HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

GREEN FINANCE FOR INCLUSIVE SUSTAINABLE GROWTH IN ETHIOPIA:

EXPLORING THE POTENTIAL OPPORTUNITIES AND CHALLENGES

DOI: 10.54598/006610

The Thesis of a Doctoral (PhD) dissertation

BY: **GOSHU DESALEGN DERESA**

Gödöllő

2025

Hungarian University of Agriculture and Life Sciences

Name of Doctoral School: Doctoral School of Economic and Regional Sciences

Discipline: Accounting and Finance

Head of Doctoral School: Prof. Dr. Zoltán Bujdosó
Full professor,
MATE, Institute of Rural Development and Sustainable Economy

Supervisor(s):

Professor, Dr. Anita Boros

Institute of Agricultural and Food Economics, MATE.

Szent Istvan Campus, Godollo,

Professor, Dr. Anita Tangl

John von Neumann University Doctoral School of Management and Business Administration, Budapest

....

Approval of the head of the school

....

Approval of supervisor(s).

……

Approval of supervisor(s).

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1. INTRODUCTION

1.1. RATIONALE AND MOTIVATION FOR THE STUDY

The global population has experienced unprecedented growth in recent decades, placing immense pressure on key sectors, including food, water, healthcare, and housing. This population flow has exacerbated resource consumption, leading to the overexploitation of natural resources, environmental degradation, and heightened risks from climate change. As a result, the need for sustainable growth strategies has become more urgent, with a focus on achieving economic development while ensuring environmental preservation. In response to these challenges, the concept of sustainable growth has gained significant attention, with green finance emerging as a pivotal tool to promote investments that support environmental sustainability and inclusive development.

Sustainable growth, particularly in low-income countries like Ethiopia, is vital for achieving long-term prosperity while mitigating environmental harm. The Ethiopian government has recognized the importance of sustainable growth through initiatives such as the Climate Resilient Green Economy (CRGE) Strategy, implemented in 2010. However, while these efforts are commendable, they have faced considerable financial challenges. The limited availability of green finance, coupled with the lack of a clear financial breakdown and institutional framework, has hindered Ethiopia's progress toward achieving its sustainable development goals. Despite international support and efforts to implement green finance mechanisms, the gap in funding remains substantial, and the impact of global challenges, such as the COVID-19 pandemic and geopolitical instability, has further stressed Ethiopia's ability to meet its green growth targets.

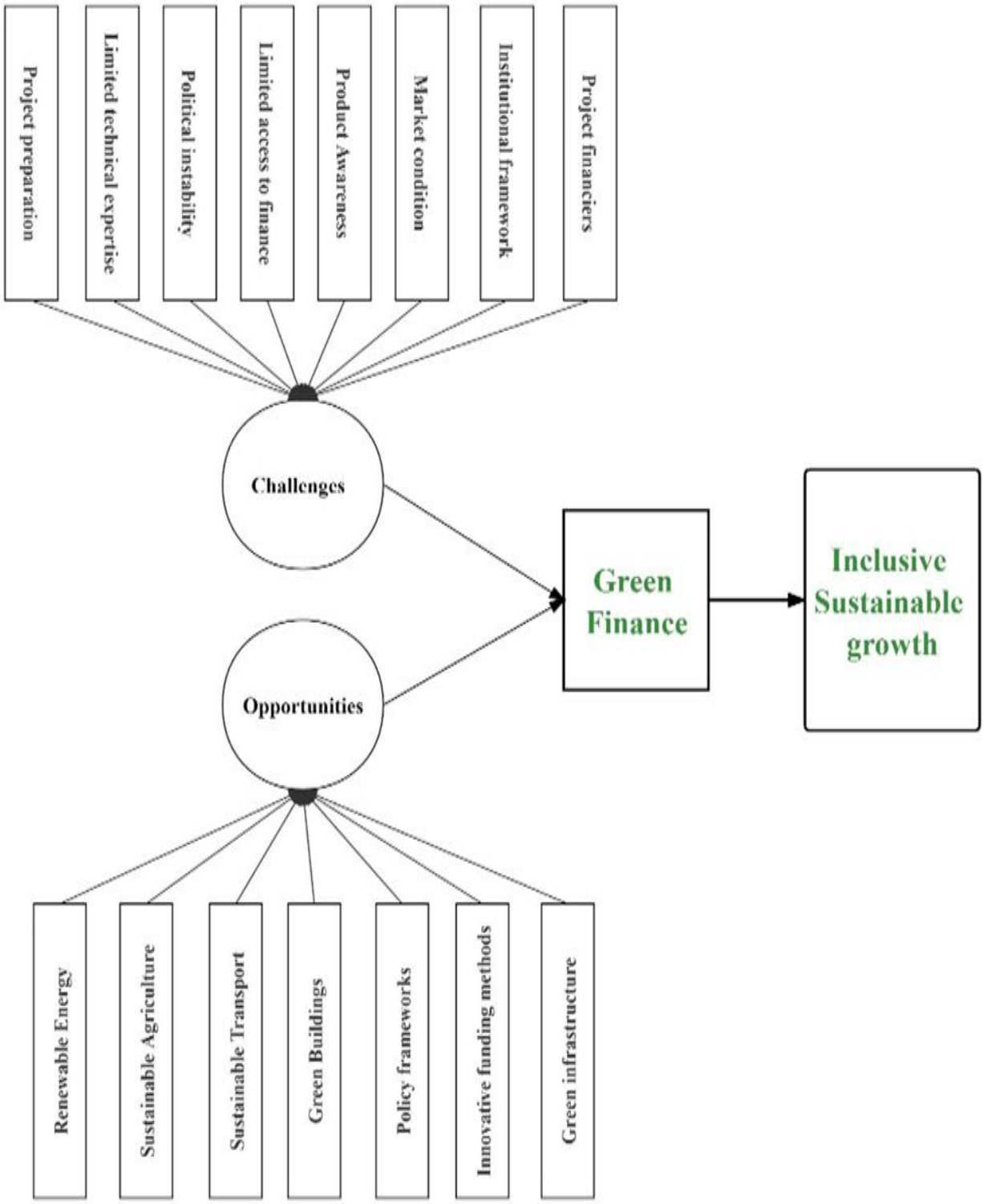
This study seeks to explore the opportunities and challenges associated with enhancing green finance in Ethiopia, focusing on its role in promoting inclusive and sustainable growth. The lack of scientific research on green finance in Ethiopia highlights the need for a comprehensive investigation into the potential of green finance to close the financing gap for sustainable development projects. By identifying the key obstacles—such as policy gaps, lack of awareness,

and limited financial resources this study aims to offer actionable recommendations for policymakers, financial institutions, and investors.

The motivation behind this study is not only to bridge the knowledge gap but also to provide a strategic framework for Ethiopia to attract the necessary investments and support to achieve its sustainable growth objectives. As Ethiopia continues to prioritize environmental sustainability and economic development, understanding the potential of green finance is crucial to fostering a resilient, low-carbon economy that benefits both the environment and its people. Through this research, the study will contribute valuable insights that can shape Ethiopia's green finance policies and accelerate the country's transition to a sustainable and inclusive growth path.

The study on hand is novel in that it contains Context-Specific Analysis**:** Unlike most studies that focus on green finance in developed nations or broad global trends, this study provides an in-depth, localized analysis of Ethiopia's green finance landscape. The study is also novel in making that Policy-Practice Gap Investigation, and Exploration of Emerging Financial Instruments: It critically examines the gap between Ethiopia's ambitious green finance policies and their real-world implementation, providing empirical insights into why these gaps exist. The following figure 3 of the study shows the overall conceptual framework of the study.

Figure 5: Conceptual Framework



Source: (Compiled by Author, 2025)

1.2. Objectives of the study

The study aims to explore the opportunities and challenges of green finance to promote inclusive, sustainable growth in Ethiopia. In line with this objective, the following specific objectives have been defined for the study.

- To assess the current state of green finance initiatives in Ethiopia and identify areas of opportunity for further development.
- To analyze the key challenges facing the implementation of green finance programs in Ethiopia and propose solutions to overcome these obstacles.
- To explore the potential impact of green finance on promoting inclusive, sustainable growth in Ethiopia
- To evaluate the effectiveness of existing green growth strategies in Ethiopia and provide recommendations for improving and expanding these efforts.

1.3. Research questions and Hypothesis

RQ1: What is the current state of Ethiopia's sustainable or green growth strategy?

H1: Existing green growth strategies in Ethiopia face limitations in effectiveness, and targeted enhancements can improve their impact and scalability.

RQ2: What are the potential opportunities for green finance in Ethiopia?

H2: Ethiopia's green finance initiatives exhibit significant gaps, creating opportunities for further development.

RQ3: What are the potential challenges of green finance in Ethiopia?

H3: Key challenges, such as regulatory barriers, limited financial resources, and low awareness, substantially hinder the effective implementation of green finance programs in Ethiopia.

RQ4: How does the promotion of green finance contribute to inclusive, sustainable growth?

H4: Green finance plays a crucial role in fostering inclusive and sustainable economic growth in Ethiopia.

1.4. Structure of the Study

The research is structured across six chapters, each with its distinct sections. Chapter one introduces the study, outlining the research problem, general and specific objectives, and the significance of the research. In chapter two, the literature review is presented, exploring the theoretical foundations of the study, empirical analyses of previous research, and the conceptual frameworks that offer a comprehensive view of the topic. Chapter three focuses on the research methodology, detailing the design and approach, target population, sampling methods, sample size calculations, and ethical considerations. Chapter four presents and analyzes the study's findings, supported by relevant evidence, while Chapter five discusses the conclusion, policy implications, and recommendations for stakeholders in the field. Chapter six highlights the study's novel scientific contributions and provides a summary of the research.

2. MATERIALS AND METHODS

2.1. Research Design

The research design is the framework or blueprint that a researcher uses to carry out a study (Abutabenjeh & Jaradat, 2018). It describes the processes used to achieve the study objectives, including the data to be collected. There are many types of research designs, however, the choice of research design is based on the behavior of the study under investigation. Based on the behavior of the study under investigation, this study will use a triangulation research design to investigate the potential opportunities and challenges of green finance in Ethiopia.

The triangulation design is a research approach that involves the simultaneous or sequential collection and analysis of multiple types of data to gain a comprehensive understanding of a research problem (Creswell, 2012). It combines quantitative and qualitative methods to provide a more robust and holistic perspective on the phenomenon under investigation. More specifically, the study will use a concurrent triangulation design that will be used in the simultaneous collection and analysis of quantitative and qualitative data (Siedlecki, 2020). This approach allows the researcher to understand the research problem. There are four variants of the triangulation design: the convergence model, the data transformation model, the quantitative data model, and the multilevel model.

The convergence model is the traditional approach in mixed-method triangulation design. In this model, the researcher collects and analyzes quantitative and qualitative data separately on the same phenomenon. The results are then compared and contrasted during the interpretation phase. This model is used when researchers want to compare or validate quantitative results with qualitative findings, to draw valid and well-supported conclusions about a single phenomenon (Creswell, 2012). The data transformation model is another option that researchers may choose to use (Creswell et al., 2004). This model also involves collecting and analyzing quantitative and qualitative data sets separately. However, after the initial analysis, the researcher employs procedures to transform one type of data into the other. This can be achieved by quantifying qualitative findings or by qualifying quantitative results. It becomes possible to integrate and compare the two data sets during the analysis stage by transforming the data.

The validated quantitative data model is used when researchers want to validate and enhance the findings obtained from a quantitative survey by incorporating a few open-ended qualitative

questions (Creswell et al., 2004). In this model, both types of data are collected within a single survey instrument. Since qualitative items are an addition to a primarily quantitative survey, they generally do not result in a rigorous qualitative data set. However, they provide the researcher with interesting quotes that can be used to validate and enrich the findings of the quantitative survey. The fourth variant of the triangulation design, referred to as multilevel research, involves using different methods (quantitative and qualitative) to address various levels within a system.

The findings obtained from each level are then integrated into a single overall interpretation (Creswell et al., 2004). As a result, this study uses a multilevel triangulation design to investigate the potential opportunities and challenges of green finance in Ethiopia.

2.2. Research Approach

A research approach is a way for a researcher to investigate a phenomenon and respond to a specific research question. There are many different research approaches, such as qualitative, quantitative, and mixed methods. The selection of the research approach is all down to the type of research question, data selection, and the study's objectives (Creswell, 2012).

The qualitative research approach is used when the researcher is interested in investigating people's experiences, views, and beliefs through techniques including in-depth interviews, observation, and focus groups. This approach aims to produce a deep understanding of the phenomenon under investigation and to shed light on the social and cultural setting in which it occurs (Creswell, 2012). It is further understood that qualitative research would be appropriate to investigate a particular phenomenon, the need for a complex and thorough understanding of a phenomenon, and the need to allow people to share their stories freely. Unlike the qualitative approach, adopting a quantitative approach can help scholars learn cause-and-effect reasoning, how to narrow down hypotheses and questions to a few key variables, how to use measurement and observation to test theories, and how to use employee-driven inquiry methods such as surveys and experiments (Creswell, 2012).

The quantitative approach aims to generalize the findings of a sample to the entire population. It employs cross-sectional, longitudinal, and self-administered questionnaires. An advantage of a well-designed and conducted quantitative research technique is that the results of the sample can be generalized to a larger population.

The mixed research approach incorporates qualitative and quantitative research into a single study. This methodology is applied when a researcher wishes to compile both numerical data and a thorough understanding of a phenomenon. The use of mixed methods enables researchers to enhance their conclusions, triangulate data, and answer topics that are not open to a single approach. In a mixed research approach, qualitative and quantitative components can be integrated in different ways, such as collecting qualitative data before or after the quantitative data or simultaneously collecting qualitative and quantitative data. The combination allows researchers to explore and understand complex phenomena more comprehensively and overcome the limitations of each method. Due to the nature of the topic being investigated, which requires both qualitative and quantitative research approaches, the mixed research approach is employed to carry out the study at hand.

2.3. Data Type and Data Source

The study utilized both primary and secondary data sources to collect relevant information. Primary data was obtained through the use of questionnaires and in-depth interviews. The questionnaires were designed to contain closed-ended questions that are relevant to the study's topic and easy for the respondents to answer. The purpose of the questionnaires was to gather quantitative data that was used in the analysis of the study (Carolyn Boyce, 2006). The questionnaires were prepared with a Likert scale ranging from 1-5 (strongly agree to strongly disagree). Furthermore, in-depth interviews with key informants from selected organizations were conducted using unstructured questions.

The unstructured questions allowed for flexibility in the interview process, allowing for additional questions to be answered within the framework of the study's objectives (Qu & Dumay, 2011). In-depth interviews are helpful when the researcher wants to go deeper into a new topic or wants to learn more about a person's ideas and actions. It frequently serves as a context for other data, giving a more thorough understanding of what transpired in the program. In-depth interviews have the main advantage of producing much more precise data than other data collection methods, such as surveys. Furthermore, they could provide a more relaxed environment for data collection; people might feel more comfortable speaking with the researcher directly about their program than completing a survey (Siedlecki, 2020). The main objective of the in-depth interviews was to assess the processes and practical challenges associated with the adoption of green finance in Ethiopia.

The secondary source of information was collected from different published and unpublished documents. Document reviews were used in the study to obtain important data. In document reviews, proclamations, regulations, and strategic plans for the Climate-Resilient Green Economy Strategy (CRGE), annual financial reports of financial institutions, including national banks, and other documents relevant to the study area were reviewed.

2.4. Population, Sample Size, and Sampling Techniques

The group of individuals or entities about which a researcher aims to investigate or draw conclusions is referred to as the target population. When designing a study, it is essential to consider the target population to ensure that the sample is appropriate. The sample is a subset of the target population that is selected for the study, and the sample needs to be representative of the target population so that the results can be applied to a larger group (Althubaiti, 2016). Inaccurately defining the target population can result in a biased sample, which can lead to incorrect conclusions. Therefore, it is crucial to identify and define the target population before selecting the sample.

The target population of the study at hand includes respondents from different organizations, including financial institutions (commercial banks), national banks, academicians, the Ministry of Economic and Finance, the Ministry of Planning and Development, and the Environment Commission. Hence, knowing the exact number of the target population is difficult. As a result, the study targets respondents from each organization. The selection process was based on the criteria set by the study which includes relevant positions (individuals who are in positions related to green finance in the organization such as Chief Financial Officers (CFO), Financial Managers, or Sustainability Managers), experience (those who have experience and knowledge of green finance, sustainability, environmental management, or related fields).

2.4.1. Sample Size

For this study, the authors used Corbetta's (2003) guidelines to calculate the sample size. They applied a 95% confidence level and a 5% margin of error to ensure the sample size was sufficient to produce reliable and meaningful results. The calculation was based on the Topman formula:

$$n = Z^2pq/e^2$$

n = required sample size

z = degree of confidence (i.e., 1.96)

p = probability of positive response (0.5)

q = probability of negative response (0.5)

e = tolerable error (0.05)

[n = (1.96) ^2 * 0.5 * 0.5 / (0.05) ^2] = 384

Based on the prescribed formula, this study includes a sample size of 384 respondents drawn from various sectors. Regarding sampling methods, the purposive and convenient sampling method was utilized. Purposive sampling is a non-probability approach where the researcher deliberately selects participants according to specific criteria (Etikan, 2016). This method aims to identify individuals who are most likely to possess the relevant information or characteristics required for the study, ensuring they can provide valuable insights to address the research questions effectively (Etikan, 2016). Out of the distributed questionnaires, 340 were returned, but 20 were incomplete. As a result, only 320 valid responses were analyzed.

2.5. Method of data analysis

This study used descriptive and inferential statistics to summarize and describe the main features of the dataset, such as central tendency and standard deviation, and to make inferences about a larger population based on a sample of data (Maguire and Delahunt, 2017). The data collected through the questionnaire were edited, coded, and analyzed using Microsoft Excel and SMART PLS software. The coding of the questionnaire responses was conducted on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Various methods, including descriptive statistics and frequency distribution, were employed to evaluate and interpret the data collected from the respondents.

Additionally, the study utilized a measurement model to assess how effectively the questions represented opportunities and challenges as accurate reflections.

2.6. Reliability and Validity

To see the consistency or stability of a measurement or research tool, the reliability test is the most important (Fshani, 2003). A reliable measurement yields consistent results over time and in many contexts. This implies that the results should be consistent if the same measure is used repeatedly to gauge the same phenomenon. On the other hand, validity refers to the extent to which a measure or research instrument measures what it is intended to measure (Fshani, 2003). In other words, a valid measure accurately captures the phenomenon being studied. The study used composite reliability and Cronbach's alpha to carry out the reliability analysis, which is supposed to be the initial part of the measurement model. The cutoff threshold for Cronbach's alpha and composite reliability is expected to be higher than 0.70, following the benchmark set by (Sarstedt et al., 2020).

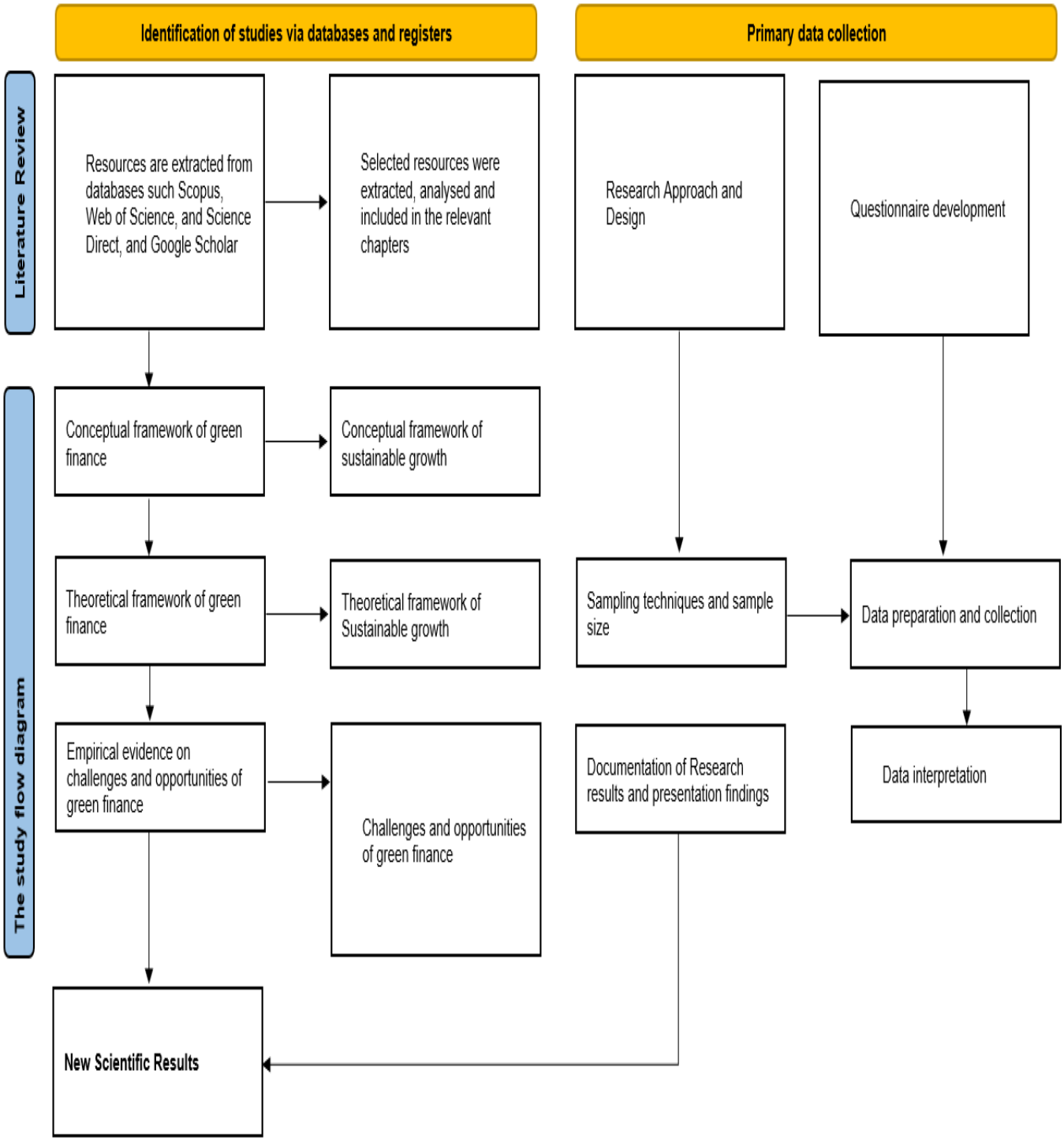
The second criterion of the measurement model is related to convergent validity; convergent validity helps determine the validity of data with an average variance extracted value (AVE). According to average variance criteria, each latent variable should score greater than 0.50 AVE to satisfy convergent validity (Sarstedt et al., 2020). Based on this fact, the study performs both reliability and validity tests to ensure the stability and accuracy of the measurements.

2.7. Ethical Considerations

Research ethics involves adhering to moral principles and professional codes of conduct during the collection, reporting, and publication of information about research subjects. This encompasses a sincere commitment to respecting subjects' rights to privacy, confidentiality, and informed consent. In this study, ethical standards were upheld by assuring participants that their authentic responses would be utilized solely for productive research outcomes and would be treated confidentially without revealing their identities. To achieve this, the data collected from participants underwent thorough screening, sorting, coding, categorization, and editing, aiming to eliminate any potential bias during the stages of discussion, analysis, and report writing.

Figure 11: The study flow diagram

The following figure 4 of the study shows the overall data flow diagram of the study to provide a clearer picture of the study.



3. RESULTS AND DISCUSSION

The study distributed 384 questionnaires, primarily using Google Forms via email to various organizations' employees, including financial institutions, the Ministry of Economic and Finance, the Ministry of Planning and Development, the Ethiopian Environmental Protection Authority, the National Bank of Ethiopia, and the Climate and Resilient Green Economy Initiative office. Out of the total distributed questionnaires, 340 were returned. However, 20 of them were not properly filled out with some important questions, as a result, the study only considered 320 responses for analysis. These responses were collected from key personnel directly targeted for the study. The analysis was conducted using SPSS version 29 and R programming version 4.2.2. In this chapter, the researcher delves into the data collected from the target population, employing various tools for comprehensive analysis. The following table 1 of the study shows the cumulative of respondents' response rate.

Table 1: Commutation of Respondents' Response Rate

Response from Respondents			
Distributed		Collected	
In No	In Per	In No	In Per
384	100%	320	83.3%

Source: Survey data, 2025.

3.1.Reliability Analysis

Reliability measures the internal consistency of the constructs/items used in the questionnaire. A construct/items of the research tools/in this case the questionnaire, is reliable if the Cronbach's alpha value of the scores of responses is greater than 0.7 (HAIR et al., 2013).

The study used data from all respondents to calculate Cronbach's alpha, a measure of the internal consistency of the questionnaire items, to assess the consistency of the scores obtained. As mentioned in the introduction section, this study was conducted to investigate the potential opportunities and challenges of green finance in promoting inclusive, sustainable growth in Ethiopia. In doing so, the study identified three main targets to explore the situation (opportunities, challenges, and the current status of green finance in Ethiopia). Based on these facts, the questionnaires were prepared for each proxy variable through different measurements.

Accordingly, Cronbach's alpha results confirmed that the data collected in the study were found reliable, with each item in the questionnaire having an alpha value of greater than 0.70. Similarly, the overall result of Cronbach's alpha value is 0.74, which discloses all items' reliability. A summary of the reliability results is presented in Table 2 below.

Reliability analysis

Call: alpha (x = Green Finance)

Table 2: The Result of Reliability Analysis

raw_alpha	std.alpha	G6(smc)	average_r	S/N	ase	mean	sd	median_r
0.74	0.74	0.76	0.11	2.90	0.021	3.7	0.32	0.11
95% confidence boundaries: lower (0.7), alpha (0.74), upper (0.78).								

Source: R programming Software version 4.2.2 output

3.2.Measurement Model of the Study

The study further employed a measurement model to examine the relationship between the latent variable and its respective outer loadings, as depicted in the following table. This analysis was conducted using the lavaan package within the R programming language, which facilitated structural equation modeling (SEM) to explore the underlying associations comprehensively. The subsequent section of the study presents a detailed analysis of the results for each variable, providing insights into their contributions and overall impact within the study's framework.

Table 3: The Result of the Measurement Model -Opportunities of Green Finance

Opportunities for Green Finance	Estimate	Std.Err	z-value	P(>|z|)	Std.lv	Std.all
Renewable Energy (OP1)	0.390	0.058	6.748	0.000	0.390	0.436
Sustainable Agriculture (OP2)	0.379	0.056	6.751	0.000	0.379	0.436
Sustainable Transport (OP3)	0.224	0.050	4.432	0.000	0.224	0.290
Green Buildings (OP4)	0.289	0.056	5.175	0.000	0.289	0.337
Policy Frameworks (OP5)	0.270	0.058	4.647	0.000	0.270	0.304
Innovative Funding Methods (OP6)	0.217	0.057	3.794	0.000	0.217	0.249
Green Infrastructure (OP7)	0.286	0.046	6.253	0.000	0.286	0.405

Source: R programming Software version 4.2.2 output

According to the findings in Table 3, there is a strong correlation between the construction of green finance opportunities and every question that was utilized in this study to reflect its opportunities. This result was confirmed by the Std.lv values, which indicate the strength of the relationship between the latent construct and each indicator. All the standardized factor loadings (Std.lv) are positive, suggesting a positive association between the latent constructs and their respective indicators. Based on the provided output, all the indicators (OP1 to OP7) have positive and statistically significant standardized factor loadings on their respective latent constructs. These results suggest that the indicators are effective in measuring the underlying constructs related to opportunities for Green Finance.

More specifically, each indicator used in this study to measure the opportunities of green finance from different aspects, such as Renewable Energy, Sustainable Agriculture, Sustainable Transport, Green Buildings, Policy Frameworks, Innovative Funding Methods, and Green Infrastructure, demonstrates a statistically significant contribution to the latent variable. The p-values for all indicators are remarkably low (all being 0.000), underscoring the high significance of these relationships. The findings suggest that investments and initiatives in Renewable Energy, Sustainable Agriculture, Sustainable Transport, Green Buildings, Policy Frameworks, Innovative Funding Methods, and Green Infrastructure are integral components contributing significantly to the overall construct of "Opportunities of Green Finance." This robust statistical support enhances confidence in the validity of these relationships within the structural equation model.

Table 4: The Result of the Measurement Model - Challenges of Green Finance

Challenges of Green Finance	Estimate	Std.Err	z-value	P(>|z|)	Std.lv	Std.all
Institutional Framework (C1)	0.255	0.056	4.574	0.000	0.255	0.293
Project Financiers (C2)	0.344	0.060	5.765	0.000	0.344	0.367
Market Conditions (C3)	0.282	0.052	5.392	0.000	0.282	0.344
Product Awareness (C4)	0.214	0.052	4.120	0.000	0.214	0.264
Access to Finance (C5)	0.276	0.060	4.592	0.000	0.276	0.294
Political Instability (C6)	0.223	0.049	4.581	0.000	0.223	0.293
Limited Technical Expertise (C7)	0.282	0.051	5.542	0.000	0.282	0.353
Project preparation (C8)	0.269	0.047	5.710	0.000	0.269	0.364

Source: R programming Software version 4.2.2 output

As highlighted in Table 4 above, the latent variable challenges of green finance and the outside loading of this variable are measured using the same methodology, as was previously indicated. Notably, the Institutional Framework exhibits a positive and statistically significant correlation with the challenges of green finance, as indicated by an estimated coefficient of 0.255 and a standardized loading of 0.293. Furthermore, the other variable identified as the challenge of green finance is Project Financiers. This variable has a substantial standardized loading of 0.367, suggesting a pronounced impact on the challenges. Market Conditions also contribute significantly, as evidenced by an estimate of 0.282 and a standardized loading of 0.344. Limited Product Awareness, though slightly lower in estimate at 0.214, is nonetheless a meaningful contributor, as indicated by a standardized loading of 0.264. Additional challenges arise from Access to Finance (estimate of 0.276 and a standardized loading of 0.294), Political Instability (estimate of 0.223 and a standardized loading of 0.293), Limited Technical Expertise (estimate of 0.282 and a standardized loading of 0.353), and Project Preparation (estimate of 0.269 and a standardized loading of 0.364). Collectively, these results shed light on the multifaceted nature of challenges associated with green finance, providing valuable insights for policymakers, investors, and other stakeholders seeking to address and overcome these impediments in sustainable financial endeavors.

Table 5: The Result of the Measurement Model - Current Status of Green Finance

Current Status of Green Finance	Estimate	Std.Err	z-value	P(>|z|)	Std.lv	Std.all
Concept of GF (CS1)	0.306	0.052	5.892	0.000	0.306	0.384
Green Finance Initiatives (CS2)	0.225	0.046	4.869	0.000	0.225	0.320
Green Finance Options (CS3)	0.343	0.066	5.218	0.000	0.343	0.342
Green Finance Supportive (CS4)	0.316	0.050	6.300	0.000	0.316	0.409
Green Finance Extent (CS5)	0.240	0.048	4.974	0.000	0.240	0.326
Availability of Green Finance (CS6)	0.321	0.058	5.523	0.000	0.321	0.361
Green Finance Awareness (CS7)	0.298	0.051	5.798	0.000	0.298	0.378
Green Finance Importance (CS8)	0.265	0.048	5.505	0.000	0.265	0.360

Source: R programming Software version 4.2.2 output

The current status of green finance sheds light on the multifaceted factors influencing the landscape of green finance practices in Ethiopia revealed in Table 5 above. Firstly, the clear Concept of Green

Finance (CS1), denoted by an estimate of 0.306 and a standardized loading of 0.384, showcases a substantial and highly significant association with the overall status of green finance. This underscores the importance of a well-defined conceptual foundation. Green Finance Initiatives (CS2) contribute significantly, as indicated by an estimate of 0.225 and a standardized loading of 0.320, signifying a positive and meaningful impact on the current state. Diverse Green Finance Options (CS3), reflected by an estimate of 0.343 and a standardized loading of 0.342, play a pivotal role, suggesting that the availability of a range of options positively influences the status of green finance. Moreover, a Supportive Environment for Green Finance (CS4) exhibits a robust association, with an estimate of 0.316 and a standardized loading of 0.409, highlighting the critical role of a supportive ecosystem in shaping the current landscape.

The Extent of Green Finance Activities (CS5) also contributes significantly, with an estimate of 0.240 and a standardized loading of 0.326, emphasizing the impact of the scale of initiatives on the overall status. Furthermore, the Availability of Green Finance (CS6), Awareness about Green Finance (CS7), and the Perceived Importance of Green Finance (CS8) all show positive and significant relationships, with estimates ranging from 0.298 to 0.321 and standardized loadings ranging from 0.361 to 0.378. These findings collectively paint a comprehensive picture of the nuanced factors contributing to the status of green finance, providing valuable insights for stakeholders aiming to foster and advance sustainable financial practices.

3.3. Results on the Current Status of Green Finance

1. Green Finance Awareness The survey results indicate that awareness of green finance in Ethiopia remains low, with 95% of respondents exhibiting limited or no knowledge of the concept. Only 5% demonstrated moderate to high awareness. The descriptive statistics support these findings, with a mean of 3.65 and a standard deviation of 0.798. The study highlights key barriers contributing to this lack of awareness, including insufficient educational outreach, limited institutional support, and inadequate integration of green finance with sustainable development goals. Additionally, restricted access to information and weak communication channels further hinder awareness.

2. Effectiveness of Green Finance Initiatives A majority (82.5%) of respondents believe green finance initiatives in Ethiopia effectively address environmental and social concerns. The mean

score of 4.03 with a standard deviation of 0.705 indicates a largely positive perception, supported by a P-value of 0.000. While this suggests confidence in existing efforts, a small portion of respondents expressed doubts, highlighting the need for enhanced communication and strategy implementation to strengthen the impact of these initiatives.

3. Availability of Green Finance for SMEs Responses regarding green finance accessibility for small and medium-sized enterprises (SMEs) vary. About 45.3% of respondents believe green finance options are moderately to highly available, while 33.4% perceive them as somewhat available, and 21.25% report low confidence in their accessibility. The mean score of 3.34 with a standard deviation of 1.007 reflects a moderate perception with notable disparities. Government initiatives, such as the Sustainable Development Fund, exist but are not explicitly linked to green finance, underscoring the need for targeted financial mechanisms to support SMEs in sustainable projects.

4. Government Support for Green Finance: The Ethiopian government's support for green finance initiatives receives a generally favorable perception, with 76% of respondents rating it as moderate to high. The mean score of 3.94 and a standard deviation of 0.773 suggest a consensus on the government's commitment. Interviews reaffirm this view, citing strategic plans and initiatives such as the Prime Minister's Green Legacy program. However, some respondents expressed concerns about the need for more structured and enforceable policies to solidify governmental support.

5. Green Finance and Inclusive Economic Growth Most respondents (56.5%) believe that green finance initiatives contribute to inclusive economic growth, while 38.75% acknowledge its significance to some extent. The mean score of 3.62 and a standard deviation of 0.738 suggest a generally positive perception, reinforced by interviews emphasizing Ethiopia's renewable energy and sustainable agriculture potential. These findings indicate optimism about green finance's role in fostering economic inclusivity.

6. Role of Financial Institutions in Green Finance Perceptions regarding the investment of Ethiopian financial institutions in green finance vary. While 51% of respondents express moderate to high confidence in their commitment, 13.75% hold a low perception. The mean

score of 3.50 and a standard deviation of 0.892 highlight differing opinions. Interviews reveal that only a few banks, such as Awash and Dashen Bank, integrate environmental considerations in financing, with no formal legal obligations compelling banks to invest in green finance. This underscores the need for regulatory frameworks to encourage financial institutions to support sustainable projects.

The study underscores significant gaps in green finance awareness, accessibility, and institutional investment in Ethiopia. While green finance initiatives are perceived as effective in addressing environmental and social concerns, their accessibility for SMEs and the level of financial institution involvement remain areas requiring improvement. Government support is recognized, but stronger policies and enforcement mechanisms are necessary. Enhancing awareness, improving financial accessibility, and fostering institutional commitment are crucial steps for advancing green finance and sustainable economic development in Ethiopia.

3.4. Results of Respondents' Response on Challenges of Green Finance

To examine the challenges of green finance in Ethiopia, key issues were identified and incorporated into a structured questionnaire using proxy questions. Each proxy question was further assessed through specific sub-questions. A Likert scale was utilized to gauge respondents' opinions, with reverse coding applied to transform its alignment. In this system, 1 indicated "Strongly Agree," while 5 represented "Strongly Disagree," reversing the conventional order. Although the questions were designed for simplicity and ease of comprehension, the reversed coding aimed to capture more nuanced perspectives ranging from strong agreement to strong disagreement.

This systematic approach enabled a thorough evaluation of the challenges in green finance, providing a detailed understanding of respondents' views within the Ethiopian context. Furthermore, frequency distribution analysis, supported by descriptive statistics and measurement models, ensured consistent reporting. The study found a general tendency toward agreement on the variables, as evidenced by the mean values, standard deviations, and the significant p-value (0.000) for all variables in the measurement model. For each variable, the data was transformed, and the average was computed to establish a unified variable. The following section of the study

discusses the details of each variable based on frequency distribution, measurement model, and descriptive analysis results.

Overall Perception of Challenges (C1)

The cumulative data on the challenges of green finance in Ethiopia, represented by C1 (Institutional Framework), reveals a mean response score of 3.67, with a standard deviation of 0.872. The P-value of 0.000 indicates that the results are statistically significant, suggesting a strong agreement among respondents that the existing institutional framework, regulatory framework, and coordination mechanisms are inadequate for supporting the implementation of green finance in Ethiopia. This reinforces the finding that these challenges are deeply ingrained and need urgent attention. As highlighted by one of the interviewees, "The lack of a cohesive strategy and fragmented coordination significantly hampers green finance efforts."

The survey results highlight a widespread perception that Ethiopia's institutional framework, regulatory environment, and stakeholder coordination are insufficient to support the effective implementation of green finance. The significant number of disagreements across the three areas (IF1: 72.8%, IF2: 58.9%, IF3: 63.3%) indicates the need for substantial improvements in these critical aspects to enable the successful promotion and implementation of green finance in the country. These findings reinforce the notion that the existing challenges must be addressed to unlock the potential of green finance in Ethiopia. This finding is consistent with other studies conducted in different economies (Lupu, Criste & Victor, 2022)

Overall Perception of Challenges (C2)

Aggregating the responses from PF1, PF2, and PF3, the data shows that there are significant challenges faced by financial institutions in supporting green finance initiatives. The mean score of 3.22, with a standard deviation of 0.939, reflects a moderate level of agreement regarding the challenges associated with project financiers in the realm of green finance. The p-value of 0.000 indicates that these results are statistically significant. The variability in responses emphasizes the diverse opinions regarding the support, knowledge, and expertise of financial institutions in financing green projects.

The concerns raised by respondents, coupled with interview insights, underscore the need for a stronger regulatory environment and greater engagement from financial institutions in green

finance initiatives. Specifically, there is a need for improved expertise, clearer strategic focus, and a supportive regulatory framework to promote green projects. In conclusion, the findings suggest that project financiers in Ethiopia face substantial challenges in supporting green finance. A large number of respondents expressed concerns over the active support and funding from financial institutions (PF1: 33.4% disagreement), difficulties in securing long-term financing (PF2: 36.9% disagreement), and the lack of expertise within financial institutions (PF3: 37.5% disagreement). Addressing these challenges requires greater institutional commitment, enhanced expertise, and a more supportive policy and regulatory environment to enable green finance initiatives to thrive in Ethiopia.

Overall Perception of Challenges (C3)

Aggregating the responses to the three sub-questions, the data suggests that market conditions in Ethiopia do present challenges to green finance, though these challenges are nuanced. The responses to MC1 and MC2 indicate an agreement on the lack of demand and insufficient supply of green financial products and services, while MC3 suggests that market mechanisms and incentives may not be as significant a hurdle as expected.

The mean response score of 3.62 reflects a moderate level of agreement on average regarding the challenges posed by market conditions. A standard deviation of 0.822 highlights relatively consistent levels of opinion among respondents. The measurement model further validates these findings, with a statistically significant p-value of 0.000 confirming the robustness of the results.

The challenges related to market conditions in promoting green finance in Ethiopia primarily stem from low demand for green financial products and services and insufficient supply from financial institutions. While market mechanisms and incentives are not perceived as major barriers, aligning the forces of demand and supply remains crucial for fostering a thriving green finance market. These findings underscore the need for strategic interventions to boost awareness, enhance product availability, and stimulate market demand for green finance initiatives in Ethiopia.

Overall Perception of Challenges (C4)

When combining the responses from PA1, PA2, and PA3, product awareness is a significant challenge in promoting green finance in Ethiopia. PA1 and PA2 highlight a substantial lack of awareness and ineffective marketing strategies, while PA3 emphasizes the need for better public

education and information dissemination. These combined issues underscore the necessity of concerted efforts to raise awareness, improve promotional activities, and enhance educational outreach about green finance. The measurement model further supports these conclusions, with a mean score of 3.72, indicating moderate agreement among respondents on the challenges posed by product awareness. A standard deviation of 0.784 reflects consistent responses across the sample, and the p-value of 0.000 confirms the statistical significance of the results.

In conclusion, addressing the challenges related to product awareness is critical for the successful promotion of green finance in Ethiopia. Targeted interventions to improve public knowledge, enhance marketing strategies, and boost educational efforts will be essential for building a well-informed market that is receptive to green financial products and services. These actions are vital for fostering the growth and success of green finance initiatives in Ethiopia.

Overall Perception of Challenges (C5)

When aggregating the responses from AF1, AF2, and AF3, it becomes evident that access to finance poses a significant challenge to the promotion of green finance in Ethiopia. AF1 and AF2 suggest that financing is not affordable or attractive enough, while AF3 reveals the lack of specialized financial institutions or funds dedicated to green projects. Collectively, these issues highlight the financial barriers hindering the development of green finance in Ethiopia and point to the need for systemic interventions to make financing more accessible and supportive of green initiatives.

The measurement model further corroborates these findings, with a mean score of 3.68 indicating moderate agreement among respondents regarding the financial challenges to green finance. The standard deviation of 0.856 reflects consistent opinions across respondents, while the statistically significant p-value of 0.000 affirms the reliability of these results.

In conclusion, the challenges related to access to finance in Ethiopia’s green finance sector are substantial. The findings highlight the importance of addressing the barriers to affordable financing, revising financial institutions' criteria, and establishing specialized financial entities dedicated to green projects. Interviews further validate these findings, revealing a consensus among stakeholders that addressing these financial challenges is critical to the success of green

finance in Ethiopia. These efforts are essential to creating an enabling environment for the growth and success of green finance initiatives in Ethiopia.

Overall Perception of Political Instability as a Challenge (C6)

Aggregating the responses to PI1, PI2, and PI3, the data reveals a consistent perspective that political instability is not perceived as a significant challenge to the implementation and growth of green finance in Ethiopia. 65.6% of participants disagreed with the notion that political instability hinders green finance initiatives, and the responses from the other two questions (PI2 and PI3) reinforced this view. The results highlight that political instability does not appear to be a primary barrier to the successful implementation of green finance in the Ethiopian context.

This finding is supported by insights gathered from interviews with stakeholders. Interviews revealed that the Ethiopian government's commitment to green finance remains strong, as demonstrated by initiatives like the Climate Resilient Green Economy (CRGE), which have continued regardless of changes in the political landscape. The government's support for renewable energy projects and foreign investment in the sector is seen as stable and unaffected by political shifts. Furthermore, the private sector, which plays a leading role in green finance in Ethiopia, is viewed as less vulnerable to the impacts of political instability.

Overall, the findings suggest that political factors are not perceived as a major challenge to the adoption and implementation of green finance in Ethiopia. While a small minority of respondents expressed concerns about the influence of political instability on green finance, the majority of participants, as well as interviewees, emphasized that political instability does not significantly hinder green finance initiatives. The Ethiopian government's long-standing commitment to green finance, coupled with a stable regulatory environment, contributes to the favorable outlook on green finance. Therefore, political instability does not appear to be the primary obstacle to the success of green finance in Ethiopia.

Overall Perception of Limited Technical Expertise (C7)

When aggregating the responses to LTE1, LTE2, and LTE3, it becomes evident that the challenge of limited technical expertise is widely perceived as a major barrier to the implementation and growth of green finance in Ethiopia. A total of 72.2% (231 respondents) agreed that the scarcity of technical expertise is a primary challenge, further confirming the importance of addressing this

issue to foster a more robust green finance ecosystem in the country. This view is supported by insights gathered from interviews conducted alongside the survey. The interviews highlighted the shortage of technical expertise, particularly in areas related to environmental activities and green finance, and the need for specialized professionals in the sector.

The absence of sufficient technical expertise results in increased project costs, as organizations must outsource professionals with the necessary skills. Additionally, the lack of technical knowledge impacts the effectiveness of monitoring and evaluation systems within green finance projects, further hindering their success. In conclusion, the findings strongly suggest that the limited availability of technical expertise is a significant challenge for green finance in Ethiopia. The majority of survey respondents expressed concerns about the shortage of skilled professionals, the inadequacy of capacity-building programs, and the lack of technical experts within financial institutions. These challenges point to a pressing need for more investment in training, professional development, and the recruitment of experts to support green finance initiatives in Ethiopia. Addressing these gaps in technical expertise will be crucial for the successful implementation and scaling of green finance projects in the country.

Overall Perception of Project Preparation Challenges (C8)

When aggregating the responses to PP1, PP2, and PP3, it becomes clear that project preparation is a significant challenge in the field of green finance in Ethiopia. A total of 76% of respondents expressed dissatisfaction with the availability of resources and capabilities, the absence of tailored project preparation procedures, and the limited consultation with green finance experts. These findings highlight the systemic weaknesses in the way green finance projects are prepared and managed, further indicating that addressing these challenges is essential for improving the green finance landscape in Ethiopia.

The interviews confirmed these results, emphasizing the complexity and obstacles faced by organizations in preparing green finance projects. Interviewees explained that the lack of resources, unclear procedures, and insufficient expert consultation are deeply intertwined challenges that prevent the effective execution of green finance projects in Ethiopia. These challenges were seen as major impediments that slowed the uptake of green finance and reduced the success rate of green projects.

The findings strongly suggest that project preparation is a significant challenge for green finance in Ethiopia. The majority of survey respondents and interviewees expressed concerns about insufficient resources, the lack of tailored project preparation procedures, and the limited consultation with green finance experts. These challenges indicate the need for a more structured approach to project preparation, which includes the development of standardized procedures, the mobilization of adequate resources, and greater involvement of specialized expertise.

3.5. Results of Respondents' Response on Opportunities of Green Finance

Green finance presents a transformative opportunity for Ethiopia to advance its sustainable development goals while addressing critical environmental challenges. By leveraging seven key dimensions, Renewable Energy (OP1), Sustainable Agriculture (OP2), Sustainable Transport (OP3), Green Buildings (OP4), Policy Frameworks (OP5), Innovative Funding Methods (OP6), and Green Infrastructure (OP7) the country can strategically align its economic growth with environmental stewardship. These areas not only offer pathways for reducing carbon footprints and enhancing resilience to climate change but also create opportunities for innovation, job creation, and global collaboration. The following section of the study discusses the details of respondents' responses on green finance opportunities in Ethiopia.

Effectiveness of Government Policies and Incentives for Renewable Energy Projects (RE1)

RE1 focused on the effectiveness of government policies and incentives in supporting the growth of renewable energy projects, thus enhancing green finance in Ethiopia. The survey revealed that 66.875% (214 respondents) of participants agreed with the notion that government policies and incentives are effectively supporting renewable energy projects.

Only 5.3% (17 respondents) disagreed with this assessment, suggesting a strong overall perception that government support is helping to foster the growth of renewable energy and green finance initiatives in the country. Interview insights confirmed these positive findings, with many respondents noting that government policies, including incentives for renewable energy projects, have been instrumental in attracting green finance investments. Policies such as tax incentives, subsidies for renewable energy projects, and a commitment to sustainable energy goals were identified as key drivers. However, some interviewees pointed out that while the policies are in

place, their implementation and reach could be improved to ensure that more projects benefit from these incentives, especially in remote or underserved areas.

Potential for Green Finance Investments in Renewable Energy Projects (RE2)

RE2 aimed to assess whether renewable energy projects in Ethiopia present significant potential for green finance investments. The data collected showed that 65% (208 respondents) agreed with the statement, while 6% (19 respondents) disagreed. This finding suggests a strong belief among respondents in the investment potential of renewable energy projects as a key avenue for green finance in Ethiopia. The positive response indicates that there is confidence in the ability of renewable energy projects such as solar, wind, and geothermal energy to attract green finance investments and contribute to the overall sustainability goals of the country.

Interviews further reinforced this perception, with participants highlighting Ethiopia's abundant renewable energy resources, such as solar and wind power, as promising sectors for attracting green finance. Interviewees also emphasized that renewable energy offers not only environmental benefits but also economic opportunities, such as job creation and rural development. The interview results highlighted the importance of creating a conducive environment for investors, including clear regulations and streamlined procedures, to fully unlock the potential of these renewable energy projects.

Financial Institutions' Role in Financing Renewable Energy Projects (RE3)

RE3 examined the active involvement of financial institutions in Ethiopia in financing renewable energy projects. The survey results showed that 67.8% (217 respondents) agreed that financial institutions are actively financing renewable energy projects as part of their green finance initiatives, while 6.8% (22 respondents) disagreed. This suggests a positive trend toward financial institutions playing a supportive role in promoting renewable energy projects and green finance. The interviews corroborated these survey results, with many participants acknowledging that financial institutions are increasingly offering financing options for renewable energy projects.

The findings suggest that renewable energy represents a significant opportunity for the expansion of green finance in Ethiopia. The government's policies and incentives are seen as effective in supporting renewable energy projects, and there is strong confidence in the investment potential of such projects. Financial institutions are also perceived to be actively involved in financing these

projects, contributing to the overall growth of green finance in the country. The interview results reinforced these positive survey findings, emphasizing the potential of Ethiopia's renewable energy sector to contribute to sustainable development and attract green finance investments. The country's vast renewable energy resources, particularly in solar, wind, geothermal, and hydro energy, position it as a leader in the region for green finance opportunities. However, some challenges were identified, such as the need for improved implementation of policies and better financial products to mitigate risks and facilitate investment. Strengthening the collaboration between government, financial institutions, and the private sector, alongside targeted capacity-building efforts, could further unlock the potential of renewable energy for green finance in Ethiopia.

Demand for Sustainable Agriculture Practices (SA1)

SA1 sought to measure whether there is a strong demand for sustainable agriculture practices in Ethiopia, which could create opportunities for green finance investments. The survey results revealed that 54.4% (162 respondents) were neutral, 38.3% (114 respondents) agreed, and 7.3% (44 respondents) disagreed. While a substantial portion of respondents acknowledged some level of demand, the majority (54.4%) were neutral, indicating uncertainty or lack of clear evidence regarding the demand for sustainable agriculture practices. The interview with an agricultural economist from the Ministry of Finance and Economy supported these results, noting that while many farmers are interested in sustainable practices, there is a gap in knowledge regarding the benefits and implementation of these practices. This suggests that while demand may exist, it is not yet fully recognized or realized by all stakeholders, especially at the grassroots level. There is a need for greater education and awareness campaigns to help farmers understand the advantages of sustainable agriculture and how green finance can support their initiatives.

Support from Financial Institutions for Sustainable Agriculture Projects (SA2)

SA2 examined the extent to which financial institutions in Ethiopia support financing sustainable agriculture projects. The survey results showed that 52.2% (155 respondents) were neutral, 37% (110 respondents) agreed, and 10.8% (55 respondents) disagreed or strongly disagreed. This suggests that while there is some support from financial institutions, many respondents were unsure about the level of engagement or the availability of financing options for sustainable agriculture projects. An interview with a bank manager revealed that financial institutions are open

to financing green projects but highlighted the lack of awareness among potential clients about these opportunities. This aligns with the survey's neutral responses, which indicate that financial institutions may not be effectively communicating their support for sustainable agriculture. There is a clear opportunity for financial institutions to develop targeted financial products and outreach programs to increase visibility and engagement with farmers and agricultural stakeholders.

Government Policies and Support for Sustainable Agriculture (SA3)

SA3 aimed to assess whether the government provides sufficient policies and support for promoting sustainable agriculture practices. The survey results revealed that 63.9% (190 respondents) were neutral, 25.6% (76 respondents) agreed, and 10.5% (54 respondents) disagreed or strongly disagreed. This shows that while there is some recognition of government support, a majority of respondents were neutral, suggesting a lack of clarity or confidence in the government's role in fostering sustainable agriculture.

Interview insights, however, provided a more positive perspective on government policies. Several participants, including policymakers and industry experts, affirmed that the government has made strides in promoting sustainable agriculture through policies such as land use regulations, water management initiatives, and incentives for adopting environmentally friendly farming practices. Despite these efforts, the survey results suggest that these policies are not widely recognized or adequately communicated to stakeholders. This discrepancy highlights the need for clearer, more robust policy frameworks and better communication to enhance the effectiveness of government support.

Overall Perception of Green Finance Opportunities in Sustainable Agriculture (OP2)

The overall opportunity for green finance in Ethiopia, as measured by OP2, received a strong positive response, with a mean score of 4.14 out of 5 and a statistically significant p-value of 0.000. This indicates that the majority of respondents agree that there are significant opportunities for green finance in Ethiopia. This aligns with the general findings from the sub-questions regarding sustainable agriculture. Despite the neutral responses in the individual areas of demand, financial institution support, and government policies, the overarching view is that there is a growing potential for green finance to be a transformative tool for sustainable agriculture in Ethiopia. In conclusion, the findings validate the potential for green finance to play a crucial role in promoting

sustainable agriculture in Ethiopia. However, several challenges must be addressed, including improving government communication and policies, enhancing support from financial institutions, and raising awareness among stakeholders. By addressing these gaps, Ethiopia can unlock the full potential of green finance, driving sustainable agricultural practices that contribute to both environmental sustainability and economic development.

Potential for Green Finance Investments in Sustainable Transport Infrastructure (ST1)

ST1 assessed whether sustainable transport infrastructure in Ethiopia offers potential for green finance investments. The survey results indicated that 33.5% (167 respondents) agreed, 9% (45 respondents) strongly agreed, and 33.3% (99 respondents) remained neutral. A minimal percentage, 2.1% (9 respondents), disagreed or strongly disagreed.

This highlights that a significant portion of respondents recognize the potential for green finance investments in sustainable transport infrastructure, although the neutral responses indicate that a considerable number are uncertain or unaware of the financial opportunities this sector offers. Supporting these findings, an interview with a transport sector expert noted, "There is a growing recognition of the importance of sustainable transport, but many stakeholders are still not fully aware of the financial opportunities it presents." This suggests that while there is optimism about the potential, there is a need for broader dissemination of knowledge about green finance opportunities in this sector to fully engage stakeholders.

Support from Financial Institutions for Sustainable Transport Projects (ST2)

ST2 examined the role of financial institutions in financing sustainable transport projects. The survey results revealed that 31.1% (156 respondents) agreed and 8.8% (44 respondents) strongly agreed, while 34.1% (104 respondents) were neutral. A small percentage, 4.1% (16 respondents), disagreed or strongly disagreed. This indicates that while some financial institutions are involved in supporting sustainable transport, the high percentage of neutral responses suggests that their efforts are either insufficiently visible or not widespread. Interview feedback from a financial sector representative reinforced this point: "While our institution is open to financing sustainable transport projects, there is limited awareness among project developers about these financing options." This underscores the need for financial institutions to better communicate and promote their green finance initiatives to stakeholders in the transport sector.

Government Policies and Support for Sustainable Transport Projects (ST3)

ST3 evaluated the effectiveness of government policies and initiatives in supporting sustainable transport. The survey results showed that 27.3% (136 respondents) agreed and 13.5% (67 respondents) strongly agreed, while 32.4% (106 respondents) were neutral. Only 2.7% (11 respondents) disagreed or strongly disagreed. The relatively high percentage of neutral responses points to a perceived ambiguity or inadequacy in current government policies and support mechanisms for sustainable transport projects. Interviews with policymakers provided additional context, revealing that while there are ongoing efforts to create policies supporting sustainable transport, the implementation and communication of these policies remain challenges. For example, government initiatives to promote electric vehicles and public transport systems are often hampered by funding and infrastructure limitations.

Overall Perception of Green Finance Opportunities in Sustainable Transport (OP3)

The general perception of green finance opportunities in Ethiopia, as measured by OP3, received a mean score of 3.76 out of 5, with a standard deviation of 0.772 and a statistically significant p-value of 0.000. This indicates that respondents generally agree that there are considerable opportunities for green finance in the transport sector. Interview findings echoed this sentiment, emphasizing the sector's potential for growth but noting the need for better alignment between policies, financial mechanisms, and stakeholder engagement to realize these opportunities. The alignment of these elements is crucial for unlocking the full potential of sustainable transport as a driver for green finance. The findings validate that sustainable transport holds significant promise to advance green finance in Ethiopia. However, realizing this potential requires addressing key challenges, including improving the clarity and robustness of government policies, increasing financial institution involvement, and raising awareness among stakeholders. By tackling these issues, Ethiopia can unlock new green finance opportunities, contributing to environmental sustainability and economic development through innovative transport solutions.

Potential for Green Finance Investments in Green Buildings (GB1)

The survey assessed whether the construction of green buildings in Ethiopia presents opportunities for green finance investments (GB1). The results showed that 33.5% (147 respondents) agreed, 11.6% (51 respondents) strongly agreed, and 20.5% (90 respondents) were neutral. A small

percentage, 6.1% (32 respondents), disagreed or strongly disagreed. This indicates a substantial recognition of the investment potential of green buildings, though the neutral responses suggest room for further awareness-building about the opportunities this sector offers. An interview with an urban development expert highlighted similar sentiments, noting, "Green buildings are a new concept for many in Ethiopia, but the potential is immense given the increasing urbanization and the need for sustainable infrastructure."

Support from Financial Institutions for Green Building Projects (GB2)

GB2 examined the role of financial institutions in funding green building projects. Survey results revealed that 34.4% (151 respondents) agreed and 11.6% (51 respondents) strongly agreed, while 21.2% (93 respondents) were neutral. A minority, 5.8% (25 respondents), disagreed or strongly disagreed. While the results demonstrate some level of support from financial institutions, the significant proportion of neutral responses suggests a gap in the visibility or availability of dedicated financial products for green building projects. An interview with a financial institution executive revealed that "While banks are increasingly interested in green financing, the lack of technical knowledge and low demand from developers limit the expansion of products specifically for green buildings".

Government Policies and Regulations Supporting Green Buildings (GB3)

The evaluation of government policies and regulations supporting green buildings (GB3) revealed that 31.9% (137 respondents) agreed, 11.9% (51 respondents) strongly agreed, and 23.7% (102 respondents) were neutral. Only 6.3% (30 respondents) disagreed or strongly disagreed. Interviews with policymakers from the Ministry of Urban Development underscored this issue. One official stated, "While there are policies promoting energy efficiency and sustainability in construction, the enforcement mechanisms are weak, and developers often lack clarity on the benefits and processes involved."

Overall Perception of Green Finance Opportunities in Green Buildings (OP4)

The general perception of green finance opportunities in Ethiopia, as measured by OP4, yielded a mean response of 3.66 out of 5, with a standard deviation of 0.895 and a statistically significant p-value of 0.000. This demonstrates strong agreement among respondents that there are considerable opportunities for green finance in Ethiopia, particularly through green buildings. Interviewees

unanimously supported this view, emphasizing that the sector has untapped potential but requires cohesive efforts from all stakeholders.

The findings affirm the substantial opportunities green buildings present for advancing green finance in Ethiopia, supported by promising survey results and complementary insights from interviews. However, realizing these opportunities requires a more structured and collaborative approach. The government must play a pivotal role by establishing clear and robust policies that incentivize sustainable building practices. Simultaneously, financial institutions need to design targeted products and increase their outreach to developers, fostering a stronger connection between financial resources and the construction sector. Moreover, stakeholders, including policymakers, real estate developers, and financial institutions, should invest in raising awareness and providing education about the benefits of green buildings and green finance. Building this knowledge foundation can shift perceptions and promote action, ultimately driving the adoption of sustainable practices. A unified effort across these domains will help unlock the sector's full potential, positioning green buildings as a cornerstone of Ethiopia's green finance future.

Comprehensiveness of Policy Frameworks (PF1)

Respondents were asked whether the government has established comprehensive policy frameworks to promote green finance initiatives. Of the 320 respondents, 136 (31.6%) agreed and 38 (8.8%) strongly agreed, while 111 (25.8%) were neutral. A smaller percentage, 35 (7.7%), disagreed or strongly disagreed. This distribution indicates that 40.4% of respondents acknowledged the presence of such frameworks, but the substantial neutral response rate (25.8%) suggests uncertainty or a lack of awareness about their comprehensiveness. The minimal disagreement rate (7.7%) implies limited opposition, though concerns persist regarding the absence of detailed and actionable elements in the policies.

Clarity and Incentives in Policy Frameworks (PF2)

When evaluating whether the policy frameworks provide clear guidelines and incentives for green finance investments, 129 respondents (30%) agreed and 30 (7%) strongly agreed, while 117 (27.1%) were neutral. A total of 44 respondents (9.4%) disagreed or strongly disagreed. These findings reveal that while 37% of respondents acknowledged the frameworks' intentions, the high neutral response rate (27.1%) reflects uncertainty about the clarity and effectiveness of the policies.

The disagreement rate (9.4%) further indicates dissatisfaction among some stakeholders. Interviews with financial experts revealed that, although policies exist, they lack specific incentives, such as tax breaks or subsidies, to make green finance investments more attractive. This highlights the need for the government to refine policies and introduce targeted measures to enhance their effectiveness.

Monitoring and Adaptation to Best Practices (PF3)

Respondents were also asked whether the government actively monitors and updates policy frameworks to align with the best international practices. Of the respondents, 131 (30.4%) agreed and 34 (7.9%) strongly agreed, while 114 (26.4%) were neutral. A smaller proportion, 41 respondents (8.6%), disagreed or strongly disagreed. Although 38.3% of respondents recognized the government's efforts, the significant neutral response rate (26.4%) suggests ambiguity about the effectiveness of monitoring and alignment processes.

Overall Perception of Green Finance Opportunities (OP5)

The general perception of green finance opportunities in Ethiopia was assessed through a question labeled OP5. The mean response score was 3.48 out of 5, with a standard deviation of 0.889 and a statistically significant p-value of 0.000. This reflects a moderate agreement among respondents regarding the existence of green finance opportunities. However, the variability in responses indicates room for improvement. The survey results validate the assumption that policy frameworks play a crucial role in facilitating green finance in Ethiopia. However, to fully realize these opportunities, there is a need for enhanced and more detailed government policies, greater support from financial institutions, and increased awareness and education about the benefits and specifics of green finance policies. Addressing these areas can help unlock the full potential of green finance, driving sustainable development in Ethiopia.

Availability of Innovative Funding Methods (IFM1)

Respondents were asked whether innovative funding methods are available in Ethiopia to facilitate green finance investments. Of the 320 respondents, 147 (34.1%) agreed and 36 (8.3%) strongly agreed, accounting for 42.4% of total responses. Additionally, 101 respondents (23.5%) were neutral, and 36 respondents (8.3%) disagreed or strongly disagreed. These findings suggest that a notable portion of respondents recognize the availability of innovative funding methods such as

green bonds and crowdfunding. However, the number of respondents who disagreed or strongly disagreed, combined with a significant neutral response rate, indicates some uncertainty or limited awareness regarding these mechanisms. This underscores the need for further education and exposure to innovative funding methods to help bridge the knowledge gap.

Diversity and Flexibility of Financing Options (IFM2)

When asked about the diversity and flexibility of financing options offered by financial institutions for green projects, 152 respondents (35.2%) agreed and 45 (10.4%) strongly agreed, accounting for 45.6% of total responses. Furthermore, 96 respondents (22.2%) were neutral, and 27 respondents (5.9%) disagreed or strongly disagreed. These results highlight that nearly half of the respondents acknowledge the availability of flexible financing options for green projects. However, the relatively small percentage of respondents who disagreed or strongly disagreed suggests that there may still be gaps in understanding or accessibility of these financing products, requiring further efforts to increase their appeal and accessibility.

Government Support for Innovative Funding Mechanisms (IFM3)

The survey also explored whether the government supports and promotes the use of innovative funding mechanisms for green finance projects. A total of 163 respondents (39.3%) agreed and 21 respondents (5.1%) strongly agreed, making up 44.4% of total responses. Additionally, 97 respondents (23.4%) were neutral, and 36 respondents (8.4%) disagreed or strongly disagreed. These findings suggest that a significant portion of respondents recognize government efforts to promote innovative funding mechanisms. However, the neutral responses imply that government initiatives may not be widely recognized or understood, and the small proportion of respondents who disagreed suggests that the support may not be perceived as robust or impactful.

Overall Perception of Green Finance Opportunities (OP6)

The general perception of green finance opportunities in Ethiopia was assessed through OP6, which yielded a mean response score of 3.57 out of 5, with a standard deviation of 0.872 and a statistically significant p-value of 0.000. This suggests a moderate level of agreement among respondents regarding the existence of green finance opportunities in the country. However, the variability in responses indicates that there are areas for improvement, particularly in raising awareness and addressing access barriers.

The survey results validate the assumption that innovative funding methods present significant opportunities for green finance in Ethiopia. However, to fully realize these opportunities, there is a need for increased awareness and education about these methods, enhanced support from financial institutions, and more proactive government promotion and support. Addressing these areas can help unlock the full potential of innovative funding methods, driving sustainable development in Ethiopia.

Financial Institutions and Green Infrastructure (GI2)

When assessing the active involvement of financial institutions in financing green infrastructure projects (GI2), 33% (141 respondents) agreed, and 12.2% (52 respondents) strongly agreed. However, the neutral responses (24.4%, or 104 respondents) suggest that while there is some recognition of financial institutions' role, more clarity is needed regarding the extent of their engagement. Additionally, 5.3% (23 respondents) disagreed or strongly disagreed, indicating that some respondents may not fully perceive the active involvement of financial institutions. A financial analyst remarked, "Financial institutions are beginning to see the value in financing green infrastructure, but there needs to be more visible and accessible financing options tailored to these projects."

Government Support for Green Infrastructure (GI3)

In terms of government support and policies for green infrastructure projects (GI3), 32.7% (140 respondents) agreed, and 14.3% (61 respondents) strongly agreed. Although this suggests a positive acknowledgment of government efforts, 22.6% (97 respondents) remained neutral, and 4.9% (22 respondents) disagreed. The high percentage of neutral responses points to perceived ambiguity or inconsistency in the government's policies and support mechanisms. A government official added, "While there are policies in place to support green infrastructure, their implementation and the level of support can be inconsistent and sometimes lack the needed incentives."

Overall Perception of Green Finance Opportunities (OP7)

The general perception of green finance opportunities in Ethiopia, as measured by OP7, yielded a mean response of 3.68 out of 5, with a standard deviation of 0.869 and a statistically significant p-value of 0.000. This indicates a strong consensus among respondents that there are substantial

opportunities for green finance in Ethiopia. However, the variability in responses suggests that there are areas for improvement, particularly in raising awareness and addressing barriers to access. An investment strategist noted, "Green infrastructure presents significant opportunities for green finance, but to fully harness these opportunities, there must be an integrated approach involving robust policy support and active financial institution participation.

The survey results validate the assumption that green infrastructure projects present significant opportunities for green finance in Ethiopia. However, to fully realize these opportunities, there is a need for enhanced government policies, greater support from financial institutions, and increased awareness and education about the benefits of green infrastructure and green finance. Addressing these areas can help unlock the full potential of green finance, driving sustainable development in

4. CONCLUSION AND RECOMMENDATIONS

This study investigated the opportunities and challenges of green finance in promoting inclusive sustainable growth in Ethiopia, a nation with significant potential for renewable energy and sustainable development, yet faced with critical economic and environmental challenges. The study adopted a mixed-methods triangulation design, combining both quantitative and qualitative approaches to ensure a comprehensive understanding of the issues. Primary data was collected through structured questionnaires and unstructured interviews, while secondary data was sourced from existing literature, policy documents, and reports. The mixed-method approach enabled the validation of findings from diverse perspectives, ensuring the reliability and depth of the study.

The study was grounded in key theoretical frameworks, including Sustainable Finance Theory, Environmental Economics Theory, Ecological Modernization Theory, and Resource Efficiency Theory. These theories provided a robust foundation for analyzing how financial systems can be leveraged to address environmental challenges, promote sustainability, and achieve long-term economic stability. Sustainable Finance Theory emphasizes integrating environmental, social, and governance (ESG) factors into financial decision-making, while Environmental Economics Theory stresses the need to internalize the costs of environmental degradation.

Ecological Modernization Theory highlights the role of technology and market-based solutions in achieving sustainable development. Resource Efficiency Theory underscores optimizing resource use to reduce environmental impacts. These frameworks were instrumental in contextualizing the challenges and opportunities within Ethiopia's unique socio-economic environment. Findings revealed that despite Ethiopia's commitment to sustainability through strategies like the Climate Resilient Green Economy (CRGE), several barriers impede the advancement of green finance. More specifically, the findings highlight a significant gap in awareness, with only 5% of respondents reporting moderate to high familiarity with green finance concepts. This lack of awareness is primarily attributed to insufficient educational initiatives and the absence of dedicated institutions to promote green financial literacy. Respondents noted that the availability of accessible resources and clear information on green finance mechanisms is critical for improving awareness among different stakeholders.

Despite the limited awareness, there is an optimistic perception regarding the success of green finance initiatives in Ethiopia. About 73% of respondents viewed these initiatives as moderately

successful in addressing social and environmental issues, such as reducing carbon emissions and supporting renewable energy projects. Respondents also pointed out that the measurable benefits of green finance, such as creating employment opportunities through green jobs and fostering innovation in renewable energy technologies, have yet to be fully realized due to various systemic challenges.

The study identifies sustainable agriculture and renewable energy projects as key opportunities for driving inclusive, sustainable growth. These areas are seen as crucial investment targets due to Ethiopia's abundant renewable energy resources, such as hydropower, wind, and solar energy. However, the study also brings to light several persistent challenges that hamper the effective implementation of green finance, including limited financial resources, weak regulatory frameworks, and inadequate project preparation and design. Respondents cited an inconsistent policy environment, where government support for green finance initiatives lacks continuity and coherence, as a significant barrier. Furthermore, stakeholder engagement was found to be inadequate, with limited involvement from financial institutions and a lack of robust public-private partnerships. These issues have created a fragmented approach to green finance, reducing its effectiveness in meeting sustainability objectives.

The analysis, supported by descriptive statistics and the use of measurement models, reinforces the need for a more structured and strategic approach to green finance in Ethiopia. Respondents emphasized the importance of establishing clear and enforceable regulations, increasing awareness campaigns, and fostering collaboration between the government, private sector, and civil society. Addressing these challenges would require scaling up financial resources, improving the capacity of institutions to manage green projects, and encouraging the private sector to actively participate in green finance.

4.1. Recommendation and Future Research Direction

4.1.1. Recommendation

To address the awareness gap, it is crucial to implement comprehensive green finance awareness campaigns targeting policymakers, financial institutions, and the general public. These campaigns could leverage multimedia platforms, workshops, and educational initiatives to increase understanding of green finance opportunities and benefits.

In tackling the regulatory framework limitations, Ethiopia shall establish a robust, transparent, and well-defined policy framework specifically for green finance. This could include mandating ESG (Environmental, Social, and Governance) criteria for investment decisions, incentivizing private-sector participation through tax benefits, and creating regulatory bodies to monitor compliance with green finance standards.

Establish standardized project preparation methodologies and provide technical assistance grants to ensure green projects are well-structured and bankable. Collaborate with international agencies and academic institutions to offer capacity-building programs and certification schemes that equip professionals with the necessary skills for green finance initiatives.

Introduce a broader range of green finance options, including green bonds, sustainability-linked loans, and crowdfunding platforms, tailored to various sectors such as agriculture, energy, and infrastructure. Develop secondary markets to increase the attractiveness and accessibility of these financial instruments.

For capacity building, targeted training programs should be introduced for stakeholders, including government officials, financial institutions, and project developers. These programs should focus on green finance structuring, risk management, and project evaluation techniques to improve efficiency and effectiveness in managing green investments.

On the matter of stakeholder engagement, a national green finance consortium could be established, comprising public institutions, private investors, NGOs, and international organizations. This consortium would facilitate coordination, resource mobilization, and the sharing of best practices.

Implement microfinance schemes and subsidized loan programs to make green finance accessible, particularly for SMEs. Encourage blended financing models that combine public and private investments to share risks and attract more capital into green initiatives.

Finally, Ethiopia should consider leveraging technology and innovation by promoting digital solutions like blockchain for transparent project financing and monitoring, and by investing in emerging green technologies, such as energy storage and smart grid systems, to reduce costs and improve project efficiency. By implementing these recommendations, Ethiopia can address the challenges and capitalize on the opportunities identified in this study. This will not only accelerate the adoption of green finance but also contribute significantly to the country’s broader goals of sustainable and inclusive growth. Future research should explore the practical implementation of these recommendations and evaluate their long-term impacts on Ethiopia's development route.

4.1.2. Future Research Direction

Future research in green finance within Ethiopia should focus on several critical areas to enhance its impact and address existing challenges. One priority is the development of localized financial instruments, such as green bonds, sustainability-linked loans, and innovative pay-for-performance mechanisms, tailored to Ethiopia's socio-economic and environmental context. Additionally, studies should investigate how Ethiopia's political and economic stability, including regional conflicts and global economic shocks, influence the mobilization and effectiveness of green finance initiatives. Expanding renewable energy investments is another key area, requiring strategic research into overcoming technological and financial barriers to fully leverage Ethiopia’s potential in hydropower, wind, and solar energy.

Building awareness and capacity among stakeholders is equally important, and future studies could evaluate the effectiveness of educational campaigns, workshops, and training programs for financial institutions, policymakers, and communities. Research should also address equity issues by examining disparities in access to green finance between urban and rural areas and identifying strategies to ensure resources are distributed inclusively. Furthermore, robust monitoring and evaluation frameworks are needed to assess the long-term social, economic, and environmental impacts of green finance projects, with a focus on transparency and accountability.

Exploring the role of green entrepreneurship and innovation is another area of interest, particularly in understanding barriers to entry, funding challenges, and opportunities for job creation through green startups. Additionally, studies could assess Ethiopia's engagement with international green finance initiatives, such as the Green Climate Fund, to identify strategies for attracting global investment and aligning local policies with international standards. By addressing these research priorities, Ethiopia can develop a stronger green finance ecosystem that drives sustainable and inclusive growth.

5. NEW SCIENTIFIC RESULTS

This study presents groundbreaking insights into the transformative role of green finance in fostering inclusive and sustainable economic development in Ethiopia, a country characterized by its low-income status but abundant natural resources. By integrating robust theoretical frameworks with empirical evidence, the research offers a nuanced understanding of the mechanisms through which green finance can drive environmental sustainability, economic resilience, and social inclusion. The findings contribute significantly to the growing body of knowledge on green finance, particularly within the context of developing economies, where financial, structural, and institutional challenges often impede progress. The following points are considered the new scientific findings of the study.

1. The study identifies unique barriers to green finance in Ethiopia, including limited institutional capacities, insufficient stakeholder awareness, and a lack of localized financial instruments. Unlike developed economies, where green finance faces challenges such as market mispricing or regulatory alignment, Ethiopia's issues are deeply rooted in structural economic constraints and reliance on international grants and concessional funding.

2. The research found the significant influence of external factors such as regional conflicts, the COVID-19 pandemic, and global economic shocks on Ethiopia's ability to mobilize green finance. These factors exacerbate existing vulnerabilities, particularly in maintaining a stable policy and investment environment. This finding underscores the interconnectedness of political and economic stability with the successful implementation of green finance initiatives.

3. The study found Ethiopia's vast renewable energy potential, particularly in hydropower, solar, and wind energy, as a primary driver for green finance opportunities. It demonstrates how strategic investments in these sectors could serve as a foundation for sustainable economic growth while reducing dependency on fossil fuels and mitigating climate change impacts.

4. The study identifies international collaboration as a critical enabler for green finance in Ethiopia. Engagement with global initiatives like the Green Climate Fund and alignment with international standards can help mobilize resources and expertise, fostering the scalability of green finance initiatives.

5. The findings underscore the necessity of integrating green finance with broader sustainable development strategies. By aligning green finance initiatives with Ethiopia's Climate Resilient Green Economy (CRGE) strategy and the Sustainable Development Goals (SDGs), the country can achieve greater coherence and impact in its development agenda.

These scientific findings contribute to the academic discourse on green finance, offering valuable insights for policymakers, financial institutions, and development practitioners working in developing countries. They highlight the multifaceted nature of green finance and its potential to drive transformative change when tailored to the specific context of a nation like Ethiopia.

6. SUMMARY

Step-by-Step Research Process in the Context of Green Finance in Ethiopia

1. Targeted Keyword Selection for Green Finance: The research process commenced with the careful selection of relevant keywords specific to green finance in Ethiopia. These keywords were chosen to capture key aspects such as sustainable investment, climate finance, policy frameworks, renewable energy funding, and financial sector involvement. This step ensured that the search results would be aligned with the core research objectives.
2. Strategic Web Search and Literature Review: Using the selected keywords, an extensive search was conducted across multiple sources, including academic databases, government reports, policy documents, and financial institution records. This was not a simple task of retrieving articles but a structured approach to identifying the most credible and relevant data. The goal was to build a comprehensive knowledge base on Ethiopia's green finance landscape.
3. Research Design: A concurrent triangulation design combining qualitative and quantitative methods was used to explore green finance opportunities and challenges in Ethiopia.
4. Research Approach: A mixed-method approach was employed to ensure a comprehensive understanding of the research problem.
5. Data Type & Source: Primary data was gathered through questionnaires and in-depth interviews, while secondary data was sourced from documents and reports.
6. Population & Sampling: A sample of 384 respondents from financial institutions and government agencies was selected using purposive and convenience sampling.
7. Data Analysis: Descriptive and inferential statistics were applied using Microsoft Excel and SMART PLS software.
8. Reliability & Validity: Cronbach's alpha and composite reliability ensured measurement consistency, while convergent validity was assessed using AVE.
9. Ethical Considerations: Confidentiality, informed consent, and ethical standards were upheld throughout the research process.

APPENDEXIES

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