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Assessing the role of green finance in addressing climate change challenges and achieving the SDGs in the UAE

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Abstract

This study investigates the status of green finance in the United Arab Emirates (UAE) and its role in addressing climate change and advancing the Sustainable Development Goals (SDGs). It aims to assess strengths, weaknesses, opportunities, and threats that shape the country's sustainable finance landscape. A qualitative research approach was applied, using policy documents, financial reports, and semi-structured interviews with professionals. Thematic analysis was employed to identify key drivers, barriers, and opportunities for green finance adoption. The results show that the UAE has made significant progress in renewable energy investments and sustainable financing initiatives, supported by national strategies such as the Green Agenda 2021–2031 and Climate Change Plan 2050. However, barriers including regulatory ambiguity, high financial risks, and low public awareness persist. The absence of a unified green taxonomy, limited risk management tools, and insufficient community involvement remain major challenges. Despite these constraints, the UAE is well positioned to lead sustainable investment in the Middle East if governance and financial mechanisms are strengthened. The study recommends introducing a national green taxonomy, offering financial incentives, and expanding public-private partnerships to boost investor confidence and accelerate green finance.

Keywords: Financial regulation, Green finance, Renewable energy, Sustainability, Sustainable investment, UAE.

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1. Introduction

Climate change is now among the leading global concerns in the 21st century, affecting the climate, economy, and people's lifestyles. This is well demonstrated in the Middle East region, where climatic factors, including temperature, water, and sea level, pose real hazards to development. The United Arab Emirates (UAE), which is aimed at developing the oil and gas sectors, has realized the need to address such issues and transition to a low-carbon economy [1]. Therefore, the UAE has endorsed several climate programs, including the UAE Vision 2021, the UAE Green Agenda 2015–2030, and the

UAE Climate Change Plan 2050. All these endeavors are intended to reduce carbon emissions, conserve energy, and diversify the economy through investment in renewable energy and technologies. Another primary concept in the UAE's transition process is green finance, defined as the finance to support the provision of environmentally sustainable projects and activities [2]. Sustainable development goals or SDGs, along with green bonds, loans, and sustainable investments, are all important in financing sustainable development. The most relevant goals to the UAE sustainability plan are SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy) [3]. Green finance in the UAE is also aimed at minimizing the effects of climate change, increasing the share of renewable energy, and fulfilling the UAE's SDG objectives. However, the following challenges prevent the UAE from realizing the full benefits of green finance. They include low visibility of green financing instruments, legal issues that may hinder the implementation of green finance, and issues related to the cost of green investments. Nevertheless, there are considerable opportunities for green finance in the UAE, mainly due to the government's support, the rising involvement of the private sector, and the UAE being an international financial hub. This paper explores the role green finance plays in the fight against climate change and the achievement of the SDGs in the UAE.

The goals of the present study are to assess the state of green finance in the UAE, to identify the effectiveness of its use in the fight against climate change, and to identify the opportunities and threats for applying green finance in the UAE to achieve the goals of sustainable development. In this respect, the research aims at enhancing theoretical knowledge of how green finance can contribute to the process of achieving the UAE's sustainable development goals, supporting climate change initiatives, and enhancing the UAE's transformation towards a green economy.

2. Literature Review

2.1. Climate Change and the UAE

The UAE is highly vulnerable to climate change problems due to its geographical position concerning climate and its dependence on oil products. According to Melville-Rea et al. [4] the UAE is a desert country prone to heat, water, and sea level stress, affecting infrastructure, economy, and well-being. From Sherif et al. [5] UAE's National Climate Change Plan 2050 reveals that the country is likely to experience a rise in temperatures by 4°C by 2050, which will compound water scarcity problems and food production. The government has understood these risks and has been involved in reducing the effects of climate change through policies. Ahmed [6] explained that the UAE Vision 2021 contains an actionable plan to mitigate the UAE's carbon footprint; the UAE Green Agenda 2015–2030 and the Climate Change Plan 2050 are based on clean energy, energy efficiency, and the diversification of the economy.

2.2. Sustainable Development Goals (SDGs) and Climate Change

The SDGs are 17 goals unanimously agreed upon by all member nations of the United Nations in 2015 to outline the global development agenda for the next 15 years. Jamaledini and Bayat [7] identified that UAE has focused on SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy). Filho et al. [8] noted that the 13th SDG focuses on taking immediate measures to address climate change and its consequences, whereas the 7th SDG promotes access to clean, efficient, and modern energy. Lintang et al. [9] noticed that the UAE has adopted these goals; for example, the DECES 2050, which intends to generate 75% of the energy in Dubai from clean sources by 2050. According to Laumann et al. (2022), all the SDGs are integrated, and climate goals impact other important domains like poverty, the economy, and social welfare. For example, combating climate change through green energies can decrease energy poverty, contribute to economic development, and increase the population's welfare by creating new workplaces. Hence, attaining SDG 13 is essential not only in the environmental context but also for the overall development goals in the UAE.

2.3. Green Finance: Definition and Concepts

Green finance uses funds, instruments, and processes to support environmentally friendly projects. Kumar et al. [10] pointed out that green finance has emerged as a more critical aspect of development due to the realization by global leadership, companies, and investors that there is a need for financial products to solve environmental problems. According to Gilchrist et al. [11], green finance refers to the set of financial products, including green bonds, green loans, and sustainable investments, directed toward financing projects that contribute to environmental sustainability. These projects encompass renewable energy, energy efficiency, and sustainable infrastructure. According to Dong et al. [12] it is essential to understand that the development of green finance has been driven by the increased recognition of the financial industry as an agent of change in the environment and the requirement for more systematic and clear guidelines. Maragopoulos [13] explained that the EU Taxonomy for Sustainable Activities and Green Bond Principles establish international guidelines for rating and reporting green investments, thus improving the market's credibility. With the gradual development of green finance, it has become an essential force in the global response to climate change and sustainable development.

2.4. Green Finance in the UAE

Over the past few years, the UAE has been pressured to incorporate green finance into its economic model. According to Agrawal et al. [14], the government has implemented measures that encourage sustainable investment, including the UAE Green Bond Guidelines, which outline the guidelines for green bond financing environmentally sustainable projects. Additionally, the growth of financial institutions integrating more sustainability factors into their operations has been observed in the country. Koch [15] noted that the Abu Dhabi Investment Authority has disclosed that it will only invest in sustainable assets and initiatives, while the Dubai Islamic Bank has floated green Sukuks to fund renewable energy projects. According to Obaideen et al. [16], the green finance initiatives in the UAE consist of big solar power generation plans such as the Mohammed bin Rashid Al Maktoum Solar Park, which is expected to generate 5,000MW of renewable energy by 2030. They are helpful for the country's energy transition and crucial for achieving its climate change goals and sustainable development objectives.

2.5. Barriers to Green Finance in the UAE

Nevertheless, several challenges are still evident in the UAE, which slow down the growth of the green finance market. Yan et al. [17] noted that regulatory and policy issues are still a problem since there is a requirement for enhanced and, at the same time, aligned policies for green investment. According to Alblooshi [18] the UAE has adopted green finance frameworks; these frameworks are still young and may need fine-tuning to foster participation from the private sector. As Debrah et al. [19] have mentioned, another problem is the low level of awareness of green finance instruments among financial organizations, companies, and the population. According to Kharb et al. [20] this lack of understanding has led to hesitation and a non-willingness to invest in green projects that are generally considered highly risky and uncertain. According to Eyo-Udo et al. [21], finances also play a role because most green investments cost more initially, and many investors are unwilling to invest their money in long-term sustainable projects with little or no tangible returns in the short run. These barriers must be overcome through the collaboration of the government, private sector, and financial institutions to ensure a favorable environment for green finance is cultivated.

2.6. Opportunities for Green Finance in the UAE

However, the prospects for future expansion of green finance in the UAE are significant. According to Sajwani et al. [22], the government of the UAE has provided various incentives and measures for green investment, such as tax holidays, subsidies, and cheap credit for green investment projects. Further, Chi et al. [23] stated that the private sector has also undergone swift positive change to support sustainable investments, as most companies and investors have realized it to be financially profitable and environmentally responsible to support green projects. According to Vassileva [24], there is also an excellent opportunity for expanding green finance through developing public-private partnerships (PPPs) in the UAE. Ugwu et al. [25] claimed that the partnerships can facilitate risk sharing and the utilization of knowledge and experience, and attract private capital to finance large-scale sustainable development projects, including renewable energy, sustainable infrastructure, and green buildings. Furthermore, the increasing interest in sustainable investment among global investors allows the UAE to introduce itself as a market that can provide a green finance framework for domestic and international investors to support its sustainability objectives.

2.7. The Role of Green Finance in Achieving SDGs

Green finance is essential for attaining the SDGs, especially around climate change and sustainable development. Rasoulinezhad and Taghizadeh-Hesary [26] acknowledged that green finance provides the financial resources for renewable energy, energy efficiency, and other environmentally sustainable projects to decrease the effects of climate change and foster the shift to a low-carbon economy. According to Ben Belgacem et al. [27], green finance is key to the UAE's implementation of SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy). According to Alnaqbi and Alami [28] UAE's investment in renewable energy, such as solar power stations and energy-efficient buildings, contributes to reducing the carbon footprint and enhances its commitment to increasing the portion of clean energy in its energy mix. According to Bei and Wang [29], green finance can support other SDGs, such as eradicating poverty through the provision of affordable energy and establishing new green economy employment. With the increasing incorporation of green finance into the economic and financial systems of the UAE, there is a possibility of advancing towards both the UAE and global sustainability objectives.

2.8. Research gap

Although the UAE has recently been paying more attention to green finance, there is a lack of analysis of how this concept works in practice and its contribution to achieving the sustainable development goals (SDGs) focused on climate change and affordable clean energy. A previous literature review has established that there is extensive literature on the broad concept of green finance. This research will address this gap by evaluating current green finance in the UAE, the impact of green finance on climate change mitigation, and the opportunities and challenges of adopting green finance to achieve sustainable development goals in the UAE.

3. Methodology

3.1. Research Design

This study aimed to understand the use of green finance in addressing climate change issues and achieving the SDGs in the UAE; therefore, a qualitative research design was adopted. Qualitative research is beneficial for exploring detailed accounts of people's perceptions, attitudes, and experiences, especially concerning contextually specific phenomena [30]. This design enables the researcher to capture the subtle practices of green finance in the UAE, a relatively new concept where qualitative information might be limited or inadequate. Semi-structured interviews were selected as the primary data collection instrument, as they allow the researcher to delve deeper into the topics of interest [31]. The semi-structured interview is beneficial when interviewing different subjects to enable the interviewee to expound on their opinions to the extent of the study's subject.

3.2. Research Approach

The study used a qualitative research methodology to gather data on perceptions, attitudes, and experiences regarding green finance in the UAE. An additional advantage of employing qualitative research methods is their suitability when the research topic is unfamiliar or when the researcher needs to understand the meaning of a phenomenon from the participants' perspectives [32]. As applied to green finance, the approach enabled the analysis of actors' roles in the financial sector in addressing environmental sustainability and climate change and eliciting the opinions of the relevant actors, including the government, financial sector institutions, and green investment professionals. Thus, adopting this approach, the study was able to investigate the main issues of green finance, as well as the advantages and threats of its implementation for achieving the goals of SDGs.

3.3. Data Collection

Qualitative data for this study were obtained through interviews with important informants in the green finance market in the UAE. The interviews aimed to gain insight into the current state of green finance in the UAE, the challenges faced by green finance stakeholders, the scope for green finance to grow in the UAE, and the effects of green finance on SDGs.

The interview guide was structured around several key themes, including:

- The existing green finance in UAE concerning current activities and policies in progress.
- Barriers that affect the practice of green finance include regulatory constraints, lack of information, and financial risks.
- Governments' incentives and the private sector for developing green finance in the UAE: prospects for development.
- The role of green finance in realizing the Sustainable Development Goals (SDGs), focusing on SDG 13 – Climate Action and SDG 7 – Affordable and Clean Energy.
- Potential development paths of green finance in the UAE and the role of innovation, public-private partnerships, and international cooperation in their realization.

3.4. Sampling Strategy

According to Curtis and Keeler [33] a purposeful sampling technique was used in this study to identify participants with extensive experience or knowledge. This type of sampling method makes it possible to capture those individuals whom the survey considers suitable to provide relevant information regarding the research problem because of their roles or participation in green finance activities. When choosing the participants for the interviews, the following aspects were considered: the position of the participant in government structures, financial organizations, NGOs, or companies engaged in sustainability and green finance initiatives.

3.5. Data Analysis

Interview data was analyzed through thematic analysis. Thematic analysis is a method used to analyze and report patterns (themes) in data [34]. It allowed the researcher to analyze the data and define several prominent themes and trends discovered during the interviews. Thematic analysis was used to examine the participants' perceptions and investigate the general concerns regarding green finance in the UAE. The emphasis was placed on identifying key patterns that could provide perspectives on green finance today, on the challenges faced by the industry in the process of further growth, and on the opportunities to meet the goals of sustainable development through its means. These results were subsequently analyzed to determine similarities and dissimilarities between the separate stakeholder groups.

3.6. Ethical Considerations

Ethical issues formed a significant component of this study as it involved human participants. All participants gave their informed consent before the interviews were conducted. Participants were informed of the study's objectives, their right to decline participation or withdraw at any time, and that participation was voluntary. Participants' identities were kept anonymous during the study, and participants' identifiers were excluded from the interview data.

3.7. Limitations

Despite the valuable insights into the nature of green finance in the UAE that this study offered, several limitations were acknowledged. One limitation was the bias in the sampling technique since the study involved only participants involved in green finance or sustainability projects. This might have led to more positive views on green finance than negative views or opposing opinions that may not have been captured. This study has been subjected to some limitations, the major one being the use of qualitative research methods, which may have limited the generality of the findings. It must be noted that the study offered a rich understanding of the views of only some specific stakeholders. Therefore, the conclusions cannot be generalized for the population or other countries with different economic or policy environments. However, these limitations have not deprived the study of providing essential insights into green finance in the UAE and the possibility of its contributing to mitigating the effects of climate change or advancing the SDGs.

4. Results

4.1. Theme 1: The Current State of Green Finance in the UAE

The development of green finance in the UAE has been identified as being in its early stages but is being boosted by government policies, financial institutions, and the private sector. The UAE's initiatives focus on sustainability;

environmental plans are incorporated into the country's economic strategy. However, problems such as enforcement mechanisms, coordination, and standardization of these structures continue to hinder their full development.

Participant interview responses from a senior government policy advisor highlighted the foundational role of government policies in green finance. He stated:

"Policies like the UAE Green Agenda 2015-2030 and the Climate Change Plan 2050 are crucial, but they need stronger enforcement mechanisms and better coordination with financial institutions to make an impact truly."

Response from a sustainability officer at a bank pointed to the operational challenges within financial institutions. She mentioned:

"Our institution has adopted green bonds and Environmental, social, and governance "ESG" funds, but challenges like a lack of standardized frameworks make it difficult to scale these initiatives effectively."

The UAE government policies, such as the UAE Vision 2021, Green Agenda 2015-2030, and the Climate Change Plan 2050, provide a background for the development of green finance [35]. These frameworks focus on sustainable power, climate-friendly structures, and low carbon emissions. Bin Abu Sofian et al. [36] pointed out that such efforts have boosted green bonds and loans important for renewable energy, as in the Noor Abu Dhabi solar plant. However, the lack of strict compliance measures makes these policies less effective, besides the fact that most stakeholders involved have not fully coordinated themselves. Governments rely on financial institutions to promote green finance, hence implementing policies. They provide services like green bonds, environmental, social and governance funds, and sustainability-linked loans. Hussain et al. [37] opined that although there have been improvements in green finance within the financial institutions of the UAE, challenges have been realized because of the absence of standard setting. This has made it difficult to scale up efforts to measure and report the environmental impact of green financial products. Focusing on the private sector investments in green projects, it is also important to mention that private capital could support government and institutional actions and stimulate innovations. As pointed out by Saleem et al. [38] there is a rising trend in green technologies and facilities that businesses are adopting, thus influencing the ever-evolving green finance system. Casady et al. [39] noted that P3 financing of large-scale green projects is under development. However, due to ambiguous policies and the absence of supportive signals from the authorities, more private sector involvement has not been encouraged.

4.2. Theme 2: Challenges to Green Finance in the UAE

This theme focuses on the significant challenges that hinder the development and utilization of green finance in the UAE. It is centered on the areas of regulation and policy, financial issues, and the absence of public awareness. Some of the keywords used in searching for information related to this theme include "challenges in UAE green finance," "regulatory barriers," "green finance risks," and "sustainability finance awareness." These problems are significant challenges to green finance and must be addressed for the UAE to achieve sustainable development.

Participant interview Response from a regulatory expert expressed:

"One major issue is the lack of a unified regulatory framework for green finance. This creates uncertainty for investors and slows down project approvals."

Interview Response of a sustainability consultant noted:

"Most people, even in financial institutions, are unaware of the benefits and mechanisms of green finance. Without widespread education and awareness, adoption will remain low."

The UAE faces several significant obstacles to the effective implementation of green finance, including regulatory issues, financial risks, and low awareness. Inefficient and inconsistent regulation is a major factor hindering the development of green finance in the UAE. The absence of a standardized green categorization system impairs the ability of financial institutions to analyze and categorize green investments. According to Rossi et al. [40] this has been effectively seen in guidelines like the EU Taxonomy for Sustainable Activities, which have been key in influencing investor confidence and private sector investments in green finance. According to Emodi et al. [41] in the UAE context, the absence of a cohesive policy hampers investors, creating doubt about what can be considered a green investment. This is because where there are no straightforward and clear requirements, projects cannot get funding, and thus, the creation of sustainable structures is slowed. In addition, a lack of regulation could result in inefficiencies, lost opportunities, and, most importantly, a lack of harmonization of the existing policies among government agencies and financial institutions. The financial risks are one of the main factors discouraging green finance. Due to the perceived high risk of green investments, especially in new industries like renewable energy, institutional and retail investors stay away from the investments. According to Côté and Salm [42], many investors avoid green projects because they do not know how much they will earn in the long run. This perception arises from factors such as the high initial costs of green investments and the long-term horizons of green projects, including the generation of solar and wind energy.

As Côté and Salm [42] pointed out, financial risks are intensified by the UAE's lack of actual data on green investment performance. Such risks can be managed through attractive investments such as green bonds that are safer and more standardized than the current financial instruments [43]. However, there has been a slow uptake of these instruments due to the continued ambiguity regarding green investments. One of the issues that hampers the advancement of green finance is the most obvious one: a lack of understanding and visibility of green finance among the public and professionals. Unfortunately, even in the finance industry, most employees fail to gain a clear understanding of how green finance operates or how to assess sustainability-related investments Seabrooke and Stenström [44]. It is, therefore, essential to conduct awareness and capacity-building initiatives to enhance the appreciation of green finance among the various players. Bhatnagar and Sharma [45]. Kamal and Abu-Hijleh [46] also noted that many investors and other stakeholders in the UAE, including financial institutions and policymakers, lack adequate knowledge of green finance opportunities. This results in a low uptake of green financial products and hampers their implementation rate. In addition, despite the steady progress in the UAE's sustainability agenda, there remains an ESG investment gap, according to Alkhalifa [47]. These challenges could be resolved by launching necessary campaigns, increasing the level of understanding of green finance, and developing educational programs on green investment products.

4.3. Theme 3: Opportunities for Advancing Green Finance in the UAE

This theme analyzes the remarkable prospects for increasing and enhancing green finance in the UAE. Key search terms include green finance opportunities in the UAE, government incentives towards green finance, private sector green investment, and public-private partnerships in the UAE. These are important for building a sound green finance market and the development of sustainable investments.

An Interview Response from a government policy analyst highlighted:

"The UAE's clean energy targets and subsidies for renewable energy projects have been instrumental in driving interest and investment in green finance."

Response from a renewable energy project manager remarked:

"PPPs have been critical in delivering large-scale solar and wind energy projects, blending public funding with private innovation and efficiency."

The UAE has progressed significantly in promoting green finance through various opportunities, such as government and private sector incentives. The UAE government has been pivotal in developing green finance opportunities by establishing favorable policies and measures. Programs such as the UAE Green Agenda 2015–2030 and the Net Zero 2050 strategy provide a solid foundation for green investments. These policies offer tax credits and/or grants for renewable energy and sustainable projects. Choi and In [48] pointed out that such government-supported programs have significantly encouraged private and institutional investors to invest in green projects. For example, Elrahmani et al. [49] noted that Mohammed bin Rashid Al Maktoum Solar Park, a large-scale renewable power project, has received support from the government as well as funds from the private sector, which proves that the government incentives are efficient in promoting green finance. Moreover, subsidies to renewable energy projects have extended the entry barriers to green finance markets into the hands of investors. The private sector is equally important in promoting green finance since companies launch new financial tools and invest in green projects [50]. According to Lin [51] private firms now consider green bonds, renewable power, and many other sustainable investments financially rewarding.

Anjanappa [52] also pointed out that private sector funding, particularly in green loans and ESG funds, has driven big-ticket sustainable infrastructure spending, such as sustainable cities and districts and waste-to-energy projects. An important aspect of green finance is the development of green financial products that the private sector actively contributes to, advancing green finance and achieving national sustainability objectives [53]. Experience in the development of PPPs has shown that this model is effective in promoting the development of green finance. Mohamadi [54] noted that the UAE has been able to leverage PPPs by mobilizing resources from both the public and private sectors to finance large-scale renewable energy projects efficiently. According to Othman and Khallaf [55] private and public partnerships (PPPs) have significantly contributed to the development of solar and wind energy. PPPs enable governments to share the costs of large infrastructure projects and acquire services from private sector entities at a lower cost. Additionally, these collaborations help secure the necessary funding to support projects of this scale and improve the efficiency of project completion through the synergies created between organizations [56]. In the same way, PPPs can facilitate the exchange of experience in the administration of sustainable energy sources, thereby increasing the economic effectiveness of green finance.

4.4. Theme 4: Recommendations for Advancing Green Finance in the UAE

This theme focuses on practical solutions to enhance the green finance system in the UAE. The following keywords have been used in this study: green finance policy UAE, risk mitigation UAE, green finance capacity building, and stakeholder awareness of green finance.

Participant Interview response from a regulatory expert.

"The UAE can benefit immensely from a standardized green taxonomy that aligns with global frameworks, coupled with tax benefits for green investments. These measures could establish trust and foster confidence among investors."

Participant Interview Response from a sustainability consultant.

"Stakeholder education programs and public awareness campaigns are crucial. These initiatives ensure that institutional and retail investors understand the long-term benefits of green finance."

Enhancing the regulatory system, using financial tools, and raising awareness are key practices for the UAE's green finance development. As the Department noted in 2023, a single and consistent green taxonomy developed to fit the UAE's economic and environmental contexts would enhance the classification and monitoring of green investments. They include the EU Taxonomy for Sustainable Activities, which helps avoid cases of greenwashing. The UAE could also offer incentives such as tax credits for companies, green bonds, and fast-track permitting alongside the best practices set by countries like Germany or Singapore [57]. South Korea's government-backed green credit guarantees could help manage the risks arising from green investments, allowing institutional and retail investors to be more involved [58]. On the same note, green funds established by the UAE Central Bank and other private institutions might also be another approach to offer SMEs and start-ups customized green financial products to support the growth of green finance. Capacity building and awareness programs are key to the changes in green finance in the UAE. Fleck and Christoffer [59] explained that implementing training workshops for policymakers, investors, and financial experts on ESG may improve decision-making about investment choices. Other awareness campaigns, like the one adopted by Qatar, could be used to educate people on the importance of green financial products and their impact on the environment and economy, hence creating a better market [60]. In addition, integrating green finance into the curriculum of higher learning institutions and professional certification programs would contribute to building a skilled workforce that will support the UAE's sustainable development goals. Regarding these strategies, the country can enhance its commitment to sustainable development and support the UAE's green finance agenda by adopting best practices at the international level.

5. Discussion

This study aims to discuss the current and potential status of green finance in the UAE and the challenges and prospects of the state. All the research themes offer useful evidence, and the results correspond to the study's objectives, though there are some counterarguments in the literature. This makes the research credible and reliable.

The first research theme of the study is government policies and their contributions to green finance. The results show that, although the government policies of the UAE offer critical support, their potential to advance green finance solely remains constrained. There are drives like the UAE Vision 2030, but private entities do not provide much funding. This corresponds with earlier studies suggesting that while government support is practical, private-sector participation is essential for the sustainable growth of green finance [61]. Indeed, government policies are crucial in the process, but without private participation, the actual growth cannot be accelerated significantly. Nonetheless, there is an opposing view to this. The results obtained in this research support the objective of demonstrating the need for both government and private sector involvement, and therefore, the study is reliable and credible.

Therefore, the study's second theme is regulatory uncertainty and its effect on the uptake of green finance. The work identifies that regulatory ambiguity continues to be the biggest impediment to green finance development in the UAE. Investors do not invest in green projects because they lack clarity concerning the legal requirements and policies [62]. This aligns with literature suggesting that well-spelled-out regulation is crucial for attracting and maintaining green finance. However, Teodoridis and Bryan [63] pointed out that overregulation could negatively impact market innovation and flexibility, which means that there must be proper regulation. Nevertheless, the results are consistent with the study's goals and confirm that policymakers' increased attention to green finance investment is essential, strengthening the study's credibility.

The third theme examines the perceived threats and difficulties associated with green finance investment among investors. This paper argues that perceived risks, especially those related to financial returns on green investments, remain a significant impediment to investor engagement in green finance. This accords with literature that suggests that investors consider green projects to be high risk because of the volatility of the returns. Santos et al. [64] noted that these perceived risks are often overestimated and can be corrected by enhancing market knowledge. However, the study findings, which suggest that perceived risk remains a significant impediment to the attraction of investment, satisfy the objective of this research and, hence, the study's credibility, considering the challenges to growth in the green finance sector.

The fourth theme of the study is the prospects of green finance, especially in the renewable energy sector. The study implies enormous opportunities for green finance with the UAE's Vision 2030, for example, in solar and wind energy. These efforts have laid down a sound foundation for renewable energy investments. This is well supported by literature as it affirms that national sustainability goals have been used to promote green finance investments. However, Salem et al. [65] also pointed out that while the UAE has such opportunities, its dependence on fossil energy sources might jeopardize investor attention to renewable energy projects. To this, there is an opposing argument; nevertheless, the study supports the idea that government-led sustainability can substantially contribute to the enhancement of green finance, thereby increasing the reliability of the study.

6. Conclusion

This research aimed at mapping the status of green finance in the UAE, emphasizing the state, barriers, trends, and suggestions. The research shows that, despite the development of the UAE as a global leader in the promotion of green finance due to the establishment of sound government policies, financial institutions, and the private sector, some barriers such as regulatory ambiguity, financial risks, and lack of public awareness still exist and hinder the country's potential. The UAE Green Agenda 2015-2030 and the Climate Change Plan 2050 offer key frameworks for green finance; however, they are weakened by enforcement shortcomings and a lack of synergy. Both the absence of a unified green taxonomy and the dispersed structure of legislation act as challenges for investors, preventing the scaling of green finance projects. Furthermore, the public, especially the financial markets, lacks knowledge of green finance and its implementation. Nevertheless, there are significant opportunities in the UAE's green finance sector, particularly in renewable energy. Government support, public-private partnerships (PPPs), and the increasing interest of private companies in sustainable infrastructure and green bonds provide a solid foundation for further growth. However, more efforts are necessary to enhance green finance in the UAE, focusing on regulatory improvements, financial de-risking initiatives, and awareness creation.

6.1. Recommendations

To overcome the barriers and capitalize on the opportunities for advancing green finance, several key recommendations emerge from this study:

- Unified Regulatory Framework: The UAE requires a clear and definite green taxonomy to systematically assess and categorize green investments. This framework should follow best practices like the EU Taxonomy for Sustainable Activities, which will help investors understand what is good or bad regarding their investments in green projects. Secondly, improving the integration of intersectoral cooperation between different governmental entities and financial organizations is vital for increasing the efficiency of green finance approval and implementation.

- Financial De-Risking and Incentives: The primary reason why the perception of financial risks in green investments is high is that they are expensive undertakings, hence the need for the UAE government to offer incentives in the form of tax exemptions for green investment, government subsidies for renewable energy projects, and insurance for green bonds.
- Education and Awareness Campaigns: An educational intervention must create awareness about the mechanisms and opportunities of green finance. This includes professional development for financial institutions, policymakers, and investors to develop sustainable finance knowledge and practice and incorporate ESG factors into investment management [66].
- Support for Private Sector Investments: It is therefore important to encourage the private sector's involvement in green finance. There is also a need to encourage private entities to invest in green projects through providing green bonds, ESG funds, and other similar products in the UAE.

6.2. Implications of the Study

Therefore, the implications of the results of this study are multifaceted, as outlined below, regarding the green finance sector in the UAE. First, they argue for increasing legal mechanisms to minimize environmental unpredictability, which would stimulate both domestic and foreign investment. With green finance deepening its roots in the international market, the UAE's capacity to establish a clear and well-structured system will go a long way in its being recognized as a leading hub for sustainable investments in the Middle East region. Second, this study highlights the need to address financial risks through de-risking measures and increasing financial incentives for green investment. Thus, the removal of these entry barriers will help the UAE attract more investors and make the green finance market more diverse and competitive. Finally, the research findings regarding education and awareness imply that enhancing stakeholder awareness is central to the fast-tracking of green finance. To create a sustainable green finance environment in the long run, the UAE needs to focus on human capital development and increasing public awareness of sustainability issues.

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