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Article

The Role of Social Entrepreneurship in Addressing Climate Change

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Abstract: This research aimed at examining how social enterprises mitigate climate change in Ghana, examining their strategies, impacts on the environment that affect climate change, and barriers. The research adopted a cross-sectional survey design, descriptive and involved 185 social enterprises. Questionnaires were administered online and data was analyzed using descriptive statistics and regression analysis. The findings revealed that the most used strategies include the development of new funding structures and advocacy for sustainable farming. It also highlights numerous environmental concerns such as the judicious use of hazardous materials and pollution. Nevertheless, results from regression analysis showed that the relationship between the number of social entrepreneurship activities and the impact on the environment is relatively low and the role of other factors may be more significant. Some of the main barriers that were found include competition from large organizations, cultural perspectives towards climate change, policy instability and lack of adequate technical education. Accordingly, the recommendations proposed are developing specialized funding programs for climate-focused social enterprises; climate change education and awareness campaigns; and capacity building to upgrade technical competencies in clean technologies and climate resilience design.

Keywords: social entrepreneurship**;** climate change; Ghana

1. Introduction

Climate change remains a significant threat to human beings, the economy, and society's social structures. Global climate studies reveal that 2100 people in different territories may experience several climate threats at once that could result in societal collapse [1,2]. As highlighted by the Intergovernmental Panel on Climate Change (IPCC), there is a need for society-wide shifts to reduce emissions of greenhouse gases and limit climate change consequences [3]. Whereas traditionally, governments and multilateral agencies have been critical in initiating climate change initiatives, there is increasing awareness of the potential for social entrepreneurship to bring novel solutions [4].

Social entrepreneurship is defined as using entrepreneurship to solve social and environmental issues, primarily focusing on the impact on society rather than profit [5]. Social entrepreneurs are crucial change agents to fight climate change and drive sustainable development through innovative technologies, business models, and approaches. They create ecological innovations in cleantech [6] and apply ICT tools to address social issues [7]. Social entrepreneurship meets sustainable development since it combines reducing poverty levels and environmental conservation [8], especially in developing nations. For instance, social enterprises are credited for introducing off-grid solar systems and clean cookstoves for low-income consumers [9]. Some stakeholders focus on enhancing energy conservation, transport, waste management, and conservation of ecosystems [10].

Social entrepreneurship can foster climate action in the following ways: First, social entrepreneurs can be intimately connected with the communities they represent and understand the context of the problems in those communities [11]. Second, they are ready to take calculated risks and try new solutions, which is crucial for developing innovation in the context of challenges such as

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climate change [12]. Third, social entrepreneurs can mobilize markets and engage with various actors, ensuring the replicability and longevity of intervention [13,14].

As much as social entrepreneurs have realized the importance of combating climate change, they encounter several challenges. Some are the availability of finance, technology, and networks; policy and regulatory barriers; and climate risk, which is complex and uncertain [15]. To address these challenges, governments, investors, and civil society must promote an environment supporting social entrepreneurship [16]. These include enhancing institutional involvement through collaborations in governance and co-governance [17], policy entrepreneurship to advance sustainable development goals and utilizing social capital to access resources and power [18].

However, there is increasing literature on the effectiveness of social entrepreneurship in combating climate change. Empirical evidence has shown that social businesses can reduce emissions, improve adaptive capacity, and advance sustainable development on different scales [19,20]. Given the current state of affairs and the pressing need to address climate change, fostering social entrepreneurship will make the global shift towards a low-carbon green economy possible. However, in the Ghanaian context, little is known about its application and relevance among social enterprises. This research aims to address this gap by exploring how social entrepreneurs in Ghana manage to address climate change through their strategies, the impacts of social enterprise's efforts on climate change, and the challenges that hinder social enterprises from responding to climate change. The study sought to answer the following research questions;

- RQ1: What are the key strategies employed by social enterprises in Ghana that successfully contribute to climate change mitigation and adaptation if any?
- RQ2: What are the environmental impact of social entrepreneurship initiatives focused on climate change?
- RQ3: What are the barriers faced by social enterprises in addressing climate change?

This research contributes to generating knowledge on practice, policy and research in social entrepreneurship and Climate change in Ghana and serves as a roadmap to other developing countries.

As for practice, the research will help identify Ghana's significant initiatives and effective practices of climate-related social enterprises. As such, these findings can help other social enterprises and organizations interested in designing suitable interventions to address and respond to climate change in comparable settings.

From a policy perspective, this study will reveal the challenges that social enterprises experience in combating climate change and possible ways of overcoming them. From this evidence, policymakers in Ghana and other developing countries can identify ways of supporting social entrepreneurship for climate action.

This article is structured as follows: Section 2 provides a comprehensive literature review covering the theoretical underpinnings of the study, conceptual review of social entrepreneurship, climate change and characteristics of climate-focused social enterprises. Finally, an empirical review of past and related studies is presented. Section 3 describes the methods used in this study. Section 4 presents the results of the study. Section 5 discusses the findings of the research questions. Finally, Section 6 concludes the article by summarizing the key findings, recommendations, and limitations of the study, and provides suggestions for future research directions in the field of social entrepreneurship in addressing climate change.

2. Literature Review

2.1. Theoretical Review

2.1.1. Social Innovation Theory

Social Innovation Theory explains how new solutions to social issues are created and deployed and, in many cases, are more successful and enduring than prior strategies [21]. This theory is helpful

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when studying social enterprises combating climate change, as this theory focuses on systems change, stakeholder engagement, and sustainability [22].

In its most basic form, Social Innovation Theory assumes that social innovations result from agents, institutions and cognitive frames [23]. Due to their crucial role in change processes, social entrepreneurs look for potential in existing social structures and bring together resources to develop change solutions [24]. This process frequently entails 'bricolage', whereby the entrepreneur inventively assembles the available resources to meet social needs [25].

Recent developments in Social Innovation theory have revealed that institutional entrepreneurship is an essential aspect of SI since the social innovators not only operate within institutions but also engage in processes of institutional formation [26]. This aspect can be especially pertinent to climate change, which entails policy, market, and culture transitions.

Furthermore, the theory also concerns the processes of scale, which are ways of amplifying the effects of successful innovations [27]. This may mean scaling up (expanding the size of the organization and its operations), scaling out or diffusing the innovation to other settings, or scaling depth (changing social norms and values) [28].

Social Innovation Theory will help the study understand how social enterprises create, operationalize, and amplify solutions to climate change challenges within the diverse social, economic, and environmental systems.

2.1.2. Institutional Theory

Knowledge Management (KM) theory, which evolved in the early 1990s, discusses knowledge creation, sharing, use, and management processes within organisations [27]. The theory focuses on knowledge as one of the key resources that can bring competitive advantage and enhance organisational performance [28]. KM theory identifies knowledge into two types: explicit, documented, and easily transferable, and tacit, which is individual, context-oriented, and hard to express [29].

From a theoretical perspective, institutional theory is a valuable lens through which to analyze relationships between organizations and their social, cultural, and legal contexts. This theory argues that organizations are designed and operated by technical and efficiency requirements and institutional constraints such as rules, norms, and beliefs [29].

Regarding climate change mitigation by social enterprises, Institutional Theory allows an understanding of their activities in the context of institutional environments. The concept of institutional isomorphism put forward by DiMaggio and Powell [30] is valid, postulating that organizations in a field become more similar over time because of coercive, mimetic, and normative pressures. However, recent advances in the theory have focused on institutional entrepreneurship and institutional work, which acknowledges the role of the actors in creating and transforming institutions [31].

As Greenwood et al. [32] explained, institutional complexity implies multiple institutional logics that are not necessarily aligned. This is especially so for SEs that operate with both social and environmental/economic goals in the context of climate change.

However, institutional theory also sheds light on the significance of legitimacy, which may help social enterprises gain support and resources. Specifically, Suchman [33] defines practical, ethical, and epistemological legitimacy: these types relate to climate-focused social enterprises as they seek to gain credibility among different stakeholders.

Recent studies by Stephan et al. [34] use Institutional Theory to analyze the prospects of social entrepreneurship, stating that institutional voids can be potential sources of opportunities. In the context of climate change, this might explain how social enterprises can appear to fill the shortages in environmental regulation.

Through the lens of Institutional Theory, this research can obtain some understanding of how social enterprises operate, adapt, and even influence the institutions relevant to climate change mitigation and adaptation.

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2.1.2. Ecological Modernisation Theory (EMT)

Ecological Modernisation Theory (EMT) is a theory that describes how society can respond to environmental issues by using technology, the market, and institutions. Emerging in the 1980s, EMT posits that sustainable economic growth and environmental conservation are harmonious and even synergistic [35].

In other words, EMT assumes that environmental issues can be resolved by continued technological progress and extension of the process of industrialization [36]. The theory is based on eco-innovation, market instruments, and environmental policy integration for sustainable development [37].

New trends in EMT have increased its applicability to global environmental concerns, such as climate change. According to Schlosberg and Rinfret [38], EMT can be used to analyze climate change governance, focusing on technological fixes and market mechanisms such as carbon pricing.

EMT has also added social aspects as a part of its later developments. Gibbs [39] states that the ecological modernization theory comprises social learning and institutional reflexivity. This aligns with the call for social enterprises to combat environmental issues.

Some authors contend that EMTs may be overly optimistic about the ability of current institutions to address environmental challenges [40]. However, supporters have argued that EMT offers an effective strategy for managing the environment in the context of capitalist systems [41].

In a similar work, Teixeira [42] extends the EMT to the circular economy concept, indicating its aptness for present-day sustainable practices. Consequently, the application of EMT in this research provided an understanding of how social enterprises participate in the processes of ecological modernization regarding climate change prevention and response.

2.2. Conceptual Review

2.2.1. Social Entrepreneurship

Social entrepreneurship is a concept that was just invented and has been receiving a lot of attention in recent years by scholars as a viable model for achieving sustainable social and environmental change. In essence, social entrepreneurship is similar to traditional entrepreneurship in that it employs innovative business practices and market orientation but primarily focuses on creating social value [43].

Social entrepreneurs are people or firms who design novel ways of addressing social issues for public good rarely offered by government and traditional market actors [12]. They stand out because they can spot a social cause, apply unique solutions, and be purposefully transformative [5].

Recent scholarship has expanded the understanding of social entrepreneurship in several key areas:

1. Hybrid Organizations: Most of these enterprises are a mix of both commercial businesses and non-profit organizations. This hybridity enables them to harness market rationality while preserving a deep and clear social purpose [44]. However, it also raises challenges of balancing and coordinating multiple institutional logics and addressing stakeholder demands [15].
2. Scaling Impact: Another area of focus in current literature relates to the impact of scaling in social enterprises. Various modes have been identified for scaling, namely growth, replication, and ecosystem [45]. In the case of sustained and generative change, Weber et al. [46] propose the process of what they refer to as ‘scaling deep’ in addition to scaling width.
3. Measuring Social Impact: Thus, measuring and evaluating social impact remains an open issue. More recent contributions have sought to build superior and generalized frameworks for better social impact assessment due to the nature of social value creation [47].
4. Institutional Context: Academia also began to acknowledge the role of the institutional environment in social entrepreneurship. Stephan et al. [34] show how legislation and norms can support or hinder social entrepreneurship in diverse countries.
5. Social Innovation: Social innovation is often linked to social entrepreneurship, as the two terms have become closely related. According to Cajaiba-Santana [23], SI is a more holistic way of

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looking at how innovation transpires and spreads to bring about positive societal shifts where social entrepreneurship is a part of the process that brings about this change.

6. Digital Social Entrepreneurship: The use of digital technologies has caused the emergence of new opportunities for social entrepreneurship. Kannampuzha and Hockerts [48] review how digital platforms allow social entrepreneurs to engage with beneficiaries, attract resources, and expand in new ways.

Thus, in the context of climate change, social entrepreneurship has been recognized as a viable source of ideas and practices for climate change mitigation and adaptation [49]. Social enterprises in this domain include start-ups creating renewable energy technologies for social businesses promoting sustainable agriculture and climate-smart community development.

2.2.2. Climate Change

Climate change has become one of the most discussed issues of the present age, defined as a long-term alteration of a planetary or regional climate caused explicitly by the enhancement of greenhouse gases in the atmosphere due to human activities [50]. Fossil fuel dependency and deforestation are the leading causes of global warming that significantly impact the earth's ecosystems, societies, and economy.

New studies have reinforced a scientific basis for anthropogenic climate change theories [51]. The Sixth Assessment Report of the IPCC stresses that many impacts of climate change will persist for centuries or millennia [50].

Climate change is present in several ways, such as global warming, rising sea levels, changes in the precipitation regime, and more intense and recurrent weather events [52]. Many of these changes pose acute threats to species extinction due to habitat and ecosystem disruption [53]. Furthermore, climate change significantly affects human health, food security, water supply, and economic resilience, especially in weaker populations and developing countries [54].

Climate change is no longer only an issue from the physical science aspect but also the socio-economic aspect of both the mitigation and the impacts. This has resulted in the emergence of integrated assessment models that involve physical climatology and economic and social systems to simulate scenarios and help in policy-making [55]. Furthermore, the idea of climate justice has emerged, drawing attention to the role of climate change in affecting vulnerable groups and the moral dimensions of climate change interventions [56].

The issue of climate change is complex, calling for mitigation measures that seek to reduce greenhouse gas emissions and adaptation measures that look at ways of dealing with climate change impacts. The Paris Agreement, adopted in 2015, represents a global commitment to limit warming to well below 2°C above pre-industrial levels, with efforts to limit it to 1.5°C [57]. Nonetheless, the current pledges and policies are insufficient to achieve these goals, thus highlighting the need for more robust action [58].

Climate change has also influenced change and innovation in so many sectors. Renewable energy technologies have been experiencing continuous improvement and deployment [59], whereas nature-based solutions are increasingly being acknowledged as solutions for climate change and biodiversity loss [60]. In addition, with the appearance of climate finance and green bonds, there are new ways to finance climate action [61].

2.2.3. Characteristics of Climate-Focused Social Enterprises

Climate change social businesses are described as organizations that apply business techniques combined with climate change objectives. Such entities are determined by the fact that they are mission-driven to respond to climate risks and are financially sustainable [15].

Another characteristic of climate-focused social enterprises is that they are creative in putting forward and enforcing climate change solutions. They sometimes rely on new technologies and innovative solutions to develop sustainable solutions for large-scale societies, including renewable energy, energy conservation, sustainable agriculture, and circular economy projects [62]. For

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instance, most of these ventures are key players in deploying and promoting sustainable energy solutions in emerging markets, thus aligning climate intervention with social justice [63].

Another essential feature is the focus on local context and involvement with a specific community. Some social enterprises' solutions target climates in particular geographic and socio-economic contexts because they understand that solutions to climate change must reflect local context [64]. This targeted approach allows them to manage climate risks while promoting sustainable development goals.

These organizations also usually have a significant level of emphasis on impact measurement and reporting. Due to the immediacy of the climate crisis, many climate-related SEs may have more formal and quantitative ways to measure and report their environmental outcomes, be it carbon emission cuts or enhancements of climate resilience [47]. Besides helping in fundraising and soliciting support, this focus on quantifiable results helps enrich knowledge on climate interventions.

Another feature of climate-focused social entrepreneurship is collaboration and networking. These organizations also keenly look for other stakeholders, such as governments, non-governmental organizations and the private sector, as it is well-understood that fighting climate change will require the involvement of all sectors [15]. They also take an international dimension, indicating global climate problems.

Lastly, climate-focused social enterprises' last attributes are flexibility and sustainability. These organizations are active in the complex and quickly changing environment for climate policy and technological innovation. This flexibility is well demonstrated in their governance structures, which are relatively more fluid than other established business or non-profit organizations [65].

2.3. Empirical Review

2.3.1. Key Strategies of Social Enterprises in Climate Change Mitigation and Adaptation

There has been a notable increase in the number of scholarly studies published on climate change mitigation and adaptation through the key strategies used by SEs in the last few years, showing the growing role of these organizations in tackling global environmental issues. This review aims to integrate the results of different empirical papers and provide the reader with a clear understanding of which approaches are more promising.

An effective strategy proposed in the literature is conceptualizing and implementing new clean energy technologies. Warnecke & Houndonougbo [66] discussed how social enterprises operate in the clean energy technological sector, particularly solar energy in developing nations. The cross-sectional study identified that about 1.3 billion people still do not have household electricity, and social enterprises are acting to provide this. Solar energy positively affects economic, social and environmental aspects of sustainable development. Social enterprises are considered significant in promoting ecological and social innovation for sustainability growth, as up to one-quarter of the UK's social enterprises are engaged in environmental objectives [67]. They differ in how they approach scaling of impact, which depends on their founding mission and interest orientation [68].

Another strategy includes promoting nature-based solutions to tackle climate change and its impacts. Chausson et al. [69] examined the role of nature-based solutions (NbS) in 385 reviewed studies. They highlighted that social enterprise is one of the critical actors implementing such solutions, especially in the coastal and urban environments most affected by climate change. Their assessment found that such enterprises could help achieve multiple ecological restoration objectives and community resilience.

Another strategy that has also been noted to be relevant for climate-focused social enterprises is the circular economy. In a study by Lazarevic and Valve [70], the authors focused on exploring the potential of social enterprises in enhancing circular economy principles in the Finnish textile sector. According to their studies, these organizations are best at developing new value chains that minimize waste and energy use and employ vulnerable groups. In addition, Goworek et al. [71] followed a group of social enterprises from the United Kingdom operating in the fashion industry, exploring

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how these organizations effectively integrated upcycling and recycling with consumer awareness campaigns for more responsible consumption.

Strategic partnerships and networks have been described as essential levers to achieve scale. Phillips et al. [13] undertook a systematic review of social innovation regarding climate change and identified that effective SEs collaborated with other sectors to access and share capital and knowledge. They found these partnerships most helpful in resolving complex and crosscutting climate issues.

Another emerging strategy is the creation of new funding models. Lehner and Nicholls [72] analyzed social ventures using crowdfunding for renewable energy projects in Europe, thus providing insights into how these organizations can use digital technology to engage communities in supporting climate change initiatives.

Increasing education and awareness raising has been identified as one of the most essential additional approaches. According to Baltador & Grecu [73], SEE can help students understand sustainability issues, increase motivation to promote sustainability and gain knowledge of tools and methods for designing and implementing sustainable business models.

2.3.2. Environmental Impact of Social Entrepreneurship Initiatives Focused on Climate Change

Renewable Energy and Energy Efficiency

Much literature has been dedicated to discussing the environmental impact of social enterprises in climate change. Warnecke and Houndonougbo [66] analyzed the effect of solar power programs in developing countries. They discovered that social businesses have provided electrical energy to almost half of the population of developing nations through modern solar lighting devices. Their study showed that such programmes do not only tackle energy poverty but also climate change since 990,000 tons of carbon were averted.

Hain et al. [74] undertook a comparative study of community-based renewable energy systems in Germany and the United Kingdom. It was established that social enterprises were helpful in resource mobilization and enhancing acceptance of RE technologies among the public. The study indicated that each community-based project was able to cut the annual CO2 emission by 3000 tons on average.

Kumar & Tiwary [75] employed the theories of co-production and social capital to discuss the involvement of social enterprises in disseminating cleaner energy to resource-poor communities. This research revealed that social enterprises played an intermediary role between communities and technology developers in creating new social capital and encouraging the use of cleaner energy.

Different social entrepreneurship initiatives in sustainable agriculture have indicated a positive impact towards climate change. Seyfang [76] investigated CSA in the UK and noted that the social enterprise business models had 30% fewer food miles than conventional supply systems, significantly reducing their emissions from transport.

A case study in IDA identified that a mechanical biological treatment plant for processing 100 tonnes per day could get a negative emission of -25. Sixty-eight tons of CO_2 equivalent per 100 tons of municipal solid waste processed [77]. For instance, a waste-to-energy development plan in Sri Lanka could prevent about 380000 tons of CO2 emissions yearly [78]. Likewise, a study conducted in Myanmar found that sustainable biodegradable waste utilization could avoid 3500-4000 Gigagrams of CO2-eq of GHG emissions per year [79].

An analysis of the contributions of social entrepreneurship in the transportation sector reveals a possibility of notable emission cuts. Geels [80], in his study on bike-sharing schemes in European cities, observed that the socially oriented enterprise-based bike-sharing systems cut car use by an average of five percent in the cities, thus resulting in an estimated annual saving of thirty thousand, seven hundred and fifty tones of CO_2 per million of inhabitants.

Martin and Shaheen [81] surveyed car-sharing SEs in North America. They pointed out that each car-sharing vehicle could replace 9-13 private cars and decrease the average user's transport-related CO2 emissions by 0.58-0.84 tons per year.

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While most social entrepreneurship activities aim at risk reduction, some are directed towards managing climate change impacts. Panyakul [82] examined how Green Net, a Thai agro-based social enterprise, strives to enhance adaptive capacity among its organic and fair trade rice farmers in Yasothorn, a Northeastern province of Thailand. This study discovered that climate adaptation activities were effectively incorporated into Green Net's organic and fair trade schemes.

In a cross-sectional study of fair trade social enterprises conducted by Huybrechts and Nicholls [64], it was established that climate adaptation programmes undertaken by these organizations helped over 1.5 million small-scale producers across the globe, thereby reducing vulnerability to climate impacts.

2.3.3. Barriers Faced by Social Enterprises in Addressing Climate Change

Financial Constraints

Privation of funds is one of the most cited limitations in the literature. Doherty et al. [15] established that the hybrid nature of social enterprises makes them financially constrained in their ability to source funding for climate initiatives. Likewise, a survey of 150 social enterprises across Europe by Richter [83] highlighted that funding is a significant challenge to scaling climate change solutions, with 73% of respondents complaining of inadequate funding.

This difficulty is compounded by the fact that most social enterprises are located in developing nations. In a case study, Ramos-Mejía et al. [84] identified that Colombian social enterprises faced problems related to credit constraints and high interest rates that prevented them from investing in clean technologies and sustainability.

Regulatory and Policy Barriers

Another critical challenge is the legal framework that does not always provide sufficient or appropriate legal protection for social enterprises. Hillman et al. [85] argued that policy frameworks in 10 European countries highlighted the absence of legal forms for social enterprises as a problem in accessing particular funding and climate action support structures. Moreover, the volatility of climate policies can cause uncertainty for social enterprises. Some studies find that climate policy uncertainty (CPU) negatively influences green innovation and digital transformation in Chinese enterprises [86,87].

Market Challenges

The challenges that social enterprises experience include the inability to compete with well-established players in the climate solutions market effectively. In a study of 200 social entrepreneurs in India, Goyal and Sergi [88] revealed a 62% response to the difficulty of scaling up climate-friendly products due to competition from larger firms.

Moreover, there is the issue of consumers' awareness and willingness to pay for greener products. Thompson et al. [89] conducted a mixed-methods study in the UK. They noted that despite consumer interest in environment-friendly products, consumers could not purchase products from social enterprises due to affordability.

Technological and Human Resource Limitations

Unfortunately, many social entrepreneurs lack the technical skills to design and execute sophisticated climate strategies. In a study by Creech et al. [62], which interviewed social entrepreneurs in Sub-Saharan Africa, the authors noted that lack of technology expertise was a significant factor limiting innovation in climate adaptation approaches.

Another area of concern is human resource constraints or limitations, which are considered formidable hurdles. Mair et al. [90] examined 300 social enterprises from different countries. They concluded that recruiting and retaining qualified employees is challenging for groups addressing complex climate problems that demand specific expertise.

Measurement and Impact Demonstration

It proved a challenge for social enterprises to demonstrate the effectiveness of their interventions in climate change mitigation and adaptation. Ormiston and Seymour [91] studied the impact reporting of 100 social entrepreneurial organizations. They argued that most had weak frameworks

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for measuring their environmental impacts, reducing the chances of attracting funders and supporters.

This challenge is made worse because climate change impacts are long-term in nature. In a study on US-based social enterprises, Lee and Jay [92] observed that the case studies highlighted the difficulties associated with showing short-term returns when it takes extended periods for climate change to manifest itself.

Institutional and Cultural Barriers

Organizational, legal, and cultural frameworks may also hinder social enterprises' climate actions. In a study on sustainable supply chain social enterprises, Bals and Tate [93] pointed out that entrenched business practices and resistance to change within partner organizations often hindered the implementation of climate-friendly innovations.

One of the cultural factors is cultural attitudes towards climate change itself. Comparing developed and developing countries, Haugh and Talwar [94] observed that social enterprises were more challenged with legitimacy issues in attaining community support when climate change scepticism was comparatively high.

3. Materials and Methods

3.1. Research Design

A quantitative research design was suitable for this research on social enterprises involved in climate change mitigation and adaptation because it facilitated the measurement and comparison of variables among organizations. This approach offers generalizable knowledge about climate-focused social enterprises' strategies, effects, and barriers.

In particular, this study used cross-sectional survey research design to effectively collect data on different types of social enterprises simultaneously [95]. This approach allowed the collection of comparable data on organizational characteristics, strategies, impacts, and challenges experienced, which was analyzed statistically and hypothetically [96].

A quantitative approach is also more appropriate, given the increasing focus on impact measurement in the social enterprise sector [47]. This research generated empirical knowledge in quantifying climate-focused social enterprise outcomes and strategies and informed evidence-based practices and policies in the field.

3.2. Study Population

Social enterprises are generally understood as organizations applying business solutions for social or environmental purposes [97]. Concerning this context, the population for this study would include organizations engaged in both business and climate change mitigation, such as GHG emission reduction, renewable energy, climate resilience and or sustainable practices. Almost 28000 social enterprises are functioning in Ghana [98].

3.3. Sampling Technique and Sample Size

The research method for this study on climate-focused social enterprises is convenience sampling. Convenience sampling is a non-probability technique using accessible and willing participants [99]. In the case of social enterprises combating climate change, this approach may be especially effective given the multifaceted and often global reach of organizations of this type. The problem of collecting a list of all climate-social entrepreneurship ventures all over the world makes probability sampling problematic [100].

Another reason for using convenience sampling is its efficiency and affordability, especially when working with a hard-to-sample group like climate-focused social enterprises [101]. This was important because it enabled the researcher to request information from organizations that are likely to be easily located through networks, databases or events, especially given that time and resources in the academic setting often limit research.

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The sample size was set at 200. This was deemed sufficient for many statistical tests and is consistent with guidelines for structural equation modelling, frequently used in organizational research [102]. For complex models, Kline [103] indicates that large sample sizes may be adequate. Furthermore, research focusing on social enterprises has adopted large samples in their investigation.

3.4. Data Collection Procedure

The data collection process of this study on climate-focused social enterprises involved a structured online survey, which has gained popularity in past years in organizational research because of its convenience and feasibility of accessing participants located in different geographical areas [105].

The survey was conducted by employing Google Forms, which includes various advanced tools for creating complex surveys and ensuring the confidentiality of the respondents' data [106]. The questionnaire was divided into sections that concerned the demographics of the respondents. These measures were taken and planned for climate change mitigation and adaptation, as well as perceived effects and difficulties.

To address the issue of content validity, the survey instrument was constructed from the literature and validated scales. For example, the items assessing social entrepreneurship orientation were adapted from literature, while the measures assessing environmental performance were sourced from [107]. Similarly, the items assessing the faced by social enterprises in addressing climate change were sourced from empirical findings. The survey was piloted to selected social enterprise leaders and academics to validate the questions and their clarity [108].

Respondents were recruited via snowballing from social enterprise networks, climate action groups, and lists of sustainable businesses. The first communication was an email that contained an overview of the study, the estimated duration of participation and a guarantee of data anonymity.

To ensure a high response rate, the study used Dillman's Tailored Design Method, which involves sending invitation reminders and highlighting the importance of responding to the given questionnaires [109]. Follow-up emails were sent at an interval of 1 week, and data collection was done between 4 and 6 weeks. There was strict adherence to ethical considerations in each stage of data collection. All participants provided voluntary consent to participate in the study and had their data analyzed anonymously and stored on a password-protected computer, as Harriss et al. [110] recommended.

3.5. Data Analysis

The analysis was conducted using statistical software, SPSS (Statistical Package for Social Science), version 26, an efficient tool for analyzing quantitative data [111]. First, basic statistical measures were calculated to examine the general characteristics of the sample and major variables. For continuous data, means and standard deviations of the variables were computed, and frequencies and percentages were calculated for demographic and organisational data.

Descriptive analysis was performed to achieve research objective one, which was to establish and analyze the strategies used by social enterprises in combating climate change and its impacts. The mean value ranking analysis facilitated the identification of the significant strategies employed to achieve climate change mitigation and adaptation. Concerning Research Objective 2, which aimed to evaluate the environmental impact of social entrepreneurship initiatives, the method used was simple regression analysis. This enabled the determination of the nature and extent of the relationship between social entrepreneurship initiatives focused on climate change and reported environmental outcomes. Descriptive analysis was conducted to achieve research objective 3, which involved identifying barriers to climate change mitigation by social enterprises. The mean value ranking analysis aimed to present the frequency distribution of the most common barriers in descriptive statistics.

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3.6. Ethical Considerations

When carrying out the study, the following ethical issues were considered to ensure the participants' welfare and maintain the integrity of the research. The participants' informed consent was collected before the study, and they thoroughly explained and understood the study's objectives, methods, and possible consequences. This process was entirely voluntary, and nobody was forced or pressured to continue in the study if they did not wish to do so. To ensure confidentiality and anonymity, the responses given by the participants were kept confidential and could only be accessed by the research team. The researcher evaluated and controlled the psychological harm to participants and their possible adverse reactions. They were informed of the handling and sharing of their data, and the researcher respected the data by using it in the manner agreed upon in the informed consent. The researcher ensured that the participants' rights were respected, potential harm was minimised, and the research adhered to high ethical standards.

4. Results

This section presents the research findings and discusses them with the literature.

4.1. Demographic Information

Table 1 shows the demographic information of respondents who participated in the survey from 185 social enterprises in Ghana.

Table 1. Demographic Information.

Demographic		**Frequency**	**Percentage**
Age	25-34	17.8	17.8
	35-44	18.4	18.4
	45-54	24.3	24.3
	55 and above	17.8	17.8
	Under 25	21.6	21.6
Gender	Female	101	54.6
	Male	84	45.4
Education Level	Postgraduate	61	33.0
	Tertiary	61	33.0
	Secondary	51	27.6
	Primary	12	6.5

[1] Source: Field Survey (2024).

The findings show an even age distribution, with those aged 45-54 years being the largest group at 24.3%, while those below 25 years are 21.6%, and those from 35-44 years represent 18.4% of the respondents. The 25-34 and 55 and above age groups represent 17.8% of the respondents. Typically, this distribution shows a relatively good representation of the population across different career life stages and experiences.

Concerning gender distribution, there are more female respondents (54.6%) than male respondents (45.4%), but not significantly different.

Concerning education, the largest group (33.0%) completed postgraduate and tertiary education, respectively; the second largest group (24.9%) attained secondary education. Primary

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education comprises 22.7% of the respondents. The different education levels indicate that the study encompasses views from people with varying levels of education.

Table 2. Organisational Information.

Variable		Frequency	Percentage
Number of Employees	1-10	35	18.9
	101-250	39	21.1
	11-50	37	20.0
	51-100	30	16.2
	More than 250	44	23.8
Years of Operation	1-3 years	36	19.5
	4-6 years	34	18.4
	7-10 years	31	16.8
	Less than 1 year	39	21.1
	More than 10 years	45	24.3
Primary Focus	Climate change adaptation	39	21.1
	Energy efficiency	30	16.2
	Renewable energy	33	17.8
	Sustainable agriculture	30	16.2
	Sustainable transportation	25	13.5
	Waste management	28	15.1

[1] Source: Field Survey (2024).

Regarding the organisation's structure, there is an equal distribution regarding the number of employees. The largest group (23.8%) comprises more than 250 employees, while the second largest (21.1%) comprises 101-250 employees. Small-scale organisations with 1-10 and 11-50 employees contribute 18.9% and 20%, respectively, while organisations with 51-100 employees represent 16.2% of the sample. This distribution implies that the study included a representative mix of small and large enterprises.

In terms of the years of operation, the sample encompasses organisations of different maturity levels. The largest group (24.3%) has been in operation for more than 10 years, demonstrating well-established businesses. Yet, there is a significant presence of organisations established more recently, with 21.1% operating for less than a year and 19.5% for 1-3 years. The organisations that have operated for 4-6 years and 7-10 years represent 18.4% and 16.8 % of the sample, respectively. This spread offers experience from new and established organisations in the sector.

The primary focus areas of these organisations are different, but they all address essential aspects of climate change and its impact. Climate change adaptation is the most prevalent strategy (21. 1%), while renewable energy is the second most frequent strategy (17. 8%). Energy efficiency constitutes 16%, sustainable agriculture constitutes 16.2% of the sample, waste management accounts for 15.1%, and sustainable transportation is 13.5%. This distribution shows a multi-sectoral approach to tackling climate change problems in Ghana.

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4.2. Descriptive Statistics

4.2.1. Strategies of Social Enterprises that Successfully Contribute to Climate Change Mitigation and Adaptation

To answer the first research question, respondents were asked to rate the extent to which their organisation uses strategies of social enterprises that successfully contribute to climate change mitigation and adaptation. The findings are shown in Table 3 below;

Table 3. Strategies of social enterprises that successfully contribute to climate change mitigation and adaptation.

Statements	Mean	Std. Dev.	Rank
Implementing new clean energy technologies (e.g., solar energy)	3.40	1.109	9th
Promoting nature-based solutions (e.g., ecosystem restoration)	3.45	1.058	5th
Implementing circular economy principles (e.g., upcycling, recycling).	3.44	1.146	7th
Forming strategic partnerships and networks.	3.52	1.166	3rd
Creating new funding models (e.g., crowdfunding for renewable energy projects).	3.54	1.094	1st
Increasing education and awareness-raising activities.	3.45	1.151	5th
Implementing community-based renewable energy systems.	3.49	1.138	4th
Promoting sustainable agriculture and food systems.	3.54	1.118	1st
Implementing waste management and waste-to-energy solutions.	3.32	1.123	10th
Developing sustainable transportation initiatives (e.g., bike-sharing, car-sharing).	3.41	1.105	8th

Source: Field Survey (2024).

The strategies: 'Creating new funding models (e.g., crowdfunding for renewable energy projects)' and 'Promoting sustainable agriculture and food systems' attained the highest mean score of 3.54. This shows that innovative financing and sustainable agriculture are the two major strategies that social enterprises implement. 'Forming strategic partnerships and networks' ranked third with a mean of 3.52, underlining the need to work together to combat climate change. The fourth most frequently addressed strategy, 'Implementing community-based renewable energy systems,' scored a mean of 3.49, pointing to the centrality of decentralised sustainable energy. 'Promoting nature-based solutions' occupies the fifth place (with a mean of 3.45) and 'Increasing education and awareness-raising activities'. The seventh-ranked strategy is 'Implementing circular economy principles' (mean = 3. 44), reflecting an emerging field of research associated with resource scarcity. The eighth-ranked strategy is 'Developing sustainable transportation initiatives' (mean = 3. 41), and the ninth is 'Implementing new clean energy technologies' (mean = 3.40). The least popular strategy is 'Implementing waste management and waste-to-energy solutions' with a mean score of 3.32, yet such a strategy is used to a moderate degree.

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4.2.2. Environmental Impact of SE Initiatives Focused on Climate Change

To answer the second research question, respondents were asked to rate their level of agreement with the environmental impact of social entrepreneurship initiatives on climate change. The findings are shown in Table 4 below;

Table 4. Environmental impact of SE initiatives focused on climate change.

Statements	Mean	Std. Dev.	Rank
Reduced pollution	3.44	1.112	2nd
Reduced energy and materials	3.40	1.133	3rd
Reduced consumption of hazardous/harmful/toxic materials	3.46	1.005	1st
Reduced frequency of environmental accidents	3.39	1.175	4th

Source: Field Survey (2024).

The most frequently reported environmental impact is the 'reduced consumption of hazardous/harmful/toxic materials', which received the highest mean score of 3. 46. This, therefore, implies that out of all the indices tested in the study, social enterprises in Ghana perform best in the elimination of hazardous substances index, which is essential for environmental and human wellbeing.

The second-ranked is 'reduced pollution', with a mean score of 3.44. This suggests that social enterprises are significantly reducing different types of pollution, which is an essential component of combating climate change and enhancing the quality of the environment in general.

Coming third with a mean score of 3.40 is 'Reduced energy and materials consumption'. This impact signifies social enterprises' action towards resource efficiency and sustainable consumption.

The fourth-ranked impact is 'reduced frequency of environmental accidents' with a mean score of 3.39. Even though this comes out last among all the four impacts, it still has a relatively high mean score, suggesting that social enterprises are playing a part in enhancing environmental safety and minimising risks.

4.2.3. Barriers Faced by Social Enterprises in Addressing Climate Change

To answer the third research question, respondents were asked to rate their level of agreement with the factors that pose barriers to their organisation's climate change efforts. The findings are shown in Table 5 below;

Table 5. Barriers faced by social enterprises in addressing climate change.

Statements	Mean	Std. Dev.	Rank
Limited access to funding.	3.11	1.124	7th
High interest rates for investments in clean technologies.	2.95	1.199	12th
Lack of appropriate legal forms for social enterprises.	3.16	1.129	5th
Volatility of climate policies.	3.19	1.208	3rd
Competition from larger, established firms.	3.22	1.189	1st
Low consumer willingness to pay for greener products.	3.10	1.207	9th
Lack of technical skills to design and execute climate strategies.	3.19	1.135	3rd
Difficulty in recruiting and retaining qualified employees.	3.14	1.208	6th

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Challenges in measuring and demonstrating environmental impacts.	2.98	1.227	11th
Difficulty in showing short-term returns on climate change initiatives.	3.10	1.200	9th
Dominant logistics practices limiting climate innovation solutions.	3.11	1.175	7th
Cultural attitudes and climate change scepticism.	3.22	1.198	1st

Source: Field Survey (2024).

With the highest mean score of 3.22, 'Competition from larger, established firms' and 'Cultural attitudes and climate change scepticism' rank similarly. This implies that market forces and social attitudes are the largest barriers to climate change mitigation by social enterprises. Ranking third are 'Volatility of climate policies' and 'Lack of technical skills to design and execute climate strategies' with an average of 3.19. This underscores the dynamics of unstable policy settings and the specificity of climate policy skills and execution. The fifth-ranked barrier is 'Lack of appropriate legal forms for social enterprises' with a mean value of 3.16, meaning that the legal environment may not be conducive to social enterprises dealing with climate issues. The sixth-ranked barrier is 'Difficulty in recruiting and retaining qualified employees' with a mean score of 3.14, indicating human resource constraints in this sector. 'Limited access to funding' and 'Dominant logistics practices limiting climate innovation solutions' hold the seventh rank (mean = 3.11), indicating lack of funding and operational barriers. The ninth-ranked are 'Low consumer willingness to pay for greener products' and 'Difficulty in showing short-term returns on climate change initiatives', which are market-related problems. 'Challenges in measuring and demonstrating environmental impacts' comes in at 11th (mean = 2. 98), implying that it may be a little hard to measure and show the effect of their work on the environment. The least ranked barrier is 'High interest rates for investments in clean technologies' (mean = 2. 95), which is still a moderate barrier.

4.3. Regression analysis

In this section, a regression analysis was performed to determine the nature and extent of the relationship between environmental impact and social entrepreneurship initiatives focused on climate change. The results are shown in Tables 6, 7 and 8 below.

Table 6. Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.160[a]	.026	.020	.54515

a. Predictors: (Constant), S

Source: SPSS data (2024).

The Model Summary table gives information about the fit of the regression model. Using the R-value of 0.160 shows a low positive relationship between the predictor (social entrepreneurship initiatives) and the dependent variable (environmental impact). The R Square value of 0.026 suggests that only 2.6% of the variance in the environmental effects can be explained by the social entrepreneurship initiatives. The Adjusted R square of 0.020 depends on the number of predictors that have been put in the model and offers a slightly less inflated estimate of the extent to which the model explains variance in the data.

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The Analysis of variance (ANOVA) table aimed to establish the overall significance of the regression model. The F-statistic of 4.809 with a significance level (p-value) of 0.030 (less than 0.05) shows that the regression model is statistically significant. This implies that the relationship between social entrepreneurship initiatives and environmental concern is not likely to have been a coincidence.

Table 7 gives details about the regression results. The intercept (constant) equals 4.350, and the coefficient for social entrepreneurship initiatives is 0.268. This means that there is a forecasted increase of 0.268 units in environmental impact for every one-unit increase in social entrepreneurship initiatives. This gives a t-statistic of 2.193, implying that this relationship is statistically significant at 0.05.

Table 7. Analysis of variance.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.429	1	1.429	4.809	.030[b]
	Residual	54.386	183	.297		
	Total	55.816	184			

a. Dependent Variable: Environmental impact

b. Predictors: (Constant), SE initiatives

Source: SPSS data (2024).

Table 8. Regression results.

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.350	.424		10.261	.000
	SE initiatives	.268	.122	.160	2.193	.030

a. Dependent Variable: Environmental impact

Source: SPSS data (2024).

5. Discussion

5.1. Strategies of Social Enterprises that Successfully Contribute to Climate Change Mitigation and Adaptation

The study results on the strategies of social entrepreneurs regarding climate change initiatives in Ghana provide a wide-ranging view of how social entrepreneurs are taking up climate change challenges. The highest priority strategies, generating new funding instruments and supporting the sustainable agriculture and food chain, can be interpreted as SEs in Ghana prioritising financing and sustainable food production as the major approaches to addressing climate change.

These findings correspond well with some of the strategies outlined in the empirical literature. For example, the focus on new funding models corresponds to the study of Lehner and Nicholls [72], who examined social ventures that employ crowdfunding for renewable energy initiatives in Europe. This means that innovation funding is prevalent in climate-focused social entrepreneurship globally

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and is not a preserve of developed nations. Seyfang's [77] study on Community Supported Agriculture in the UK supported the high ranking of sustainable agriculture, where social enterprise business models were attributed to 30% fewer food miles than conventional supply systems. This means that there is evidence that sustainable agriculture could help address climate change across various settings.

Strategic partners and networks are ranked third (mean 3.52) in the Ghanaian context, conforming overwhelmingly with the findings of Phillips et al. [13]. They found that efficient social enterprises work closely with other sectors to mobilise and transfer capital and information, specifically on solving multifaceted climate concerns. In the present study, implementing community-based renewable energy systems is the fourth priority. This corroborates the findings of Hain et al. [75], who assessed the community-based renewable energy systems in Germany and the UK. They argue that decentralised and community-based energy systems are used across various jurisdictions.

Nevertheless, like all other studies, the results obtained in this study in Ghana contradict the findings in different research. For instance, while implementing new clean energy technologies was ranked low in the present study, it was perceived differently in other studies, such as Warnecke & Houndonougbo's [74] on solar energy in developing countries. This could result from diverse local conditions, resources or concerns. Likewise, in the Ghana study, nature-based solutions are ranked 5th, but they are presented as a crucial strategy by Chausson et al. [69], especially in the coastal and urban areas. These differences can be due to environmental concerns or obstacles in diverse locations. Notably, the rank of the circular economy in the present study is low, but it is considered a viable approach by Lazarevic and Valve [70] and Goworek et al. [71]. This implies that although there is awareness of circular economy principles, their application is perhaps not as highly valued in Ghana as in comparable settings.

5.2. Environmental Impact of Social Entrepreneurship Initiatives Focused on Climate Change

The findings on the environmental impact of social entrepreneurship initiatives addressing climate change in Ghana show that these enterprises have made essential contributions. The effects identified are ranked in descending order by their mean scores as follows: reduced consumption of hazardous/harmful/toxic materials (mean score of 3.46), followed closely by reduced pollution (3.44), reduced energy and materials consumption (3.40), and reduced frequency of environmental accidents (3.39).

These findings demonstrate a holistic approach to environmental impact, addressing direct climate change factors like pollution and energy consumption and related environmental concerns such as hazardous materials and accident prevention. This extensive impact fits well with the definition of climate-focused social enterprises discussed in the literature, which describes them as organisations using a business approach and climate change goals [15].

Some studies support the present study's findings regarding the impact of implementing the programme in reducing pollution and energy consumption. For instance, Warnecke and Houndonougbo's [74] research on solar power programs in developing countries identified that social businesses distributed electrical energy to nearly 48% of the populace through modern devices such as Solar Lighting. This is similar to the finding of Hain et al. [75] on the effectiveness of community-based renewable energy systems in Germany and the UK, where each project was estimated to reduce CO2 emissions by an average of 3000 tons per year.

The use of less hazardous materials and energy in the Ghana study is in line with the sustainable practices that were indicated by this study by Seyfang [77] that social enterprise business models for Community Supported Agriculture in the UK had reduced food miles by 30% compared to conventional transportation, thus, decreasing emissions. Although waste management is not directly mentioned in the study conducted in Ghana, the emphasis on reducing the consumption of materials is equivalent to a case study in IDA, where a mechanical biological treatment plant could produce harmful emissions of -25.68 tons of CO_2 equivalent per 100 tons of municipal solid waste processed

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[78]. Likewise, research conducted in Sri Lanka and Myanmar demonstrated great possibilities for emissions cuts through waste management measures.

From the regression analysis in the Ghana study, the social entrepreneurship initiatives have a positive though low correlation with the environmental impact ($R = 0.160$, $R^2 = 0.026$), which is statistically significant. The low value of R Square indicates that while there is a statistically significant relationship between social entrepreneurship initiatives and environmental impact, other factors outside this model seem to contribute much more to the overall environmental impacts. Therefore, even though the model is statistically significant, the F-value implies a weak relationship strength. This concurs with the low value of R Square in the Model Summary. This shows a positive relationship between social entrepreneurship initiatives and environmental results, as indicated by the positive coefficient. However, the coefficient itself is not very high (0. 268), which means the effect is insignificant. These findings are consistent with Bozhikin [113], who identified that social entrepreneurship ecosystems develop solutions for environmental issues on a larger scale as various factors contribute to their development and sustainability.

5.3. Barriers Faced by Social Enterprises in Addressing Climate Change

The studies on the challenges to social enterprise's efforts to address climate change in Ghana depict a network of issues. The first two barriers ranked are 'Competition from larger, established firms' and 'Cultural attitudes and climate change scepticism', both have a mean value of 3.22 while the 3rd and 4th barriers are 'Volatility of climate policies' and 'Lack of technical skills to design and execute climate strategies' which both received a mean value of 3. 19.

The first-ranked barrier in the Ghana study above, competition from larger firms was similarly identified in Goyal and Sergi's [89] survey of 200 social entrepreneurs in India, who reported that 62% of them faced challenges of scaling up climate-friendly products due to competition from larger firms. This implies that competition in the market is a significant concern for climate-orientated social enterprises in various locations.

The high ranking of cultural attitudes and climate change scepticism in the Ghana study is consistent with Haugh and Talwar [95]. They discovered legitimacy and community support issues were more profound among social enterprises operating in states with high climate change scepticism. This shows that the perception and awareness of the public play a critical role in the success of climate change social enterprises. The fact that policy volatility was highlighted as a significant barrier in the Ghana study is consistent with the observations made by Sun et al. [87] and Mo & Liu [88], where policy volatility was noted to affect strategic planning and investment decisions among social enterprises in the renewable energy sector.

The absence of technical know-how highlighted in the Ghana study aligns with Creech et al. [62], who highlighted that lack of technology know-how was a factor that inhibited innovation in climate change adaptation measures among social entrepreneurs in Sub-Saharan Africa.

Notably, despite many scholars sometimes identifying financial restrictions as a primary issue [15,84]. 'Limited access to funding' is not prioritised in the present work. This might indicate that other barriers are more salient in the Ghanaian context or that Ghanaian social enterprises have devised strategies to overcome financial risks. The 'Lack of appropriate legal forms for social enterprises' matches the results described by Hillman et al. [86] regarding the problem of the absence of favourable legal conditions for SEs in European states.

The findings that recruiting and retaining skilled employees is a challenge in the present study coincide with Mair et al. [91] about the problems of attracting and retaining talent for solving complex climate change issues. 'Challenges in measuring and demonstrating environmental impacts' is ranked comparatively low in the present study, whereas it is noted as a significant concern in Ormiston and Seymour [92]. 'Low consumer willingness to pay for greener products' resonates with the affordability challenges highlighted by Thompson et al. [90] concerning consumers of social enterprise products in the United Kingdom.

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6. Conclusions

The study on social enterprises engaging with climate change in Ghana provides insights into the approaches, outcomes and challenges of such organizations. Out of all the strategies formulated and implemented by social enterprises in Ghana, the development of new funding structures and the promotion of sustainable agricultural practices have been highlighted as the most effective methods towards the fight against climate change. It also shows an emphasis on finance innovation and climate change mitigation through sustainable food systems as key to addressing the problem.

The following are key areas where these enterprises are making a positive environmental impact, primarily curtailing the use of hazardous materials and pollution. On the other hand, the regression analysis results reveal that while statistically significant, the coefficient of determination between social entrepreneurship initiatives and the environmental impact is rather low, meaning that other factors may explain more of the variance in the environmental outcomes.

This research also identifies several barriers that social enterprises encounter in addressing climate change. The barriers noted to be significant include competitive threats from large firms and cultural threats related to climate change, the volatility of policies, and the absence of technical skills. Overall, these results indicate that fighting climate change through the means of social entrepreneurship is not as simple as it may seem. Even though these enterprises are producing significant positive impacts, they experience a complex range of issues that demand more extensive assistance from the authorities, investors, and society.

In the research domain, this study will add to the pool of information on the contribution of social entrepreneurship in managing grand challenges such as climate change. The study will contribute to the literature by presenting findings based on the Ghanaian experience and offering practical insight into social entrepreneurship in developing nations. The findings can also form new research questions and hypotheses for future research.

6.1. Recommendations

Based on the findings of this study on social enterprises addressing climate change in Ghana, the following recommendations are proposed:

1. There is a need for specialized funding structures for climate-orientated social enterprises and policies regarding sustainable agricultural practices. This may entail developing green bonds, climate-focused impact investment funds, grants, taxation relief, and technical assistance schemes.

2. The Ministry of Education together with the Environmental Protection Agency and local NGOs needs to design and provide climate change education and awareness programs which should be implemented to counteract scepticism and increase understanding of the effects of climate change. This could entail using community structures and groups, adding climate change content in school lesson plans, and using local television and radio stations for outreach.

3. To support such initiatives, programs should be developed by the Ghana Climate Innovation Centre in partnership with universities and other institutions like the United Nations Development Programme to increase the level of skill possessed by social entrepreneurs to include clean energy technologies, circular economy, and climate-resilient designs.

6.2. Limitations of the Study

The use of convenience sampling may reduce the extent to which the results generated can be generalised to all social enterprises in Ghana. The cross-sectional nature of the study limits the capabilities of the study in depicting long-term growth and development trends of social enterprise and their impacts. One weakness is that the study focused on Ghana and therefore its results cannot be easily generalized to other settings especially developed countries or those with different climatic conditions.

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6.3. Suggestions for Further Studies

Subsequent academic research should undertake a longitudinal evaluation of climate-orientation social enterprise businesses. Following the environmental and social changes of climate-focused social enterprises operating in Ghana for several years would be more informative to evaluate the effectiveness of their actions.

Future researchers can focus on a comparative study of climate-focused social enterprises in different African countries. A case study comparing climate-orientated social enterprises across some African countries would provide insight into how specific contexts affect the behaviours, accomplishments, and difficulties of such organisations.

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