on the output of MSMEs in Lagos, Nigeria. G-power was employed to determine the study's sample size of 146. The researcher employed PLS-SEM for the study analysis, and a simple random sampling procedure was used to choose the respondents. The study established that microinsurance significantly and favourably affects MSME sustainability.

Also, a previous study by Akotey, Osei, and Gemegah (2011) explored Ghana's need for microinsurance. Primary data drawn at random from 100 members of the MSME sector in four significant market hubs in Accra, Ghana was used for the research. The empirical investigation made use of the probit regression model. According to the outcome, microinsurance is a useful tool for managing financial risks that can help the informal sector lessen the double drawbacks of poverty and susceptibility to risk.

Microinsurance aids MSMEs as well as those who are financially vulnerable when disaster strikes, provides financial support to mitigate the effect of calamities and to absorb shocks, encourages savings and sustain employment, and also helps clients build up their assets. In a recent study by Gabrah, Mensah, and Yidana (2020) to examine the role of microinsurance in reducing poverty in Ghana, it was found that a low level of public trust, a lack of innovative microinsurance products, insufficient distribution channels, weak insurance regulations, uncompetitive pricing of microinsurance products, low government support for microinsurance programmes, low income levels of subscribers, and factors related to religion or culture are factors that may affect demand for microinsurance products.

Mobarak and Rosenzweig (2012) posited that smallholder farmers with insurance cover are more likely to choose resilient crop varieties. According to Mobarak and Rosenzweig (2012), farmers in India who have access to insurance switch to riskier but higher-yielding rice farming. Cai, Chen, Fang, and Zhou (2015) found that insurance on sow raising significantly boosts farmers' inclination to engage in sow raising in southern China, where raising sows is thought to be exposed to varieties of risk but has the potential of generating enormous profits.

According to Karlan, Osei, Osei-Akoto, and Udry (2014), farmers in Ghana who are holders of rainfall index insurance increase their investment in agriculture. A study by Clement, Botzen, Brouwer, and Aerts (2018) brings to light that Mali's cooperatives that purchased area-yield index insurance for cotton increased the amount of highly resilient cotton the nation produced. Wong et al. (2020) contend that insurance encourages rural Ethiopian farmers to take bigger but profitable risks by significantly increasing the usage of seeds and fertilizer purchases. However, according Fofie (2016), MSMEs in Ghana do not purchase enough insurance, which leaves them vulnerable to uninsured catastrophes, fatalities, and monetary losses. MSMEs in Ghana are among the most vulnerable sectors (Mubashiru & Musah, 2014), and they need support systems like microinsurance to help mitigate some of the risk they face.

In addition, Aduko (2011) investigated insurance purchases made by 171 MSMES in the Tamale metropolis. It was revealed that MSMEs in Ghana continue to be vulnerable to risks associated with businesses that do not hold insurance, insufficient insurance coverage, and unawareness of the crucial role insurance plays as a risk transfer device. Consequently, these problems result in low insurance product uptake and demand in emerging nations like Ghana. The demand for microinsurance in Ghana was also explored by Akotey et al. (2011), and the findings revealed that premium flexibility, income level, and nodal agency are potential predictors of the demand for microinsurance in Ghana. They argued that Ghana only has a small number of well-structured microinsurance products. The authors also contend that the few well-structured products are underutilised.

Rey Benayas and Bullock (2012) also examined the drivers underpinning the purchase of business insurance by SMEs in South Africa and the impact that insurance has on these SMEs' financial performance. Quantitative methods were utilised and relied on the probit and ordinary least squares regression models. The study's findings revealed that SMEs in South Africa had a low insurance uptake rate. Still, they also showed a strong correlation between SMEs' performance and their use of business insurance.

Though few scholars have expressed opposing views on the effect of microinsurance on the sustainability of MSMEs and household asset preservation (Cheung & Padieu, 2011; Giesbert, Steiner, & Bendig, 2011; Giné & Yang, 2009; Hsu et al., 2011), it is largely clear from the discussions above that microinsurance might encourage MSMEs to invest in high-yielding initiatives that increase their sustainability, welfare, and productivity. According to empirical studies, microinsurance affects MSMEs' ability to remain viable.

3.6 Microsavings and MSMEs’ sustainability

The viability of MSMEs is primarily contingent upon their capacity to allocate funds to capitalise on prospective business opportunities, addressing unforeseen contingencies, and fostering business expansion (Jatmiko, Udin, Raharti, Laras, & Ardhi, 2021; Santoso, Nijwah, Sulaiman, Akbar, & Umam, 2020). Savings can be described as the deliberate act of setting aside a portion of one's present earnings to utilise or invest it at a later time. The funds that have been saved can be retained within one's residence, placed into a savings account, or allocated towards other forms of capital investment. Katsikeas, Leonidou, and Zeriti (2016) assert that savings accumulation may lead to investment in green technologies, practices and processes.

According to Omondi and Jagongo (2018), savings is an essential service for entrepreneurs seeking secure and convenient means of keeping cash that facilitate business transactions.. Kurgat's (2007) research on the Kenya Women Finance Trust found that Microfinance Institution's clients preferred loan and savings services. The primary motivation for their savings activities was to facilitate business expansion (62%), provide education for their children (40%), and prepare for unforeseen situations (26%). Furthermore, it was shown that a significant majority of the clients, specifically 71%, perceived compelled savings as a favourable means to accumulate funds.

This study posits that the mobilisation of savings has a crucial role in enhancing financial performance and expanding outreach, particularly in rural areas characterised by limited access to financial services. Entrepreneurs frequently have a tendency to commingle their corporate and personal funds, thereby complicating the task of monitoring the cashflow of their business. This phenomenon can be characterised as a method of allocating business financing towards expenditures that are not directly related to the core operations of the organisation, thereby diminishing the inclination to engage in saving practices.

It is necessary for MSMEs to have liquidity (cash and cash equivalents) to be able to pay their short-term debts when they are due while still maintaining profitability (Omondi & Jagongo, 2018). Key among the underlying causes of the astronomical failure rate of MSMEs has been identified as lack of savings (Senzu & Ndebugri, 2018). According to Nizaeva and Coşkun (2018), MSMEs encounter particular and distinct problems in accessing outside finance due to their informational opacity and their closely and privately held ownership structures (Cowling & Matthews, 2018). Lack of actual collateral for loans typically makes access to credit worse (Mukherjee, 2018). As a result, many MSMEs rely excessively on their own resources to finance their operations and supply the necessary cash for running them daily.

The question of whether corporate cash-saving decisions affect firm value has received a lot of theoretical and empirical attention. Transaction costs and precautionary incentives support the claim that having a lot of cash on hand allows managers to operate more freely under the trade-off hypothesis of capital structure. Cash-rich businesses can finance potential business openings as they present themselves or engage in aggressive market competition with their rivals (Banerji & Fang, 2021). The transaction motive, which was first propounded by Keynes in 1937, states that firms put aside liquid resources to avoid the costs associated with disposing illiquid assets and converting them into cash or using the capital markets to raise money to secure resources to make payments that are due. Having cash on hand keeps your finances flexible and opens up growth opportunities by acting as a buffer against potential future negative shocks, according to the precautionary motive view. In light of the fact that MSMEs frequently face information asymmetry and information opacity when seeking loans (Van Caneghem & Van Campenhout, 2012), they ought to employ certain financing techniques to protect their financial sustainability. As a result, it is suggested that in MSMEs, cash saving is a voluntary decision that lessens susceptibility to lack of external finance, building an internal ability to maintain expansion through savings (L. Xu & Zia, 2012). According to empirical studies, having cash on hand increases a company's worth, especially when there are market imperfections brought on by expensive external financing (Asante-Darko, Bonsu, Famiyeh, Kwarteng, & Goka, 2018; Deshmukh, Goel, & Howe, 2021; Martínez-Sola, García-Teruel, & Martínez-Solano, 2013; Nisasmara & Musdholifah, 2016). Myers's (1984) pecking order theory contends that businesses rely more on internally generated funds than external sources of funding, which in this case takes the form of savings, on the grounds that insiders of corporations are more knowledgeable than outside stockholders.

Internal financial management primarily focuses on the management of working capital, which affects a company's short-term financial condition (Arnold, Reeder, & Steger, 2013). This was noted as one of the most significant issues MSMEs must deal with (Mazzarol, 2014, p. 2). Proper control of internally generated resources, notably the surplus cash from successful commercial activities, is a crucial component of this. Yet, Keynes (1937) provided the foundation for the development of the link between precautionary saving and the management of current assets and current liabilities (working capital) by first highlighting two fundamental viewpoints because a company would desire to hold cash. First, payments made in cash or quickly liquidated assets are less expensive than those that call for the realisation of cash from illiquid assets, retaining cash or highly liquid assets reduces transaction costs. Second, having cash reserves protects against the possibility that future income flow would be less than anticipated. Gyimah and Boachie (2018) contend that MSMEs, particularly those in rural areas of emerging countries, must set aside some of their income for future investments. Due to the difficulties MSME owners frequently have in obtaining formal sources of financing, they are dependent on informal sources of funding such as bootstrapping, retained profits, friends and family, personal savings, and supplier's credit. Because of this, MSMEs must adopt a culture of saving in order to better handle unforeseen costs or financial difficulties.

A study conducted by Cowling, Brown, and Rocha (2020) in the UK, found that just 39% of enterprises were increasing their cash levels in the months before the outbreak the COVID-19 pandemic. This finding suggests that 61% of firms may run out of cash. They went on to say that MSMEs need to save money ahead of time in order to increase their resilience to Black Swan incidents. Similar to this, numerous studies have been done that highlight the effect of saving on the performance of MSMEs' profitability and have demonstrated that failing to save leads to business failures across the globe (Karadag, 2015).

According to a study by Hamza, Mutala, and Antwi (2015), the effectiveness of cash management was positively correlated with SME financial performance at a 1% significance level. The study examined cash management practices and their impact on SME financial performance in the Northern Region of Ghana. In their study to determine how microfinance services affect the expansion of SMEs in Kenya, Kisaka and Mwewa (2014) found that training, microcredit, and microsavings all favourably affect the growth of SMEs. According to the report, SMEs should be encouraged to save in addition to receiving larger loans from MFIs to help them expand and advance their businesses. According to a survey by Gray, Saunders, and Goregaokar, (2012) in the UK, reinvesting profits (68%) as well as personal/family savings (39%) and bank loans (29%) were the primary sources of funding for SMEs. This shows how crucial saving is for financing business growth at 39%. Ayub, Harun, Mifli, and Majid, (2020) looked into the effects of business grants, microsavings, and financial literacy on SME firm performance in Sabah. Their research confirms that microsaving and SME performance have positive, substantial relationships La Rocca, Staglianò, La Rocca, Cariola, and Skatova (2019) research supports the significance of the precautionary savings incentive for MSMEs by showing that savings have a benefit operating performance. This finding stems from a study examining how cash holdings impacted a large sample of small and medium-sized businesses' operating performance in Europe. These justifications indicate a strong connection between cash savings and business sustainability.

3.7 Green microfinance and innovativeness of micro, small, and medium enterprises

The concept of innovation is a multifaceted process that encompasses the creation, dissemination, and application of knowledge in the form of novel or adapted outputs, and the advancement of new methods for production or processing. In a general sense, the process of innovation can be conceptualised as a multifaceted endeavour wherein existing and novel knowledge is utilised with the aim of achieving commercial objectives (Azmat, Lim, Moyeen, Voola, & Gupta, 2023). Since the initial research conducted by Schumpeter in 1934, the concept of 'innovation' has garnered significant attention in scholarly literature. However, a universally accepted definition of this term remains elusive.

Innovation is critical and fundamental in the advancement of firms' activities, processes, marketing and products. Porter (1998) avers that innovation is a driving force that supports firms to out compete with their competitors. Innovation is the process of generating and developing new ideas and practicalising same (Galbraith, 1982, Okpara, 2007, Tidd & Bessant, 2020). According to Hamdoun, Jabbour, and Othman, (2018), innovation entails the conception and introduction of new products, processes, activities, knowledge transmissions and technologies, which impact a firm's business activities. It has been established that innovation leads to improved business performance and sustainability (Fernando, Jabbour, & Wah, 2019). This is so because innovation leads to higher future earnings (Teece, 2018). Rajapathirana and Hui (2018) opine that both large and small firms need finance to engage in meaningful innovation. This shows therefore that access to capital is a key factor to drive innovation.

Since the MSMEs are constrained in terms of getting sufficient collateral for drawing requisite finance for innovation from the traditional banks, they largely depend on MFIs as their source of finance for their innovation activities. According to Kono and Takahashi (2010), the characteristics of microfinance credit such as relative high interest rate, short repayment periods, and smaller loan amount, among others, do not stimulate innovation. Microfinance, on the other hand, can spur innovation in two ways. One impact is that its relative accessibility can substantially raise the likelihood of obtaining capital to support innovative activities, while another effect is that the speed with which it can be provided can greatly reduce the time lag associated with capital acquisition.

However, in a competitive environment, firm innovation is crucial to survive in the market. Green microfinance institutions therefore, come to play a significant role that impacts MSMEs to innovate by designing loan products for environmentally friendly processes, activities and products. When MSMEs churn out innovative products they benefit from higher future earnings (Teece, 2018) and this enhances their performance and sustainability. Equally, green microfinance involves the incorporation of a strong component of environmental education in the non-financial services of MFIs.

3.7.1 Age and Size of MSMEs and Access to Credit

MSMEs at the early stage of operation encounter challenges in accessing credit due to informational asymmetries (Wajebo, 2022). The longer a firm exists, the greater its capacity to manage risks, which in turn increases creditors' confidence in extending loans (Gupta et al., 2018) Older firms have strong relationships with financial institutions, resulting in superior access to loans compared to newer enterprises. Mersha and Ayenew (2017) reported that the age of a business positively influences MSMEs' access to bank loans. Furthermore, Chandrayanti, Nidar, Mulyana, and Anwar (2020) research reveals a positive correlation between a business's age and the volume of credit MSMEs secure. However, Meivita and Farida (2021) report that business age has no significant influence on access to formal credit, A study by Abdesamed and Abd Wahab (2014) indicate that the most significant category of MSMEs facing rejection is those less than one year old, while the group with the least rejection for proposed loans comprises MSMEs that have been operational for over ten years. Financial institutions are more inclined to extend substantial loans to older firms because the associated business risk is lower compared to newly formed enterprises. The duration of a business's operation is indicative of the owner's experience in management and their ability to sustain business continuity (Mersha & Ayenew, 2017). Eniola (2018) identifies age variables, membership composition, business size, and education as factors influencing small enterprises' decisions between formal and informal financing sources. Research by Damocha (2022) indicates that business size positively and significantly influences credit acquisition.

3.8 Microfinance built-in education and awareness campaign vis-a-vis sustainability of MSMEs

Many owners and managers of MSMEs lack managerial expertise and training. A number of MSME operators develop their own management style through unplanned processes (Turner & Endres, 2017). They probably have a more intuitive than analytical management style, one that is more concerned with immediate issues than long-term ones, and one that is tentatively more opportunistic than strategic. This attitude may provide issues when difficult decisions need to be taken, despite the fact that it is the essential strength during the start-up phase of the business because it fosters creativity. Poor managerial skills have the effect of leaving MSME owners ill-equipped to deal with changing economic conditions and environmental issues, plan necessary technological upgrades, and reduce environmental risk. Most MSMEs' activities are undertaken by individuals that have low levels of education. As a result, they might not be adequately prepared to do managerial tasks to maintain their businesses (Turner & Endres, 2017).

According to Rotich, Lagat, and Kogei (2015), the lack of access to business advisory services that focus on entrepreneurship, training in effective business management, product marketing, technological innovation, and information, is a constraint on MSMEs.

CGAP, (2004) (BRIEF, 2004) asserts that not everyone or every circumstance warrants the use of microcredit. Before requesting loans, those who are hungry and in need but lack the means of repayment or an income must first receive alternative support in the form of other non-financial services as a more effective strategy for reducing poverty. Such non-financial services ought to be combined wherever possible with saving money. Yunus (2017) emphasises that aspiring MSME owners regularly need other services beyond financial services. To ensure the survival and growth of MSME businesses, the business skills of the owners and managers need to be enhanced regularly.

So, in addition to providing MSMEs with loans and other forms of credit, MFIs also provide non-financial services. MFIs also provide other important and essential services, which, if appropriately provided to MSMEs, can boost their performance and improve the nation's economy. Other services, aside financial, such as business advisory services, workshops on environmental awareness, hygiene, management and technical training, to name just a few, are frequently found in many microfinance programmes and are provided as support services to MSMEs.

Characteristically, the majority of microfinance educational services are designed to encourage the use of credit and other social services purposefully to improve the beneficiaries' access to working capital and social lives (Gyimah & Boachie, 2018). A case in point is the global programme initiated by Freedom from Hunger termed "microfinance credit with education" that was introduced in Ghana and other West African countries in 1988. The programme aimed at helping the vulnerable battle poverty by introducing self-help solutions to the people. To analyse each firm individually and to act as a loan repayment period, MFIs typically offer education on a weekly or monthly basis. MFIs offer business owners eminent solutions to their problems during educational training sessions and workshops that can eventually aid in the growth of their firms.

To evaluate the impact of microfinance services on the performance of MSMEs, Rotich et al. (2015) sampled 270 businesses out of a targeted 429 registered MSMEs. To draw conclusions about the study, multiple regression analysis was used. Rotich et al. (2015) argue that microfinance clients who receive training in small business operations are better able to manage their businesses and reduce transaction-related risks.

A follow-up investigation by Uusiku (2019) into the effects of microfinance services on the development of MSMEs in Namibia revealed that a combination of loans, education/training, and the duration of the business' existence all had a substantial impact on growth. The investigation showed that the major variable, microcredit, had no bearing on the expansion of MSMEs. Therefore, the study contends that obtaining access to microcredit alone cannot result in the expansion of small businesses, but rather a combination of other crucial factors, such as education and business experience, are necessary for utilising microcredit in a way that may lead to the expansion of MSMEs. A previous study by Kasali, Ahmad, and Ean (2016) highlighted that the poor are poor because there are factors that contribute to poverty other than not having access to credit.

The above conclusions were supported by A. K. Yeboah and Obeng (2016) in their study that examined the effect of financial literacy on the demand for microinsurance for market operators in Ghana. A total of 612 commercial market operators from six different markets in Ghana, spanning the country's north and south, were included in the study's sample. The Heckman's two-step estimating technique was employed in the study to reach its goal. The study's findings demonstrated how market participants' financial literacy affected their propensity to purchase insurance products in Ghana. Again, in Ghana, Akotey et al. (2011) investigated factors that affect the demand for microinsurance products and services from informal employees. The investigation employed a quantitative research approach, and data was gathered through a survey. The study sampled 100 respondents in total, and probit regression was used for the analysis. The study's results demonstrated a positive and substantial correlation between insurance knowledge and the amount of demand for microinsurance products.

Similarly, in a research conducted by Simeyo, Martin, Nyamao, Patrick, and Odondo (2011), they highlighted that the performance of MSMEs was most significantly impacted by access to credit, training, and mobilisation of savings.

Another study conducted by Ayopo and Ibidunni (2015) looked into the effects of microfinance institutions' non-financial services on the efficient output of MSMEs in Southwest Nigeria. The study's findings showed a correlation between MSMEs' performance and non-financial services provided by microfinance banks.

Finally, Kyabarongo, Moses, and Siraje (2022) investigated how the skills provided by MFIs affected MSMEs' capacity to withstand the COVID-19 pandemic in Uganda. The results revealed that management skill development has a substantial impact on MSMEs' sustainability. The above analysed empirical literature is evidence to support the proposition that education, training and awareness campaigns offered by MFIs positively impact the sustainability of small entities. The following hypotheses, discuss next, are therefore postulated.

3.9 Research hypotheses

The purpose of the research was to assess the perceived impact of green microfinance on the sustainability of micro, small and medium enterprises. This section therefore reviews the relevant literature to discuss the hypotheses set in this research.

3.9.1 Relationship between the elements of green microfinance and financial performance of micro, small and medium-sized enterprises

Microfinance institutions provide microcredit to MSMEs which normally goes with other non-financial services such as technical assistance. It is believed that an MFI has the financial capacity and ability to impact its clients (MSMEs) to engage in activities that preserve the environment. MSME activities could have negative impacts such as soil infertility due to the implemented agricultural practices (Ramprasad, 2019) and deforestation. Personal health of MSME employees and the community can also be affected as a result of air, water and waste pollution or the use of agro-chemicals (Nejati, Amran, & Hazlina Ahmad, 2014) .

Environmental impacts also stretch beyond the community to the global environment through emission of greenhouse gases (Shahidullah & Haque, 2014), or through impacts on biodiversity (Huybrechs et al., 2015). As a result, green microfinance is interconnected with other areas such as credit risk management, MSMEs' financial performance, food sufficiency, access to affordable energy, health, climate change adaptation and mitigation, rural development and social mission (Huybrechs, 2018).

Green MFIs also examine and establish procedures and strategies for mitigating the possibility of environmental deprivation caused by MSMEs' operations, as well as supporting more resilient investments, risk transfer via microinsurance, and determining the modalities for supporting MSMEs' activities (Huybrechs et al., 2015).

Key among the underlying causes of the astronomical failure rate of MSMEs has been identified as a lack of savings (Senzu & Ndebugri, 2018). Transaction costs and precautionary incentives support the claim that having a lot of cash on hand allows managers to operate more freely under the trade-off hypothesis. Cash-rich businesses can finance potential expansions as they present themselves or engage in aggressive market competition with their rivals. The transaction motive, which was first propounded by Keynes in 1937, states that firms put aside liquid resources to avoid the costs associated with disposing illiquid assets and converting them into cash or using the capital markets to raise money to secure resources to make payments that are due. According to La Rocca et al. (2019), savings positively contribute to operating results of MSMEs. This supports the significance of the precautionary savings incentive for MSMEs by showing that savings have a beneficial effect on operating performance.

Risk cannot be isolated from MSME operations because it is connected to all business pursuits. Consequently, every firm needs to implement risk-reduction methods in order to manage a variety of hazards and maintain their operations (Bhaskara & Filimonau, 2021; Neise & Diez, 2019). Teece et al. (2016) suggest that using insurance products and services is the best strategy to handle uncertainty in business operations. Also, a study by Panigrahi (2012) on the advantages of a strong risk control plan for small enterprises in India revealed that MSMEs can use risk mitigation as a helpful method to increase the sustainability and longevity of their businesses.

Therefore, the subsequent hypotheses are formulated:

H1a: Green credit positively and significantly impacts MSMEs’ financial performance
H1b: Green education positively and significantly impacts MSMEs’ financial performance
H1c: Microsavings positively and significantly impact MSMEs’ financial performance
H1d: Microinsurance positively and significantly impacts MSMEs’ financial performance

3.9.2 Relationship between the elements of green microfinance and social performance of micro, small and medium-sized enterprises

Traditionally, microfinance has been guided by the double bottom line of financial and social objectives. The social objective is pervasive in microfinance which attracts greater attention. This could be inferred from a statement made by the United Nations (2003) that "sustainable access to microfinance helps alleviate poverty by generating income, creating jobs, allowing children to go to school, enabling families to obtain health care, and empowering people to make choices that best serve their needs". Microfinance grants credit to the poor which enables them to engage in economic activities to generate enough income to pay back the loan and its associated interest under appropriate conditions, and to stabilise income, smoothen consumption, protect against risk, acquire assets and alleviate poverty. Access to credit by low-income earners, the poor, the vulnerable and the financially excluded from the conventional banks has been an immemorial issue (Corrado & Corrado, 2017; Khan et al., 2020; Zhang & Posso, 2019).

Many owners and managers of MSMEs lack managerial expertise and training. Many entrepreneurs lack adequate knowledge and skills to run their businesses successfully. They develop their own management style through unplanned processes (Turner & Endres, 2017). Poor managerial skills have the effect of leaving MSME owners ill-equipped to deal with changing economic conditions and environmental issues, plan necessary technological upgrades, and reduce environmental risk. Most MSMEs activities are undertaken by individuals that have low levels of education. As a result, they might not be adequately prepared to do managerial tasks to maintain their businesses (Turner & Endres, 2017). According to Yunus (2017), to ensure the survival and growth of MSME businesses, the business skills of the owners and managers need to be regularly enhanced.

Microfinance provides other services such as business advisory services, workshops on environmental awareness, hygiene, management and technical training frequently as a support service that enhances the activities of MSMEs.

Cash-rich businesses can finance potential business openings as they present themselves or engage in aggressive market competition with their rivals. The transaction motive, which was first propounded by Keynes in 1937, states that firms put aside liquid resources to avoid the costs associated with disposing illiquid assets and converting them into cash to make payments that are due. According to the precautionary motive view, having cash on hand keeps the finances of MSMEs flexible and opens up growth opportunities by acting as a buffer against potential future negative shocks.

Insurance serves as a tool for transferring risk, offering comfort and loss protection. Access to proper insurance protection can help low-income people and small businesses thrive sustainably and give them the means to improve their level of living (Easterly, 2000)). It can lessen how personal and societal catastrophes affect the accumulation of assets, offering a way out of the poverty cycle that engulfs every new generation.

According to Jarzabkowski et al. (2019), an organisation suffering losses could be able to bounce back and rebuild by using the reimbursement received from insurance companies. Thus, the business is able to continue business without affecting the ability to meet other commitments such as payment of salaries. Additionally, Abdul Manab and Ahmad (2014) suggest that the benefit of using insurance in a business is to protect against losses and enhance the chances of securing loans from banks.

Following from the above discussion, the hypotheses below are developed:

H2a: Green credit positively and significantly impacts MSMEs' social performance.
H2b: Green education positively and significantly impacts MSMEs' social performance.
H2c: Microsavings positively and significantly impact MSMEs' social performance.
H2d: Microinsurance positively and significantly impacts MSMEs. social performance.

3.9.3 Relationship between the elements of green microfinance and environmental performance of micro, small and medium-sized enterprises

Microentrepreneurs may engage in activities that pose a danger to the environment regarding pollution (chemical usage, contaminated soil and water, etc.) or unsustainable resource use (deforestation, degraded soil, overexploitation, etc.). Certain industries, such as leather tanning, brick making, metal working, textile dyeing, small-scale mining, charcoal production, food processing, crop farming, animal husbandry, fishing, etc. are abound with environmental consequences (Allet, 2014b, 2017; Shahidullah & Haque, 2014). Due to the fact that MFIs' main job as a financial intermediary is to help MSMEs, it is thought that MFIs can help MSMEs change their goals and operations so that they are more environmentally friendly (Nugroho et al., 2017). Green microfinance either proscribes the extension of credit to support non-eco-friendly activities or vigorously design loan products to enhance pro-environmental business activities to mitigate MSMEs' susceptibility to environmental problems. These aims of green microfinance lessen the environmental impact of business actions, assist in reducing monetary risk, improving standard of living, and/or conserving and natural resource restoration (Huybrechs et al., 2015). MFIs that adopt green policies positively and significantly impact environmental performance (Mia et al., 2018). Green finance is important in the financial industry due to measures to safeguard banks and society from an unanticipated future financial crisis caused by environmental issues, public agitations, and corruption (Zhixia et al., 2018).

Insurance serves as a tool for transferring risk, offering comfort and loss protection. Access to proper insurance protection can help low-income people and small businesses thrive sustainably and give them the means to improve their level of living (Easterly, 2000)). It can lessen how personal and societal catastrophes affect the accumulation of assets, offering a way out of the poverty cycle that engulfs every new generation. MSMEs can use insurance as a helpful approach to increase their viability and sustainability of their businesses (Panigrahi, 2012). Insurance serves to safeguard the company from the negative financial effects of losing eco-friendly equipment, properties and lives, as opposed to physically defending them. Savings, on the other hand is very important for MSMEs to secure future opportunities and procure eco-friendly equipment to enhance their environmental performance. Gyimah and Boachie (2018) contend that MSMEs, particularly those in rural areas of emerging countries, must set aside some of their income for future investments. Education and environmental awareness creation make MSMEs more environmentally conscious. Poor managerial skills have the effect of leaving MSME owners ill-equipped to deal with changing economic conditions and environmental issues, plan necessary technological upgrades, and reduce environmental risk. Most MSME activities are undertaken by individuals that have low levels of education.

Hence, the hypotheses suggested are as follows:

H3: Green microfinance positively and significantly impacts MSMEs' environmental performance.

H3a: Green credit positively and significantly impacts MSMEs' environmental performance.

H3b: Green education positively and significantly impacts MSMEs' environmental performance.

H3c: Microsavings positively and significantly impact MSMEs' environmental performance.

H3d: Microinsurance positively and significantly impacts MSMEs' environmental performance

3.9.4 Relationship between the elements of green microfinance and innovativeness of micro, small and medium-sized enterprises

According to Hamdoun et al. (2018), innovation entails the conception and introduction of new products, processes, activities, knowledge transmissions and technologies, which impact a firm's business activities. Innovation leads to business performance and sustainability (Fernando et al., 2019). This is so because innovation leads to higher future earnings (Teece, 2018). Rajapathirana and Hui (2018) opine that both large and small firms need finance to engage in meaningful innovation. This shows therefore that having access to financial resources is a critical component in driving innovation. Since micro and small size firms are constrained in terms of getting sufficient collateral for drawing requisite finance for innovation from the traditional banks, those firms largely depend on microfinance institutions as their source of finance for their innovation activities. Contrary to this, there is a school of thought that the characteristics of microfinance credit such as relative high interest rate, short repayment periods, and smaller loan amount, among others, do not stimulate innovation.

In a competitive environment, firm innovation is considered crucial to survive in the market. Green microfinance institutions play a significant role that impacts MSMEs to innovate by designing loan products for environmentally friendly processes, activities and products. When MSMEs churn out innovative products they benefit from higher future earnings (Teece, 2018) and this enhances their performance and sustainability. Equally, green microfinance involves the incorporation of a strong component of environmental education in the non-financial services of MFIs. Education on environmental awareness conscientises owners and managers of MSMEs to adopt processes that curtail environmental risk. Small businesses save to acquire innovative technology to boost their operations. Saving aids MSMEs to acquire knowledge and skills that contribute significantly to their innovation drive. Abandoning or shifting away from the traditional mode of operation to a more environmentally friendly process demands some financial commitment.

Therefore, the subsequent hypotheses are formulated:

H4a: Green credit positively and significantly impacts MSMEs' innovativeness.
H4b: Green education positively and significantly impacts MSMEs' innovativeness.
H4c: Microsavings positively and significantly impact MSMEs' innovativeness.
H4d: Microinsurance positively and significantly impacts MSMEs' innovativeness.

3.10 Conceptual framework

It has been established that close to 95% of businesses across the world are MSMEs contributing to about 60% of job avenues in the private sector (Dasaraju et al., 2020). The United Nations Industrial Development Organisation (UNIDO) has established that MSMEs account for more than 90% of all African registered businesses. The contribution of MSMEs to Ghana's GDP increased by 49% in 2012 (Nimako et al., 2013). Adaletey et al., (2022) reveal that small and medium enterprises in Ghana create close to 85% of manufacturing job avenues and contribute nearly 70% to the GDP of Ghana and also form approximately 92% of businesses in Ghana.

A thriving MSME sector, according to Abisuga-Oyekunle et al., (2020) and Chetama, Dzanja, Gondwe, and Maliro (2016), is critical for poverty reduction and growth, particularly in SSA. In Ghana the SME sector plays a pivotal role in employment creation (Kodua, 2019) and poverty reduction. This role was evident in the review of surveys in various African countries conducted by Liedholm and Mead (2005). Notwithstanding the immense contribution of MSMEs to the advancement of emerging economies, it is commonly known that most MSMEs' operational activities contribute to ecological issues (Brahmbhatt et al., 2017). It is suggested that microfinance institutions could go green to help reorient MSMEs to include the environmental aspect to their financial and social bottom lines (Allet, 2012) by incorporating environmental conditions in their loan administration criteria and other services.

MSMEs in Ghana are capital constrained, which thwarts their survival and growth (Agyapong, 2020; Amoah & Amoah, 2018). The major sources of credit and other financial and non-financial services for MSMEs are microfinance institutions. The services of microfinance institutions include provision of loans, savings, microinsurance, and education, all of which impact on the sustainability of MSMEs. The effect of microfinance on the long-term viability of small firms can be measured by employing various criteria such as financial performance, social performance and environmental performance. In the present study, the perceived impact of green microfinance on sustainability of MSMEs is measured by a Likert scale of five points to illicit the viewpoints of the entrepreneurs. Thus, financial performance (FIP) is measured by increase in sales, increase in number of employees, increase in profit, increase in firm's assets and cash savings. Social performance (SOP) is assessed by employees' remuneration, employees' training/workshops, customer satisfaction, and contribution to community. On the other hand, environmental performance (EVP) is measured by MSMEs environmentally friendly practices, waste disposal plan, energy efficient equipment of firm, and amount spent on electricity.

As denoted in Figure 6, green microfinance services impact the sustainability of MSMEs. These services can be categorised into financial and non-financial services. The financial services comprise credit/loan, microsavings, microinsurance, and remittances but this study focused on the first three. The non-financial services, on the other hand, consist of education in the form of financial literacy, simple bookkeeping, environmental awareness creation, and training/workshops**.** Figure 6 depicts the proposed conceptual framework for the research.

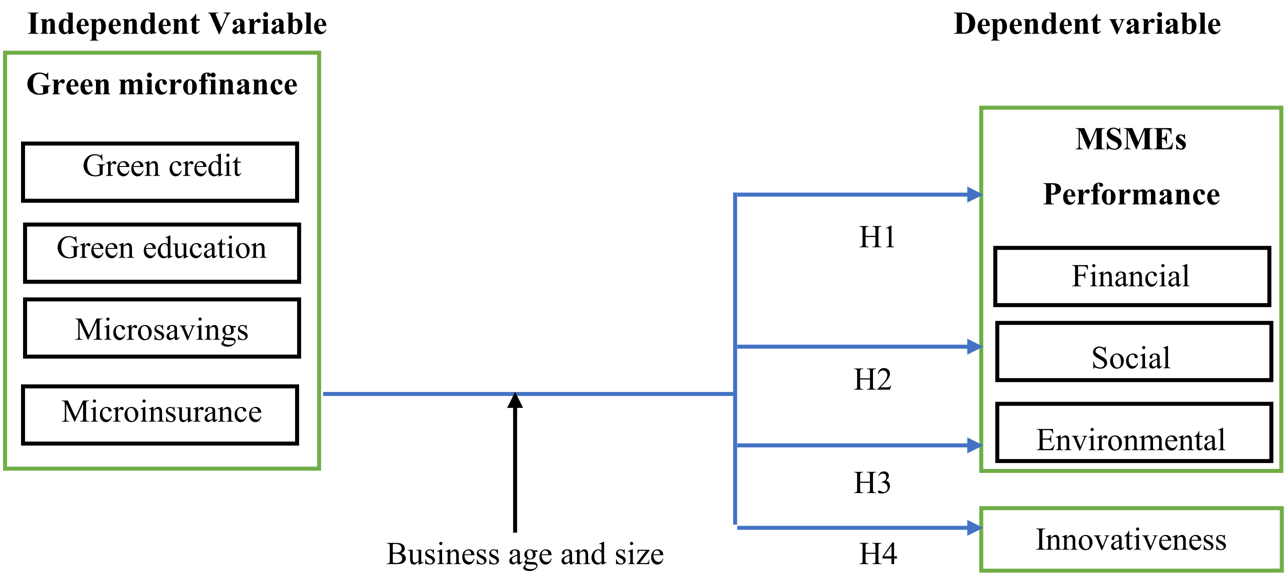

Figure 6: The study's proposed conceptual framework

Source: Adapted from Farghly et al. (2018)

Based on the above conceptual framework, the features of green microfinance: green microcredit, microinsurance, microsavings, and green education served as independent variables. MSMEs' financial performance, social performance, environmental performance and innovativeness served as dependent variables. Proxies for financial performance include profit growth, sales growth and growth in number of employees. Firm size and age serve as moderating variables as research has established that firm age and size can impact firm performance.

3.11 Gaps identified in literature

After extensive review of literature related to the topic conducted within and outside Ghana, it was discovered that there is dearth of research on green microfinance in Ghana. The few studies on green microfinance were conducted outside Ghana. This shows that there is scarcity of research in Ghana that empirically investigates the potential of microfinance institutions to influence MSMEs to engage in green activities.

Furthermore, most of the research works reviewed on microfinance and sustainability of MSMEs did not involve moderating variables as this study sought to do. Incorporating moderating variables gives comprehensive understanding and dynamics of the green microfinance concept.

3.12 Chapter summary

The chapter presented the empirical literature, conceptual framework and the hypotheses that underpinned the research. It examined previous works conducted by other researchers in the domain of the current study and analysed the findings and conclusions drawn. This has contributed to the identification of gaps which formed the basis of this research, as well as the significance of the research. The chapter ended by presenting the conceptual framework that guided the study and the gaps identified. The conceptual framework clearly demonstrates the relationship between the explanatory (independent) variables and the explained (dependent) variables and makes the whole concept easy to grasp.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter highlights the methods employed to put the hypotheses to test and accomplish the research objectives. Subsequently, it covers the research design, the sample frame, sample size, data sampling technique, data collection instrument, and the procedures used to select participants. In addition, the chapter assesses the validity and reliability of the instrument used for data collection. The chapter ends with a discussion on research ethics.

4.2 Research philosophy

The philosophy of a research deals with the fundamental worldview presuppositions that influence the choice of research design and the particular techniques used to implement the strategy. Joslin and Müller (2016) contend that choices regarding research methodology should consider the social science phenomenon being investigated as well as the researcher's philosophical stance. The fundamental assumptions underlying the world view are addressed by the research philosophy, which in turn affects the decision regarding the study design and the specific methodology to be applied to implement the strategy in the real world. The choice of research methodology should therefore consider the paradigm that directs the study, and the potential applications of that theory of knowledge (Tuli, 2010). Additionally, whether to employ quantitative, qualitative, or hybrid research methodologies depends on the type of belief system the researcher holds (Mertens, 2015). Therefore, when creating a research design, a researcher's research philosophy must be considered.

As a result, the research methodologies selected reflect the paradigm that frames the study, specifically the convictions regarding the essence of reality and humanity, the corpus of information that serves as the basis for the research, and the potential applications of that theory of knowledge in practice (Tuli, 2010). Furthermore, whether to do research utilising quantitative, qualitative, or mixed approaches is based on the type of belief system that the researcher holds (Doyle, Brady, & Byrne, 2009; Johnson & Onwuegbuzie, 2004; Mertens, 2015). According to Mustafa (2011) and Ponterotto (2005), a research paradigm is a "set of interrelated assumptions about the social world which provides a philosophical and conceptual framework for the organised study of that world". These presumptions concern how the researcher sees reality, how they connect to what needs to be learned, and how the inquiry is carried out. The research paradigm is comprised of fundamental assumptions that are connected to the worldview that underpins the research methodology and the specific methods that are utilised to accomplish the objectives of the study.

Similarly, Rahi (2017) describes a research paradigm as beliefs about the world that the researcher ascribes to. A Research paradigm is a school of thought, or shared beliefs, that reflects the meaning or interpretation of research data (Creswell & Creswell, 2017). The research paradigm gives credence as to why a researcher selects a quantitative, qualitative or mixed method approach (Creswell & Creswell, 2017). The researcher is guided by their chosen paradigm when deciding on the best participants, tools, techniques, and research methodologies (Denzin & Lincoln, 2005). Research paradigm is defined by Guba and Lincoln (1994:105) as "the belief system or world view that guides the investigator, not only in the choice of method but in ontologically and epistemologically fundamental ways as well as in method choice".

Creswell (2014) drew attention to four worldviews that exist in the academic literature and are frequently the subject of controversy. Pragmatism, constructivism, transformational paradigms, and post-positivism/positivism are the four schools of thought that fall within this category. Creswell (2014) also categorised these worldviews as paradigms. Conceptually, this study's philosophical beliefs are based on the positivist/post-positivist paradigm.

Guba and Lincoln (1994), identified three pertinent inquiries or assumptions while defining the paradigm. The paradigm was founded upon ontological, epistemological, and methodological principles. The ontological presumptions pertain to the essence of what is observable or to nature itself. The epistemological inquiries pertain to the correlation between the inquiry-proposer (the researcher) and the phenomenon beingstudied. Aside from methodological assumptions, which pertain to the researcher's approach to acquiring the necessary knowledge and comprehension, axiological and rhetorical structure have also been mentioned as assumptions (Goduka, 2012; Ponterotto, 2005).

4.2.1 Positivist paradigm

In the science of research, there are a number of different philosophical directions that might be taken; nonetheless, this study adopted the positivist route. Several philosophers, including John Locke, Aristotle, Auguste Comte, and Francis Bacon, are credited with developing the positivist paradigm, often known as "science research" or the "scientific method." These philosophers developed the positivist paradigm, which exhibits a rationalistic, empiricist worldview (Mertens, 2015 & Creswell, 2014).

According to Mertens (2015), the positivist worldview is that social science and natural science may be studied in tandem. Consequently, the idea of objective realism serves as the foundation for the method used to investigate the social environment. Mertens (2015) posits that cause-and-effect relationships may be described in the context of social environments just as simply as they can in the context of natural environments. Creswell (2014) asserts that the positivist approach increases knowledge by precise research and the impartial evaluation of reality in the natural world. Creswell (2014) explains that the positivist approach was how knowledge develops. Post positivists say that the scientific method of inquiry uses experiments and careful analysis of what is seen to come up with general rules that can be used to find links between different factors. Additionally, positivists maintain that the social world is governed by laws or theories, which may be tested and, if necessary, amended, by using techniques from natural science. Insofar as it aims to reduce concepts to measurable variables that are expressed as hypotheses and research questions, the positivist philosophical approach is reductionist. Furthermore, because the positivist worldview is deterministic in its very nature, effects might be determined by causes. When it comes to the study of human behaviour, the use of empiricist knowledge is restricted due to the positivist premise that scientific data is particularly convincing, reliable, and objective (Mertens, 2015).

According to positivists, scientific information is persuasive, impartial, correct, and reliable. It has been said that a significant amount of the human experience is overlooked, even though it can be seen.

Positivism's basic thesis is that social behaviour may be observed from a "scientific" standpoint, allowing for an objective interpretation (Krauss, 2005). However, its epistemological presumptions are more crucial; according to positivism, knowledge is created through deducing conclusions from a theory or hypothesis. Thus, a hypothetic-deductive approach must be used to generalise the findings from large sample sizes. This procedure comprises the creation of hypotheses based on how the researcher conceptualises a specific phenomenon. Babbie (2007), points out that, research with a positivist mindset typically relies on logical thinking, which generates several hypotheses for testing before seeking empirical confirmation. The deductive approach, as defined by Ghauri and Grønhaug (2005), is characterised by concluding a pattern of logical reasoning; hypotheses are constructed using information and literature that already exist before being put to the test empirically to make conclusions.

This directly led to the development of post-positivism. The limiting positivist premise that what might be researched is independent of what could be observed is rejected by post-positivism, and the justification for formulating generalisable principles pertinent to human behaviour is questioned. Post-positivists, however, propose that researchers reconstruct their claim on grasping the "truth" based on probability rather than certainty. They still believe value-free inquiry and generalisability are essential (Ghauri & Grønhaug 2005). Mackenzie and Knipe (2006) claim that positivist and post-positivist researchers heavily rely on quantitative methodologies for the collection of data and analysis.

Guba and Lincoln (1994) and Creswell (2014) emphasised that the purpose of research in the positivist and post-positivist paradigms is to theorise by developing hypotheses in order to uncover the relationships that are necessary to anticipate and manage social occurrences. Within the positivist and post-positivist worldview, this objective of inquiry is of the utmost importance. In addition, Guba and Lincoln (1994) and Creswell (2014) drew attention to the fact that the research questions and/or hypotheses are offered in the form of quantitative claims and are subjected to empirical testing in order to either support or disprove them.

Positivism contends that there is a single reality and therefore seeks to identify causal relationships through objective measurement and quantitative analysis (Firestone, 1987). In the positivist paradigm, the researcher is considered independent and objective using larger samples to test carefully constructed hypotheses. The prevailing wisdom is that the researcher in the positivist tradition can put aside values to avoid bias in a process of inquiry.

Positivist researchers seek to obtain law-like generalisations, termed nomothetic (Neuman, 2011), by conducting value-free research to measure social phenomena. Positivists maintain the conviction that when multiple researchers examine a given factual issue, they will arrive at comparable conclusions through the meticulous application of statistical tests and the implementation of an analogous research methodology when examining a sizable sample (Creswell, 2014). Their shared conviction is the existence of a context-applicable universal generalisation, which is presently referred to as naïve realism. This study used the positivist philosophical worldview as adopted by Nguyen, Tham, Khatibi, and Azam, (2019) and by Petersen and Gencel (2013). Phillips and Burbules (2000) advance that adoption of post positivist/positivist worldview attaches serious importance to methods and conclusions such as validity and reliability. By utilising a priori hypotheses and empirical data, this study aimed to investigate the perceived impact of green microfinance on the sustainability of MSMEs in order to either validate or refute the hypothesis that there is a relationship between the two.

4.2.2 Justification for Selecting Positivism

The research methodology chosen must be carefully considered given the complexity of the phenomena being studied, as this impacts the research's quality (Eriksson, 2013). Selecting the best paradigm for the research is crucial, for this reason. The researcher's training, social pressure from peers and mentors, and desire for particular sorts of research-derived insight all have an impact on the paradigm they choose (Weber, 2004). It is vital to acknowledge that each paradigm has unique assumptions and aims that are different from the others, even when the distinctions between the many paradigms may not always be evident in practice or theory (Avramidis & Smith, 2006). Therefore, based on their study questions, the researcher must choose the worldview that best fits their work rather than relying on the assumptions of other paradigms. A number of justifications can be stated for the paradigm chosen in this study based on the justifications offered for both the interpretivist and positivist paradigms, as well as the existing literature evaluated. First, according to Orlikowski and Baroudi (1991), positivism is the preeminent research paradigm in the field of finance. Second, since this study sought to examine the perceived impact of green microfinance on the sustainability of MSMEs through the examination of the relationships among specific variables, the positivist paradigm is the most appropriate approach to achieve the study's objectives. The reason for this approach choice is that it is the approach that answers the research questions as adopted by Nguyen, Tham, Khatibi, and Azam, (2019), Farghly et al., (2018) and Petersen and Gencel (2013).

Additionally, positivist research implies an independent social environment that can be perceived, identified, and quantified from an ontological point of view. In this study, Likert scales were used to quantify the variables in the predicted model. Positive epistemology suggests dualism and objectivity, as was previously stated. In other words, the participants and the researcher are separate entities. The researcher in the current study took an unbiased stance and distanced himself from the subjects. The variables of interest in this study were measured without the researcher or participants having any influence over them. Finally, the positivist paradigm was chosen as the most suitable option because the present investigation aimed to investigate postulated links using structural equation modelling. According to Urbach and Ahlemann (2010), structural equation modelling adheres to a positivist epistemic philosophy.

4.3 Research approaches

Creswell (2014) defines research approaches as "plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation" In other words, research approaches encompass the entire process of conducting research. Different sorts of research methodologies, such as mixed method, qualitative, and quantitative research, are available to researchers, as stated by Creswell (2014).

Qualitative research is an approach that investigates individuals' experiences comprehensively through a defined array of research methods, including in-depth interviews, focus group discussions, observation, content analysis, visual approaches, and biographies (Hennink, Hutter, & Bailey, 2020). It seeks to solve societal scientific and practical challenges through naturalistic and interpretative methods across several subjects (Creswell, 2014). This approach employs diverse empirical data, including case studies, personal experiences, and narratives that illustrate the routines and challenges individuals face, emphasising their profound meanings and reasons that elude quantification (Tracy, 2024). Qualitative research seeks to gather primary, firsthand textual data and examine it through particular interpretive methods. It is a valuable method in researching a phenomenon with limited accessible information as its nature is exploratory. Consequently, the qualitative method can unveil novel insights, concepts, and formulate new hypotheses. It frequently focusses on the findings of events within a given environment and timeframe, neglecting the potential future ramifications and outcomes in other contexts necessary for generalising the study's results (Tracy, 2024). Quantitative research, on the other hand, is the approach that utilises numerical data obtained from observations to elucidate and describe the phenomena these observations represent (Punch, 2004). This method utilizes empirical statements, which describe the significance of cases in the real world rather than their normative aspects, along with various methods. Additionally, it utilizes empirical evaluations to determine the degree to which a policy or program satisfies a norm or standard. Moreover, statistical procedures are used to analyse the gathered numerical data. Quantitative research seeks to characterise a specific phenomenon through the collection of numerical data to answer specific enquiries. However, Mixed-methods research utilises a combination of qualitative and quantitative approaches adapted to the study's objectives and the nature of the research question, thereby enhancing comprehension of the subject matter. The merging of both approaches enables researchers to address intricate study scenarios across several domains. This approach encompasses the benefits of both qualitative and quantitative methods. A mixed methods design, therefore, offers the best chance of answering research questions by combining two sets of strengths while compensating at the same time for the weaknesses of each method (Johnson & Onwuegbuzie, 2004).

It has been noted that the type of research challenge, the researcher's past experiences, and the study subjects all have an impact on the research approach that is ultimately adopted. A quantitative research approach was utilised for this study since it is congruent with the positivist worldview that underlies it (Mertens, 2015; Creswell, 2014). The study's main objective was to investigate the perceived impact of green microfinance on the sustainability of micro, small and medium enterprises. A quantitative research technique was deemed appropriate since it allows for the production of data that can be presented quantitatively and makes use of statistical tools to evaluate the hypotheses that were generated in order to accomplish the study's purpose.

4.3.1 Quantitative research approach

A quantitative study, according to Creswell (2003), is "an investigation into a social or human problem based on testing a theory composed of variables, measured with numbers, and analysed with statistical procedures, in order to ascertain whether the predictive generalisations of the theory hold true." Punch (2004) gave a very brief definition of quantitative research, stating that it is "empirical research where the data are in the form of numbers". A strategy that involves collecting, analysing, and presenting numerical data is referred to as the quantitative research method. Developing hypotheses that can either be verified or disproven is the primary objective of quantitative research (Creswell, 2014, p. 48). This is the core goal of quantitative research. Not only that, but Teddlie and Tashakkori (2009) mentioned that a hypothetico-deductive technique is widely utilised by quantitative researchers. The a priori derivation of hypotheses from a conceptual framework or a theory is a part of this process, which also involves testing the statements through the use of numerical data and statistical analysis (Creswell, 2014). This approach is necessary in order to generalise and replicate the results.
This stands in stark contrast to qualitative research, where data is typically given verbally or through narratives rather than through numerical data collection (Creswell, 2014). Quantitative researchers "focus on deduction, confirmation, theory/hypothesis testing, explanation, prediction, standardised data collection, and statistical analysis," according to Johnson and Onwuegbuzie (2004, p. 18).

Several different types of research designs, including experimental, survey, and correlational designs, are related with the quantitative method (Teddlie & Tashakkori, 2009).
According to Saunders, Lewis, and Thornhill, (2007), the phrase "quantitative method" is used when a researcher employs an objective, logical approach that places an emphasis on acquiring data in the form of numbers and measures. This study used quantitative methods to examine data in order to account for realism ontology and positivist epistemology (Saunders et al., 2007). Creswell (2014), advances that quantitative research is a way for examining the validity of ideas by measuring the correlations between variables. These variables can then be quantified and analysed numerically using statistical methods. In this study, the quantitative research design was adopted since it was objective, scientific, and did not modify the issue being examined. Johnson and Onwuegbuzie (2004) explain that the advantages of the quantitative research method include its suitability for researching larger populations, the objectivity of the research findings, and their ability to be generalised when replicated with several populations. They contend, however, that the knowledge produced by quantitative research may be too general and abstract to be directly applied to specific locations, circumstances, and people.
Johnson and Onwuegbuzie (2004) contend that quantitative research approaches permit the identification of both similarities and distinctions between variables to establish the objective relationship between them. Quantitative research is frequently conducted to provide the researcher with data collected from a relatively limited sample size, which serves as an indicator of a more extensive population (Cresswell, 2014). Consequently, a quantitative research approach was adopted for this study because it allowed the researcher to establish the perceived correlation between the elements of green microfinance and the long-term viability of MSMEs. The data analysis of this study employed both descriptive and inferential statistics.

4.4 Research Design

A research design is plan for collecting and analysing data (Kothari, 2004) . It also includes processes that might be used to carry out the study methodology (Williams, 2007). Research design, as defined by Easterby-Smith, Thorpe, and Jackson, (2012). Easterby-Smith et al. (2012), is the arrangement of research activities, including data collection, in a way that advances the research's objective. As stated by Wisker (2008), various scholars assert that the research design chosen for an investigation is contingent upon a multitude of factors, such as the subject of the study, the participants, the available time and resources, the accessibility of information, and the advancements resulting from empirical evaluations. It describes and justifies the data that will be gathered, how it will be gathered, where it will be gathered and analysed to answer the questions posed by the study.

4.4.1 Survey Research Strategy

Researchers have a wide range of research strategies available to them to choose from when it comes to the process of acquiring information for a study. In the process of selecting a research strategy, there are a number of factors that are taken into consideration. The purpose of the study, the type of research objectives and questions, the present level of knowledge, the amount of time necessary to finish the investigation, the resources that are accessible, and the philosophical assumptions that underpin the research are all examples of variables that are considered in this context (Saunders et al. 2007). Saunders et al. (2007) assert that a survey strategy is a logical procedure for obtaining data from a sample of entities to produce quantitative descriptors of the characteristics of the wider population of which the entities are a part. This objective is accomplished by collecting data from a sample of entities. According to Saunders et al. (2007), research strategy is "the methodological link between the researcher's philosophy and subsequent choice of methods to collect and analyse data." Bhattacherjee (2012), relates the survey research approach to "the systematic collection of data about people and their thoughts, feelings, and behaviour through standardised questionnaires or interviews".

A survey strategy is typically associated with a deductive research approach which relates to testing existing theories (Saunders et al., 2007). Surveys can gather homogeneous data from a large population in an efficient method by employing questionnaires, which simplifies comparisons (Bhattacherjee, 2012). More so, the survey approach is very simple to explain and comprehend and generally considered to be convincing. It enables the researcher to acquire numerical data that can be statistically examined using inferential and descriptive statistics. Again, data collected through a survey method can be utilised to develop models of these interactions and to offer potential justifications for specific correlations between variables. A survey approach gives the researcher greater command over the study procedure, and sampling allows for producing results that mimic the whole population at a lesser cost than collecting data from the entire population.

According to Saunders et al. (2007), the survey method is an efficient and economical means to gather substantial data from a sizable population. Data can also be utilised to suggest causes for a variable relationship to create models from the relationships. On the other hand, it has been suggested that the researcher does not have enough control over the variations in the variable of interest that are not systematic. Therefore, a lack of control over the essential factors can result in fascinating but inconclusive from a scientific standpoint (Bhattacherjee, 2012).

As per the author’s assessment, the survey research technique is appropriate for investigations that involve the consideration of each respondent as a separate unit of analysis.
As noted by researchers, the survey research strategy provides several benefits when juxtaposed with other methods. Bhattacherjee (2012) pointed out some compelling attributes of survey research. To begin, survey research is the most effective method for gathering data from large populations that are impractical to investigate personally. Survey research is the greatest method for gathering data on a large number of people that is very large and not feasible to reach each individual.

Also, a lot of respondents prefer surveys that employ questionnaires because, in comparison to other forms of surveys, they are less invasive and give respondents the opportunity to give their answers to the questionnaire items at a time that is most suitable for them. Furthermore, survey research is more efficient in terms of both time and financial commitment as compared to the other research methods. However, Bhattacherjee (2012) maintains that there are a few distinct drawbacks that are associated with survey research as well. The author explains that survey research is susceptible to a wide variety of biases, including recollection bias, sampling bias, and non-response bias, amongst others.

4.5 Time dimension

Survey research can be conducted under two different time horizons, cross-sectional and longitudinal (Creswell, 2014). When the researcher is interested in obtaining data from a sample at a certain point in time, cross-sectional survey is employed. Contrary to this, the term "longitudinal survey" refers to the practice of collecting data from a sample more than one period in time, with the goal of analysing how the population has evolved or changed throughout the course of the study.

Researchers perform cross-sectional studies by collecting data once in a particular period to capture a "snapshot" of the issue under study. Surveys are sometimes utilised in cross-sectional studies to investigate a phenomenon at a particular point in time When the researcher faces time limitations, cross-sectional studies are a suitable research approach. Alternatively, longitudinal research involves collecting multiple "snapshots" of the issue at different time intervals. According to Neuman (2011), the cost of conducting a cross-sectional survey is reduced because it involves the participation of only one group at any one point in time. Neuman (2011) asserts that a cross-sectional survey's intrinsic strength stems from the fact that it is a straightforward and less expensive option to other research strategies. Variables are assessed at successive time points during longitudinal research. For example, environmental performance of MSMEs is expected to improve over time as managers/owners are sensitised more about green environment. While one benefit is the ability to observe temporal changes in the phenomenon under investigation, this approach is both costly and time-intensive (Sekaran & Bougie, 2010). Due to financial and time limitations, the researcher conducted a cross-sectional investigation for the current study.

4.6 Study area

The study was conducted in two municipalities in Ghana, Sunyani and Techiman. An overview of the two municipalities is provided next.

4.6.1 Sunyani Municipality

The Bono regional capital is Sunyani, hitherto, the capital city of the Brong Ahafo Region which was the second largest region in Ghana until 2019 when the region was administratively divided into three regions: Bono with Sunyani as the capital city, Bono East of which Techiman is the capital city.

Sunyani is regarded as Ghana's greenest and cleanest capital. Sunyani Municipality occupies an area of 506.7 square kilometres. It is situated between latitudes 70 20'N and 70 05'N and longitudes 20 30'W and 20 10'W. The Sunyani Municipality shares its border to the north with the Sunyani West District, to the west with the Dormaa East District, to the south with the Asutifi District, and to the east with the Tano North District.

The lowest temperature is typically in August, while the warmest is typically in March or April. Monthly temperatures range from 23°C to 33°C. There are major and minor rainy seasons, the former occurs from March to September whereas the latter starts from October up to December.

According to Ghana Statistical Service (GSS) (2021), the population of Sunyani Municipality is 193 595, with a 4.3% annual growth rate. Roughly, 31.33% are below 15 years of age, 65.2% are 15-64 years while the remaining 3.47% are 65 years and above.

In comparison to men, who make up 49.77% of the population, women make up the majority of the population, or 50.23 percent. Akans make up the majority of the municipality's ethnic population (66.51%), followed by Mole-Dagbon (17.38%) and Ewe (3.65%). Then, 4.64% is made up of the Grusi (3.52%), Mande (2.26%), Ga-Dangme (2.04%), and other ethnic groups. Basically, Sunyani is home to practically all of Ghana's other ethnic groups. Sunyani enclave has numerous educational institutions. It has 228 basic schools, 111 are public and 117 private. It has 91 junior high schools, 54 are public and 37 are private. Nine are senior high schools (5 public and 4 private) and four tertiary institutions. About 84.88 % of people, 11 years and older can read and write, while 15.12% cannot (GSS, 2021). There are six hospitals, 12 clinics, seven chip compounds, three maternity homes, and three health facilities in the municipality that offer medical services to the populace (GSS, 2014). The municipality is home to a sizable number of financial institutions, namely banks and non-bank financial institutions, such as microfinance companies. By providing loans to prospective clients and supporting investments, these financial institutions contribute to enhancing the quality of life for those who reside in the municipality. It is estimated that 81% of the population of the municipality is urban, and 19% rural.

The major economic activities that support livelihood are services, agriculture, and industry. Service is a major driver of employment in the municipality. Nearly 65,2% of the population that is economically engaged is employed in the service industry. The city has become the region's commercial centre as a result of the many activities that go on in this sector, including wholesale and retail. About 26.4% of people in an economically active age work in agriculture. About 8.4% of the working population is employed by the industry, which includes various mechanical garages, food processing businesses, construction companies, and wood processing. The most popular way to dispose of solid waste is dumping in public containers. This accounts for 52.5% of all solid waste disposals. About 10.7% of houses burn their solid trash, compared to 17.4% who use public landfills (open spaces), house to house rubbish collection accounts for 8.5%. Households (10.9%) in the district most frequently dispose of liquid garbage by throwing it onto the compound (36.6%) and onto the street (22.9%).

4.6.2 Techiman Municipality

On the other hand, Techiman serves as the Bono East Regional capital city. It is situated between longitudes 10 49' east and 20 30' west and latitudes 80 00' north and 70 35' south. The four districts that border Techiman are the Offinso-North District in the Ashanti Region, the

Wenchi and Nkoranza Municipalities in the Bono East Region, and Techiman North. Techiman Municipality covers a total land area of 647.6 square kilometres (GSS, 2021). There are 243 335 people living in the municipality as a whole. As a result, there is a population of closely 375.8 people per square kilometre. Males make up 48.8% of the population, while females make up 51.2%. Only 22.2% of the population resides in rural areas, compared to 77.8% who reside in urban areas. Regarding the population in the municipality, 20.8% is under 25, while nearly 60% of the population is between the ages of 15 and 24. Those who are 65 years and older make up 3.8% of the population. Almost 74.3% of people are literate, compared to 25.7% of people who are not (GSS, 2021).

Similar to Sunyani, Techiman has a diversity of ethnic groups. The customs and cultures of these ethnic groups are distinctive. Techiman is one of the biggest markets in Ghana. The market is transnational as it draws visitors from other West African nations including Mali, Burkina Faso, Nigeria, and Niger. About 36% of the economically active population engage in agriculture, with services (28.2%) and industry following closely behind.Techiman has several international and commercial financial institutions including rural banks and credit unions.

The commonest means of disposing solid waste in the municipality is dumping of waste in open spaces, which accounts for 49.7% of all disposals. Four percent of the households indiscriminately dispose of their solid waste. About another 4% of rubbish is collected from house to house. The two most popular ways used by houses in the municipality for disposing of liquid waste are throwing the waste into compounds (25.5%) and throwing waste onto the street or outside the compound (44.0%) (GSS, 2014). Sunyani and Techiman Municipalities were selected as a study site because they have a large number of microfinance institutions and diverse MSMEs that fairly represent the economic activities in Ghana.

4.7 Study population

The entire group in whom the researcher is interested and wishes to draw conclusions on is referred to as a population. According to Saunders et al. (2007, p. 205) population is “the full set of cases from which a sample is taken”, while Hair et al. (2010, p. 131) defined target population as the “complete group of elements (people or objects) that are identified for investigation based on the objectives of the research project”. Consequently, Nwankwo (2003) described population of a research as the totality of a group of people or objects that the researcher wants to draw conclusions about. The reason for choosing these cities is that they are the largest cities in Bono and Bono East Regions. Moreover, they have the greatest number of MSMEs in the two regions (GSS, 2021). By choosing Sunyani and Techiman, the researcher managed to save time, money, and improve the efficiency of the questionnaires' distribution.

The population of the study consisted of all micro, small and medium enterprises owners/managers who are beneficiaries of microfinance credit and other services. Four rural banks and four Credit Unions which are located in Sunyani and Techiman Municipalities were randomly selected. The database of the selected microfinance institutions indicated that they have 5,303 MSMEs borrowers which constituted the target population of the study.

4.8 Sampling frame

Once the population for the research has been defined, the sampling frame is established as the subsequent step in the procedure. "Sampling frame is a representation of all the elements in the population from which the sample is drawn" (Sekaran & Bougie, 2010). Saunders et al. (2007) also defined it as "a complete list of all the cases in the population from which your sample will be drawn". The study was also limited to Rural banks and Credit Unions because they have similar characteristics in terms of business model. This was to mitigate the potential impact of response variation on the ultimate results. Presumably, microfinance institutions vary with regard to the clients they target, the methods they employ for lending, and the non-financial services they provide. The responses and, ultimately, the study's findings could be influenced by these variations.

4.9 Determination of sample size

Following the selection of an appropriate sampling technique, it is critical to ascertain the size of the appropriate sample. The sample size for a research is contingent on the degree of accuracy required or the margin of error, the time frame for the study, the research objective and the kind of analysis to be performed (Saunders et al., 2007; Sekaran & Bougie, 2010). Potentially, increasing the sample size improves accuracy and decreases sampling error. There are numerous methods by which sample size could be ascertained. The researcher may initially select the subject matter capriciously according to financial and time constraints. An alternative approach involves employing statistical principles to ascertain the sample size, presuming knowledge of the population parameters. Subsequently, the researcher might ascertain the sample size by consulting the methods employed by other scholars in prior research.

In order to ascertain the appropriate size of the sample for this study, the method developed by Krejcie and Morgan (1970) for estimating sample size was utilised.

The total number of MSME borrowers of the selected microfinance institutions in Sunyani and Techiman numbered 5,303 (Database of selected microfinance institutions, 2023). Krejcie and Morgan's (1970) model, which specified a confidence level of 95% and a margin of error of 5%, was followed in order to gather a sample of 358 respondents. This was accomplished by sticking to the rules outlined in the model. The level of certainty that corresponds to a confidence level of 95% means that if the sample is selected one hundred times, at least 95% of these samples will undoubtedly represent the attributes of the population. This is the conclusion that can be drawn from the fact that the level of reliability is 95%. It has been stated by Saunders et al. (2007) that the margin of error is a method that can be utilised to ascertain the degree of accuracy the population estimates possess.

The sample size of the study was arrived at as follows:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P(1-P)}$$

With the variables explained as follows:

S = the size of the sample needed

X^2 = the Chi-square table value for 1 degree of freedom at the chosen level of confidence

X = 1.96 (Thus X^2= 1.96 x 1.96 = 3.842)

N = size of the population

P = the fraction of the population (assumed to be 0.5 because that would give the largest sample size)

d = 0.05 (the fraction of the degree of accuracy)

d^2 = 0.0025

The size of the study's sample frame (population) = 5,303

Therefore, sample size is calculated as follows:

$$S = \frac{3.842\ x\ 5{,}303\ x\ 0.5(1 - 0.5)}{0.0025(5{,}303 - 1) + 3.842\ x\ 0.5(1 - 0.5)}$$

$$S = \frac{3.842\ x\ 5{,}303\ x\ 0.25}{0.0025(5{,}302\ ) + 3.842\ x\ 0.25}$$

$$S = \frac{5{,}093.5315}{13.255 + 0.9605}$$

$$S = \frac{5{,}093.53}{14.2155}$$

Thus, sample size, S = 358

So, the total number of samples used in the study was 358. The sample size obtained is consistent with researches that employed structural equation modelling. De Winter, Dodou and Wieringa (2009), Marsh and Bailey (1991), Marsh, Balla, and McDonald (1988), and Marsh, Hau, Balla, and Grayson, (1998) have all provided suggestions regarding the minimum sample size that should be utilised when employing structural equation modelling. Sample sizes for factor analysis-based research should not fall below one hundred, according to Kotrlik and Higgins (2001). Additional guidance is provided by Barclay, Higgins, and Thompson (1995) regarding the application of the 10-times rule when determining the minimum sample size for studies utilising structural equation modelling. For the latent construct with the greatest number of manifest variables, this recommendation suggests that the researcher select a minimum sample size equal to ten times the number of manifest variables in the model or ten times the quantity of latent constructs in the model. Neglecting to meet the minimum sample size criterion could result in "overfitting" the data, wherein the findings appear favourable in appearance but lack generalisability (Hair, Black, Babin, & Anderson, 2014).

Kombo and Tromp (2006) claim that choosing a sample size based on homogeneous groups with particular characteristics increases statistical precision. The respondents were chosen using a stratified systematic sampling technique. Based on size, the study's population was split into homogeneous groups that were proportionally represented in the sample (Table 4).

Table 4: Proportionate distribution of target population and sample size

Firm sector	Population	Sample size proportion	Sample size
Agriculture	1052	19.84%	71
Service	2799	52.78%	189
Manufacturing	1154	21.76%	79
Construction	209	3.94%	13
Others	89	1.68%	6
Total	**5303**	**100%**	**358**

Source: Selected Microfinance Institutions Database (2023)

The microfinance institutions selected for the study were Nsoatreman Rural Bank, Kaaseman Rural Bank, Drobo Community Bank, Nkoranman Rural Bank, Abosomakotere Cooperative Credit Union, Trinity Cooperative Credit Union, Ebenezer Cooperative Credit Union and Techiman Areas Teachers Cooperative Credit Union. These microfinance institutions were chosen for the study because they have the highest market share of MSMEs.

4.10 Sampling technique

Sampling is a method used by researchers to systematically choose a smaller, representative subset of a defined population to act as subjects for observation or experimentation in accordance with their study objectives (Sharma, 2017). Researchers have access to sampling techniques that include non-probability and probability sampling. The probability sampling process demonstrates that researchers can determine the equal likelihood of selecting each unit from the population. In contrast, non-probability sampling indicates that the likelihood of selecting each element in the population is not known. This requires the researcher to rely on their own judgment when selecting sample elements. Furthermore, this method cannot address research questions or fulfill objectives through statistical inferences regarding the population's features. Nonprobability sampling methods include snowball sampling, purposive sampling, quota sampling, and convenience sampling.

Stratified systematic sampling was the probability sampling approach used in the current study. The respondents for this study were chosen using a stratified systematic sampling technique. Stratified systematic sampling, as defined by Pandey and Shukla (2022), is a statistical sampling technique in which the population is subdivided into homogenous subgroups known as strata, with each population item belonging to just one stratum and using a constant interval appropriate for each stratum to select members from each stratum to form the sample

Stratified systematic sampling, as defined by Pandey and Shukla (2022), is a statistical sampling technique in which the population is subdivided into homogenous subgroups known as strata, with each population item belonging to just one stratum and using a constant interval appropriate for each stratum to select members from each stratum to form the sample. Using stratification, one can make sure that the sample is evenly distributed among the pertinent subgroups. Additionally, it guarantees that the sample will fairly represent the population in light of the stratification criteria (Zikmund, Babin, Carr, & Griffin, 2010). The sampling frame was made up of all MSME borrowers whose records were captured on the database of the selected microfinance institutions in Sunyani and Techiman Municipalities and was stratified based on the industrial sector of the MSME. They were stratified into agriculture, service, manufacturing, construction, and others. The advantage of stratified sampling is that it adds an additional ingredient to random sampling by guaranteeing that each stratum within the population is represented. This is in contrast to the method of sampling known as random sampling, which only represents one stratum of the population. According to Singh and Belwal (2008), this results in an enhanced probability of accuracy, as well as increased precision and reliability of estimates. Following the completion of the stratification, systematic sampling was employed to proportionately select MSME owners or managers from each stratum for inclusion in the sample of the study. Samples of MSMEs were picked in a methodical manner, with a random starting point and a predetermined interval in between. The random start method was used to determine the first MSME in each stratum's sample. The median squared error for the second sample was equivalent to the random start plus the interval. In order to identify the remaining sample MSMEs, consecutive multiples of the interval were added to the cumulative sum until the end of the sorted list was reached. This was done in order to obtain the necessary number of sampled MSMEs for each stratum. After collecting samples from each stratum's businesses, the samples were combined to create the study's sample.

4.10.1 Sample inclusion criteria

For the purpose of this investigation, selection into the sample was performed based on a number of important parameters of interest. To begin, in order to be included in this study, micro, small, and medium-sized enterprises needed to be customers of the designated microfinance institutions. Second, the MSMEs had to be borrowers from the microfinance institutions. Third, the MSMEs operations had to take place within either the Sunyani or Techiman Municipalities. Only MSMEs that were able to satisfy these requirements were considered for inclusion in the study.

4.11 Sources of data

Both primary and secondary sources of data were accessed for the study. Whereas primary data was collected from the selected owners/managers of MSMEs to give responses to the research questions, the researcher also resorted to secondary data from microfinance institutions, Bank of Ghana records, the internet, journals and books, to acquire enough literature applicable and relevant to the research. The researcher was able to enhance the study questions and objectives, and also better understood the data analysis results, with the assistance of the secondary data.

4.12 Research instrument

The researcher used paper-based questionnaire personally to obtain data from respondents. According to Saunders et al. (2007), questionnaire is typically utilised for research that is either descriptive or explanatory in nature. This is due to the fact that they are the most effective tools for gathering factual data and make it possible to acquire data from a wide and geographically scattered population in a more timely and cost-effective manner (Saunders et al. 2007). Studies suggest that the paradigm and research questions that are utilised in a study are two of the most significant aspects that determine the selection of appropriate techniques for the collection and analysis of research data. As a result of the fact that the present study is compatible with the positivist/post positivist research paradigm (Mackenzie & Knipe, 2006), the quantitative data gathering approach was utilised in order to collect the data for the study. In this context, data was collected about the influence of green microfinance on the sustainability of MSMEs in Sunyani and Techiman Municipalities through the use of questionnaire. The following considerations served as the impetus for the decision to use paper-based questionnaire that were individually administered: 1) This allows the investigator to develop a personal connection with the participant and elucidate the significance of the study to them. 2) Should the participants remain uncertain regarding a particular query, the researcher may provide clarification. 3) A very high number of responses is anticipated once the participants consent to complete the survey.

Malhotra and Birks (2007) contend that a survey is a methodical approach to data collection that is comprised of a series of questions to which a respondent is required to provide a response. It is possible that these questions will be asked verbally or in writing. There are three distinct approaches that can be taken when developing a questionnaire: open-ended, closed-ended, or a combination of the two. (Saunders et al., 2007) Closed-ended questions provide the respondent with a list of possible responses from which they are to select, but open-ended questions encourage the respondent to provide their own responses to the questions. In spite of the fact that open-ended questions generate information that is more comprehensive and richer, they are often associated with qualitative research methods (Creswell, 2014).

Because closed-ended questions are typically used in quantitative research methods, the current research employed closed-ended questions (Creswell, 2014 & Mertens, 2015).

4.12.1 Questionnaire design

To achieve the specified study objectives, the questionnaire was created in cognisance with the stated research questions. The questionnaire consisted of eight components, which ranged from A to H, each of which was organised according to the study's key objectives. The first component of the questionnaire was dedicated to collecting information about the participants' demographic details, such as their age, gender, educational background, and occupational history whereas the second section focused on the business characteristics of the respondents. The rest of the sections of the questionnaire utilised a Likert scale with five points, ranging from strongly disagree (1) to strongly agree (5). The third section of the questionnaire sought to ascertain the respondents' perception about the effect of green microfinance on their businesses. In line with the studies of Omondi and Jagongo (2018) and Farghly et al. (2018), the questionnaire items in this section were grouped under the elements of microfinance, including green credit, green education, microinsurance and microsavings.

The following section captured the research participants' perceptions about the influence of green microfinance on the financial performance of the respondents' businesses. Five items were developed to assess MSME owners/managers' perceptions of the impact of green microfinance on MSMEs. The test items for measuring MSMEs' financial performance were derived from prior test items and modified.The ensuing section elicited research participants' responses to assess their perception of the influence of green microfinance on the environmental performance of their enterprises. The penultimate section of the questionnaire aimed to solicit the perception of MSMEs' owners/managers about the impact of green microfinance on the social performance of their enterprises. The final section elicited the respondents' perception of the effect of microfinance on their innovativeness. According to Straub, Boudreau, and Gefen (2004), it is more cost-effective to use an existing questionnaire that has proof of reliability and validity of the instrument than it is to design a new instrument.

Consequently, all the test items were borrowed from previous studies where the validity and reliability had been proven, and some were modified to achieve the objective of the current study. The items were re-worded to reflect the context of the current study. Financial performance was measured by five test items adapted from Aladejebi (2019), Kio, Amed, Abubakar, Aliyu, and Lawal, (2021) and Haider, and Fatima, (2017). Eight items employed to measure environmental performance were taken and modified from Akao and Managi (2006), J.-F. Henri and Journeault (2008), and Zimmer, Fröhling, and Schultmann, (2016). Zimmer et al. (2016), whereas seven item adapted from Farghly et al. (2018), Abdali (2011) and Sweeney

(2009) were used to measure social performance. Finally, firm's innovativeness was assessed by four items borrowed and modified from Arundel and Smith (2013) and Cirera and Muzi (2016). Each and every aspect of the study was covered by the questionnaire. The majority of the items were closed-ended questions and are graded on a five-point Likert scale.

Table 5: Design of test items

Latent Constructs	Items (Scale 1 – 5)/ Variable	Source	Adapted
Financial Performance	The amount of my business capital has increased as a result of using MFIs' products	Aladejebi (2019)	
	The amount realised by my business for net profits has increased as a result of using MFIs' products	Kio et al. (2021), Farghly et al. (2018)	
	The use of microfinance products is the only way to improve the financial performance of my business	Aladejebi (2019)	
	The sales volume of my business has increased as a result of using MFIs' products	Kio et al. (2021), Haider, Asad, and Fatima (2017)	
	My business assets have increased as a result of using MFIs' products	‘ ’	
Environmental Performance	My firm recycles the waste it generates	Akao and Managi (2006)	
	I employ environmentally friendly technology/practices in my operations to reduce pollution	J.-F. Henri and Journeault (2008)	
	I have devised cleaner processes in my activities	‘ ’	
	I have acquired energy efficient equipment	Farghly et al. (2018)	
	I spend lesser amount on electricity now	‘ ’	
	I plan my waste disposal very well	‘ ’	
	I do waste separation	J.-F. Henri and Journeault (2008)	
	I do waste recycle	‘ ’	
Social Performance			
	My firm identifies and prioritises key human resource issues and problems as a result of MFI product	Abdali (2011)	
	My employees now receive more regular training/workshop as a result of using MFIs' products	‘ ’	
	My employees are more content with their conditions of service as a result of using MFIs' products	‘ ’	
	My customers' expectations are usually met as a result of using MFI products	‘ ’	

Latent Constructs	Items (Scale 1 – 5)/ Variable	Source	Adapted
	I address my customers concerns on time as a result of MFI product	‘’	
	I do donate to the community as a result of using MFI product	Zimmer, Fröhling, and Schultmann, (2016)	
	I have provided education/health/electricity/water facility to the community as a result of using MFI products	Zimmer et al. (2016)	
Innovativeness	My firm introduced a new product/service onto the market as a result of using MFI products	Arundel and Smith (2013),	
	My firm introduced a new method of producing goods or services as a result of using MFI products	Cirera and Muzi (2016).	
	My firm acquired advanced machinery, equipment, computer hardware or software to produce new or improved products or services as a result of using MFI products	‘’	
	My firm introduced new or significantly improved delivery or distribution methods for my goods or services as a result of using MFI products	‘’	

Source: Researcher’s compilation

4.12.2 Pilot study

A pilot study was conducted before the main study to determine whether or not the chosen instrument was clear and unambiguous and to ensure that the intended study had been effectively conceptualised (Coughlan, Cronin, & Ryan, 2007). A pilot study serves as an experimental version of the primary survey, enabling the researcher to validate a data collection procedure on a limited number of cases prior to the commencement of primary research data collection (Matthews & Ross, 2010, p. 65). According to Saunders et al. (2007), the objective of the pilot study is to "further refine the questions" with the goals of "removing any ambiguities and eliminating problems that may arise when recording the data." In addition, Ticehurst and Veal (2000) describe the objectives of a pilot study as including the following: (1) validating the the questionnaire’s wording; (2) examining the query order; (3) testing the layout of the questionnaire; (4) becoming acquainted with respondents; (5) estimating the amount of time required to finish the questionnaire; and (6) testing the procedures for conducting analysis. In addition, the researcher is able to determine the instrument's reliability and validity through the course of the pilot study. In the long run, these checks on the dependability and authenticity of the data could make the data collection process more efficient. According to Blumberg, Cooper, and Schindler, (2014), the size of the pilot sample may range from 25 to 100 participants.

The prepared pilot questionnaire was initially submitted to the university ethics committee of the researcher for the purpose of conducting an initial evaluation. This aided the researcher in determining the questionnaire's representativeness and usefulness regarding the research issues. The questionnaire was then randomly given to 40 MSMEs owners/managers in the field with the goal of determining if the answers to the questions were in line with their intended use. The Cronbach alpha coefficient was employed to assess the instrument's reliability. According to Hair, Black et al. (2014), Cronbach alpha should be used as a measure of reliability. They explain that a coefficient of 0.70 and higher is considered sufficient to accept the study instrument as reliable and dependable. Since the Cronbach's alpha values for all of the study's variables were found to be more than 0.7, it suggested that all the variables were reliable.After the pilot test, certain questions were altered, due to complaints from some respondents that some questions were not very clear to them.

4.12.3 Questionnaire administration and data collection procedure

A total of 358 questionnaires were distributed personally to collect data from the respondents in Sunyani and Techiman Municipalities. A meeting was held with the President of the Association of Rural and Community Banks and the Chapter Manager of the Ghana cooperative Credit Unions Association, who are the heads of the regional apex bodies of the rural and community banks and credit unions, as a first step in the process of collecting data. The purpose of the meeting was to explain the issues relating to the data collection and to approach the institutions that were involved in order to get access to their MSME clients. Subsequently, the researcher engaged four research assistants to assist in the administration of the questionnaires. The researcher had a meeting with the research assistants, who were engaged from the University of Energy and Natural Resources in Sunyani, Ghana to gather the data. The questionnaire was thoroughly presented to the research assistants and copies were provided for them to familiarise themselves. Before the questionnaire was administered, the researcher and the research assistants met again to go over the questionnaire and clarify any unclear questions.

The data gathering process began on February 20, 2023, and ended on April 14, 2023. The questionnaires were administered to managers or owners of MSMEs who were loan clients of the rural and community banks and credit unions selected for the study. Where respondents struggled to answer a question, the research assistants assisted them and helped them finish the question. This made it simpler for respondents to finish the questionnaire, which increased the total number of responses the survey received.

4.13 Data analysis methods

To obtain representative results of the study objectives, the researcher ensured the validity and reliability of the test instruments. According to Saunders et al. (2007), validity is the degree to which the research actually measures that which it was intended to assess or the degree to which the research results are authentic. The study thoroughly reviewed relevant literature and built its models on sound theoretical frameworks.

It is argued that a pilot study enables the researcher to examine the instrument's reliability and validity. To ascertain whether the instrument was clear and unambiguous and to confirm that the intended study had been adequately captured, a pilot study was carried before the main study (Coughlan et al., 2007). Through the pilot study, the researcher is able to assess the validity and reliability of the instrument. These verifications of the reliability and validity of the data may, in the long term, increase the effectiveness of the data collection process. Forty Microfinance MSME clients participated in the pilot test. According to Jagongo (2009), the pilot test can show whether the questions are relevant, rationally structured, and worded so that respondents can understand them. It can also show whether any items need to be clarified.

The questionnaire was presented to academics and researchers with experience in microfinance and MSMEs to provide their feedback and suggestions to improve the questionnaire. This was done to guarantee that the content of the questionnaire was valid. According to Bhattacherjee (2012), test reliability is the consistency or dependability of the test items used to measure a construct. Malhotra and Birks (2007) explain that the reliability of a test instrument is assessed by the potency of the instrument to produce results that are steady and constant when repeated measurements are made. To test for reliability and validity, Cronbach alpha, composite reliability, and discriminant validity were used.

To assess the suitability of the PLS-SEM technique for the analysis of the current study, the data was subjected to a number of data analytic procedures. Additionally, the data was checked for outliers, and missing values were dealt with. A comprehensive explanation of these checks is presented in Sections 4.13.2 to 4.13.3 below. The PLS-SEM was then utilised to test the hypotheses that were derived from the research model.

4.13.1 Data quality controls

A preliminary review of the data was done to make sure it is appropriate for statistical analysis and yields relevant results (Sekaran & Bougie, 2010). By conducting a preliminary analysis of the data, researchers are provided with a complete method to investigate the individual factors as well as the correlations between these variables (Hair, Black et al., 2014). Preliminary data analysis is regarded as supporting empirical analysis rather than serving as a substitute for it (Hair, Black et al., 2014). Checking the correctness of the data input, identifying and treating outliers and missing values, and testing the assumptions of the multivariate statistical approach used are all part of the preliminary analysis process. The researcher handled outliers and missing values in this study and reviewed the data to ensure that it was accurate. In addition, the data were examined to determine whether or not they were normal to provide support for the use of PLS-SEM. To guarantee data quality, outliers, missing values, and normality were assessed.

4.13.2 Assessing outliers

Outliers are "observations with a unique combination of characteristics identifiable as distinctly different from the other observations" (Hair, Black et al., 2014, p. 62). Data cases that have values that are not consistent with the majority of the cases in the dataset are referred to as outliers. Due to the fact that their inclusion in the data set may lead to inaccurate judgments regarding the analysis, it is of the utmost importance to recognise and effectively deal with outliers. The Mahalanobis distance D^2 was used to identify multivariate outliers, which were then removed from the dataset. The Mahalanobis distance measures the distance of each observation in multidimensional space from the mean centre of all observations. As a rule, an observation is flagged when the probability of the Mahalanobis distance exceeds 0.001.

4.13.3 Assessing missing values

The term "missing data" refers to the situation in which certain information pertaining to a certain case or subject is not accessible for a subject (or case) upon which other information is accessible. In the event that respondents do not answer one or more of the items in a survey, or if there are problems in the data entry process, missing data may occur. In the current study four cases were detected which were as a result of data entry and which were corrected.

According to Bhattacherjee (2012), test reliability is the consistency or dependability of the test items used to measure a construct. Malhotra and Birks (2007) explain that the reliability of a test instrument is assessed by the potency of the instrument to produce results that are steady and constant when repeated measurements are made. To test for reliability and validity, Cronbach alpha, composite reliability, and discriminant validity were used. To assess the suitability of the PLS-SEM technique for the analysis of the current study, the data was subjected to a number of data analytic procedures. Additionally, the data was checked for outliers, and missing values were dealt with. A comprehensive explanation of these checks is presented in Sections 5.5.1 to 5.5.2 of Chapter Five. The PLS-SEM was then utilised to test the hypotheses that were derived from the research model. The two-step procedure recommended by Chin (1998) was used to conduct the PLS-SEM analysis. The measurement model was evaluated to determine the reliability and validity of the variables in the proposed research model. The causal relationships (paths) between the variables in the hypothesised model were examined once it had been determined that the measurement model was appropriate. In accordance with the recommendation made by Hair et al. (2010), the variables GCR3, GCR6, GCR7, GED1, GED3, GED4, MIS1, SAV1, SAV3, and SAV5 from the questionnaire in Appendix 3 were not included since they had poor factor loadings. Therefore, in order to guarantee uniformity, these variables were excluded from the frequency distributions. The adoption of PLS-SEM methodology is justified in detail below, along with an explanation of structural equation modelling.

4.14 Model specification

This study aimed to examine the perceived impact of green microfinance on various dimensions, including financial, environmental and social performance, and innovativeness of MSMEs. Four regression models were employed to achieve this. A regression model is used to describe each facet of sustainability, namely financial performance (FIP), social performance (SOP), and environmental performance (EVP). The fourth regression model indicates the variable of innovativeness (INV). Regression model 1 encompasses the dependent variable of financial performance, whereas regression models 2, 3 and 4 incorporate social performance, environmental performance (EVP), and innovativeness (INV) as their respective dependent variables. The study included green credit (GCR), micro savings (SAV), microinsurance (MIS), and green education (GED) as independent variables to examine the perceived impact of green microfinance on the sustainability of MSMEs. The study employed business age (AGE) and size (SIZ) as moderating variables to comprehensively examine the impact of green microfinance on the financial, social, environmental performance and innovativeness of MSMEs. The educational level (EDL) of the owner/manager of the MSMEs was employed as a control variable and ε is the error term.

The following regression models were formulated to test the hypotheses:

$FIP= \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+EDL+\varepsilon$ Model 1

$FP= \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+\beta_5GCR*SIZ+\beta_6GCR*AGE+EDL+\varepsilon$ Moderation

$SOP = \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+EDL+\varepsilon$ Model 2

$SOP= \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+\beta_5GCR*SIZ+\beta_6GCR*AGE+EDL+\varepsilon$ Moderation

$EVP= \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+EDL+\varepsilon$ Model 3

$EVP= \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+\beta_5GCR*SIZ+\beta_6GCR*AGE+EDL+\varepsilon$ Moderation

$INV = \beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+EDL+\varepsilon$ Model 4

$INV=\beta_0+\beta_1GCR+\beta_2SAV+\beta_3MIS+\beta_4GED+\beta_5GCR*SIZ+\beta_6GCR*AGE+EDL+\varepsilon$ Moderation

Source: Researcher's construct

The statistical software used for conducting the analysis are IBM SPSS and the Smart-PLS Structural Equation Model (SEM). The subsequent explanations pertain to the variables within the previously specified model.

4.14.1 Description of variables in the model

4.14.1.1 Dependent variables

The dependent variables in this research were financial performance, social performance, environmental performance and innovativeness.

Financial performance

The researcher measured financial performance based on eight test items. Out of the eight questions, four were adapted from Kio et al. (2021) and two from Aladejebi (2019). The test items focus on number of employees, net profit, sales, business assets and capital build up as can be seen in the appendix.

Social performance

Seven questions were used to measure social performance. Five questions out of the seven questions were adapted from Abdali (2011) and the other two adapted from Zimmer et al. (2016).

Environmental performance

Seven items were used to measure environmental performance. Three of the questions were adapted from Henri and Journeaut (2008) and another three from Farghly et al. (2018) and one question was adapted from Akao and Managi (2006).

Innovativeness

To assess innovativeness, four items were employed. Three of the questions were adapted from Cirera and Muzi (2016) and one from Arundel and Smith (2013).

All the questions utilised a Likert scale with five points, ranging from strongly disagree (1) to strongly agree (5).

Hamdoun et al. (2018) describe innovation as the generation and implementation of novel products, processes, activities, knowledge dissemination, and technology that have a significant influence on a company's operational endeavours. The phenomenon of innovation can be understood as a complex undertaking in which both established and new information are employed in order to attain economic goals (Azmat et al., 2023). Porter (1998) contends that innovation serves as a pivotal factor enabling organisations to gain a competitive advantage over their rivals.

The implementation of innovation inside an organisation has a positive impact on both firm performance and sustainability (Teece, 2018). This assertion is supported by Teece (2018), who argues that innovation is directly linked to increased future profitability. According to Rajapathirana and Hui (2018), both large and small enterprises require financial resources in order to effectively participate in substantial innovation endeavours. Due to limitations in obtaining adequate collateral required by traditional banks, micro and small-sized enterprises rely heavily on microfinance institutions as a primary source of funding for their innovative endeavours.

4.14.1.2 Independent variables

The elements of green microfinance employed in the study are green credit, micro savings, microinsurance, and green education. The aforementioned elements comprised the independent variables.

Green credit

According to (2020), a positive relationship exists between the level of loan accessibility for MSMEs and their overall success. This assertion demonstrates that the performance of MSMEs is significantly impacted by their ability to obtain financing. According to Shahidullah and Hague (2014), MSMEs that are granted green financing exhibit sustainability, adhere to prevailing environmental standards, and possess adequate profit margins to assure their long-term survival. Seven (7) questions were used to measure green credit, modified from the works of Farghly et al. (2018), Aladejebi (2019), and Kio et al. (2021). A 5-point Likert scale, adapted from Farghly et al. (2018), was employed to assess green credit, which ranged from 1 (Strongly disagree) to 5 (Strongly agree).

Micro savings

One of the financial services offered by microfinance institutions is microsavings. MSMEs, particularly those situated in rural areas of emerging nations, are advised to allocate a portion of their earnings towards prospective investments (Gyimah & Boachie, 2018). Senzu and Ndebugri (2018) argue that one of the primary factors contributing to the high failure rate of MSMEs is a deficiency of savings. Cash-rich businesses have the ability to finance potential business openings as they arise or engage in competitive market strategies against their rivals. According to La Rocca et al. (2019), savings has a beneficial effect on operating performance of MSMEs. Savings is very important for MSMEs to secure future opportunities and procure eco-friendly equipment to enhance their environmental performance. The establishment of savings holds significant importance for MSMEs as it enables them to safeguard future prospects and acquire environmentally appropriate equipment to improve their ecological performance by adopting innovative processes and practices. Six (6) questions were utilised to assess micro savings, employing measuring scales ranging from 1 (Strongly disagree) to 5 (Strongly agree).

Microinsurance

Microinsurance is another independent variable of the study. Studies indicate that risk is an inherent aspect of MSMEs' operations, since it is intricately linked to all facets of their commercial endeavours. Therefore, it is imperative for all organisations to adopt risk mitigation strategies to effectively handle a range of potential threats and sustain their business activities (Bhaskara & Filimonau, 2021; Neise & Diez, 2019). The acquisition of insurance policies by

MSMEs is an optimal approach for managing the inherent uncertainties associated with business operations (Teece et al., 2016). As noted by Panigrahi (2012), MSMEs have the potential to enhance the viability and sustainability of their enterprises by employing risk mitigation strategies. An organisation experiencing financial losses may potentially recover and restore its operations by utilising the reimbursement obtained from insurance providers (Jarzabkowski et al., 2019). Microinsurance better functions as a means of protecting the organisation from the adverse financial consequences resulting from the loss of environmentally sustainable assets, properties, and human lives, rather than employing physical measures for their defence. Microinsurance was assessed using five (5) questions and a measuring scale ranging from 1 (Strongly disagree) to 5 (Strongly agree), derived from Aduko (2011) and Akotey et al. (2011).

Green education

Most MSMEs are operated by individuals with limited educational attainment. Consequently, individuals may find themselves lacking the necessary preparation to effectively fulfil managerial responsibilities in order to sustain their enterprises (Turner & Endres, 2017). The presence of inadequate managerial skills among MSME owners might result in their lack of preparedness to address dynamic economic situations and environmental concerns, as well as hinder their ability to strategise for essential technology advancements and mitigate environmental risks. Hence, to secure the continuity and expansion of MSMEs, it is imperative to consistently augment the business acumen of their proprietors and managers (Yunus, 2017). The significance of enhancing management skills in MSMEs is widely acknowledged due to its profound influence on their long-term viability (Kyabarongo et al., 2022). Green microfinance offers a range of non-financial services to MSMEs in order to strengthen their operations. These services include business advisory support, workshops focused on environmental awareness, hygiene, financial management and technical training. By providing these supplementary services, green microfinance aims to bolster the activities of MSMEs. These are represented by green education as an independent variable. Six (6) questions were utilised to measure green education, employing modified measuring scales ranging from 1 (Strongly disagree) to 5 (Strongly agree).

4.14.1.3 Moderating variables

The study incorporated business age and size as moderating variables. Moderating variables have the capacity to influence the magnitude or characteristics of the association between two variables (Dawson, 2014). A moderator variable can be conceptualised as an additional variable that exerts an influence on the relationship between an independent variable and a dependent variable. The moderator manipulates the independent variable in order to influence the magnitude or direction of the dependent variable (Ramayah, Cheah, Chuah, & Memon, 2018).

Business age as a moderator

The concept of firm age refers to the uninterrupted duration, typically measured in years, during which a firm has operated in its present industry. This metric is indicative of the firm's accumulated knowledge and experience (Olumide, 2010). The existing body of empirical research presents divergent findings regarding the relationship between age and performance. Some studies such as Loderer and Waelchli (2010) suggest a negative impact of age on performance. Additionally, Younis and Sundarakani (2020) find that the relationship between firm age and performance is not statistically significant. Ural and Acaravci (2006) assert that the aging of firms has a detrimental effect on performance, in terms of sustainability and renewal strategies. They propose that managers can mitigate this decline by utilising the knowledge gained from the experiences of other firms. This observation suggests a negative correlation between the age of a firm and its financial performance. According to Ural and Acaravci (2006), age is considered a component of an organisation's resources and capabilities.

The accumulation of years results in a growth in age, which in turn leads to the acquisition of experiences. According to the findings of Pástor and Pietro (2003), there is a negative relationship between firm age and both profitability and market-to-book ratios. This relationship can be attributed to the process of investor learning and a reduction in uncertainty with time. According to Azoulay, Jones, Kim, and Miranda (2020), the rate of firm development tends to decrease as firms age. This can be attributed to the fact that older organisations have already reached the lowest efficiency scale of production, as highlighted by Coad, Segarra, and Teruel (2016).

Research shows that mature organisations perform worse than younger ones. Age may bring drawbacks, despite increasing experience. Drucker (1987) links aging to obsolescence, which can renew and threaten sustainable growth. Stark (2022) linked the concept of organisational life cycle to this. Coad et al. (2016) contend that the innovation processes of organisations undergo transformations over their life cycle, based on the premise that as firms mature, they accumulate knowledge and develop established routines.

In contrast, other studies, such as Ghafoorifard, Sheykh, Shakibaee, and Joshaghan, (2014), indicate a positive association between age and performance. Petruzzelli et al. (2018) argue that older organisations have superior performance compared to younger firms when they effectively utilise established information. Mature firms may derive benefits from their efforts in innovation. Numerous studies have brought attention to the presence of learning effects, which facilitate the capacity of older firms to engage in innovation with greater effectiveness (Coad et al., 2016). According to Doucouré and Diagne (2020), the variables of size and age exert a significant influence on performance outcomes. The age of the business was assessed based on its duration of operation, categorised as less than 3 years, 3-10 years, 11-15 years, and over 15 years.

Business size as a moderator

A firm's size can be assessed using different indicators, such as investment value, the number of employees or total assets (Vij & Farooq, 2017). The size of a firm exerts a notable influence on its economic performance, environmental performance, and social performance (Younis & Sundarakani, 2020). The majority of MSMEs in emerging economies are facing challenges in effectively implementing all aspects of performance measurements concurrently. According to Surya et al. (2021), certain MSMEs tend to disregard their own technical and managerial capacities while striving for economic performance. When faced with the concept of sustainable development, large firms possess significant research and development, funding, marketing skills, and social compacts. Great traits are utilised by large organisations to strive for sustainable performance (Wang, Li, & Zhao, 2018).

The research conducted by Mahmood, Uddin, and Fan, (2019) indicates that a business's size is a significant determinant of how credit and sustainable performance are correlated. According to the findings of Babalola (2013), the profitability of manufacturing enterprises in Nigeria was positively influenced by company size, as measured by total assets and total sales. In a study conducted by Niresh and Thirunavukkarasu (2014), it is argued that the profitability of a company is significantly influenced by its size, as per the concept of economies of scale in the neo-classical perspective of the firm. Likewise, the study conducted by Hussain et al. (2018) investigated the moderating influence of business size and interest rate on the capital structure of firms within the sugar sector of Pakistan, utilising panel data. The study's conclusions show a substantial and inverse relationship between interest rates and business size in terms of how each affects the firm's capital structure. According to Kuncová et al. (2016), there was an observed correlation between the size of enterprises and their economic success, with larger firms demonstrating better levels of performance in comparison to smaller ones.

Firms of larger scale possess certain competitive advantages relative to firms of smaller size. Large companies demonstrate strong financial stability, enabling them to allocate greater financial resources towards initiatives that promote environmental sustainability, social well-being, and economic development, in contrast to smaller enterprises (Zhou & Liu, 2023). The study by Hernández et al. (2020) looks into how firm size affects the link between MSMEs' economic performance and CSR as a moderator. The study's conclusions show that business size significantly modifies the relationship between CSR and economic success. Furthermore, the analysis reveals that the magnitude of this relationship is contingent upon the organisational size, with larger MSMEs exhibiting a more pronounced association between CSR activities and economic performance.

The investigation into the impact of company size on environmental performance is garnering increasing attention. The application of corporate environmental policies may be influenced by the size of the organisation, as larger enterprises often possess greater resources and face more significant environmental pressures compared to smaller firms (Wong et al., 2020). According to Younis and Sundarakani (2020), a positive correlation exists between the size of a corporation and its environmental, economic, and social performance. The effect of eco-friendly supply chain methods on construction firms' environmental performance was examined in the study carried out by Fianko, Amoah, and Dzogbewu, (2021). The study finds that the association between construction firms' environmental performance and green design is moderated by firm size, particularly when it comes to external green supply chain practices.

Additionally, the study conducted by Lin et al. (2015) revealed a remarkable adverse moderating impact of business size on both eco-friendly innovation approach and financial performance. According to Petruzzelli et al. (2018), larger organisations possess a higher capacity for innovation by using both emerging and highly developed information. On the other hand, smaller firms tend to generate more valuable inventive solutions when they draw upon knowledge that has reached a moderate level of maturity. From the scholarly perspective of Knott and Vieregger (2020), larger organisations are more inclined to engage in fundamental research to innovate. Kijkasiwat and Phuensane's (2020) study sought to investigate the moderating effects of business size and financial capital on the relationship between firm performance and innovation in processes and products. According to the study's findings, innovation's impact on business performance is moderated and mediated by both firm size and financial capital. Farooq, Vij, and Kaur, (2021) investigated the impact of firm size on the correlation between innovation orientation and business performance in a sample of manufacturing and service companies located in the Indian state of Punjab. According to research findings, the relationship between profitability and innovation orientation is moderated by the scale of the organisation, as measured by headcount. Nevertheless, an analysis of the correlation between innovation orientation and business performance reveals no observable association with firm size (as measured by investment).

Nevertheless, Ramasamy, Ong, and Yeung (2005) caution researchers against generalisations of the correlation between firm size and firm performance as the link is ambiguous. They emphasised the need of considering industry-specific factors and recommended that researchers analyse each instance individually rather than relying on broad generalisations. The researcher measured business size using the number of employees, categorised as follows: 1-5 (micro), 6-30 (small), and 31-100 (medium), adapted from Ghana Enterprise Agency (GEA, 2021).

4.15 Structural equation modelling (SEM)

The statistical technique known as SEM has grown in significance for scientific studies. Structural equation modelling is a set of advanced statistical techniques used to estimate and evaluate the causal relationships between several variables. It involves the use of statistical data and qualitative causal assumptions. According to Gefen, Straub, and Boudreau, (2000) and Hair, Black et al. (2014), SEM enables researchers to simultaneously evaluate and predict correlations between numerous independent and dependent variables. According to Hair, Black et al. (2014) and AmirAlavifar (2012), SEM differs from first-generation statistical methods like regression and factor analysis in three ways. First, SEM has the capacity to estimate a number of distinct but related correlations simultaneously. Furthermore, SEM can represent unobserved concepts in these links and take measurement error into account during the estimation process. The consistency of numerous manifest variables, or indicators, is examined in order to quantify these latent constructs or unseen factors indirectly. The researcher is finally able to define a model that accounts for the complete collection of associations using SEM.
Moreover, Bowen and Guo (2011) demonstrated the ability of SEM to allow for simultaneous regression of equations whereby mediating variables are predicted to partially or entirely explain the relationship between exogenous and endogenous variables. According to the

authors, unlike classic regression models, SEM may simultaneously estimate regression correlations among common factors, as well as between indicator variables and unobserved factors.

Regression analysis as one of the first-generation techniques is constrained to analysing complex relationships. Only the link between one dependent variable and a number of independent factors may be captured using regression. However, there may be a number of dependent factors as well as a number of independent variables that are complicatedly linked in many real-world scenarios. Given the complexity of the research model in the current study, SEM was the best method for analysing the correlations. By using indicators (manifest variables or items) to measure latent factors (unobserved variables), SEM enables researchers to predict measurement error for the observable variables as well. According to Chin (1998), this enables researchers to "statistically test a priori substantive/theoretical and measurement assumptions against empirical data (i.e., confirmatory analysis)".

To estimate parameters, both covariance-based technique (CB-SEM) and partial least squares approach (PLS-SEM) can be used (Hair et al., 2014). Despite the fact that these two methods address the issue of examining complex cause-and-effect relationships between latent constructs in various ways (Hair, Ringle, & Sarstedt, 2011). They differ in terms of the estimate process and underlying assumptions. In order to optimise the variance explained in the target endogenous variable and reduce error terms, the PLS technique estimates parameters using a regression-based ordinary least squares method. (Hair, et al., 2014; Hair, Sarstedt, Pieper, & Ringle, 2012). The maximum likelihood estimation method is used by CB-SEM to estimate parameters with the goal of reducing the difference between the observed and estimated covariance matrices. Since achieving strong model fit is the main goal of CB-SEM, it does not concentrate on the variance explained (Hair, Hult, Ringle, & Sarstedt, 2014).

In the 1960s, statistician Herman Wold developed PLS-SEM (Farooq & Salam, 2020; Hair, Sarstedt et al., 2012; Sarstedt, Ringle, Smith, Reams, & Hair, 2014) and it is widely used in social science and business research, including accounting (Nitzl, 2016), finance (Sarstedt et al., 2014; Ramli, Latan, & Solovida, 2019), marketing (Ernst, Hoyer & Rübsaamen, 2010; Rose & Samouel, 2009) and management (Gruber, Heinemann, Brettel, & Hungeling, 2010; Nambisan & Baron, 2010). PLS-SEM is a popular statistical tool due to its soft modelling orientation, employing ordinary least squares multiple regression. PLS-SEM is not guided by assumptions as regards the distribution of data in the computation of the model parameters. The use of SEM has transcended testing established theories and concepts (Rigdon, 1998), to

evaluate the measurement of latent variables (unobservable variables), as well as measuring the relationships between latent variables. The data does not have to be normally distributed for this technique to work. Again, constructs that have less than three indicators (items) could be performed in that the issues of identification are done with. Notwithstanding, the models can handle a larger number of indicator variables, in excess of 50 items. These special attributes make PLS-SEM the preferred technique for conducting exploratory research. This statistical technique is noted for its capability to solve sophisticated structural modelling problems.
One of the reasons for the popularity of PLS-SEM is that it allows researchers to estimate exceedingly sophisticated models with many constructs and indicator variables, which is especially essential when the purpose of the analysis is prediction. In addition, Goodhue, Lewis, and Thompson (2006) point out that PLS-SEM offers a great degree of flexibility in terms of data requirements and construct-indicator variable relationships when the sample size is small, thus, PLS-SEM is better than CB-SEM. PLS-SEM is applied to endogenous latent components (dependent variables) to reduce unexplained variances while boosting the explained variance. Structural equation modelling, according to Barrett (2007), consists of two analytical procedures: the measurement and the structural models. He emphasised that the former model precedes the latter model in the SEM method. The structural relationships are expressed as regression equations, which are diagrammatically illustrated to graphically demonstrate the concept of the theory under study. As a result, a path diagram is commonly used to depict structural equation modelling. The route diagram depicts the proposed linkages between common components and observable variables, and also the correlational (non-directional) and regression (directional) interactions between unobserved variables (Bowen & Guo, 2011). The statistical significance of distinct structural paths that demonstrate the impact of one latent variable on another or a latent variable on an observable variable is investigated using path coefficients in structural equation model analysis. The t-statistic or the z-statistic are used to determine the relevance or significance of the path coefficient (Schreiber, Nora, Stage, Barlow, & King, 2006).

Last but not least, there is some contemporary PLS software that is simple to use and includes a friendly graphical user interface, such as PLS-Graph, SmartPLS, XLSTAT, ADANCO, and WarpPLS. In comparison to those used for CB-SEM analysis, these programmes are much simpler to use. The study explores the perceived impact of green microfinance elements on the financial, social, and environmental performance of MSMEs. With multiple dependent and independent variables in the research model, PLS-SEM was found suitable for the study because it simultaneously assesses and predicts complex relationships among multiple independent and dependent variables, without requiring a normal distribution of the data.

4.15.1 SEM model assessment: Two-step approach

The two-step method suggested by Chin (1998) was used to conduct the PLS-SEM analysis. First, the measurement model should be examined for validity and reliability. Second, the structural model must be assessed. The structural relationships between the latent variables in the research model can be tested using the if the results of the measurement model test meet the threshold set forth by earlier researchers. It is necessary to conduct an initial test of the measurement model because, in the event that the measurement items do not accurately measure the latent variables, it will be unable to verify the probable relationships that exist between these latent variables when the model is not evaluated.

4.15.2 Measurement model assessment

The researcher must make a distinction between formative and reflecting models when evaluating the measuring model (Henseler, Ringle, & Sinkovics, 2009). All latent variables in this study were modelled as reflective latent variables. Reliability, discriminant validity, and convergent validity were used to assess reflective latent variables.

4.15.2.1 Reliability

As the first criterion, the internal consistency reliability of the measurement model is assessed. Cronbach's alpha (Cronbach, 1951) has typically been used to assess the reliability of internal consistency. However, it should be noted that Cronbach's alpha α underestimates reliability due to its assumption that each item of a latent variable loads equally. Additionally, the number of elements in the latent variable influences Cronbach's alpha, which results in an underestimation of reliability.

Composite reliability, which is frequently computed together with structural equation modelling, is a popular substitute for Cronbach's alpha. Composite reliability and, more recently, ρ_A (Dijkstra & Henseler, 2015) have taken the place of Cronbach's alpha in recent research. In exploratory research, Hair, Hult et al. (2014) propose that composite values ranging from 0.6 to 0.7 are deemed adequate. However, for advanced stages, Nunnally and Bernstein (1994) advocate for values between 0.7 and 0.9. Reliability is compromised for values below 0.6. Conversely, reliability values exceeding 0.95 are undesirable as they suggest that all the items are assessing the identical phenomenon and, as such, lack the credibility to accurately represent the construct being measured (Hair, Hult et al., 2014).

Furthermore, an evaluation of the dependability of each indicator is conducted by examining its factor loadings. It is generally expected that all indicator loadings will exhibit statistical significance and surpass a value of 0.708. Items containing indicator loadings below 0.4 ought to be eliminated automatically, while indicators loadings between 0.4 and 0.7 ought to be evaluated for removal if their removal results in an improvement in composite reliability that surpasses the predetermined threshold.

4.15.2.2 Discriminant validity

According to Malhotra and Birks (2007), discriminant validity is the extent to which test items for theoretically separate categories have a lower correlation with items for other constructs from which they purport to vary.

The level of discriminant validity denotes the extent to which a particular latent construct can be distinguished from other latent constructs. This indicates that the latent construct in question is distinct from all other latent constructs in the model. Three approaches to the assessment of discriminant validity have been proposed. First, indicators must exhibit a higher loading on the latent construct they are measuring compared to the other latent constructs included in the model. Thus, it can be stated that the factor loading of a latent construct should exceed that of its cross loadings. Second, it is essential to adhere to the Fornell-Larcker criterion, which stipulates that the average variance extracted (AVE) of a latent construct should exceed the sum of the squared correlations between that construct and all others. Proposing the Heterotrait-Monotrait ratio of correlations (HTMT) as the third criterion for evaluating discriminant validity, Henseler, Ringle, and Sarstedt (2015) identified several shortcomings in the Fornell-Larcker criterion in their recent publication. An approximation of the factor correlation is the HTMT. In order for two factors to be distinguished, the HTMT must be considerably less than one (Henseler, Hubona, & Ray, 2016). According to Henseler et al. (2015), values below 0.85 are advised.

4.15.2.3 Convergent validity

Convergent validity refers to the degree to which an indicator correlates positively with other indicators that measure the same construct. It signifies the degree to which specific items comprising a construct converge when compared to items that assess different constructs. For convergent validity to be indicated, items comprising a specific construct must exhibit a shared percentage of variance. When evaluating convergent validity, the AVE is used. It is generally required that the AVE values for each construct exceed 0.5. The implication is that the latent construct accounts for a minimum of 50% of the variance in the measurements.

4.15.2.4 Assessment of structural model

The structural model can be assessed when the measurement model has demonstrated adequate reliability and validity. The path coefficient, the coefficient of determination R^2, the predictive relevance Q^2, and f^2 effect sizes are used to evaluate the structural model. The significance, magnitude, and direction of path coefficients are utilised in their evaluation. 5000 resamples were drawn with replacement in accordance with a standard bootstrapping procedure to ascertain the significance of each estimated path. A significant path coefficient indicates that the path in question is statistically significant, or that there is a significant relationship between the two variables it connects. An inverse relationship is indicated by the path coefficient having a negative value. The coefficient of determination R^2 and Stone-Geisser Q^2 were used to measure the structural model's predictive power for endogenous constructs (Sarstedt et al., 2014). R^2 for endogenous variables is the squared correlation between the endogenous construct's actual and predicted values. R^2 values of 0.75, 0.5, and 0.25 are, in descending order of significance, considered to be substantial, moderate, and weak, respectively (Hair, Hult et al., 2014). Additionally, the Stone-Geiser Q^2 (Geisser, 1975; Stone, 1974) is used to test the model's predictive significance; values greater than zero suggest predictive relevance.

4.15.2.5 Fitness of the model

The overall fitness of the model is assessed using the standardised root mean square residual (SRMR) composite factor (Henseler et al., 2015). According to the study conducted by Hu and Bentler (1999), structural equation models exhibiting an SRMR value of zero signify optimal fit; however, a cut-off value below 0.08 is sufficient for the purpose of model fit testing.
(Henseler et al., 2015).

4.16 Statistical software

The researcher conducted the descriptive analysis using IBM SPSS version 23, and the decision to do so was influenced by the software's intuitive user interface. In the process of evaluating the research model, the SmartPLS version 4 software was also utilised for structural equation modelling.

The majority of the publications that were examined by the author made use of SmartPLS, and the researcher had received some instruction on how to operate the software. The user interface of SmartPLS is likewise very simple and straightforward to operate. At the time that this study was conducted, SmartPLS was the known software that had both the ρ_A measure for determining reliability and the HTMT ratio for determining the discriminant validity of a model. This was one of the reasons that led to the decision to use SmartPLS.

4.17 Ethical consideration

At every stage of the research process, including gaining access to organisations, data gathering, data analysis, reporting, and the distribution of results, ethical conduct must be taken into consideration. The term "ethics" refers to the principles of conduct that direct a researcher's actions regarding the legal rights of persons who become the focus of their work or are impacted in some way as a result of it (Saunders et al., 2007). Thus, the researcher gave due consideration to the legal framework governing the conduct of academic research.

More significantly, as a rule of the university, all researchers are enjoined to apply for and receive ethical clearance to serve as a green light to conduct research. In accordance with the regulations of the university, an ethical clearance approval letter with the following reference number: HSSREC/00004780/2022 was received. This approval acted as a prerequisite for carrying out the research inside the boundaries of the institution.

In order to gain the consent of all the research participants, informed consent forms were given to them to complete. The informed consent form outlined the scope and purpose of the research, it also gave participants the researcher's contact information, including the university of enrolment, in case they had any additional questions. The primary purpose of the informed consent form was to guarantee that each and every participant was provided with a comprehensive understanding of the research.

.In addition, the researcher guaranteed the participants that their personal information and the data they supplied would only be utilised for academic research, and that their names and identities would not be revealed in any published results of the study. Respondents were asked to offer only demographic information, such as their gender, age, and income status, so that the maximum level of anonymity could be maintained. However, this information could not be used to identify individual respondents because respondents were not prompted to provide any personal information, such as their names. In addition, rather than providing their precise ages, the respondents were requested to indicate an age range.

In conclusion, the authors of the publications that were utilised in the study were acknowledged and duly referenced in the study.

4.18 Chapter summary

The methods used to carry out this research were covered in this chapter. The research design that was used was described at the beginning of the chapter. The best philosophy for this research was a positivist one. The decision to adopt the positivist philosophy was supported with arguments. It was decided that a quantitative research technique would be the most effective for validating the suggested study model. It was necessary to determine measurement scales for every variable in the suggested model. Well-validated measures were modified and refined into a self-administered questionnaire for data collection, drawing on prior research.

To clear up any misunderstandings in the questionnaire, a pilot test was conducted. The purpose of the pilot study was to evaluate the questionnaire's validity and reliability. The study's sampling strategy was covered in detail and supported. This chapter also explained the analytical methods utilised to assess the data gathered as well as the reasoning behind their selection. A review of the ethical issues surrounding this research concluded the chapter.

CHAPTER FIVE

DATA ANALYSIS AND PRESENTATION OF RESULTS

5.1 Introduction

The first part of this chapter presents the response rate that was assessed and descriptive statistics are used to explain the features of the data that was obtained. The method for testing the suggested research model using SEM modelling is then covered in the second section of the chapter. The two-stage procedure suggested by Chin (1998) was used to do the SEM analysis. Firstly, the reliability and validity of the measurement model (outer model) was assessed. Secondly, the structural model was also evaluated in order to determine the causal linkages that exist between the variables that were included in the proposed model. Again, the effects of moderating variables were investigated. In addition, the quality of the model was evaluated by using the coefficient of determination R^2, the predictive relevance Stone-Geisser Q^2 index, and the model fit indices.

5.2 Response rate

Out of the 358 questionnaires distributed, 332 were completed and collected. A total of 320 of the 332 questionnaires that were collected were usable, translating to a response rate of 89%, which was deemed appropriate for the study. These included managers and owners of 189 micro-enterprises, 124 small enterprises, and seven medium-sized enterprises. According to Hart (1987), business surveys have response rates ranging from 17 to 60%, with an average of 36%. In order to draw statistical conclusions from MSMEs in Sunyani and Techiman, it was considered that the response rate of 89% was over the acceptable level for such a survey. The response rate analysis of questionnaires given to managers and owners of MSMEs who were randomly selected are summarised in Table 6.

Table 6: Response rate analysis

Questionnaire analysis	**Total number**	**Valid percentages**
Total number of questionnaires distributed	358	100
Total number of questionnaires collected	332	93
Total number of questionnaires deemed usable	320	89

Source: Generated by Researcher

5.3 Sample description

The responses were analysed in terms of the respondent's age, gender and level of education, and their enterprises' ages and the number of employees. The results of the analysis are summarised in Table 7.

Table 7: Characteristics of respondents

Variable	Options	Number of Respondents	Percentage
Gender	Male	155	48.4
	Female	157	49.1
	Prefer not to say	8	2.5
Respondent Age	18-25 years	7	2.2
	26-35 years	59	18.4
	36-45 years	175	54.7
	46-60 years	70	21.9
	More than 60 years	9	2.8
Education	Basic Education	102	31.9
	Secondary Education	159	49.7
	Diploma	25	7.8
	University Degree	34	10.6
Business Age	Less than 3 years	74	23.1
	3-10 years	159	49.7
	11-15 years	40	12.5
	Over 15 years	47	14.7
Number of Employees	1-5 employees	189	59
	6-30 employees	124	38.8
	31-100 employees	7	2.2

Source: Generated by Researcher

Of the 320 managers/owners of MSMEs that responded, 155 (48.4%) were males while 157 were females representing about 49.1%. This indicates that female respondents slightly outnumber the males. Meanwhile eight respondents representing 2.5% preferred not to disclose their gender, as illustrated in Table 7. A total of seven (2.2%) respondents were aged 18-25, while 59 (18.4%) respondents were aged between 26 and 35. The research recorded 175 (54.7%) for the age range 36-45 and 70 (21.9%) and 9 (2.8%) respectively for the age range 46-60 and those older than 61 years. The modal age range for respondents was 36-45 recording a total of 175 responses. The age distribution of respondents is shown in Table 7.

In terms of educational status, 102 (31.9%) of the respondents had basic education, 159 (49.7%) of the respondents had secondary education as their highest educational qualification, 25 (7.8%) had diploma, and 34 (10.6%) had a university degree. Overall, the findings indicate that the majority of study participants had secondary education, followed by a basic education, then university degree, and the least is diploma. Out of the 320 MSMEs used for the analysis, 74 (23.1%) had been in existence for less than three years, 159 (49.7%) were in the age range 3 to 10 years, 40 (12.5%) were captured in the age range 11-15 years, whilst 47 (14.7%) had been in existence for more than 15 years. The data illustrates that almost 50% of the MSMEs sampled have not been in existence for more than 10 years. This is also shown in Table 7.

The number of employees of respondents' businesses was assessed in the questionnaire according to the recent definition given by Ghana Enterprise Agency (GEA, 2021) for micro, small and medium enterprises. In total, 189 (59%) of the MSMEs had one to five employees, which puts them under micro-enterprises category. Also 127 (38.8%) of the respondents' firms employed 6 to 30 workers indicating that they are small enterprises, whereas only seven (2.2%) of the MSMEs were categorised as medium-sized enterprises, employing 31-100 persons. Overall, the majority of the MSMEs were micro businesses, followed by small businesses and the least were medium-sized businesses as represented in Table 7.

5.3.1 Sector of respondents' business

The respondents in the study were engaged in various business sectors as captured in Figure 7. As shown in Figure 7, 54 (16.9%) of MSMEs in the study were in the agriculture, 168 (52.5%) were in the service sector, which formed the majority group, 68 (21.3%) of MSMEs were in manufacturing, 13 (4%) were engaged in construction, 7 (2.2%) were in small scale mining and 10 (3.1%) were involved in sand winning activities.

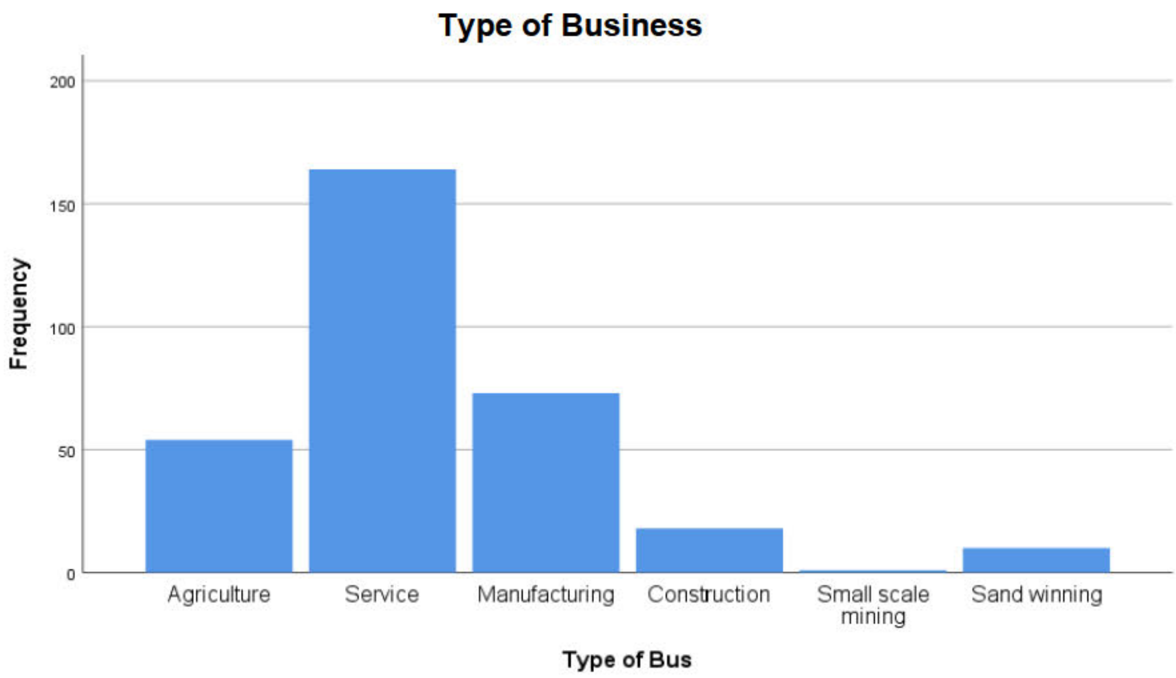

Figure 7: Type of business sector

Source: Generated by Author (2023)

5.3.2 Monthly sales by respondents' business

Figure 8 illustrates the ranges of average revenues made by the respondents per month. Most of the respondents, 203 (63.4%), made monthly sales less than GHS 10,000.00, 50 (15.6%) of the respondents had monthly sales of GHS 10,000.00 but less than GHS 15,000.00, 31 (9.7%) of the respondents made monthly sales of GHS 15,000.00 but below GHS 20,000.00 and 36 (11.3%) of the respondents' monthly sales were more than GHS 20,000.00.

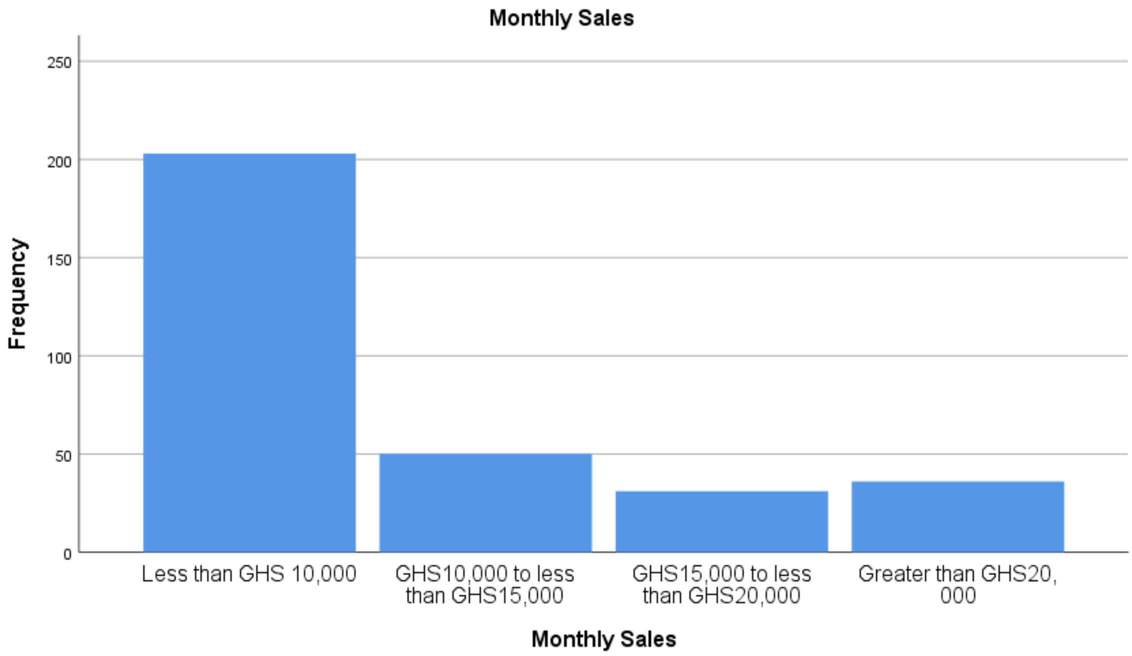

Figure 8: Monthly sales by respondents

Source: Created by Author (2023)

5.3.3 Recent loan amounts granted to respondents by microfinance institutions

Table 8 depicts the quantum of recent loans that the respondents received from their microfinance institutions. As high as 75% of the respondents were granted a loan amount of less than GHS 20,000.00, 15% of the respondents were granted an amount of GHS 20,000.00 and above but less than GHS 40,000.00, 6.6% of the respondents, received loans of GHS 40,000.00 but less than GHS 80,000.00, whereas, 3.4% of the respondents were granted loans of GHS 80,000.00 and above.

Table 8: Recent loans to respondents

Options	Frequency (Number of enterprises)	Percentage
Less than GHS20,000	240	75%
GHS20,000 to less than GHS40,000	48	15%
GHS40,000 to less than GHS80,000	21	6.6%
Greater than GHS80,000	11	3.4%
Total	320	100%

Source: Generated by Researcher

5.4 To examine the perception that entrepreneurs in the Sunyani and Techiman Municipalities have of green microfinance

This section presents the findings pertaining to the participants' perceptions of the overall microfinance initiatives supporting green activities undertaken by owners and managers of micro, small, and medium enterprises in the cities of Sunyani and Techiman. The questions solicited respondents' views on the various elements of green microfinance.

5.4.1 Green credit: Microfinance green credit helps to improve my business operations

The results of the respondents' perspectives on the impact of MFI green credit on their firm activities are illustrated in Table 9. The results of the study reveal that among the 320 participants, 17.2% (55) expressed a strong agreement with the favourable influence of green credit on their operational activities, while an additional 27.5% (88) indicated agreement. In contrast, a notable proportion of respondents, namely 15.3% (49 individuals), expressed strong disagreement with the notion that green financing had a beneficial influence on their respective enterprises. Additionally, 18.4% (59 individuals) indicated disagreement with this assumption, whereas a total of 21.6% (69) expressed an inability to either confirm or refute the statement. A total of 143 respondents, representing 44.7%, concurred that green credit supports their enterprises, while 108 respondents, or 33.7%, disagreed. This result corroborates the conclusions of Shahidullah and Hague (2014), which indicated that MSMEs receiving green finance demonstrate sustainability, comply with existing environmental regulations, and maintain sufficient profit margins to ensure their enduring viability.

Table 9: Respondents' perception of green credit

	Number of Respondents	Percentages	Cumulative Percentages
Strongly Disagree	49	15.3%	15.3%
Disagree	59	18.4%	33.8%
Uncertain	69	21.6%	55.3%
Agree	88	27.5%	82.8%
Strongly Agree	55	17.2%	100.0%
Total	320	100.0%	

Source: Generated by Author

5.4.2 Microsavings: I am able to save as a result of doing business with microfinance institutions

The participants were questioned about their ability to accumulate funds as a consequence of engaging in transactions with MFIs. Table 10 presents the responses of the participants. Among the total sample size of 320 respondents, it was observed that 26.8% (86) expressed a strong agreement with the positive impact of microfinance institutions on their savings. A total of 38.4% (123) of the respondents expressed agreement, whereas 11.3% (36) strongly disagreed and 16.9% (54) disagreed. Within the sample population, a total of 21 individuals, about 6.6% of the respondents, expressed uncertainty. A total of 209 respondents (65.2%) concurred that microfinance institutions assist them in saving money, whereas 90 respondents (28.2%) disagreed. This implies that MFIs promote savings among MSMEs. This outcome corroborates the conclusions of Omondi and Jagongo (2018), which indicated that MFIs offer many savings options to encourage MSMEs to save.

Table 10: Respondents' perception of microfinance savings product

	Number of Respondents	**Percentages**	**Cumulative Percentages**
Strongly Disagree	36	11.3%	11.3%
Disagree	54	16.9%	28.2%
Uncertain	21	6.6%	34.8%
Agree	123	38.4%	73.2%
Strongly Agree	86	26.8%	100.0%
Total	320	100%	

Source: Generated by Author

5.4.3 Microinsurance: Microinsurance services provided by my microfinance institution could help sustain my business

Table 11 presents the respondents' perception of microinsurance. Among the 320 participants surveyed, it was found that 20.3% (65) expressed a strong belief in the ability of microinsurance to effectively support their business in the event of any potential risks. Additionally, 24.4% (78) of the respondents agreed with this notion. In contrast, a total of 13.4% (43) of respondents expressed strong disagreement, while an additional 14.1% (45) indicated disagreement. The majority of the respondents, specifically 27.8% (89 individuals), were unable to articulate their opinion. This indicates that many MSME managers and owners fail to acknowledge the significance of microinsurance. The results corroborate the conclusions of Gabrah et al. (2020) that diminished public trust, a deficiency of innovative microinsurance offerings, inadequate distribution channels, feeble insurance regulations, non-competitive pricing of microinsurance products, limited governmental support for microinsurance initiatives, and the low-income status of MSMEs adversely impact the demand for microinsurance products.

Table 11: Respondents' perception of microinsurance services

	Number of Respondents	**Percentages**	**Cumulative Percentages**
Strongly Disagree	43	13.4%	13.4%
Disagree	45	14.1%	27.5%
Uncertain	89	27.8%	55.3%
Agree	78	24.4%	79.7%
Strongly Agree	65	20.3%	100.0%
Total	320	100%	

Source: Generated by Author

5.4.4 Green education: Microfinance education has helped make my business environmentally friendly

Table 12, presents the outcomes of the survey participants' perspectives regarding the impact of microfinance education on the environmental friendliness of their business. The results suggest that among the 320 participants, 9.1% (29) expressed a strong agreement with the good influence of microfinance education on their operations as regards the environment, while an additional 18.1% (58) also agreed. In contrast, a considerable proportion of respondents, specifically 25.6% (82), strongly disagreed with the claim that microfinance education has a good environmental impact on their enterprises. Similarly, many participants, accounting for 42.8% (137) disagreed. Additionally, 4.4% (59) of respondents, were unable to affirm or deny the statement definitively. The results reveal that the environmental education provided by MFIs is insufficient and requires intensification, as proposed by Yunus (2017), who asserts that to guarantee the sustainability of MSME enterprises, the business acumen of owners and managers must be regularly improved.

Table 12: Respondents' perception of green education on the environment

	Number of Respondents	Percentages	Cumulative Percentages
Strongly Disagree	82	25.6%	25.6%
Disagree	137	42.8%	68.4%
Uncertain	14	4.4%	72.8%
Agree	58	18.1%	90.9%
Strongly Agree	29	9.1%	100.0%
Total	320	100%	

Source: Generated by Author

5.4.5 Overall perception of green microfinance: I would recommend my microfinance institution to others

Table 13 below shows the participants' opinions about the general microfinance services in the study area. The results reveal that 42.8% (137) of the respondents strongly agreed that they would recommend their microfinance institutions to others. The majority, 50.0% (160), agreed they would recommend their microfinance institutions to others. However, 0.9% (3) strongly disagreed to recommend their microfinance institutions to others, and 2.8% (9) disagreed to recommend. Meanwhile, 3.4% (11) of the respondents expressed uncertainty. This implies that majority of respondents were satisfied with the services provided by GMFIs in the study area.

Table 13: Respondents' overall perception of green microfinance

	Number of Respondents	Percentages	Cumulative Percentages
Strongly Disagree	3	0.9%	0.9%
Disagree	9	2.8%	3.8%
Uncertain	11	3.4%	7.2%
Agree	160	50.0%	57.2%
Strongly Agree	137	42.8%	100.0%
Total	320	100.0%	

Source: Generated by Author

5.5.3 Test for normality

Prior to evaluating the structural model, it is necessary to perform a multicollinearity test in order to ascertain the presence of correlation among the independent variables. This study used the variance inflation factor (VIF) to assess multicollinearity. The assumption of normality is one of the most fundamental assumptions that underpins the majority of multivariate methods. The degree to which the data is consistent with the normal distribution is referred to as "normality." Version 23 of IBM SPSS was utilised to carry out the multivariate normality test. In order to determine whether or not the data was normal, the skewness and kurtosis values for each variable were analysed. Because the data was found to be not normally distributed, the researcher settled on the variance-based version of the SEM as more effective for the study. The values of skewness and kurtosis for each variable are listed in Table 14. Accordingly, Table 14 demonstrates that the data was negatively skewed and not normally distributed.

Table 14: Descriptive statistics for indicator variables

				Skewness		Kurtosis	
Items	**N**	**Mean**	**Std. Deviation**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
GMF 1	320	4.27	1.001	-1.516	0.136	1.878	0.272
GMF 2	320	3.14	1.334	-0.214	0.136	-1.156	0.272
GMF 3	320	3.24	1.303	-0.286	0.136	-0.981	0.272
GMF 4	320	4.14	0.724	-1.221	0.136	3.071	0.272
GMF 5	320	4.34	0.712	-1.277	0.136	2.705	0.272
GMF 6	320	4.54	0.651	-1.874	0.136	5.824	0.272
GMF 7	320	4.67	0.651	-3.102	0.136	13.634	0.272
GMF8	320	1.35	0.858	2.991	0.136	8.845	0.272
GCR 1	320	4.14	0.796	-1.303	0.136	2.61	0.272
GCR2	320	4.27	0.827	-1.431	0.136	2.695	0.272
GCR3	320	4.31	0.764	-1.48	0.136	3.206	0.272
GCR 4	320	4.13	0.794	-1.303	0.136	2.626	0.272
GCR 5	320	4.27	0.827	-1.431	0.136	2.695	0.272
GCR 6	320	3.65	1.087	-1.142	0.136	0.598	0.272
GCR 7	320	4.09	0.914	-1.222	0.136	1.273	0.272
GED 1	320	2.31	1.166	0.529	0.136	-0.856	0.272
GED 2	320	3.08	1.265	-0.413	0.136	-0.978	0.272
GED 3	320	2.34	1.262	0.601	0.136	-0.759	0.272
GED 4	320	2.18	1.087	0.452	0.136	-0.877	0.272
GED 5	320	2.19	1.187	0.679	0.136	-0.704	0.272
GED 6	320	2.83	1.349	-0.174	0.136	-1.411	0.272
MIS 1	320	4.31	0.764	-1.48	0.136	3.206	0.272
MIS 2	320	4.13	0.794	-1.303	0.136	2.626	0.272
MIS 3	320	4.27	0.827	-1.431	0.136	2.695	0.272
MIS 4	320	4.09	0.914	-1.222	0.136	1.273	0.272
MIS 5	320	3.46	1.068	-0.555	0.136	-0.257	0.272
SAV 1	320	3.65	1.087	-1.142	0.136	0.598	0.272
SAV 2	320	4.09	0.914	-1.222	0.136	1.273	0.272

				Skewness		Kurtosis	
Items	**N**	**Mean**	**Std. Deviation**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
SAV 3	320	3.46	1.068	-0.555	0.136	-0.257	0.272
SAV 4	320	4.13	0.794	-1.303	0.136	2.626	0.272
SAV 5	320	4.27	0.827	-1.431	0.136	2.695	0.272
SAV 6	320	4.31	0.764	-1.48	0.136	3.206	0.272
FIP 1	320	3.1	1.323	-0.073	0.136	-1.314	0.272
FIP 2	320	4.12	0.726	-1.277	0.136	3.236	0.272
FIP 3	320	4.13	0.721	-1.258	0.136	2.972	0.272
FIP 4	320	3.97	0.909	-1.071	0.136	1.023	0.272
FIP 5	320	4.02	0.803	-1.093	0.136	1.872	0.272
EVP 1	320	3.24	1.005	-0.752	0.136	-0.383	0.272
EVP 2	320	3.22	0.99	-0.411	0.136	-0.674	0.272
EVP 3	320	3.3	1.14	-0.41	0.136	-0.886	0.272
EVP 4	320	3.28	1.206	-0.24	0.136	-1.23	0.272
EVP 5	320	3.06	1.324	0.116	0.136	-1.366	0.272
EVP 6	320	3.53	1.4	-0.598	0.136	-1.045	0.272
EVP 7	320	1.9	1.111	1.351	0.136	1.048	0.272
EVP 8	320	1.9	1.189	1.287	0.136	0.531	0.272
SOP 1	320	3.3	1.14	-0.41	0.136	-0.886	0.272
SOP 2	320	3.28	1.206	-0.24	0.136	-1.23	0.272
SOP 3	320	3.24	1.005	-0.752	0.136	-0.383	0.272
SOP 4	320	3.22	0.99	-0.411	0.136	-0.674	0.272
SOP 5	320	3.06	1.324	0.116	0.136	-1.366	0.272
SOP 6	320	3.53	1.4	-0.598	0.136	-1.045	0.272
SOP 7	320	1.9	1.111	1.351	0.136	1.048	0.272
INV 1	320	2.18	1.087	0.452	0.136	-0.877	0.272
INV 2	320	2.19	1.187	0.679	0.136	-0.704	0.272
INV 3	320	2.31	1.166	0.529	0.136	-0.856	0.272
INV 4	320	3.08	1.265	-0.413	0.136	-0.978	0.272
INV 5	320	2.34	1.262	0.601	0.136	-0.759	0.272

Source: Generated by Author

The testing of univariate normality is presented in Table 14, which contains the results. With the help of Table 14, it is possible to observe that the data for the majority of the indicator variables are negatively skewed.

The outcomes of the multivariate normality test for latent variables are also presented in Table 15. Both the Shapiro-Wilk test and the Kolmogorov-Smirnov test have produced results that indicate that the distribution of the data for all latent variables is significantly different from the normal distribution in both males and females.

Table 15: Assessment of multivariate normality for latent variables

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Gender	**Statistic**	**Df**	**Sig.**	**Statistic**	**Df**	**Sig.**
Financial_Performance	Male	0.149	155	0.000	0.931	155	0.000
	Female	0.134	157	0.000	0.964	157	0.000
	Prefer not to say	0.240	8	0.195	0.862	8	0.124
Environmental_Performance	Male	0.146	155	0.000	0.951	155	0.000
	Female	0.108	157	0.000	0.968	157	0.001
	Prefer not to say	0.203	8	.200*	0.898	8	0.280
Social_Performance	Male	0.125	155	0.000	0.931	155	0.000
	Female	0.110	157	0.000	0.955	157	0.000
	Prefer not to say	0.189	8	.200*	0.910	8	0.352
Innovativeness	Male	0.104	155	0.000	0.963	155	0.000
	Female	0.098	157	0.001	0.958	157	0.000
	Prefer not to say	0.154	8	.200*	0.972	8	0.912
Green_Microfinance	Male	0.134	155	0.000	0.950	155	0.000
	Female	0.115	157	0.000	0.967	157	0.001
	Prefer not to say	0.245	8	0.174	0.861	8	0.123

*. This is a lower bound of the true significance

Source: Generated by Author

PLS-SEM can be used to model data that is not normal, which is just one of its many applications (Sarstedt et al., 2014). The non-normal nature of the data that was obtained in this investigation justifies the usage of PLS-SEM in the analysis that was carried out.

5.6 Analysis of partial least square structural equation model

The two-step method suggested by Chin (1998) for evaluating structural equation modelling models was utilised. The first step was to evaluate the measurement model in order to ascertain whether or not the psychometric qualities of the latent variables were suitable. The researcher evaluated the reliability of the latent variables, including their convergent and discriminant validity. After demonstrating that the measurement model possessed adequate levels of reliability and validity, the researcher proceeded to evaluate the structural model. According to Sarstedt et al. (2014), the structural model is responsible for determining whether or not the structural linkages in the hypothesised model have any significance. During the process of evaluating the structural model, the researcher looked at the path coefficients of the hypothesised paths, as well as the predictive power of the models and the fitness of the model.

5.6.1 Assessment of the measurement model

According to Henseler et al. (2009), during the process of evaluating the measurement model, the researcher is required to differentiate between reflective and formative models in order to determine the most suitable assessment strategy. Within the scope of this research, each and every latent variable was modelled as a reflective latent variable. For the purpose of evaluating reflective latent variables, reliability, discriminant validity, and convergent validity were evaluated.

5.6.1.1 Reliability

Hair et al. (2014) defined reliability as "the degree to which a set of indicators of a latent construct is internally consistent in their measurements". In order to have a high level of reliability, a construct must contain items that are intimately connected to one another. Putting it another way, structures that are dependable have indicators that measure the same thing. Cronbach's alpha is the most often used measure for determining degree of reliability.

The most popular measure of reliability is Cronbach's alpha. However, it has been demonstrated that Cronbach's alpha underestimates reliability (Hair, Hult et al., 2014). The reason for this is that Cronbach's alpha operates under the assumption that all items exhibit the same level of loading on the construct.

As an alternative to Cronbach's alpha, the composite reliability or Dillon-Goldstein's ρ and Dijkstra-Henseler's rho have been suggested as potential substitutes. Presently, the only reliable measurement that is consistent is the Dijkstra-Henseler's rho. Cronbach's alpha and composite reliability are commonly measured by the majority of PLS software. Furthermore, SmartPLS 4 offers reliability statistics for each of the three measures simultaneously. Statistical information is provided for each of the three measures in the current study by the researcher.

According to Nunnally and Bernstein (1994) and Henseler et al. (2016), a construct is considered to be reliable if its reliability measure is more than 0.7. The results of the reliability test, which included all three measures, are presented in Table 16.

.

Table 16: Results of reliability test

Variables	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)
Environmental Performance	0.839	0.917	0.900
Financial Performance	0.811	0.896	0.865
Green Credit	0.835	0.860	0.887
Green Education	0.793	0.802	0.878
Innovativeness	0.763	0.828	0.843
Microinsurance	0.805	0.828	0.868
Microsavings	0.767	0.792	0.864
Social Performance	0.836	0.882	0.887

Source: Generated by Author

5.6.1.2 Convergent validity

Convergent validity is defined as the degree to which indicators of a specific construct share significant amount of variance in common (Hair, Black, et al., 2014). The authors define convergent validity as the degree to which a specific indicator exhibits a positive correlation with other indicators employed to assess the same construct. Convergent validity guarantees that items purporting to measure a particular latent variable do, in fact, measure that variable exclusively and not any other latent variable being evaluated (Urbach & Ahlemann, 2010). In measuring convergent validity, both the AVE measure and the factor loadings of items are utilised. The Average Variance Extracted is a metric utilised to assess the extent to which the latent variable can account for the variability present in the items it measures, relative to the variance attributable to measurement errors (Aibinu & Al-Lawati, 2010). Generally speaking, for convergent validity to be established, the AVE values must exceed 0.5 (Hair et al. 2011).
In other words, this indicates that the latent variables account for at least fifty percent of the variance in the measurement. From Table 17, it is evident that the AVE values range from 0.569 for Financial Performance to 0.752 for Environmental Performance. Convergent validity is demonstrated by the fact that the average variance extracted (AVE) values of all latent variables are significantly higher than the threshold value of 0.5.

Table 17: Results of convergent validity

Variables	Average Variance Extracted (AVE)
Environmental Performance	0.752
Financial Performance	0.569
Green Credit	0.663
Green Education	0.705
Innovativeness	0.575
Microinsurance	0.624
Microsavings	0.680
Social Performance	0.663

Source: Generated by Author

5.6.1.3 Discriminant validity

Hair Jr et al. (2021) and Hair, Black et al. (2014) described discriminant validity as the "extent to which a construct is truly distinct from other constructs both in terms of how much it correlates with other constructs and how distinctly measured variables represent only this single construct". The following guidelines were adhered to in order to evaluate the discriminant validity of the indicators: (1) the loadings of each indicator should be greater than all of its cross-loadings (Chin, 1998); (2) the Fornell- Larker criterion, which states that the average variance extracted (AVE) of each latent construct should be greater than the highest squared correlations between any other construct (Fornell & Larcker, 1981); and (3) the more recent Heterotrait-Monotrait (HTMT) criterion proposed by Henseler et al. (2015), which states that all HTMT ratios of correlation must be less than 0.85.

5.6.1.4 Discriminant validity using indicator loadings and cross loadings

In the context of reflective measurement model assessment, it is necessary for the researcher to evaluate the outer loadings of the indicators in order to determine the reliability of those indicators. Constructs with high outer loadings suggest that the indicators linked with the construct share a significant amount of common variance, thereby effectively representing the construct. According to Chin (1998), the outer loadings of all indicators should exhibit statistical significance at the very least. the loadings of each indicator should be greater than all of its cross-loadings (Chin, 1998) It is a widely accepted guideline that the standardised outside loadings should be equal to or greater than 0.708.

In this phase, the associations between the reflective constructs and their indicators (i.e. outer loadings) were estimated, as presented in Table 18. An inspection of Table 18 shows that all of the indicator variables load the highest on their respective constructs (the values that are displayed in bold), and that no indicator loads higher on any other constructs than it does on the construct that it was designed to load on. The results for the outer loadings are presented in Table 18.

The reflecting constructs EVP, FIP, SOP, INV, GCR, GED, MIS, and SAV exhibit outer loadings that surpass the threshold value of 0.708, indicating satisfactory levels of indicator reliability. The indicators FIP 5 and SOP 3, with an outer loading of 0.715, exhibit the lowest indicator reliability at a value of 0.511 (0.715^2). Conversely, the indicator EVP 5, with an outer loading of 0.916, demonstrates the highest indicator reliability at a value of 0.839 (0.916^2).

Table 18: Results of discriminant validity using indicator loadings and cross loadings

	Environmental	Financial	Green Credit	Green Education	Innovativeness	Microinsurance	Savings	Social
EVP 4	**0.894**	0.211	0.208	-0.207	-0.018	0.178	0.121	0.831
EVP 5	**0.916**	0.172	0.185	-0.389	-0.132	0.176	0.152	0.596
EVP 6	**0.789**	0.143	0.205	-0.120	-0.046	0.128	0.059	0.543
FIP 1	0.326	**0.765**	0.101	0.123	0.254	0.088	0.115	0.315
FIP 2	0.135	**0.861**	0.250	0.115	0.110	0.224	0.297	0.192
FIP 3	0.133	**0.879**	0.340	0.069	0.093	0.307	0.423	0.168
FIP 4	0.146	**0.702**	0.179	0.187	0.144	0.171	0.186	0.170
FIP 5	0.152	**0.715**	0.196	0.122	0.131	0.126	0.214	0.142
GCR 1	0.048	0.310	**0.796**	0.120	0.148	0.360	0.784	0.091
GCR 4	0.048	0.311	**0.797**	0.118	0.150	0.369	0.785	0.087
GCR 5	0.241	0.194	**0.792**	-0.095	-0.132	0.224	0.394	0.174
GCR2	0.317	0.220	**0.870**	-0.090	-0.100	0.308	0.514	0.243
GED 2	-0.327	0.114	0.022	**0.819**	0.515	-0.164	-0.048	-0.233
GED 5	-0.123	0.166	-0.036	**0.828**	0.821	-0.071	0.025	0.056
GED 6	-0.347	0.078	0.015	**0.872**	0.510	-0.170	-0.063	-0.191
INV 1	0.006	0.180	0.001	0.419	**0.762**	0.003	0.013	0.085
INV 2	-0.137	0.146	-0.034	0.801	**0.825**	-0.067	0.007	0.031
INV 3	0.107	-0.013	0.026	0.431	**0.654**	-0.008	-0.070	0.166
INV 5	-0.158	0.171	0.020	0.489	**0.785**	0.023	0.180	-0.028
MIS 1	0.199	0.180	0.326	-0.200	-0.051	**0.826**	0.462	0.173
MIS 2	0.038	0.155	0.351	-0.033	0.015	**0.710**	0.421	0.025
MIS 3	0.181	0.177	0.300	-0.124	-0.028	**0.791**	0.230	0.183

	Environmental	Financial	Green Credit	Green Education	Innovativeness	Microinsurance	Savings	Social
MIS 4	0.126	0.303	0.268	-0.092	-0.004	**0.826**	0.454	0.141
SAV 2	0.113	0.352	0.548	-0.033	0.039	0.410	**0.881**	0.170
SAV 4	0.039	0.267	0.755	0.096	0.120	0.359	**0.782**	0.065
SAV 6	0.172	0.267	0.555	-0.108	-0.036	0.432	**0.808**	0.176
SOP 1	0.599	0.155	0.155	-0.170	-0.010	0.162	0.140	**0.874**
SOP 2	0.869	0.255	0.218	-0.179	0.016	0.181	0.135	**0.813**
SOP 3	0.296	0.133	0.122	0.055	0.178	0.070	0.163	**0.715**
SOP 4	0.491	0.198	0.109	-0.023	0.132	0.149	0.145	**0.854**

Note. EVP-Environmental Performance, FIP-Financial Performance, SOP-Social Performance, INV- Innovativeness, GCR- Green Credit, GED-Green Education, SAV-Microsaving, MIS-Microinsurance.

Generated by Author

All indicators in the table above exhibited superior loading on their designated latent variables compared to other variables.

The Fornell- Larker criterion states the average variance extracted (AVE) of each latent construct should be greater than the highest squared correlations between any other construct. It is possible to observe that the Fornell-Larcker criterion is satisfied, as demonstrated by the fact that the square root of the AVE for every construct is higher than the cross-correlation between the construct in question and any other construct. This can be seen by referring to Table 19.

Table 19: Results of discriminant validity using the Fornell-Larker criterion

Variables	Environmental	Financial	Green Credit	Education	Innovativeness	Insurance	Savings	Social
Environmental	**0.867**							
Financial	0.202	**0.754**						
Green Credit	0.225	0.307	**0.814**					
Green Education	-0.303	0.147	-0.004	**0.84**				
Innovativeness	-0.085	0.164	-0.003	0.754	**0.759**			
Microinsurance	0.188	0.268	0.379	-0.155	-0.027	**0.79**		
Savings	0.136	0.362	0.73	-0.029	0.043	0.487	**0.825**	
Social	0.751	0.236	0.196	-0.129	0.071	0.183	0.173	**0.815**

Source: Generated by Author

Table 20 presents the results of discriminant validity using the HTMT criterion. It states that all HTMT ratios of correlation must be less than 0.85.

Table 20: Results of discriminant validity using the Heterotrait-Monotrait ratio

Variables	Environmental	Financial	Green Credit	Education	Innovativeness	Insurance	Savings	Social
Environmental								
Financial	0.285							
Green Credit	0.249	0.354						
Green Education	0.351	0.196	0.154					
Innovativeness	0.178	0.268	0.218	0.816				
Microinsurance	0.205	0.288	0.488	0.183	0.096			
Savings	0.153	0.409	0.474	0.138	0.149	0.628		
Social	0.827	0.304	0.207	0.231	0.194	0.191	0.213	

Source: Generated by Author

The findings presented in Table 20 demonstrate that the HTMT requirement has been satisfied, as each of the numbers contained within that table is lower than 0.85. For this reason, it is possible to draw the conclusion that the measurement model demonstrates evidence of discriminant validity. Following the completion of the reliability, convergent validity, and discriminant validity verifications of the measurement model, the researcher is now in a position to proceed with the testing of the relevance of the structural paths that are included in the proposed research model.

5.7 Structural model assessment

After establishing the satisfactory psychometric features of the measurement model, the evaluation of the structural model was conducted. The evaluation of the structural model was dependent on the examination of the path coefficients associated with each proposed path, including the direction, magnitude, and statistical significance of the path coefficients at each proposed path. In order to determine the significance of each predicted path, the researcher utilised the bootstrapping method, which involved the generation of 5000 resamples that were drawn with replacement.

The study also examined the moderating impacts of business age and business size (measured by the number of employees) in the suggested model. In order to examine the structural model, an initial evaluation was conducted to determine the presence of collinearity among the exogenous variables. The coefficient of determination R^2 and the Stone-Geiser Q^2 were used to evaluate the significance of the estimated model in terms of both its predictive power and its predictive relevance. The SRMR composite factor model was utilised to evaluate the model's fit.

The assessment of the structural model began by examining it for potential issues related to collinearity (Hair Jr et al., 2021). Hair Jr et al. (2021) posit that the presence of substantial collinearity among the predictor constructs can introduce bias into the estimation of path coefficients. Based on the research conducted by Hair Jr et al. (2021), it is advisable to maintain VIF values below 5 for the predictor constructs, with an ideal threshold of below 3. Ensuring that collinearity does not exert a substantial influence on the estimations of the structural model is of utmost importance. The collinearity data is presented in Table 21. According to the data shown in Table 21, it is evident that the values of all the indicator variables are below 3. This suggests that the presence of collinearity does not have a substantial impact on the estimate of the structural model.

Table 21: Results of collinearity assessment (VIF)

Variables	VIF
EVP 4	2.445
EVP 5	2.224
EVP 6	1.685
FIP 1	1.35
FIP 2	2.852
FIP 3	2.986
FIP 4	1.757
FIP 5	1.809
GCR 1	2.05
GCR 4	2.12
GCR 5	2.668
GCR2	2.973
GED 2	1.885
GED 5	1.472
GED 6	2.213
INV 1	1.785
INV 2	1.381
INV 3	1.311
INV 5	1.775
MIS 1	1.705
MIS 2	1.632
MIS 3	1.585
MIS 4	1.688
SAV 2	1.756
SAV 4	1.571
SAV 6	1.467
SOP 1	2.281
SOP 2	1.592
SOP 3	1.722
SOP 4	2.397

Source: Generated by Author

Figure 9 below represents the structure of the study's model, showing the path coefficient without the moderating variables (business age and business size).

Measurement Model Path Diagrams

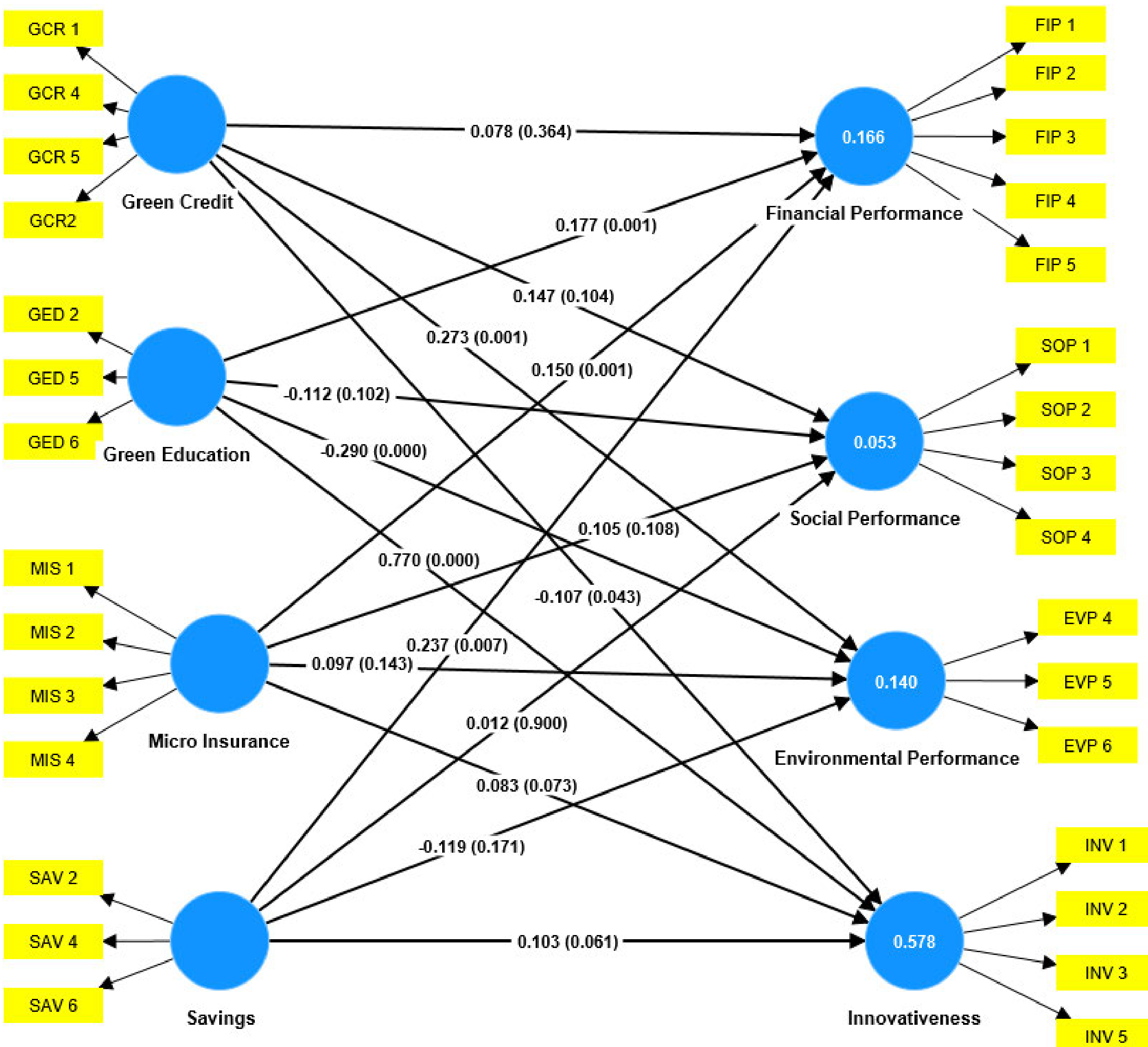

Figure 9: Structural equation model path coefficients (without moderating variables)

Source: Generated by Author

Figure 9 also illustrates the constructs on the perceived impact of green microfinance on the sustainability of MSMEs in Ghana. The reliability of each indicator item is evaluated based on the factor loadings of each indicator.

The diagram illustrates the relationship between the exogenous variables (green credit, green education, microsavings, and microinsurance) and the endogenous variables (financial performance, social performance, environmental performance, and innovativeness).

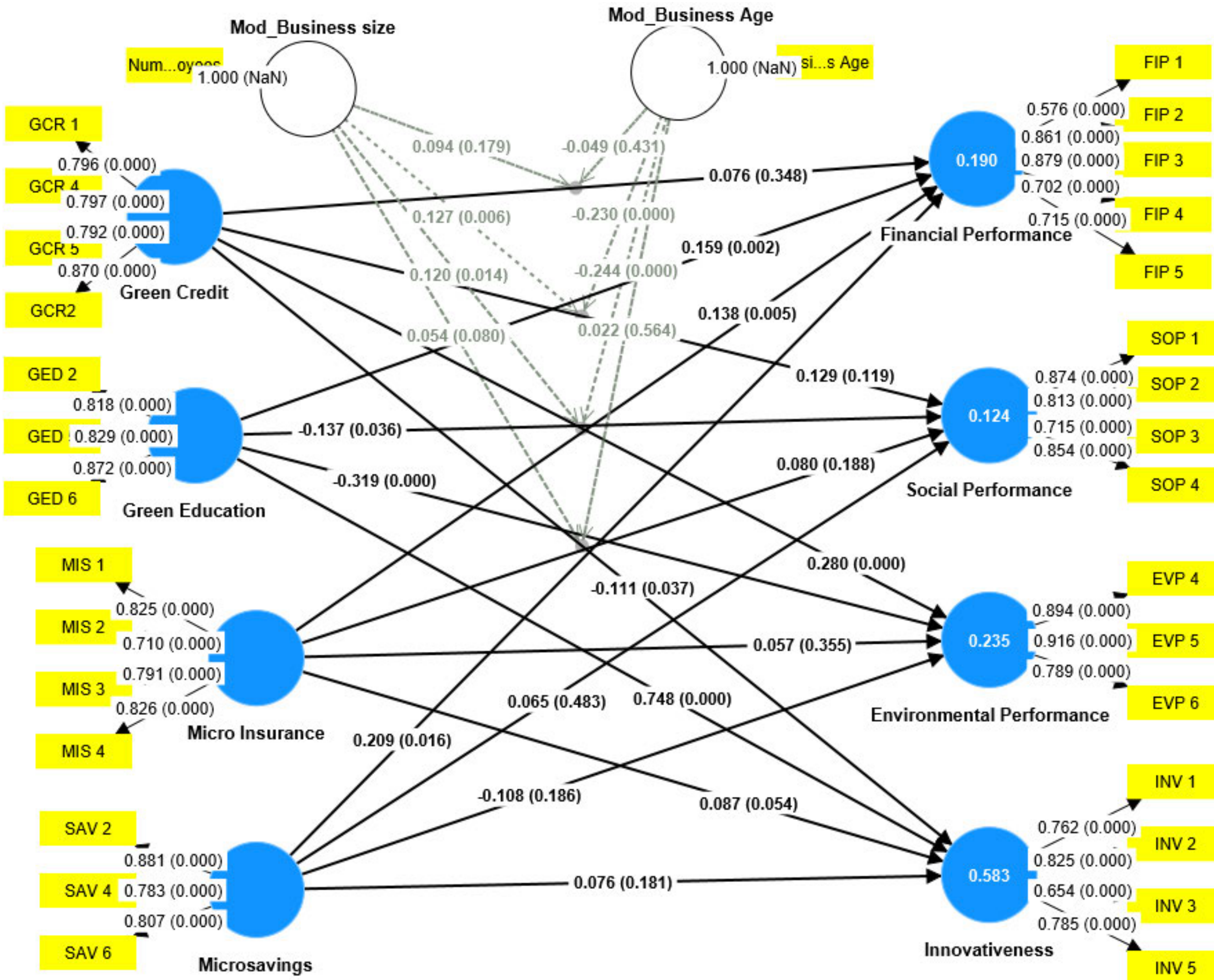

Figure 10: Structural equation model path coefficients and factor loadings (with moderating variables)

Source: Generated by Author

The relationship between green credit and the endogenous variables is moderated by business size and age as shown in Figure 10. Each factor loading is displayed in relation to its corresponding latent constructs. Figure 10 shows that all the indicators of each construct have factor loadings that meet the reliability criterion. All the indicator items that registered low-factor loadings were removed.

The study's structural model consisted of eight main constructs. The constructs were measured using a total of 30 indicator items, which may be seen in Figures 9, 10, and 11. Green credit (exogenous variable) was assessed using four indicator items, while the green education (exogenous variable) was assessed using three indicator items. Similarly, microsavings and microinsurance, both exogenous variables, were assessed using three and four indicator items respectively. In addition, the financial performance, social performance, environmental performance, and innovativeness were assessed using 5, 4, 3, and 4 indicators accordingly. The link between green credit and the endogenous factors was moderated by the size and age of the business.

Measurement Model Path Diagram T- Values

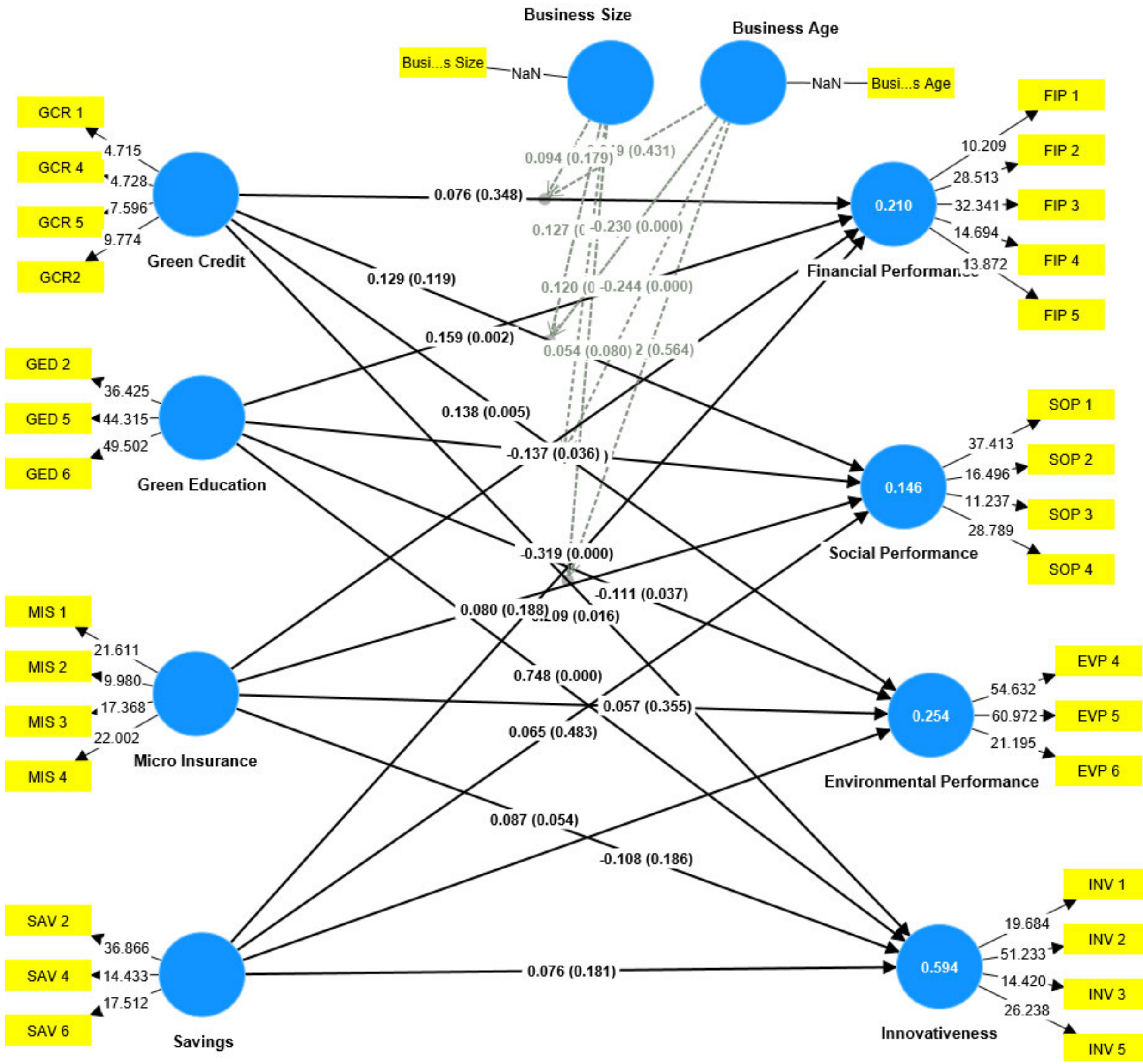

Figure 11: Model path diagram with T-values

Source: Generated by Author

The study's structural model consisted of eight main constructs. The constructs were measured using a total of 30 indicator items, which may be seen in Figures 9, 10, and 11. Green credit (exogenous variable) was assessed using four indicator items, while the green education (exogenous variable) was assessed using three indicator items. Similarly, microsavings and microinsurance, both exogenous variables, were assessed using three and four indicator items respectively. In addition, the financial performance, social performance, environmental performance, and innovativeness were assessed using 5, 4, 3, and 4 indicators accordingly. The link between green credit and the endogenous factors was moderated by the size and age of the respectively. In addition, the financial performance, social performance, environmental performance, and innovativeness were assessed using 5, 4, 3, and 4 indicators accordingly. The link between green credit and the endogenous factors was moderated by the size and age of the business.

The structural model is assessed through the utilisation of estimations and hypothesis testing to ascertain the causal connections between the independent and dependent variables represented in the route map. The test statistics for the relevant parameters were computed using the Bootstrapping feature of SmartPLS 4. The SmartPLS Bootstrapping option computes standard errors and validates statistics for the relevant parameters. The model was utilised to evaluate the statistical significance of the probability values (p-values) between the exogenous and endogenous variables, as depicted in Figure 11 above. The path coefficients are clearly provided in Table 22 below.

Table 22: Path coefficients

	Education	Environment	Financial	Green Credit	Innovativeness	Insurance	Savings	Social
Education		-0.290	0.177		0.770			-0.112
Environment								
Financial								
Green Credit		0.273	0.078		-0.107			0.147
Innovativeness								
Microinsurance		0.097	0.150		0.083			0.105
Savings		-0.119	0.237		0.103			0.012
Social								

Source: Generated by Author

A path coefficient of substantial magnitude indicates the significance of the path under consideration, or the presence of a meaningful relationship between the two variables it connects. A negative value of the path coefficient indicates the presence of an inverse link. The predictive power of the structural model for endogenous constructs was assessed using the coefficient of determination R^2 and Stone-Geisser Q^2 (Sarstedt et al., 2014; Urbach & Ahlemann, 2010).

5.7.1 Evaluating the coefficient of determination (R^2) and predictive relevance (Q^2)

The R^2 and Q^2 values of the endogenous constructs are shown in Table 23.

Table 23: R square and Q square values of the endogenous variables

Variables	R Square	Q Square
Environment Performance	0.140	0.132
Financial Performance	0.166	0.154
Innovativeness	0.578	0.457
Social Performance	0.053	0.042

Source: Generated by Author

The R^2 was calculated from the structural model. This value shows the proportion of the variance in the endogenous constructs that can be assigned to the exogenous variables that are displayed by the model or simply the predictive power model (Hair et al., 2014, Sarstedt et al., 2014; Chin, 1998). This value can be found in the model. R^2 values range from 0 to 1 with values that are closer to 1 suggesting a higher degree of predictive power. In order to ensure that the predictive power of an endogenous variable is both practical and statistically significant, it is recommended that the R^2 values be equal to or greater than 0.10 (Lee, Petter, Fayard, & Robinson, 2011).

According to the rule of thumb proposed by Cohen (1988), it is categorised as being small or weak when the R^2 is 2%, medium when it is 13%, and large or strong when it is 26%. Table 23 shows that R^2 values for Environmental Performance of MSMEs is 0.140, the values for Financial Performance, Social Performance and Innovativeness are 0.166, 0.053 and 0.578 respectively. This shows that green microfinance explains 14% of the variance in environmental performance, 16.6% of change in financial performance, 5.3% of the variance in social performance and 57.8% of the variance in the innovativeness of MSMEs.

The concept of predictive relevance, also known as Q^2 value, was first introduced by Stone (1974) and Geisser (1975). The approach in question bears resemblance to blindfolding, as it shares the objective of assessing generalised cross-validation. If Q^2 has a value greater than zero, it indicates that the conceptual model has predictive relevance. In contrast, it is possible for the researcher to deduce a deficiency in predictive relevance alone when the Q^2 value is below zero (Chin, 1998). According to Henseler et al. (2009), the Stone-Geisser criterion suggests that predictions on the endogenous latent variable(s) should be based on the complete model. The Q^2 values reported in Table 23 indicate that the model had predictive relevance. In conclusion, it can be observed that all the Q^2 values obtained in the study were more than zero, so suggesting the existence of predictive relevance for all the endogenous variables.

5.7.2 Model fit

The researchers, Henseler et al, (2015) employed an SRMR composite factor model to assess the overall fit of the model. According to the study conducted by Hu and Bentler (1999), it was determined that structural equation models with SRMR values below 0.08 can be considered as having a reasonable fit. The SRMR value for the estimated model was found to be 0.036, as seen in Table 24. The observed value is notably below the stated threshold, indicating that the model is fitting effectively. Table 24 illustrates that the model exhibits a satisfactory level of conformity with the observed data.

Table 24: Model fit result

Fit Index	Estimate	t-Statistics	p-Values	Result
SRMR	0.036	5.403	0	Significant

Source: Generated by Author

5.8 Hypothesis testing

In the second chapter of this thesis, the researcher proposed hypotheses from H1a to H4d. The researcher developed the hypotheses to address the research questions about the influence of green microfinance elements on the financial, social, and environmental performance, as well as the innovativeness of MSMEs in Ghana. The first four hypotheses aim to study the second objective, which is to understand the relationship between green microfinance elements and the financial performance of MSMEs. The researcher classifies green microfinance into four components, namely green credit, microsavings, microinsurance, and green education. The a priori expectation is that increased access to green credit, savings, microinsurance, and education will lead to higher financial performance for MSMEs (Ratnawati, 2020; La Rocca et al., 2019; Yunus, 2017). The second set of hypotheses investigates the correlation between green microfinance elements and social performance. The a priori assumption is that green credit, green education, microinsurance, and microsavings lead to better social performance (Jarzabkowski et al. 2019; Abdul Manab & Ahmad, 2014; Yunus, 2017). The fourth objective examines the relationship between green microfinance elements and the environmental performance of MSMEs. The researcher expects significant improvements in environmental performance from green credit, green education, microinsurance, and microsavings (Mia et al., 2018; Nugroho et al., 2017; Allet, 2017; Huybrechs et al., 2015). The next objective examines the relationship between green microfinance elements and innovative practices of MSMEs. We anticipate that MSME innovative practices will improve with access to green credit, green education, and microsavings (Rajapathirana & Hui, 2018), but we do not expect microinsurance to significantly impact MSMEs' innovativeness. Finally, the last two hypotheses examine the moderating effects of business age and size on the relationship between green credit and the financial, social, and environmental performance and innovativeness of MSMEs. The variables of age and size exert a significant influence on performance outcomes (Doucouré & Diagne, 2020).

Hypothesis H1a posited that the use of green credit positively influences the financial performance of micro, small, and medium-sized enterprises. According to the findings presented in Table 25, the analysis reveals that while there was a positive association between Green Credit and Financial Performance, this is statistically insignificant ($\beta = 0.078$, $p = 0.364$). This is against the a priori expectations. This suggests that enhancing Green Credit may not yield substantial enhancements in the financial performance of MSMEs. The hypothesised effect was therefore not supported by the results of the study.

Table 25: Results of hypothesis testing

Hypothesis	**Hypothesised Path**	**Path Coefficients** (β)	**T statistics**	**P values**	**Results**
H1a	Green Credit -> Financial Performance	0.078ns	0.908	0.364	**Not Supported**
H1b	Green Education -> Financial Performance	0.177**	3.331	0.001	**Supported**
H1c	Microsavings -> Financial Performance	0.237**	2.711	0.007	**Supported**
H1d	Microinsurance -> Financial Performance	0.15**	3.186	0.001	**Supported**
H2a	Green Credit -> Social Performance	0.147ns	1.626	0.104	**Not Supported**

H2b	Green Education -> Social Performance	-0.112ns	1.635	0.102	**Not Supported**
H2c	Microsavings -> Social Performance	0.012ns	0.126	0.900	**Not Supported**
H2d	Microinsurance -> Social Performance	0.105ns	1.607	0.108	**Not Supported**
H3a	Green Credit -> Environmental Performance	0.273**	3.194	0.001	**Supported**
H3b	Green Education -> Environmental Performance	-0.290***	5.047	0.000	**Supported**
H3c	Microsavings -> Environmental Performance	-0.119ns	1.368	0.171	**Not Supported**
H3d	Microinsurance -> Environmental Performance	0.097ns	1.467	0.143	**Not Supported**
H4a	Green Credit -> Innovativeness	-0.107*	2.023	0.043	**Supported**
H4b	Green Education -> Innovativeness	0.77***	35.833	0.000	**Supported**
H4c	Microsavings -> Innovativeness	0.103ns	1.873	0.061	**Not Supported**
H4d	Microinsurance -> Innovativeness	0.083ns	1.792	0.073	**Not Supported**

Note: * significant at α=5%, ** significant at α = 1%, *** significant at α =0.1%

Source: Generated by Author

Hypothesis H1b proposed that Green Education and Financial Performance are positively correlated. The results of the study show that there was a statistically significant positive correlation between Green Education and Financial Performance (β=0.177, p = 0.001), which lends support to H1b. From Table 25 it can be inferred that a 10% increase in Green Education would result in a 1.77% increase in Financial Performance. The results of the study therefore, supported this hypothesis. A priori expectations were therefore met.

In hypothesis H1c, the researcher proposed that Savings positively influences Financial Performance. Results from the PLS analysis presented in Table 25 show that Savings has a significant positive relationship with Financial Performance (β = 0.237, p = 0.007). The result implies that an improvement in Savings will likely cause an improvement in MSME's Financial Performance. The a priori hypothesis is therefore supported by the study.

According to the researcher's hypothesis H1d, there is a positive and significant correlation between microinsurance and financial performance of MSMEs. Following this initial anticipation, it was discovered that microinsurance had a significant and positive correlation with financial performance of MSMEs ($\beta = 0.15$, $p = 0.001$). The positive and significant relationship implies that the purchase of microinsurance would possibly translate to an improvement in the financial standing of MSMEs. This research's findings therefore, supported hypothesis H1d.

Hypothesis H2a posited that the provision of Green Credit would positively impact on the Social Performance of MSMEs. According to the findings presented in Table 25, the analysis revealed a positive association between Green Credit and Social Performance. However, it is critical to acknowledge that this link did not reach statistical significance ($\beta = 0.147$, $p = 0.104$). This suggests that an enhancement in Green Credit may not provide substantial advancements in the Social Performance of MSMEs. This further suggests that there may not be a direct correlation between the increase in Green Credit and the enhancement of social activities inside MSMEs. The hypothesised effect was therefore not supported.

Hypothesis H2b posited a positive relationship between Green Education and Social Performance. However, the results presented in Table 25 reveals a negative and insignificant relationship between Green Education and Social Performance ($\beta= -0.112$, $p = 0.102$). The result suggests that enhancement in Green Education may not translate into the improvement of social undertakings of MSMEs. The hypothesis was therefore not supported.

For hypothesis H2c, the researcher proposed that Savings positively and significantly influence Social Performance. Inconsistent with the initial position, Savings exhibited a positive insignificant correlation with Social Performance ($\beta = 0.012$, $p = 0.900$). This implies that improvement in MSMEs savings may not result in enhancement of their socially related activities. The positive insignificant relationship between Savings and Social Performance as depicted in Table 25 does not support this hypothesis.

In hypothesis H2d the researcher also proposed that Microinsurance was positively and significantly associated with Social Performance. It was affirmed in this study's results presented in Table 25 that Microinsurance was positively associated with Social Performance. Contrary to expectation, the relationship between Microinsurance and Social Performance was found not to be significant ($\beta = 0.105$, $p = 0.108$). The implication is that the purchase of microinsurance does not necessarily result in an improvement in social performance. The hypothesis was therefore not supported.

Hypothesis H3a posited a positive and significant correlation between Green Credit and Environmental Performance. The findings from Table 25 support this hypothesis, indicating that green credit has a statistically significant beneficial impact on the environmental performance of MSMEs ($\beta = 0.273$, $p = 0.001$). This implies that a rise of 10 standardised units in Green Credit would correspond to a growth of around 3 standardised units in Environmental Performance. The findings suggest that enhancing Green Credit has the potential to enhance the environmental effect of MSMEs. The postulated effect was thus corroborated.

Hypothesis H3b stated that Green Education has positive effect on the environmental performance of micro, small, and medium enterprises. According to the findings shown in Table 25, a significant inverse association was seen between Green Education and Environmental Performance ($\beta = -0.29$, $p = 0.000$). Indeed, it has been determined that Green Education has a notable impact on Environmental Performance. The findings suggest that enhancing the Green Education provided by microfinance banks has the potential to decrease the carbon footprints of micro, small, and medium enterprises. Thus, the hypothesis was supported.

In hypothesis H3c the researcher proposed that Savings has a significant positive effect on Environmental Performance. Inconsistent with the anticipated results, it was determined that Savings did not exhibit a positive significant relationship with Environmental Performance ($\beta = 0.119$, $p = 0.171$). From Table 25 it can be inferred that an improvement of Savings would not result in improvement in MSMEs' environmental performance. Therefore, the hypothesis was not supported by the study.

In hypothesis H3d it was proposed that Microinsurance has a positive effect on Environmental Performance of MSMEs. As expected, Microinsurance was found to have a positive relationship with Environmental Performance but the relationship was found not to be significant ($\beta = 0.097$, $p = 0.143$). The result implies that the purchase of insurance by MSMEs would not improve the carbon footprint of MSMEs. Thus, the hypothesis was not supported.

Hypothesis H4a posited a positive correlation between Green Credit and the level of innovativeness exhibited by MSMEs. According to the findings presented in Table 25, it is evident that the observed link between Green Credit and Innovativeness aligns with the anticipated hypothesis. Specifically, the analysis reveals a statistically significant positive association between these two variables, as indicated by the regression coefficient (β= -0.107, p = 0.043). The findings suggest that an increase in Green Credit is likely to lead to enhancements in the ability of MSMEs to innovate and adopt more efficient production techniques, as well as integrate new technology to improve their operations.

Hypothesis H4b proposed that Green Education has positive relationship with MSMEs' innovativeness. In line with the hypothesised expectation, Green Education was found to have a positive significant relationship with Innovativeness of MSMEs. From Table 25 it can be seen that it is consistent with the expectation as the relationship between Green Education and Innovativeness was found to be positive and significant at (β= 0.77, p = 0.000). This implies that a 10% increase in Green Education is likely to increase Innovativeness of MSMEs by 7.7%. The hypothesis was therefore supported.

The researcher proposed in hypothesis H4c that Savings was positively associated with Innovativeness. In Table 25 it is shown that Savings was positively associated with Innovativeness. However, the relationship between Savings and Innovativeness was found not to be significant (β = 0.103, p = 0.061). It follows that improvement in Savings would not necessarily translate into improvement in innovative practices by MSMEs. The hypothesis was therefore not supported.

Finally, the researcher proposed in hypothesis H4d that Microinsurance has a positive influence on Innovativeness. The data presented in Table 25 indicates that Microinsurance has a positive relationship with Innovativeness of MSMEs; however, the correlation did not reach statistical significance ((β = 0.083, p = 0.073). The result suggests that subscription to microinsurance policy by MSMEs would not culminate into creativity and new practices of small businesses. The hypothesised effect was therefore not supported.

5.8.1 Moderating effects

The study investigated the moderating influence of business age and business size on the relationships between green credit and the endogenous variables (financial performance, environmental performance, social performance and innovativeness)

Hypothesis H5a postulated that business age moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

Business age served as the moderator while financial performance, environmental performance, social performance, and innovativeness served as the dependent variables. This interaction was used to assess the moderating influence of business age. Regression results' direct and indirect effects were taken into consideration when determining the moderating role, as demonstrated by Hair et al. (2014).

The R^2 values for EVP, FIP, SOP, and INV were 0.140, 0.166, 0.053, and 0.578, respectively, when the moderating factor (business age x green credit) was not included in the model. By incorporating the interaction term, the R^2 values for EVP, FIP, SOP, and INV experienced a rise to 0.254, 0.210, 0.146, and 0.594, respectively. The R^2 values for EVP, FIP, SOP, and INV increased by 0.114, 0.044, 0.093, and 0.016, respectively. The data indicates a rise of 11.4%, 4.4%, 9.3%, and 1.6% in EVP, FIP, SOP, and INV correspondingly.

The study also examined the significance of the moderating effect. The results indicated a negative and significant moderating influence of business age on the association between green credit and both EVP (β = -0.244, t = 4.221, p = 0.000) and SOP (β= -0.23, t=3.558, p = 0.000), hence confirming the hypothesis. The results indicated that there was a negligible and statistically insignificant moderating influence on the link between green credit and FIP (β= -0.049 t=0.787, p = 0.431). Nevertheless, the findings demonstrated that the influence of business age on the connection between green credit and innovativeness was both positive and statistically insignificant (β= 0.022, t=0.576, p = 0.564). This demonstrates that as a firm becomes older, the correlation between green credit and both environmental performance and social performance becomes less strong. The summary analysis of the moderation is displayed in Table 26 below.

According to Cohen (1988), there are three different ways in which effect sizes of moderation can be defined: small (0.02), medium (0.15), and large (0.35). The effect sizes were 0.072, 0.003, 0.001, 0.056, and 0.072 for EVP, FIP, INV, and SOP, respectively. This suggests that business age effect does not significantly add to our understanding of the endogenous constructs.

Hypothesis H5b proposed that business size moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

The results of the business size moderating effect showed that there is a positively significant moderating influence of business size on the relationship between green credit and EVP (β= 0.12, t=2.448, p = 0.014) and between green credit and SOP (β= 0.127, t=2.740, p = 0.006). The hypothesis was therefore supported. Nevertheless, the results indicated that the size of the business had a minor and statistically negligible moderating effect on the connection between green credit and both FIP (β = 0.094, t=1.344, p = 0.179) and innovativeness (β = 0.054, t=1.752, p = 0.08). These results demonstrate that when businesses grow larger, the relationships between green credit and the endogenous variables (environmental performance and social performance) become stronger, as indicated in Table 26. With business size as the moderator, the effect sizes were 0.023, 0.014, 0.009, and 0.023 for EVP, FIP, INV and SOP respectively. This shows that the moderating effect of business size contributes little to explaining the endogenous constructs.

The implication of this result is that Business Age and Business Size, although not directly connected to Environmental Performance, Financial Performance, Social Performance or Innovativeness, MSMEs that are old (that is more experienced) and big (resourceful) with the necessary support from microfinance institutions could have a more influence on their social and environmental performance.

The results of the hypotheses are shown in Table 26 below.

Table 26: Moderating effects

	Beta (β)	**T statistics**	**P values**
Green Credit -> Environmental Performance	0.28	3.484	0.000
Green Credit -> Financial Performance	0.076	0.939	0.348
Green Credit -> Innovativeness	-0.111	2.081	0.037
Green Credit -> Social Performance	0.129	1.558	0.119
Business Size x Green Credit -> Environmental Performance	0.12	2.448	0.014
Business Size x Green Credit -> Financial Performance	0.094	1.344	0.179
Business Size x Green Credit -> Innovativeness	0.054	1.752	0.08
Business Size x Green Credit -> Social Performance	0.127	2.74	0.006
Business Age x Green Credit -> Environmental Performance	-0.244	4.221	0.000
Business Age x Green Credit -> Financial Performance	-0.049	0.787	0.431
Business Age x Green Credit -> Innovativeness	0.022	0.576	0.564
Business Age x Green Credit -> Social Performance	-0.23	3.558	0.000

Source: Generated by Author

5.9 Chapter summary

In this chapter, the researcher presented the results of the analysis. In all, 320 questionnaires were considered fit for analysis. First the reliability of the test items and the constructs were ascertained and found to conform to required thresholds. The researcher then tested the measurement and the structural models of the study. The a priori hypotheses which guided the study were tested. The study sought to investigate the perceived impact of green microfinance on the financial, social and environmental performance of MSMEs. The analysis of the hypothesis revealed that Green Credit has a significant positive relationship with Financial Performance and innovativeness of MSMEs. Green education was found to have an inverse and significant relationship with Environmental Performance. However, green education exhibited a positive and significant effect on Financial Performance and Innovativeness. The analysis again revealed that Microinsurance has positive and significant relationship with Financial Performance. The investigation further revealed that Savings positively and significantly impact the Financial Performance of MSMEs. Finally, the moderating effects of Business Age and Business Size were tested. The results indicate that Business Size moderates the relationship between Green Credit and Environmental Performance and also Business Size further moderates the relationship between Green Credit and Social Performance. Similarly, the relationship between Green Credit and Social Performance was found to be affected by Business Age.

CHAPTER SIX

DISCUSSIONS OF THE RESEARCH FINDINGS

6.1 Introduction

The study aimed to investigate the impact of green microfinance on the sustainability of micro, small, and medium businesses. Consequently, the objective of this research was to assess the the perceptions of owners and managers of MSMEs about the elements of green microfinance. The study also examined the influence of green microfinance on the financial, social, and environmental performance of MSMEs as well as their innovativeness.

The preceding chapter presented the noteworthy discoveries derived from the analysis of the data gathered in the field, in order to address the study inquiries and accomplish the objectives. The chapter also included an analysis of the demographic characteristics of the respondents, specifically the owners and managers of MSMEs, in relation to their perceptions of the various dimensions of green microfinance. Additionally, the chapter discussed the assessment of the test items' validity and reliability, as well as the examination of the hypotheses proposed in the study. The entirety of the results was derived by employing descriptive statistics and a structural equation modelling.

The present investigation utilised a quantitative methodology, employing a cross-sectional survey design to gather primary data. The development of a questionnaire involved the process of adopting and adapting measurement scales from prior investigations. The survey instrument underwent a pre-testing phase before being sent to a targeted sample of owners and managers of MSMEs in the Sunyani and Techiman regions of Ghana. The selection of participants was carried out using a stratified systematic sampling approach. The data analysis was conducted using a final sample size of 320 respondents. The research was performed utilising two statistical software packages, namely SPSS version 23 and SmartPLS 4. The preliminary data analysis was conducted using SPSS, whereas the structural equation modelling analysis, including hypothesis testing, model fit assessment, and examination of moderating effects, was performed using SmartPLS 4.

The primary objective of the present chapter is to provide analyses and interpretations of the empirical results presented in Chapter 5. This chapter focuses on the analysis of the study objectives and the corresponding hypotheses, aiming to derive conclusions and recommendations.

Additionally, it identifies avenues for future research, which are further explored in the concluding chapter of this thesis.

6.2 OBJECTIVE ONE

6.2.1 To examine entrepreneurs' perceptions of green microfinance in Sunyani and Techiman Municipalities.

The study sought to examine the perception that owners and managers of MSMEs in Sunyani and Techiman have of green microfinance elements as well as the overall green microfinance. This is in respect of the fact that microfinance institutions have been acknowledged as the backbone of MSMEs (García-Moritán, 2020; Singh et al., 2018; and Mukherjee, 2018).

The research discovered that respective percentages of 44.7%, 65.2%, 44.7%, and 27.2% of the respondents expressed satisfaction with the green credit, savings, microinsurance, and green education services provided by microfinance organisations. Aside from savings, a minimal percentage of respondents deemed the other services attractive. This partially supports the findings of Omondi and Jagongo (2018) and Aladejebi (2019), who revealed that microfinance services impact positively on the sustainability of MSMEs. The above researchers concluded that finance availability, savings mobilisation, and financial skills have a substantial impact on MSMEs' success. The findings also support the outcome of a study conducted by Lakuma et al. (2019), which established that financial access boosts the growth of micro, small, and medium companies. This finding aligns with the findings of previous studies (Agyapong, 2020; Amoah & Amoah, 2018), which indicate that the majority of MSMEs face restricted access to financial services offered by conventional banks, leaving microfinance institutions as their primary alternative.

The study also revealed that 44.7% of the respondents considered microinsurance worthwhile for the sustenance of their businesses. This implies that majority of MSMEs owners/managers do not appreciate the importance of microinsurance services. The responses of 44.7% of the participants corroborate the assertion by Mukhtar (2013) that microinsurance for MSMEs is one of the most effective ways to lessen MSMEs' exposure to the effects of property loss, disease, theft, disability, fire, and other dangers. The study concurs with the findings of Wong et al. (2020), Hansen et al. (2019), Clement et al. (2018), and Karlan et al. (2014) that microinsurance encourages MSMEs to invest in earning assets and crops with greater risk yields that render them more viable. The findings also support Agboola and Epetimehin's (2021) conclusion that microinsurance has a significant and positive impact on MSME performance.

The number of respondents who found microinsurance attractive was relatively low (44.7%). This confirms the findings by Aduko (2011) and Akotey et al. (2011) in studies conducted in Ghana. It was revealed that there was low patronage of microinsurance by MSMEs. This was attributed to insufficient insurance coverage and unawareness of the crucial role insurance plays as a risk-transfer device. The low uptake of insurance policies makes MSMEs in Ghana continue to be vulnerable to risks associated with businesses. The researchers identified premium flexibility, income level, and nodal agency as potential indicators of the need for microinsurance in Ghana. The authors stated that Ghana's microinsurance market is characterised by a limited array of meticulously designed products. The authors further argue that a limited number of well-organised products are not fully utilised.

Though MSME operators have some reservations about the services of microfinance institutions, they consider them the best option available. In aggregate, a significant majority of 92.8% of the surveyed micro-entrepreneurs expressed their inclination to endorse microfinance firms to prospective individuals.

However, the study revealed that a significant proportion of respondents, specifically 33.7%, 28.2%, 27.5%, and 68.4%, expressed dissatisfaction with the green credit, savings, microinsurance, and green education services offered by microfinance institutions, respectively. The survey yielded noteworthy findings indicating that 21.6%, 6.6%, 27.8%, and 4.4% of respondents had a neutral stance towards green credit, savings, microinsurance, and green education services, respectively, as offered by microfinance organisations. These respondents were neither satisfied nor dissatisfied. This suggests that an improvement in microfinance services in Ghana would switch this group to the satisfied category. This implies that irrespective of the perceived support rendered by MFIs, there are a number of their clients who do not recognise their impact.

6.2.2 To investigate the impact of green microfinance on MSMEs' sustainability in Sunyani and Techiman Municipalities, Ghana

Here, the research sought to investigate the impact of green microfinance elements on the financial, social and environmental performance and innovativeness of MSMEs. In order to assess the perceived value of green microfinance in Sunyani and Techiman Municipalities, the various elements of microfinance were utilised, considering that microfinance is a complex and multifaceted concept. Hence, the research investigated the influence of green credit, microsavings, microinsurance, and green education on the overall sustainability of MSMEs in Sunyani and Techiman Municipalities.

This section provides a discussion of the test results pertaining to the hypotheses formulated to accomplish the stated purpose.

6.3 Discussion of test results of the hypotheses

This section provides a discussion of the test results pertaining to the hypotheses formulated to accomplish the stated purpose.

6.4 **OBJECTIVE TWO**

The second objective of the study was to investigate the impact of green microfinance on MSMEs' financial performance in Sunyani and Techiman Municipalities, Ghana. This was achieved by testing four hypotheses, H1a – H1d.

H1a: Green credit positively and significantly impacts MSMEs’ financial performance

The test results indicate that green credit does not significantly impact MSMEs’ financial performance. The result reveals that while there was a positive association between green credit and financial performance, this link did not reach statistical significance ($\beta = 0.078$, $p = 0.364$). This suggests that enhancing green credit may not automatically yield substantial enhancements of the financial status of MSMEs. This result supports the findings of a previous study by Allet and Hudon (2015), which found that firms that receive green credit and prioritise environmental sustainability do not exhibit higher or worse levels of profitability compared to other firms. Previous studies (Uusiku, 2019; Kasali et al., 2016) show that obtaining access to microcredit alone cannot result in the expansion of small businesses, but rather a combination of other crucial factors such as education and business experience are necessary for utilising microcredit in a way that may lead to the expansion of MSMEs.

However, other studies (Farghly et al., 2018; Uddin, Kassim, Hamdan, Saad, & Embi, 2021; Shahidullah & Hague, 2014) found that access to green credit significantly boosts the profitability of MSMEs. Without access to credit, business owners might not have the funds they need to invest in green operations, recruit staff, buy eco-friendly equipment, or buy merchandise (Zhang & Posso, 2019; Corrado & Corrado, 2017; Khan et al., 2020).

H1b: Green education positively and significantly impacts MSMEs' financial performance

The results from the test also indicated a noteworthy and favourable correlation between green education and financial performance ($\beta = 0.177$, $p = 0.001$). This outcome suggests that incorporating green education into microfinance practices is a crucial component that offers vital support to MSMEs. The observed result provides support for hypothesis H1b and aligns with the conclusions drawn in prior studies (Turner & Endres, 2017; Yunus, 2017; and Kyabarongo et al., 2022), which suggest that effective education and training of MSME owners and managers promotes financial performance and sustainability. This study's outcome is consistent with those of previous studies (Omondi & Jagongo, 2018; Aladejebi, 2019; Ratnawati, 2020), who recognised education as a distinct dimension of microfinance. The results of the current study therefore support microfinance theory (Chibba, 2009; Rhyne & Otero, 2006; Obaidullah, 2008; Pearce, 2011; Cosgrove, 2021), which suggests that the microfinance concept evolved from the quest to provide microloans, including other financial and non-financial services. As an important source of finance for MSMEs, MFIs need to escalate their education drive to provide a favourable and unique opportunity to their clients to give them a competitive advantage.

H1c: Savings positively and significantly impact MSMEs' financial performance

The test findings show that there is a positive significant relationship between savings and financial performance ($ß = 0.237$, $p = 0.007$). This result indicates that providing microfinance services with appropriate savings products encourages MFI clients to put money aside to expand their businesses and meet future exigencies and expansion (Jatmiko et al., 2021; Santoso, 2020). The finding reveals that saving is one of the important factors in sustaining MSMEs, as suggested in studies conducted by Nizaeva and Coşkun (2018). MSMEs encounter particular and distinct problems in accessing outside finance due to their informational opacity, their closely and privately held ownership structures, and their lack of actual collateral for loans, which typically affect their sustainability (Mukherjee, 2018). As a result, many MSMEs rely heavily on their own resources to finance their operations and supply the necessary cash for running their firms on a daily basis. This result suggests that it is crucial for MSMEs in emerging countries to set aside some of their income for future investments. This is very important because payments made in cash are less expensive than those that call for the realisation of cash from illiquid assets. More so, retaining cash or highly liquid assets reduces transaction costs. MSME owners must properly control their internally generated resources, notably the surplus cash from successful commercial activities, to ensure seamless business operations and survival. This outcome of the study also supports the microfinance concept, which indicates that microfinance services should be provided with credit along with other financial and non-financial services. This current study also supports and concurs with the results of past research authors (Aladejebi, 2019; La Rocca et al., 2019; Omondi & Jagongo, 2018; Gyimah & Boachie, 2018; Senzu & Ndebugri, 2018; Xu & Zia, 2012; Kurgat, 2007), who found that savings have a positive and significant influence on the financial performance of MSMEs.

H1d: Microinsurance positively and significantly impacts MSMEs' financial performance

The findings of the study indicate a significant relationship between microinsurance and financial performance, as evidenced by the test results ($\beta = 0.15$, $p = 0.001$). Furthermore, this finding provides confirmation for hypothesis H1d. This finding aligns with previous research, which suggests that microinsurance has a beneficial impact on financial performance (Memon et al., 2020; Agboola & Epetimehin, 2021). The finding also aligns with previous studies conducted by Panigrahi (2012), Abdul Manab and Ahmad (2014), Teece et al. (2016), Neise and Diez (2019), and Bhaskara and Filimonau (2021), which suggest that the longevity and survival of MSMEs are enhanced by microinsurance's restoration of losses caused by disasters.

6.5 OBJECTIVE THREE

Objective three explored the impact of green microfinance on social performance of MSMEs in Sunyani and Techiman Municipalities in Ghana. Four hypotheses were employed.

H2a: Green credit positively and significantly impacts MSMEs' social performance

In contrast with the proposed hypothesis that green credit has a positive and significant effect on social performance, the result proved otherwise ($\beta = 0.147$, $p = 0.104$). This result indicates that microinsurance policyholders would mitigate losses they may suffer when a risk crystallises. Owners and managers of MSMEs who purchase insurance reduce the likelihood of going out of business as a result of disasters, therefore ensuring business continuity. The result supports the assertion by Teece et al. (2016) that using insurance products and services is the best strategy to handle uncertainty in business operations.

The result implies that owners and managers of MSMEs need to subscribe to microinsurance policies in order to manage a variety of hazards and maintain their operations. This is more important due to the fact that risk cannot be isolated from MSMEs' operations because it is connected to all business pursuits (Hirawati & Sijabat, 2020). Risk is viewed as a potential aspect of business that can happen at any time. Moreover, MSMEs have higher rates of failure than large enterprises because they are more susceptible to the many perils to which businesses are exposed. Consequently, MSMEs are urged to use microinsurance products and services as a formidable strategy to handle uncertainty in business operations. The findings contradict previous research (Memon et al., 2020), which contends that access to credit allows SMEs to devote resources to socially responsible activities that result in higher and more efficient output. The study, however, concurs with earlier studies (Sung Kim & Oh, 2019), which reveal that MSMEs may engage in socially responsible activities either through the firm's own strategy to enhance their performance or as a result of compliance with regulatory policy but not as a result of access to credit.

Other studies (Jain et al., 2016) found that the idea of MSMEs engaging in social activities is still philanthropic. The finding suggests that MSMEs would not engage in social activities just by getting access to green credit but would be compelled to do so when considering economic benefits. This supports Sung Kim and Oh's (2019) findings. Though access to credit is not the sole factor that stimulates social investment by MSMEs, previous studies (Memon et al., 2020) attest to the significant role it plays. The decisions of firms to invest in social activities hinge largely on their financial situation and the perceived accrued benefits, as credit would be applied to first boost the operational activities before considering the social aspect.

H2b: Green education positively and significantly impacts MSMEs' social performance

In contrast to the researcher's initial assumptions, the present study revealed that green education did not yield a statistically significant impact on social performance ($\beta = -0.112$, $p = 0.102$). This implies that creating environmental awareness may not improve social performance of MSMEs. This contradicts the findings reported in prior literature (Jarzabkowski et al., 2019; Turner & Endres, 2017), Nevertheless, it was determined that the indirect impact was statistically significant due to the fact that green education emerged as a major predictor of financial performance, which then emerged as a substantial predictor of social performance. While the significance of green education may not be a prominent factor in relation to social performance, microfinance institutions have the potential to improve their performance in green education, as it could indirectly contribute to the enhancement of social performance in micro, small, and medium enterprises.

H2c: Microsavings positively and significantly impact MSMEs' social performance

The study's results indicated an insignificant positive relationship between microsaving and social performance ($\beta = 0.012$, $p = 0.900$). The results of the study indicated that accumulation of savings has a positive but statistically insignificant correlation with social performance. This implies that MSMEs that embark on social responsibilities do so for other reasons apart from having more savings. For instance, the firm that give back to society, in turn, gains a high reputation and greater patronage for its goods or services. This gives the firm a competitive advantage and strengthens its survival. This is contrary to previous studies (Wiklund & Shepherd, 2005; Memon et al., 2020; Khattak et al., 2021), which showed that saving is positively correlated to social performance. The authors suggested that MSMEs should employ pragmatic strategies to put part of their earnings aside to allow them (MSMEs) to devote resources to socially responsible activities that benefit customers, the community, and employees.

H2d: Microinsurance positively and significantly impacts MSMEs' social performance

In contrast with the proposed hypothesis that microinsurance has a positive and significant effect on social performance, the result proved otherwise ($\beta = 0.105$, $p = 0.108$). The findings indicate that the implementation of microinsurance would not improve the social performance of MSMEs. However, previous studies (Zampetakis et al., 2011) found that microinsurance provides access to funds to protect a firm from unexpected losses and obstacles and provides the firm with the opportunity to devote resources to socially responsible activities such as undertaking eco-friendly initiatives, making donations to charities, providing education and health facilities, and paying living wages, which result in higher and more efficient output. This indicates that microinsurance has an indirect effect on MSMEs' social performance. MSMEs, therefore, should effectively embrace microinsurance to enhance business continuity and achieve sustainable social performance.

6.6 OBJECTIVE FOUR

Objective four sought to investigate the impact of green microfinance on environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana. The research employed four hypotheses to achieve this objective.

H3a: Green credit positively and significantly impacts MSMEs' environmental performance

The test findings show that there is a positive and significant relationship between green credit and environmental performance (ß = 0.273, p = 0.001). Consequently, H3a is supported and concurs with the result of past research (Kumar et al., 2021), which found that green microfinance either proscribes the extension of credit to support non-eco-friendly activities or vigorously designs loan products to enhance pro-environmental business activities to mitigate MSMEs' susceptibility to environmental problems. The aims of green credit are to lessen the environmental impact of business actions, assist in reducing monetary risk, improve the standard of living, and/or conserve and restore natural resources. Green credit offers MSMEs funds to purchase eco-friendly machines or equipment to engage in environmentally friendly operations.

H3b: Green education positively and significantly impacts MSMEs' environmental performance

Consistent with expectations, it was determined that the presence of green education significantly predicts environmental performance (β = -0.29, p = 0.000). In fact, of the four variables that predicted the environmental performance of MSMEs, green education was one of the most significant. This finding aligns with the prior studies conducted by Yunus (2017), Gyimah and Boachie (2018), Rotich et al. (2015), Uusiku (2019), and Kyabarongo et al. (2022), who also found education to be one of the most significant predictors of MSMEs' sustainability.

The result implies that with the provision of green education by trained microfinance practitioners, universities, other professional bodies, and facilitating the identification of solutions to various challenges, the active promotion of environmental consciousness is likely to enhance the impression of its use. This is because lack of access to business advisory services that focus on green production and services, training in effective business management, product marketing, technological innovation, and information is a constraint on MSMEs.

H3c: Microsavings positively and significantly impact MSMEs' environmental performance

Inconsistent with prior scholarly investigations (Jatmiko et al., 2021; Santoso, 2020), that found a significant relationship between savings and environmental performance, the findings of this study indicate an insignificant inverse relationship between microsavings and environmental performance ($\beta = -0.119$, $p = 0.171$). This implies that MSMEs owners and managers need not to accumulate savings before they can enhance their environmental performance. Therefore, an increase in savings as a result of efficient business operations and presence of financial control measures will not increase MSMEs' environmental performance. The results indicate that as savings increases, environmental performance decreases and when savings decreases environmental performance increases. This indicate that when savings is invested in green practices and processes, it increases environmental performance. The accumulation of savings could lead to investment in green technologies, practices, and processes (Katsikeas et al., 2016).

H3d: Microinsurance positively and significantly impacts MSMEs environmental performance

In contrast to the premise put forward, which suggests that microinsurance has a favourable and substantial impact on environmental performance, the result proved otherwise ($\beta = 0.097$, $p = 0.143$). The findings indicate that the adoption of microinsurance would not improve environmental performance of MSMEs. However, previous studies (Mukhtar, 2013, De Bock et al., 2010, Hansen et al., 2019) found that microinsurance can encourage MSMEs to invest in earning assets and crops with greater risk yields. Therefore, it can be argued that microinsurance serves as an efficient risk transfer mechanism and an essential component of a comprehensive catastrophe risk management plan. MSMEs generate thin profit margins, so the illness of the owner dissipates the earnings of the firm. In such a situation, insurance would cover such costs and allow credit and savings to be used more effectively for environmentally friendly products. Thus, the importance of microinsurance as a financing mechanism is to protect MSME owners from negative financial consequences resulting from illnesses or poor health (Navare & Handley-Schachler (2018). Though microfinance does not have a direct or significant effect on environmental performance, it can be inferred that it has a remote effect.

H4a: Green credit positively and significantly impacts MSMEs' innovativeness

Consistent with previous research, the result of this study shows that green credit has a significant positive effect on innovativeness ($\beta = -0.107$, $p = 0.043$). These results support the previous studies (Fernando et al., 2019; Teece, 2018; Rajapathirana & Hui, 2018), which revealed that both large and small firms need finance to engage in meaningful innovation. This shows, therefore, that access to finance is a key factor in driving innovation.

In a competitive environment, firm innovation is considered crucial to survive in the market. Green microfinance institutions therefore come to play a significant role that impacts MSMEs to innovate by designing loan products for environmentally friendly processes, activities, and products. When MSMEs churn out innovative products, they benefit from higher future earnings, which enhances their performance and sustainability.

6.7 OBJECTIVE FIVE

Objective five examined the impact of green microfinance on innovative practices of MSMEs in Sunyani and Techiman Municipalities, Ghana. Four hypotheses were also used in this instance.

H4b: Green education positively and significantly impacts MSMEs' innovativeness

Consistent with the researcher's hypotheses, it was seen that green education had a substantial impact on the level of innovativeness. The anticipated outcome aligns with prior studies undertaken in this field, which have consistently found that green education serves as a strong indicator of innovativeness in MSMEs (Yunus, 2017; Turner & Endres, 2017; Teece, 2018; Fernando et al., 2019). The authors highlighted that green education plays a significant role in inspiring MSMEs to innovate by designing loan products for environmentally friendly processes, activities, and products. The presence of adequate managerial skills and environmental consciousness among MSME owners might result in their preparedness to address dynamic economic situations and environmental concerns, as well as improve their ability to strategise for essential technological advancements and mitigate environmental risks. Hence, in order to secure the continuity and expansion of MSMEs, it is imperative to consistently augment the business acumen of their proprietors and managers.

H4c: Savings positively and significantly impact MSMEs' innovativeness

In contrast to the researcher's initial hypotheses, the results of the study indicate that there is no statistically significant association between saving and innovativeness ($\beta = 0.103$, $p = 0.061$). However, other researchers (Rajapathirana & Hui, 2018) highlight that both large and small firms need money to engage in meaningful innovation. Such funds are usually obtained through microfinance credit with associated high interest rates, short repayment periods, and smaller loan amounts, which do not stimulate innovation. It therefore implies that MSMEs that generate enough savings are better placed to implement their innovative agenda than their competitors.

The ability to save part of their earnings can substantially raise the likelihood of obtaining capital to support innovative activities. Though savings have no significant positive correlation with innovation as depicted by the result, they enhance the ability to innovate, and innovation, on the other hand, positively affects financial performance. When MSMEs churn out innovative products, they benefit from higher future earnings (Teece, 2018), which enhances their performance and sustainability.

H4d: Microinsurance positively and significantly impacts the innovativeness of MSMEs

The empirical findings indicate that the impact of microinsurance ($ß = 0.83$, $p < 0.073$) on the innovativeness of MSMEs in Sunyani and Techiman Municipalities is not statistically significant. In the literature, there is a scarcity of studies that examine the correlation between microinsurance and innovativeness. However, there are studies that indicate that microinsurance influences financial performance (Neise & Diez, 2019; Bhaskara & Filimonau, 2021), and financial performance positively affects innovativeness (Fernando et al., 2019). It therefore implies that microinsurance has an indirect influence on innovation. Innovation entails the conception and introduction of new products, processes, activities, knowledge transmissions, and technologies that impact a firm's business activities. Thus, a firm must be financially secured by purchasing microinsurance to be able to adopt new technologies. This limits the apprehension of losses of acquired eco-friendly production assets through flooding, fire outbreaks, or other unexpected hazards that may occur.

6.8 OBJECTIVE SIX

Objective six investigated the moderating effect of business age and business size on the financial, social and environmental performance of MSMEs. Two hypotheses were used in this investigation.

Business age and business size served as moderating variables.

H5a: Business age moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

The study revealed a negligible and statistically insignificant moderating influence of business age on the link between green credit and financial performance (β= -0.049 t=0.787, p = 0.431). This implies that business age has no effect on the relationship between green credit and financial performance of MSMEs. There is no distinction in the financial performance of MSMEs that utilise green and traditional credit (Allet & Hudon, 2013). The financial performance of MSMEs primarily relies on effective management of operational activities and robust internal controls. A firm's financial performance is determined by its ability to generate income, manage its assets and liabilities, and address the financial interests of its stakeholders and investors, rather than by the firm's age (Mahrani & Soewarno, 2018; Mirza & Javed, 2013). This supports the findings of Younis and Sundarakani (2020) that the relationship between firm age and performance is not statistically significant.

The study also found a negative and significant moderating influence of business age on the association between green credit and both environmental (β = -0.244, t = 4.221, p = 0.000) and social performance (β= -0.23, t=3.558, p = 0.000). This suggests that as a firm age, it becomes increasingly environmentally sensitive and can utilize green credits to implement green activities, thereby reducing its environmental footprint. The environmental performance depends on the orientation of the owner/manager (Allet, 2017), which evolves with time. This concurs with a previous study by Loderer and Waelchli (2010) which suggested a negative impact of age on performance. Nevertheless, the findings demonstrated that the influence of business age on the connection between green credit and innovativeness was both positive but statistically insignificant (β= 0.022, t=0.576, p = 0.564). This is in synch with previous study (Coad et al. (2016)) that a firm’s age does not significantly contribute to its innovative drive.

H5b: Business size moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

The findings showed a positive and significant moderating influence of business size on the relationship between green credit and both environmental (β= 0.12, t=2.448, p = 0.014) and social performance (β= 0.127, t=2.740, p = 0.006). This implies that larger MSMEs are more favourably positioned to implement green activities. Effective management of operational activities and implementation of rigorous internal controls enable MSMEs to scale up, leading to enhanced environmental and social performance performance. Large MSMEs possess the capacity to create revenue and manage their assets and liabilities (Mahrani & Soewarno, 2018; Mirza & Javed, 2013). This supports the findings of Younis and Sundarakani, 2020 which established a notable influence of a firm's size on its economic performance, environmental performance, and social performance. However, the findings indicated that the size of the business had a little and statistically negligible moderating effect on the connection between green credit and both financial performance (β = 0.094, t=1.344, p = 0.179) and innovativeness (β = 0.054, t=1.752, p = 0.08). This outcome is in contrast to past studies (Mahmood et al.,.2019, Petruzzelli et al., 2018), which found significant influence of firm age on financial performance and innovativeness.

6.9 Chapter Summary

In this chapter, the general perception of MSME operators about the services of MFIs was assessed through descriptive statistics. The study's hypotheses were tested using PLS-SEM. The p-values indicated that certain variables significantly explained the financial, social, and environmental performance and innovativeness of MSMEs, whereas others did not. The outcomes of the hypothesis tests were summarised according to the objectives of this study.

The following chapter, presents the summary of the study, together with a discussion of the conclusions and recommendations.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This study examined the perceived impact of green microfinance on the sustainability of micro, small, and medium enterprises (MSMEs) in Sunyani and Techiman Municipalities of Ghana. It aimed to investigate the perspectives of MSME owners/managers regarding the impact of green microfinance on the financial performance, environmental performance, social performance, and innovativeness of small firms. The hypotheses were formulated and subsequently tested based on the conceptual framework of the research.

This chapter provides a summary of the thesis as well as conclusions and recommendations based on the data that are in line with the objectives of the study. The chapter wraps up the research by identifying areas for potential future research.

7.1.2 Research questions

The study was guided by the following research questions:

i. What are the perceptions of entrepreneurs in Sunyani and Techiman Municipalities about green microfinance?
ii. To what extent does green microfinance impact financial performance of MSMEs in Sunyani and Techiman Municipalities, Ghana?
iii. What impact does green microfinance have on the social performance of MSMEs in Sunyani and Techiman Municipalities, Ghana?
iv. What impact does green microfinance have on environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana?
v. How does green microfinance impact innovation of MSMEs' operations in Sunyani and Techiman Municipalities, Ghana?
vi. How do business age and business size moderate the financial, social and environmental performance of MSMEs in Sunyani and Techiman Municipalities, Ghana.?

7.1.3 Study hypotheses

H1a: Green credit positively and significantly impacts MSMEs' financial performance

H1b: Green education positively and significantly impacts MSMEs' financial performance

H1c: Microsavings positively and significantly impact MSMEs' financial performance

H1d: Microinsurance positively and significantly impacts MSMEs' financial performance

H2a: Green credit positively and significantly impacts MSMEs' social performance

H2b: Green education positively and significantly impacts MSMEs' social performance

H2c: microsavings positively and significantly impact MSMEs' social performance

H2d: Microinsurance positively and significantly impacts MSMEs' social performance

H3a: Green credit positively and significantly impacts MSMEs' environmental performance

H3b: Green education positively and significantly impacts MSMEs' environmental performance

H3c: Microsavings positively and significantly impact MSMEs' environmental performance

H3d: Microinsurance positively and significantly impacts MSMEs' environmental performance

H4a: Green credit positively and significantly impacts MSMEs' innovativeness

H4b: Green education positively and significantly impacts MSMEs' innovativeness

H4c: Microsavings positively and significantly impact MSMEs' innovativeness

H4d: Microinsurance positively and significantly impacts MSMEs' innovativeness

H5a: Business age moderates the relationship between green credit and financial, social and environmental performance of MSMEs

H5b: Business size moderates the relationship between green credit and financial, social and environmental performance of MSMEs.

7.2 Summary of the research

The research investigated the perceived impact of green microfinance on the sustainability of MSMEs in the Sunyani and Techiman Municipalities in Ghana. The study assessed the perceptions of green microfinance among MSME owners/managers in Sunyani and Techiman. The research also examined the impact of green microfinance on the innovative practices of MSMEs in the specified study locations.

There were seven chapters in the thesis. The background information, the research problem, the research objectives, and the thesis structure were all provided in the first chapter, which also provided an overview of the study subject and its circumstances. MSMEs are known to be unaware of the extent of their impact on environmental challenges, despite the fact that they offer many benefits to growing economies. Again, it was observed that owners and managers of MSMEs are yet to appreciate the full benefits of the services of microfinance institutions in the sustainability of their businesses.

The education component of microfinance was found not to dwell more on environmental issues but mostly on the financial aspect. Therefore, it was proposed that the microfinance in-built education should focus more on environmental awareness to mitigate the carbon footprints of MSMEs. The research objectives outlined in the chapter were to examine the perception of entrepreneurs about green microfinance in the Sunyani and Techiman Municipalities; to examine how microfinance components affect MSMEs' sustainability and; lastly, to investigate the influence of green microfinance on MSMEs' innovative activities. The study's aims directly informed the research questions.

In Chapter Two, the theoretical framework and concepts underpinning the study were discussed. The microfinance theory and the triple bottom line framework were presented. According to the literature review chapter, the majority of studies employed the microfinance theory and the triple bottom model framework proposed by Yunus in the 1970s and Elkington (1994), respectively. Relying on the microfinance theory and the triple bottom line framework, the researcher built a conceptual model of green microfinance and sustainability of MSMEs and postulated hypotheses to test the acceptability of the model. The four exogenous variables: green credit, savings, microinsurance, and green education, and the endogenous variables: financial performance, environmental performance, social performance as well as innovativeness, in the model served as the foundation for the development of the research hypotheses, which addressed the study's purpose.

Chapter Three of the thesis provided a comprehensive review of extant literature on green microfinance, MSMEs and sustainability. In the literature it was revealed that despite the immense contribution of MSMEs to the advancement of emerging economies, most MSMEs' operations contribute to ecological issues such as species extinction, land degradation, deforestation, poor waste disposal and pollution This chapter on the literature that the researcher had reviewed also showed that green microfinance has become well-known recently in other emerging and developed countries but less emphasised in Sub-Saharan Africa, particularly Ghana. The literature assessment made clear that MSMEs contribute immensely in aggregation to ecological problems in emerging economies and that green microfinance is a viable means to reduce the environmental onslaught caused by MSMEs. The literature reviewed also highlighted the need for green microfinance to provide both financial and non-financial services simultaneously as they complement each other. For instance, provision of credit must be accompanied by education on financial management, environmental awareness creation, appropriate saving products to stimulate savings and microinsurance products to protect the client's business in case of any hazard or disaster. The literature review highlighted that microfinance elements influence environmental, financial and social performance of MSMEs. However, the reviewed literature indicates that the implementation of green activities depends on other factors such as the orientation of the entrepreneur, the perceived benefits to be derived, competition, legitimisation, and stakeholders' pressure.

The fourth chapter included a detailed description of the methodology employed in conducting the research. The study's discussion focused on addressing concerns regarding the validity and reliability of the test instruments in order to provide reliable and accurate results. The study utilised quantitative research methods to match with the positivist assumptions that underpin the research, in order to accomplish its aims. Data from 358 owners and managers of MSMEs from Sunyani and Techiman was collected using a survey questionnaire that consisted of closed-ended questions. Ethical considerations were also addressed in the methodology chapter to ensure that the research followed ethical principles. In pursuit of this objective, the researcher secured ethical clearance from the University of KwaZulu-Natal's Humanities and Social Sciences Research Ethics Committee with the corresponding reference number HSSREC/00004780/2022. An analysis was performed on the acquired data utilising SPSS and SmartPLS 4. For descriptive statistics, the Statistical Package for the Social Sciences was used, whereas SmartPLS 4 was utilised for structural equation modelling.

Chapter Five presented and explained the results of the data analysis. Initially, the internal consistency reliability of the test items was assessed through the utilisation of Cronbach alpha statistics; the results obtained were deemed satisfactory. To assess the reliability of the constructs, composite reliability was applied. The results indicated that the internal consistency reliability of all latent variables was satisfactory. The numerical data were explicated and presented in accordance with the quantitative research methodology that was implemented. This chapter showcased the results derived from descriptive and inferential statistics, with an especially strong focus on structural equation modelling (SEM). The procedure for structural equation modelling was executed in two phases, in adherence to the guidelines outlined in the literature that is presently available for publication. Initially, a measurement model was developed to provide an additional assessment of the constructs' validity and reliability. Following that, a structural model was applied to examine the hypotheses proposed for the study. In addition, path diagrams for the measurement and structural models of the SEM were provided, and the model fit indices were examined and explained in greater detail.

In Chapter Six, the researcher analysed the results reported in Chapter Five and compared them to existing literature and previous studies. This chapter examined the perceptions of MSME owners/managers in the Sunyani and Techiman Municipalities regarding green microfinance and its impact on the sustainability of MSMEs, in line with the research goals. A comprehensive analysis was conducted on the general perception towards green credit, microsavings, microinsurance, and green education.

The current research confirmed previous findings by indicating that the elements of green microfinance positively impact the overall sustainability of MSMEs in the Sunyani and Techiman Municipalities. Furthermore, 92.8% of MSMEs owners/managers who participated in the study were satisfied with the overall services of the microfinance institutions. This result supported the proposed research hypothesis that green microfinance has a favourable and significant impact on MSMEs' overall sustainability.

The study supported the hypothesis that environmental performance and innovativeness are significantly influenced by green credit; however, it rejected the proposition that financial performance and social performance are significantly influenced by green credit. The study revealed that green education significantly influences environmental performance, financial performance and innovativeness but did not support the proposition that green education significantly affects social performance. The study confirmed the hypothesis that microinsurance significantly influences financial performance. The study further established that saving significantly influences environmental, financial and social performance. Overall, the research established that business age and size have a significant but moderated influence on sustainability.

The researcher has summarised the previous chapters of the thesis in this seventh chapter, emphasising how much the empirical findings have addressed the study questions and, consequently, the aims. The research's major findings have been emphasised in this chapter, from which conclusions are drawn. Based on these conclusions and the study's limitations, recommendations and future study directions are put forth next.

7.3 Conclusion

Though MSMEs play a major role in the development of the economy, their activities continue to cause environmental problems. These environmental problems threaten the sustainability of MSMEs, the health of the communities and the general well-being of individuals. The less attention given to the environment by MSMEs could be as a result of non-alignment of environmental concerns with the credit policies of most MFIs, MSMEs owner/manager orientation, inadequate environmental awareness creation, and lack of enforcement of environmental regulations.

The study examined the perceived influence of green microfinance on the sustainability of MSMEs in the municipalities of Sunyani and Techiman. Green microfinance factors that were analysed included green credit, microsavings, microinsurance and green education.

The study's findings lead to the following conclusions:

The study revealed that most of the MSMEs surveyed believed that green credit had a positive impact on their firms' operational activities. The results show that the majority of those who perceived green credit to have considerable improvement on their operational performance indicated that green credit did not result in higher financial performance. On the other hand, the outcomes showed that green credit significantly affects environmental performance.

Additionally, the results revealed that Business Size moderates the relationship between Green Credit and Environmental Performance. Business Size further moderates the relationship between Green Credit and Social Performance. On the other hand, the results revealed that Business Age moderates the relationship between Green Credit and Environmental Performance and the relationship between Green Credit and Social Performance. From the results, fewer respondents (33.7%) did not perceive green credit to favourably impact on their operational performance.

Green education exerted the most significant influence on MSMEs' financial, social and environmental performance as well as innovativeness. Green education was perceived by MSME owners/managers to contribute significantly to the financial, social and environmental performance of their firms. Green education was also perceived as a driver for innovation. However, the majority of respondents (68.4%) were found to not be satisfied with the level of green education provided by the MFIs. This could be that a greater number of MFIs focus more on the education aspects that enhance the loan repayment capacity of the MSMEs than on the environment. From the results, a paltry 27.2% of the respondents were satisfied with environmental education offered by MFIs. The effect of green education on small business owners' perceptions of their capacity to go green is explained, and it may be related to elements like business owners' orientation, perceived economic benefits, stakeholder pressure, legislation and demand for eco-friendly products.

In terms of microsavings, the study found that the majority of the respondents (68.4%) perceived microsavings to have a favourable impact on their firms' operational activities. The study revealed microsavings as significantly influencing financial performance. This could be that the MFIs have microsavings products that suit the circumstances of the various MSMEs.

The study revealed that green microfinance elements (green credit, green education, microsavings and microinsurance) play a vital role in MSMEs' sustainability. Green microfinance is perceived to have the potential to reduce the environmental problems caused by MSMEs. Environmental problems would be reduced when green microfinance is backed by legislation. More MSMEs will be able to sustainably create jobs as a result of improved green microfinance, and higher productivity will raise government revenue, allowing it to invest more in infrastructure to support economic growth and development.

Again, green microfinance reduces environmental degradation and pollution which have health implications for the populace and consequently lessening government's expenditure on the

National Health Insurance Scheme (NHIS). Green microfinance incentivises entrepreneurs to devise innovative processes and practices to produce eco-friendly products.

7.4 Recommendations

Drawing from the study's results, the researcher recommends the following:

The study revealed that green credit positively and significantly influences environmental performance of MSMEs. Also, the study confirmed that green credit enhances the innovativeness of MSMEs. Hence, microfinance institutions should allocate financial resources to provide more green credit to MSMEs to mitigate the environmental problems they caused and to spur the production of innovative eco-friendly products.

The government should create a dedicated green fund that microfinance institutions can access at a favourable interest rate to then lend to MSMEs for green activities.

In order to promote the adoption of environmentally friendly practices among MSMEs, government initiatives such as the National Entrepreneurship and Innovation Programme (NEIP) and GEA SME grant, which offer financial assistance to selected entrepreneurs, should include a thorough evaluation of their environmental impact as a prerequisite for qualification. This will inspire entrepreneurs to devise inventive methods to mitigate the environmental impact of their activity. Furthermore, it is essential to conduct regular monitoring following the distribution of the money to verify that it is being utilised for the intended purpose.

Moreover, the study confirmed that green education significantly enhances environmental performance, financial performance and innovativeness of MSMEs. Therefore, MFIs have a vested interest in encouraging MSMEs to adopt environmentally friendly practices, since this would decrease the credit risk associated with the management of environmental risks by MSMEs. MFIs should have trained officers to monitor clients' activities after loan disbursement to ascertain that green activities are carried out. The contention posited here is that environmental hazards have the potential to diminish the financial stability of MSMEs. The depletion of natural resources may render a business unsustainable, leading to potential reputational issues and adverse impacts on its operations. Failure to comply with environmental standards could result in the imposition of fines, while pollution may give rise to health problems. To mitigate the credit risk for the MFI, it is crucial for them to effectively manage the environmental risks associated with their clients.

Thus, microfinance institutions, particularly rural and community banks and credit unions should improve the educational aspect of their services focusing more on environmental awareness creation. Green education should be provided by trained microfinance practitioners, universities, other professional bodies, and by facilitating the identification of solutions to various challenges, the active promotion of environmental consciousness is likely to enhance the impression of its use.

In order to increase MSMEs' awareness of the need to be environmentally conscious, this study also suggests that the Environmental Protection Agency (EPA), National Commission for Civic Education (NCCE), Ministry of Fisheries and Water Resources, and Ministry of Health (MoH) offer training and environmental education campaign programmes. To reach a wider audience and get more acceptability, these institutions should form partnerships with MSMEs, the local community, the media, and opinion leaders in their environmental education campaign.

Moreover, the Bank of Ghana should expand its Environmental and Social Risk Management (ESRM) policy framework for green financing to give considerable attention to microfinance institutions. This is because a policy directive or legislation issued by the Central Bank or the government to require MFIs to adhere to environmental sustainability is very important, as the enforcement of policies or legislation on environmental sustainability will motivate MFIs to incorporate environmental concerns in their operational guidelines.

Furthermore, the study established that microinsurance significantly influences financial performance. Therefore, MSMEs should be encouraged and motivated to purchase microinsurance to cover their assets and the health of their workforce. Microfinance institutions should liaise with microinsurance companies to develop tailor-made products for small businesses with flexible premium payments to suit the entrepreneurs' financial capabilities.

Finally, the study also established that microsavings enhance the financial performance of MSMEs. Therefore, rural and community banks and credit unions should develop safe and secured saving products to boost the confidence of small business owners to save, especially where field officers are sent to clients to mobilise savings. Rural and community banks and credit unions should continue to develop appropriate saving products to encourage more MSMEs to save as it will increase the confidence of MFI clients to save more. This will lead to increased savings mobilisation for the Central Bank and reduce the informal savings mechanism employed by some MSMEs owners.

7.5 Contribution to knowledge

The academic literature acknowledges the positive impact of microfinance institutions on job generation, economic growth, and poverty alleviation (Adaletey et al., 2022). However, the field of green microfinance lacks sufficient empirical studies (Huybrechs et al., 2019; Allet & Hudon, 2015). As there is limited evidence on the impact of green microfinance on the sustainability of MSMEs in Ghana, a major contribution of this study is its provision of findings on the ability of microfinance institutions to influence MSMEs in Ghana to implement green activities. The present research undertaking possesses the capacity to provide a significant contribution to the current corpus of empirical literature pertaining to green microfinance.

It is noted in microfinance literature that the effect of green microfinance differs in different countries (García-Pérez et al., 2020). This study is therefore unique to empirically provide new knowledge about the perceptions of MSMEs in Ghana regarding the capacity of MFIs to influence them to implement green activities. Prior studies (Huybrechs et al., 2019; Allet & Hudon, 2015) focus mostly on green credit but the current study expanded the horizon to include other elements of green microfinance (microsavings, microinsurance and green education) concurrently to obtain comprehensive knowledge about MFIs' influence on MSMEs to adopt sustainable practices. The study showed that the majority of MSMEs agree that microfinance credit helps to boost their businesses to reduce their environmental footprints. The study established that microsavings and microinsurance facilities provided by MFIs are perceived to be contributing positively to MSMEs.

The study revealed that green education is the most dominant element of green microfinance as its effect is permeative. It was found that green education has a significant influence on financial performance, environmental performance and innovativeness. This new knowledge of green education means that environmental awareness needs to be taken seriously when formulating policy on MSMEs' sustainability. This confirms the fact that addressing only the credit needs of MSMEs cannot ensure their long-term survival because credit is not always the answer to their problems (CGAP, 2004) and this calls for education as a key element of the microfinance concept.

Furthermore, this thesis is one of the limited numbers of empirical studies that have established that microfinance has a significant effect on the environmental performance of MSMEs. As a result, the study would equip policymakers with knowledge and insight about the strategic role of microfinance institutions in the fight against environmental problems. The study's findings are expected to assist policymakers in incorporating the overall environmental impact of MSMEs' activities into their policy development. The implementation of such laws would provide benefits not just for the nation as a whole, but also for MSMEs, as it would strengthen their sustainability by mitigating self-imposed risk factors. MFIs would equally benefit from such policies since the credit extended to MSMEs would be invested in sustainable businesses, thereby reducing loan defaults.

The analysis of data in this study was conducted using partial least square structural equation modelling (PLS-SEM). Few empirical studies in Ghana use PLS-SEM, despite the fact that it is gaining a lot of attention as an emerging second-generation approach to testing research hypotheses, especially in the social sciences. This study makes an additional contribution as it utilised PLS-SEM to examine the relationships between green microfinance elements and sustainability dimensions of MSMEs in Ghana.

7.6 Limitations of the study

First, the scope of the research is restricted by the region and the kind of MFI clients involved. The respondents are clients of a small number of MFIs, including credit unions and rural and community banks. Moreover, the research solely includes MSMEs from the Sunyani and Techiman Municipalities. Thus, the findings might be limited to the MSMEs under investigation. Because of this, there may be concerns about the sample's representativeness of all MSMEs in Ghana. But the researcher is confident that the study's findings will accurately depict the perceived effect of green microfinance on the sustainability of MSMEs in Ghana since the MSMEs that serve as clients of rural and community banks in Sunyani and Techiman share many traits with the majority of other MFI clients in Ghana, making them a true representation of MFI clients in Ghana.

Due to budgetary and scheduling limitations, the bulk of MSMEs in Sunyani and Techiman were not included in the survey. The effort was restricted to 358 MSMEs due to limited money and other resources. The researcher was unable to collect every questionnaire that was provided due to time constraints. Despite all efforts to get the questionnaires, 332 of the 358 that were distributed were retrieved because some respondents were unable to complete them within the designated time frame for data collection.

The respondents' perceptions were the basis for the research design of the study. Because they have reservations about academic research, some MSMEs owners/managers are unwilling to provide investigators with the data required for an unbiased measurement. As a result, the data might not be entirely accurate and might not accurately represent the situation as it is in the field.

7.7 Suggestions for future research

First, more investigation may be needed to ascertain whether the results of this study hold true for various microfinance organisations. The results of this study will be better understood in light of more research into other microfinance organisations, as this study primarily focused on rural and community banks and credit unions. Samples from other MFI clients ought to be used in later investigations

Furthermore, it is imperative to do additional research in other regions of Ghana in order to verify whether the findings of this study can be applied to the entire nation. This research can also be conducted, for comparison purposes, in other regions of Africa.

Despite the fact that the study discovered a connection between the variables examined and the sustainability of MSMEs, the model was never able to provide a 100% prediction. This indicates that other variables exist that are just as significant but were not taken into account in this study. It will be beneficial to do more research to examine additional variables that were not covered in this study.

Further research could investigate the perceived impact of green microfinance on the sustainability of MSMEs by introducing other moderating variables such as educational level and gender of MSME owners/managers in the regression model.

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APPENDICES

APPENDIX 1 – THESIS TITLE AMENDMENT APPROVAL LETTER

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

25 October 2024

Daniel Berko (221038170)
School of Acc Economics & Fin
Pietermaritzburg Campus

Dear D Berko,

Protocol reference number: HSSREC/00004780/2022
Project title: The perceived impact of green microfinance on sustainability of micro, small and medium enterprises in Ghana
Amended title: The perceived impact of green microfinance on the sustainability of micro, small, and medium-sized enterprises in Ghana
Degree: PhD

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 25 October 2024 has now been approved as follows:

- Change in title

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Best wishes for the successful completion of your research protocol.

Yours faithfully

[redacted]

....

Professor Dipane Hlalele (Chair)

/nng

Humanities & Social Sciences Research Ethics Committee
UKZN Research Ethics Office Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Tel: +27 31 260 8350 / 4557 / 3587
Website: http://research.ukzn.ac.za/Research-Ethics/

APPENDIX 2 – INFORMED CONSENT

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF ACCOUNTING, ECONOMICS and FINANCE

Dear Respondent,

PhD Thesis in Finance
Researcher: MR Daniel Berko (024 244210056)
Supervisor: PROF Rajendra Rajaram (033 260 6267)
Research Office: MS Mariette Snyman (031 260 8350)

I, **Daniel Berko**, am a PhD of Finance student at the School of Accounting, Economics and Finance at the University KwaZulu-Natal, South Africa. I would like to invite you to participate in a research project entitled: "**THE PERCEIVED IMPACT OF GREEN MICROFINANCE ON THE SUSTAINABILITY OF MICRO, SMALL AND MEDIUM ENTERPRISES IN GHANA".** The purpose of this study is to assess the impact of microfinance on financial, social and environmental sustainability of micro, small, and medium enterprises in Ghana.

Your participation will enable me to understand the role microfinance plays in financial, social and environmental performance of micro, small, and medium enterprises in Ghana. The research findings are meant to help lessen Ghana's multiple environmental issues and increase the resilience of the country's micro, small, and medium-sized businesses.

Your participation in the survey is completely voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequences. There will be no monetary gain from participating in the survey. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Accounting, Economics, and Finance.

If you have any questions or concerns about completing the questionnaire or about participating in this research project, you may contact me or my supervisor at the numbers listed above.

The survey should take you about 15 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Investigator's signature____________________________________ Date_________________

This page is to be retained by participant

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF ACCOUNTING, ECONOMICS and FINANCE

PhD Thesis in Finance
Researcher: Daniel Berko (024 244210056)
Supervisor: Professor Rajendra Rajaram (033 260 6267)
Research Office: Ms Mariette Snyman (031 260 8350)

<u>CONSENT</u>

I ……………………………………………………………………………….(full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project**.**

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT DATE

………………………………………………………………………………………………

This page is to be retained by participant

APPENDIX 3 – QUESTIONNAIRE

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF ACCOUNTING, ECONOMICS AND FINANCE
COLLEGE OF LAW AND MANAGEMENT

QUESTIONNAIRE

I am a Ph.D. student in finance at the School of Accounting, Economics, and Finance, University KwaZulu-Natal, South Africa. As part of the requirements for the award of Ph.D. in Finance, I am undertaking research on **"The perceived impact of green microfinance on the sustainability of micro, small, and medium enterprises in Ghana".** In this regard, I kindly ask for your cooperation in this matter, so please set aside some time to answer the attached questionnaire.

Your opinions are extremely important to the research. Every information you provide will be kept completely confidential. We value every piece of information we gather, and all will be treated as anonymous. Please take a few minutes to complete this questionnaire by checking the applicable boxes (√). Please feel free to contact me with any queries at daniel.berko@uenr.edu.gh or 221038170@stu.ukzn.ac.za. Alternatively, you can reach the researcher at +233244210056.

SECTION A:
BIOGRAPHICAL DATA
Please, select the appropriate response by ticking the box that corresponds to you.

1. Gender: Male [ ] 01 Female [ ] 02 I prefer not to say [ ] 03
2. Age: 18 – 25 years [ ] 01 26 – 35 years [ ] 02 36 – 45 years [ ] 03 46 – 60 years [ ] 04 More than 60 years [ ] 05
3. Education: Basic education [ ] 01 Secondary education [ ] 02 Diploma 03 [ ] Degree [ ] 04 any other specify……………………………………

SECTION B: BUSINESS CHARACTERISTICS

4. Type of Business: Agriculture [ ] 01 Service [ ]02 Manufacturing [ ]03 Construction [ ] 04 Small scale mining[ ]05 Sand winning [ ] 06 any other specify…………………
5. Is your business legally registered? Yes [ ] 01 No [ ] 02
6. Which of the following best describes the form of ownership of your business? Sole proprietorship [ ] 01 Limited liability company [ ] 02 Partnership [ ] 03
   [ ] 04 Other, specify ----------------------------
7. Monthly Sales: Less than GHS10,000 [ ] 01 GHS10,000 to less than GHS15,000 [ ] 02 GHS15,000 to less than GHS20,000 [ ] 03 Greater than GHS20,000 [ ] 04
8. Monthly expenses Less than GHS5,000 [ ] 01 GHS5,000 to less than GHS10,000 [ ] 02 GHS10,000 to less than GHS15,000 [ ] 03 Greater than GHS15,000 [ ] 04 any other, specify……………………..
9. What is the number of your employees? 1- 5 [ ] 01 6-30 [ ] 02 31-100 [ ] 03 Greater than 100 [ ] 04
10. How old is your business? Less than 3 years [ ] 01 3-10 years [ ] 02 11- 15 years [ ] 03 Over 15 years [ ] 04
11. How much was your recent loan for environmentally friendly activities? Less than GHS20,000 [ ] 01 GHS20,000 to less than GHS40,000 [ ] 02 GHS40,000 to less than GHS80,000 [ ] 03 Greater than GHS80,000 [ ] 04

SECTION C: PATRONAGE OF MICROFINANCE SERVICES

Please check the boxes that relate to you.

12. Have you ever been denied credit from Microfinance Institutions? Yes 01 [ ] No 02 [ ]
13. If yes, what was the reason for the denial? Insufficient savings [ ] 01 Lack of collateral [ ] 02 Lack of guarantor [ ] 03 Business is insolvent [ ] 04 Any other specify [ ] 05 …………
14. Has any microfinance institution reduced the amount of loan you applied for? Yes 01 [ ] No 02 [ ]
15. If yes, what were the reasons for the reduction? Small savings [ ] 01 Loan requested was too high [ ] 02 Lack of collateral [ ] 03 Lack of guarantor [ ] 03
    Any other specify [ ] 04 ……………………………………………………

16. Apart from credit, which of the following services does your microfinance institution provide to your business? Savings [ ] 01 Education [ ] 02 Insurance [ ] 03 Remittances [ ] 04 Other specify [ ] 05 ……………………………..

SECTION D: Impression on Green Microfinance features

Please use the following scale to indicate how much you agree or disagree with the following statements by checking the appropriate box.

1.Strongly Disagree (SD), 2. Disagree (D), 3. Uncertain (U) 4. Agree (A), 5. Strongly Agree (SA)

Green Microfinance

S/N	Statement	1	2	3	4	5
1	Microfinance green credit helps to improve my business operations					
2	Microfinance education gives me more information about the environment					
3	Microfinance makes my operations environmentally friendly					
4	My microfinance institution helps me to be more innovative					
5	I am able to save as a result of doing business with my microfinance institution					
6	Microinsurance services provided by my microfinance institution help sustain my business					
7	I will recommend my microfinance institution to other MSMEs owners/managers					

Green Credit

S/N	Statement	1	2	3	4	5
1	The loan amount received is sufficient to meet our enterprise's environmentally friendly activities.					
2	The rate of interest on loans offered by the MFIs for environmentally friendly activities improves the financial performance of my business.					
3	The loan is to help mitigate the effect of my operations on the environment					
4	The effect of my activities on the environment is assessed before the MFI grants me a loan					
5	The loan is linked to environmentally friendly products and/or practices					
6	The loan has expanded our business					
7	The loan has collapsed our business					

Green Education

S/N	**Statement**	1	2	3	4	5
1	Education by the MFI creates the awareness and accessibility of loan for environmentally friendly products/practices					
2	Education provides enough information about environmentally minded microfinance					
3	I attend training on environmental issues anytime there is opportunity					

4	The providers of loans for environmentally friendly products/practices organize training/workshop on environmental risks for us					
5	I organize training for my employees on environmental issues					
6	Education on environmental issues gives me more knowledge on the environment					

Microinsurance

S/N	Statement	1	2	3	4	5
1	Insurance protects my properties.					
2	I shall always have insurance cover for every asset I acquire					
3	I have microinsurance policy to cover my assets against environmental risks					
4	The premium I pay on insurance is reasonable					
5	I believe insurance policy is good					

Savings

S/N	Statement	1	2	3	4	5
1	I am able to make savings from my environmentally friendly operations/products					
2	My savings continuous to increase					

3	My cash savings result from my environmentally friendly operations					
4	My microfinance provider has enabled me to build up more savings for my business.					
5	I expect to make more savings					
6	My saving is enhancing my business					

SECTION E: **Impact of green microfinance on financial performance of Micro, Small and Medium Enterprises**

Please use the following scale to indicate how much you agree or disagree with the following statements by checking the appropriate box.

1.Strongly Disagree (SD), 2. Disagree (D), 3. Uncertain (U) 4. Agree (A), 5. Strongly Agree (SA)

S/N	Statement	1	2	3	4	5
1	The amount of my business capital has increased as a result of using MFIs' products.					
2	The amount realized by my business for net profits has increased as a result of using MFIs' products					
3	The use of microfinance products is the only way to improve the financial performance of the business					
4	The sales volume of my business has Increased as a result of using MFIs' products					
5	My business assets have Increased as a result of using MFIs' products.					

SECTION F: **Impact of green microfinance on environmental performance of Micro, Small and Medium Enterprises**

S/N	Statement	1	2	3	4	5
1	My firm recycles the waste it generates					
2	I employ environmentally friendly technology/practices in my operations to reduce pollution					
3	I have devised cleaner processes in my activities					
4	I have acquired energy efficient equipment					
5	I spend lesser amount on electricity now					
6	I plan my waste disposal very well					
7	I do waste separation					
8	I do waste recycle					

SECTION G: Impact of green microfinance on social performance of Micro, Small and Medium Enterprises

S/N	Statement	1	2	3	4	5
1	My firm identifies and prioritizes key human resource issues and problems as a result of MFI product					
2	My employees now receive more regular training/workshop as a result of using MFIs' products					

3	My employees are more content with their conditions of service as a result of using MFIs' products					
4	My customers’ expectations are usually met as a result of using MFI products					
5	I address my customers concerns on time as a result of MFI product					
6	I do donate to the community as a result of using MFI product					
7	I have provided education/health/electricity/water facility to the community as a result of using MFI products					

SECTION H: Impact of green microfinance on innovativeness of Micro, Small and Medium Enterprises

S/N	Statement	1	2	3	4	5
1	We now have a new way of selling our products					
2	We have made changes to our services					
3	We have device a new method for our operation					
4	Our products/services have been extended to a new market					
5	We have added a new type of customers					

Thank you very much for your time

APPENDIX 4 – GATE KEEPERS LETTER 1

Post Office Box717
Sunyani

September 30,2022

The Chapter-Manager
Ghana Co-operative Credit Unions Association
Sunyani.Branch
Abesim-Sunyani
Ghana

Dear Sir,

A REQUEST FOR PERMISSION TO CONDUCT RESEARCH ON THE CLIENTS OF CREDIT UNIONS IN THE BONO AND BONO EAST REGIONS

I am Daniel Berko, a Doctor of Philosophy (PhD}student in the School of Accounting, Economics and Finance of University of KwaZulu-Natal, Pietermaritzburg in South Africa. The. title of my research project is "The perceived impact of green micro-finance on the sustainability of micro, small and medium enterprises in Ghana" for my PhD degree. The purpose of the research is to investigate the perceived impact of micro-finance on financial, social and environmental performance of micro small, and medium enterprises in Ghana. Data will be collected through the distribution of questionnaires to clients of ·credit unions in the two regions to solicit their· views on how microfinance contribute to financial, social and environmental performance of their businesses.

I hereby seek your permission to conduct this research on the clients of credit unions in the Bono and Bono East Regions. I promise that the data gathered will be used solely for the purpose of the research. For further information with respect to this research you may contact me on the above-stated address or my supervisor, Professor Rajendra Rajaram (Rajaramr@ukzn.ac.za) who can be located at the School of Accounting, Economics and Finance, Pietermaritzburg Campus of University of Kwazulu-Natal, South Africa.

You may also contact the Research Office through:

Mariette Synman

HSSREC Research Office;
Tel: +27 312608350
E-mail: HssrecLms(@ukzn.ac.za

Your co-operation will be very much appreciated.

Yours faithfully,

[redacted]

Daniel Berko

Should you give me permission to conduct this research on the clients of credit unions in the afore-mentioned regions, please complete the following declaration:

I Gilbert Bene Pewudie the Chapter Manager of Ghana Co-operative Credit Unions Association, Brong Ahafo Chapter, Sunyani, hereby grant permission to Daniel Berko to conduct research on clients of credit unions in Bono, Bono East and Ahafo Regions, Ghana. I understand that he will generate data through the use of questionnaires.

Gilbert Bene Pewudie

Name of Manager

[redacted]

Signature and Stamp

REG. MANAGER
0 6 OCT 2022
BOX 320 SUNYANI B/A

APPENDIX 5 – GATE KEEPERS LETTER 2

Post Office Box717
Sunyani

September 30,2022

The President
Association of Rural Banks
Brong Ahafo
Chapter
Sunyani.

Dear Sir,

A REQUEST FOR PERMISSION TO CONDUCT RESEARCH ON RURAL AND COMMUNITY BANKS CLIENTS IN THE BONO AND BONO EAST REGIONS

I am Daniel Berko, a Doctor of Philosophy (PhD}student in the School of Accounting, Economics and Finance of University of KwaZulu-Natal, Pietermaritzburg in South Africa. The. title of my research project is "The perceived impact of green micro-finance on the sustainability of micro, small and medium enterprises in Ghana" for my PhD degree. The purpose of the research is to investigate the perceived impact of micro-finance on financial, social and environmental performance of micro, small, and medium enterprises in Ghana. Data will be collected through the distribution of questionnaires to clients of rural and community banks in the two regions to solicit their· views on how microfinance contribute to financial, social and environmental performance of their businesses.

I hereby seek your permission to conduct this research on the clients of credit unions in the Bono and Bono East Regions. I promise that the data gathered will be used solely for the purpose of the research. For further information with respect to this research you may contact me on the above-stated address or my supervisor, Professor Rajendra Rajaram (Rajaramr@ukzn.ac.za) who can be located at the School of Accounting, Economics and Finance, Pietermaritzburg Campus of University of Kwazulu-Natal, South Africa.

You may also contact the Research Office through:

Mariette Synman

HSSREC Research Office;
Tel: +27 312608350
E-mail: HssrecLms(@ukzn.ac.za

Your co-operation will be very much appreciated.

Yours faithfully,
[redacted]
Daniel Berko

Should you give me permission to conduct this research on the clients of rural and community banks in the afore-mentioned regions, please complete the following declaration:

I Isaac Owusu Gyamfi the President of Association of Rural

Banks (ARB), Brong Ahafo Chapter, Sunyani, hereby grant permission to Mr. Daniel Berko

to conduct research on clients of rural and community banks in Bono, Bono East and Ahafo Regions, Ghana. I understand that he will generate data through the use of questionnaires.

Isaac Owusu Gyamfi

Name of President

[redacted]

Signature and Stamp

PRESIDENT
ASSOCIATION OF RURAL BANKS
BRONG AHAFO CHAPTER
P. O. BOX 1458
SUNYANI

APPENDIX 6 – THESIS PROPOSAL APPROVAL LETTER

UNIVERSITY OF KWAZULU-NATAL

College : **Law & Management Studies**
School : **Accounting, Economics & Finance**
Committee : **Higher Degrees and Research**
Date of the letter : **6 July 2022**
Student Name : Daniel Berko
Student No 221038170
Registered Qualification: **PhD - Finance**
Title of the study : The Impact of Green Microfinance on sustainability of MSMEs in Ghana

Dear Daniel

This letter serves to inform you that your proposal, as presented on the 1 July 2022 has been approved by the School's Higher Degrees Research Proposal Review Committee. You can follow any comments on the proposal for improvement by following this link
https://ukzn.zoom.us/rec/share/LU4dL1dsZ2zEP-aKcLujbOysaWVnNlGdUnYKEVUadn2zV9llEGiKE0ShGpXiLUYP.VQkshXIANHtZsZg0?startTime=1656656982000
Passcode: BYp@Ng!3

Please note the following information in order to progress smoothly towards your qualification:

1) You are registered on a *full-time basis*, and your first registration was in semester 1 of 2021. You have been registered for 3 semesters to date. You have only 5 semesters remaining to complete studies.
2) You are required to apply for ethical clearance immediately online after receiving this letter by following instructions at https://ics.ukzn.ac.za/rig-online-help-1/ and follow up with the help desk at RIGEthicsHelp@ukzn.ac.za should you have any queries.
3) You must submit an "Intention to submit form" 3 months before your intended date of submission.
4) You must submit your thesis for examination electronically on the date indicated on the "intention to submit form". Failing to submit your dissertation for examination within the remaining semesters will result in your academic exclusion from the University (See rule DR7).

A copy of this letter will be placed in your student file.

Yours sincerely

School of Accounting, Economics and Finance
Postal Address: Private Bag X01, Scottsville.3209

Telephone: +27 (0) 3 260-6486 Facsimile: 0865613412 E-mail: singhju@ukzn.ac.za

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg **Westville**

[redacted]

Dr. Mishelle Doorasamy
(On Behalf of the Committee Chair)

CC: Professor Josue Mbonigaba
CC: Professor Rajendra Rajaram
CC: Ms Seshni Naidoo

School of Accounting, Economics and Finance
Postal Address: Private Bag X01, Scottsville.3209

Telephone: +27 (0) 3 260-6486 Facsimile: 0865613412 E-mail: singhju@ukzn.ac.za

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

CC:

CC: Mrs. Mishelle Doorasamy(supervisor)
CC: Ms. Seshni Naidoo
CC: Dr Akinola Wilfred (supervisor)
CC: Dr Odunayo M Olarewaju

School of Accounting, Economics and Finance
Postal Address: Private Bag X01, Scottsville.3209

Telephone: +27 (0) 3 260-6486 Facsimile: 0865613412 E-mail: singhju@ukzn.ac.za

APPENDIX 7 – PROOF OF EDITING

JEANNE ENSLIN

FREELANCE LANGUAGE PRACTITIONER

Editing certificate

TO WHOM IT MAY CONCERN

Language editing

I, Jeanne Enslin, acknowledge that I did the language editing of **Daniel Berko's** thesis submitted in fulfilment of the requirements for the degree Doctor of Philosophy in Finance at the University of KwaZulu-Natal.

The title of the thesis is:

THE PERCEIVED IMPACT OF GREEN MICROFINANCE ON THE SUSTAINABILITY OF SMALL, MICRO, AND MEDIUM-SCALED ENTERPRISES IN GHANA

All corrections and changes are evident in the version of the thesis in track changes and with several comments for the student's attention.
The quality of the final document, in terms of language, formatting and references remains the student's responsibility.

[redacted]

Technical editing

I, Ronel Gallie, acknowledge that I did the technical editing, checked/corrected all in-text references and the reference list, as well as did cross-referencing thereof, of **Daniel Berko's** thesis submitted in fulfilment of the requirements for the degree Doctor of Philosophy in Finance at the University of KwaZulu-Natal. Detailed feedback has been provided.

[redacted]

[redacted]

J H Enslin BA (US); STD (US); Hons Translation Studies (UNISA)

APPENDIX 8 – ETHICAL APPROVAL NOTIFICATION

UNIVERSITY OF KWAZULU-NATAL™
INYUVESI YAKWAZULU-NATALI

23 January 2023

Daniel Berko (221038170)
School of Accounting, Economics & Finance
Pietermaritzburg Campus

Dear D Berko,

Protocol reference number: HSSREC/00004780/2022
Project title: The perceived impact of green microfinance on sustainability of micro, small and medium enterprises in Ghana
Degree: PhD

Approval Notification – Expedited Application

This letter serves to notify you that your application received on 15 September 2022 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

<u>This approval is valid until 23 January 2024.</u>
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Health Research Ethics Council (REC-040414-040).

Yours sincerely,

[redacted]

Professor Dipane Hlalele (Chair)

/ms

Humanities and Social Sciences Research Ethics Committee
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 8350/4557/3587 **Email:** hssrec@ukzn.ac.za **Website:** http://research.ukzn.ac.za/Research-Ethics

Founding Campuses: Edgewood · Howard College · Medical School · Pietermaritzburg · Westville

INSPIRING GREATNESS