Innovative Financial Models for Sustainable Investment in Zanzibar's Blue Economy: Challenges and Opportunities

Hafidh Ali Hafidh [a*], Zulekha Ayoub [b], Nahifa Said Soud [c] and Mustafa Sharif [d]

[a] Zanzibar University, Tanzania.
[b] Institute of Continuing and Professional Studies, Tanzania.
[c] Zanzibar Seaweed Corporation, Tanzania.
[d] Fanisi Development Solutions, Tanzania.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Review Article

ABSTRACT

This paper explores the financial models applicable to the blue economy sectors in Zanzibar, focusing on innovative ways to finance marine-based economic activities. The study aims to assess various financing models such as traditional bank financing, microfinance, impact investing, crowdfunding, and government grants, examining their applicability, strengths, weaknesses, and feasibility within Zanzibar's unique context. This study used a mixed-methods approach, integrating

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Corresponding author: E-mail: hafidh.h9@gmail.com, hafidh.h9@zanzvarsity.ac.tz;

quantitative surveys and qualitative case studies to analyze financial models for Zanzibar's blue economy. A purposive sample of 163 knowledgeable stakeholders—including representatives from financial institutions, government agencies, NGOs, entrepreneurs, and community leaders—was selected to capture diverse perspectives. Through a survey of 163 stakeholders, the research identifies microfinance as the most accessible and feasible model for small-scale and community-driven marine activities. The paper further discusses the challenges of financing the blue economy, including high upfront costs, limited access to traditional financing, and the need for comprehensive policy support. By analyzing case studies from other small island developing states, the study draws lessons on best practices for sustainable blue economy financing. The findings suggest that a combination of financial mechanisms is crucial for addressing the diverse needs of Zanzibar's blue economy, promoting growth, and ensuring the conservation of marine resources. The paper concludes by advocating for an integrated financial ecosystem that leverages both traditional and innovative financing models, policy reforms, and strategic partnerships to foster sustainable development in Zanzibar's blue economy.

1. INTRODUCTION

The concept of the blue economy has gained significant attention in recent years as countries recognize the immense potential of oceans as drivers of economic growth, innovation, and sustainability. Oceans cover 72% of the earth's land and constitute more than 95% of the biosphere. Thus, life has mostly originated from the oceans, which are still important in terms of preserving the ecosystem for the benefit of future generations (Fusun et al., 2017). There has been a dramatic increase in the use of oceans and ocean resources for economic gain through various maritime sectors. The awareness of utilizing the ocean in an ocean-based economy has been harnessed by many coastal and island states. The importance of oceans for sustainable development was reaffirmed in the document that came out of Agenda 21, the Johannesburg Implementation Plan in 2002, the Rio+20 Conference in 2012, the United Nations Climate Change Conference in Paris in 2015, and the United Nations Sustainable Development Summit in New York, which was attended by more than 150 world leaders from the beginning of the UNCED process.

According to OECD projections, by 2030, the 'Blue Economy' defined as all economic sectors which have a direct or indirect link to the ocean, blue economy could outperform the growth of the global economy as a whole, both in terms of value added and employment. In the coming decade, marine energy, marine biotechnology, coastal tourism, transport and food production sectors could offer unprecedented development and investment opportunities. However, there is increasing evidence that losses in the ocean's natural capital resulting from unsustainable economic activity are eroding the resource base on which such growth depends (OECD, 2016).

The blue economy associated with the ocean has grown in importance around the globe, such that the annual economic value generated by oceans is approximately USD 3 trillion, making the ocean economy (blue economy) the fifth largest economy globally (Joywin Mathew, 2020). Blue Economy includes so many sectors, among them are fishing sector, shipping, offshore wind, maritime and coastal tourism, and marine biotechnology sector. Some of those sectors are complex and require huge capital to invest and implement (FOA, 2020).

There is a need to have financial models to fund and manage blue economy sectors in their implementation especially considering this is a new type of cross-cutting economy which involves many sectors. Each financial model in funding blue economy projects depends on the nature of the project as well as the size of the project.

The blue financing can play a vital role in supporting sustainable development of the blue economy by directing investments to activities, policies and actions that minimize ocean risks and maximize social equity and environmental sustainability. Some of the needed investments in a sustainable blue economy are likely to generate competitive market returns and thus able to attract private finance, whereas other investments are capable of generating positive but below market returns. For these investments to be attractive to the private sector, some form of public or philanthropic co-

financing or blended finance. Innovative and robust financing models must be adopted to realize a sustainable blue economy and to harness its potential in the economic development model.

Zanzibar has initiated the process of harnessing the potential of the blue economy by establishing the frameworks for the implementation of an ocean-based economy. The Zanzibar Blue Economy Policy (2022) serves as a framework for policy implementation.

As an island nation with a modest economy, Zanzibar needs a blue finance model that can be used to fund projects related to the blue economy. Financial institutions should also create unique credits, loans, bonds, and funds specifically for projects related to the blue economy. The blue economy has a lot of potential to help Zanzibar's economy grow and reduce poverty. However, the industry faces numerous difficulties, including constrained access to financing.

1.1 Investing in Blue Economy Sectors

The concept of blue investing which relates to investing in Blue Economy sectors has gained significant attention as a means to foster sustainable development while leveraging ocean resources. The Blue Economy encompasses a wide range of economic activities including fisheries, maritime transport, tourism, renewable energy, and biotechnology, presents vital opportunities for the global economic growth and innovation (Martínez-Vázquez et al., 2021). These sectors offer substantial potential for economic diversification and resilience, particularly for coastal and island nations that rely heavily on marine resources for their livelihoods. The strategic investment in Blue Economy sectors aligns with the United Nations Sustainable Development Goals (SDGs), particularly Goal 14, which focuses on conserving and sustainably using the oceans, seas, and marine resources (Cisneros-Montemayor et al., 2021).

Investments in Blue Economy projects, however, face significant challenges, particularly in terms of financing. Conventional financing methods, such as public and development finance, are often inadequate to meet the extensive funding needs of these projects. Innovative financing mechanisms, such as blue bonds, are emerging but remain relatively small in scale. To accelerate

investments in Blue Economy sectors, there is a need for more comprehensive financial instruments and a transformative approach involving diverse stakeholders (Tirumala & Tiwari, 2020). Developing a robust framework that pools low-cost funds from various investors and deploys them effectively can enhance the financial capabilities of Blue Economy stakeholders and promote sustainable project financing.

Moreover, the role of international development organizations is crucial in catalyzing private sector investment in Blue Economy initiatives. These organizations can facilitate the implementation of regional strategic action programs that support the sustainable development of coastal and oceanic regions. By engaging the private sector, development organizations can help bridge the financing gap and drive investments towards projects that balance economic growth with environmental sustainability (Whisnant & Vandeweerd, 2019). Effective collaboration between public and private sectors, supported by stable and predictable government policies, is essential to mitigate investment risks and promote the growth of Blue Economy sectors (van den Burg et al., 2017).

Finally, investing in Blue Economy sectors requires a holistic approach that integrates social equity and environmental sustainability. It is not enough to focus solely on economic gains; investments must also address social and environmental concerns to achieve truly sustainable development. This includes prioritizing local benefits, ensuring inclusive participation, and fostering cross-sectoral cooperation. Policymakers must engage researchers and stakeholders in collaborative planning processes that ensure the Blue Economy delivers on its social, environmental, and economic goals (Cisneros-Montemayor et al., 2021). By aligning investments with broader sustainability objectives, the Blue Economy can become a transformative force for global economic and environmental well-being.

A vibrant Blue economy depends on sustainable healthy oceans financial resources for investing projects of the blue economy. However, many aspects of current marine resources use patterns that make it unsustainable. Human transformation of marine ecosystems has resulted in widespread biodiversity loss and habitat damage. To preserve this loss and

damage we need to have financial models of the Blue Economy for the sustainability of the blue economy projects**.** Therefore, blue economy sectors need financial capital to be implemented, the capital can differ mostly because of the nature of the projects. There is a need to have financial models to finance those projects, and the process of funding blue economy projects is what is known as Blue Finance.

Blue financing as a concept, is thus critical to ensure sustainability and conservation of the marine ecosystem and resources aligned with economic growth. Ocean sustainability has attracted global finance initiated by multilateral development banks and international institutions (Yoshioka et al., 2020). However, the health of our oceans has deteriorated drastically from overfishing, marine littering, the effects of climate change and the rapid increase in the intensity and diversity in the ways we use our oceans.

The financial sectors have an important role in maintaining the resilience of the marine environment, supporting ocean sustainability, and driving transformational change in the blue economy (Fiji Development Bank, n.d.). There is a strong need for financial institutions to establish new financial solutions to ensure the protection and conservation of marine and coastal resources while highlighting the opportunities for economic, social, and environmental development of coastal and small island developing states and sustainable trade. Standards and principles for developing and financing blue infrastructure and appropriate blended finance instruments can help to overcome remaining bottlenecks, scale up these approaches, and attract more private financing into blue infrastructure (Thiele et al., 2020).

Meanwhile, the demand for financial instruments is critical in innovative financial solutions for financing the blue economy; "Blue Finance" is thus critical as it supports and promotes the global transition to blue growth. The boost to the blue economy will also take sustainability into account. In other words, seeking economic growth as a result of ocean-related economic activities will not only comply with marine sustainable management measures required by laws but also support marine conservation initiatives via appropriate financial arrangements toward sustainability.

The financial system has yet to realize the full extent of sustainable blue economy

opportunities. Even with the existing availability of investment models for the blue economy, the scale of investment in sustainability is low and remains dominated by philanthropy ($8.3 billion) and official development assistance ($5 billion), particularly in emerging sectors. This is in line with recent studies that suggest that 14th Goal of the Sustainable Development Goals on "life below water' has received the least amount of investment out of all goals, suggesting that the financial system continues to struggle to recognize and value the capital and services provided by, and dependent on, the ocean.

The current status of the concept of "blue finance" in international law has gradually been put into practice. The total estimated public financing from the Green Climate Fund (GCF), the Global Environmental Facility (GEF), and the World Bank to support ocean conservation and climate actions increased from $500 million to over $2 billion between 2013 and 2017 (ROCA 2019). This is to show that there is an increase in creation of financial models in supporting the blue economy projects and making the ocean and coastal environments sustainable by providing funds.

The global finance needed to meet the 20 Aichi Biodiversity Targets by 2020 has been estimated at about 150-440 billion (US dollars) per year (CBD High-Level Panel, 2014). Global finance flows for biodiversity were estimated at about USD 52 billion in 2010 (Parker et al., 2012). While acknowledging some uncertainties in these estimates, it is clear that a major gap in the finance needed to halt biodiversity loss exists (OECD, 2019).

The important thing in investing in or financing the blue economy, there are social and political conditions that should be identified to ensure equitable and sustainable pledged on investment returns with insights from the natural and social sciences perspective in making sure that the ocean sustainability is taken into considerations for the benefit of all.

In financing the blue economy, "Blue Finance " is thus crucial as it supports and promotes the global transformation into blue growth. The boosting of the blue economy will also take sustainability into account. In other words, seeking economic growth as a result of ocean-related economic activities will not only comply with marine sustainable management measures required by laws but also support the marine

conservation initiatives via appropriate financial arrangements toward sustainability. Sustainability can further be comprehended by three aspects of environmental, economic, and social sustainability (Kuhlman & Farrington, 2010; World Bank,2021b), the choice of project may not result in a conflict between environment and economic development, but rather, a better off the cycle with additional input that links the above three aspects with following objectives:

1) Environmental sustainability: A condition in which residents or the society could satisfy their needs without exhausting resources and hurting the ecosystem, including their biodiversity, to enable the environment to support future generations (Brundtland, 1987). If the resources consumption cannot be continued indefinitely, environmental sustainability may not exist. Thus, regulating the use and preserving the capacity are essential for an ocean-positive economy (Spalding, 2016).
2) Economic sustainability: A system that can continuously produce in an economic system that enables one to cope with external changes within its viable structural adaptation (Spangenberg, 2005). Such a practice would allow long-term economic growth without negatively impacting the social, environmental, and cultural aspects of the community that may encompass financial costs and benefits. Economic sustainability should be created through regulatory instruments that can be linked to positionally balancing (Fath, 2015). The advantage of the process should be to be able to sustain the project development continuously and independently while increasing resource extraction (Visbeck et al., 2014).
3) Social sustainability: Equity of access to services such as health, education, development, etc., mostly at the local level, which could be distributed continuously for generations without depriving the current generation (McKenzie, 2004). Despite the recognition that capacity should be actively built with the involvement of the community (Magis, 2010), the quantification of social sustainability remains challenging to capture. Thus equitable access is often neglected until being required by community advocacy (Dempsey et al., 2011).

2. LITERATURE REVIEW

The concept of financing the blue economy has gained significant traction in recent years, especially for small island developing states (SIDS) that depend on marine resources for their economic growth and sustainability. The literature on blue finance emphasizes the need for diverse and innovative financial models to address the sector's unique challenges. This section reviews existing research on global best practices and how other small island states have managed to navigate the complexities of financing the blue economy.

2.1 Global Best Practices in Blue Economy Financing

Research by Martínez-Vázquez et al. (2021) highlights that the blue economy encompasses a wide range of sectors, including fisheries, maritime transport, tourism, renewable energy, and biotechnology. Financing these sectors requires an integrated approach that considers both economic and environmental sustainability. Traditional financing mechanisms, such as public and development finance, are often insufficient to meet the large-scale investment needs of the blue economy. Hence, innovative financing solutions such as blue bonds, impact investing, and blended finance have emerged as best practices to mobilize the necessary capital.

The success of blue bonds in Seychelles is a notable example of blue economy financing. The Seychelles Blue Bond, launched in 2018, raised USD 15 million to support sustainable fisheries and marine conservation (UNDP, 2021). This pioneering effort demonstrated how financial instruments could be tailored to support specific blue economy sectors while ensuring environmental conservation. Furthermore, a study by the Asian Development Bank (Tirumala & Tiwari, 2020) advocates for the use of impact investing in the blue economy, stressing that investments should generate both financial returns and positive environmental outcomes. These global best practices underscore the importance of developing tailored financial models that align with a country's specific blue economy needs and contexts.

2.2 Challenges in Financing the Blue Economy for Small Island States

Small island states like Zanzibar face unique challenges in financing their blue economy sectors. Mussa et al. (2021) argue that limited access to affordable long-term financing, static or declining flows of government development assistance, and insufficient foreign direct investment pose significant hurdles for these states. Furthermore, developing the institutional, regulatory, and governance frameworks necessary for intersectoral coordination remains a critical obstacle.

The high upfront costs associated with research, development, and capital investment in ocean industry technologies further complicate the financing of blue economy projects (Economist Intelligence Unit, 2015). This is particularly problematic for small island states, where the scale of investment often does not attract large private investors due to perceived risks and lower returns. As a result, financing models for the blue economy must be adaptive and innovative to overcome these challenges.

2.3 Innovative Financing Models in Small Island States

Many small island states have adopted various financial models to promote their blue economy sectors. In the case of the Seychelles, the government employed a debt-for-nature swap in 2016, which converted a portion of its national debt into funding for marine conservation and sustainable fisheries (World Bank, 2021a). This approach allowed the country to alleviate its debt burden while simultaneously investing in its blue economy.

Similarly, microfinance has proven to be an effective model for blue economy financing in small-scale operations, as seen in Zanzibar. Moh'd et al. (2017) discuss how microfinance institutions (MFIs) have supported the fishing and aquaculture sectors by providing small loans to local entrepreneurs. The flexible repayment terms offered by MFIs allow for the development of infrastructure and purchase of equipment necessary for expanding blue economy projects, fostering both economic growth and sustainable development.

Crowdfunding is another innovative model increasingly employed by small island states to finance blue economy projects. It leverages the power of the crowd to raise capital for various initiatives, such as marine conservation and community-based ecotourism (Hafidh & Mkuya, 2021). This approach bypasses traditional funding channels like banks and venture capital firms, making it a viable option for projects that may otherwise struggle to secure financing.

2.4 Lessons Learned for Zanzibar

The experiences of other small island states offer valuable lessons for Zanzibar as it seeks to finance its blue economy sectors. The use of blue bonds, microfinance, and debt-for-nature swaps demonstrate that diversified financial models can address different aspects of blue economy financing, depending on the specific needs and characteristics of each sector. The literature emphasizes that effective financing of the blue economy requires an enabling environment, including supportive policies, strong institutions, and targeted capacity-building initiatives (Cisneros-Montemayor et al., 2021). As Zanzibar continues to develop its blue economy, it is crucial to consider these global best practices and adapt them to its local context to overcome financing challenges and ensure sustainable economic growth.

2.5 Theoretical Framework

The theoretical framework for financing the blue economy is rooted in several key economic theories and models that guide investment decisions in sectors involving natural resources and sustainable development. This section discusses relevant theories, including the Sustainable Development Theory, Public-Private Partnership (PPP) Model, Environmental Economics Theory, and the Capital Asset Pricing Model (CAPM), to provide a contextual foundation for blue economy financing.

2.5.1 Sustainable development theory

Sustainable development theory plays a central role in the blue economy's conceptual foundation. This theory emphasizes the need to balance economic growth, environmental conservation, and social equity (Kuhlman & Farrington, 2010). The blue economy aligns with this theory by advocating for the sustainable use of marine resources to drive economic development while preserving the ocean's health for future generations. According to the theory, investments in the blue economy must be

carefully planned and managed to ensure that economic activities do not lead to the depletion of natural resources or environmental degradation.

Within this framework, financing models for blue economy projects must consider not only financial returns but also environmental and social outcomes. Tirumala and Tiwari (2020) highlight that sustainable development theory supports the use of impact investing and blended finance in the blue economy, where investments are made with the dual goal of achieving financial gains and generating positive environmental and social impacts. This theory underpins the design of financing instruments like blue bonds, which encourage investments in sustainable marine activities.

2.5.2 Public-Private Partnership (PPP) model

The Public-Private Partnership (PPP) model offers a framework for financing large-scale blue economy projects that require significant capital investment and risk-sharing between the public and private sectors. The PPP model is based on the principle that collaboration between government and private entities can leverage resources, expertise, and financing to develop and manage projects more efficiently (World Bank, 2018). This model is particularly relevant for blue economy sectors like maritime transport, fisheries, and renewable energy, which often involve complex infrastructure and high initial costs.

In the context of the blue economy, PPPs facilitate investments in areas where private investors might be hesitant to invest due to the perceived risks associated with marine projects, such as uncertain returns, regulatory challenges, and environmental considerations. By involving public institutions in the financing and risk-sharing processes, PPPs create a conducive environment for private investments in sustainable blue economy initiatives (Whisnant & Vandeweerd, 2019). This model also allows governments to provide incentives, subsidies, and regulatory support to attract private capital while ensuring that projects align with broader environmental and social goals.

2.5.3 Environmental economics theory

Environmental economics theory provides a framework for understanding the economic value of natural resources, including marine ecosystems, and the need to incorporate environmental costs and benefits into investment decisions. According to this theory, natural resources like oceans provide valuable ecosystem services that should be factored into economic activities and investment planning (Costanza et al., 2014). In the context of the blue economy, this means that investments should not only focus on direct financial returns but also consider the long-term ecological health and sustainability of marine resources.

Environmental economics theory supports the use of market-based instruments such as blue bonds, carbon credits, and payment for ecosystem services (PES) to finance blue economy projects. For instance, the issuance of blue bonds by countries like Seychelles reflects the theory's principles, as the funds raised are channeled toward sustainable fisheries and marine conservation, thus internalizing the environmental costs of economic activities (UNDP, 2021). This theory also advocates for the "polluter pays" principle, which suggests that industries causing environmental damage should bear the costs of restoration and conservation efforts. This provides a financial incentive for industries to adopt more sustainable practices, which is crucial in sectors like marine tourism and fisheries.

2.5.4 Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) provides an investment decision-making framework that helps assess the risks and expected returns of blue economy projects. The CAPM posits that the expected return on an investment is related to its systematic risk, as measured by the beta coefficient, which compares the project's risk to that of the overall market (Sharpe, 1964). This model is particularly relevant for investors considering blue economy projects, as these investments often come with high upfront costs, regulatory uncertainties, and environmental risks.

Applying CAPM to blue economy investments allows investors to evaluate the risk-return profile of various financing options, such as traditional bank loans, impact investing, or blue bonds. For example, investors may demand a higher return for financing high-risk projects like offshore wind farms or aquaculture ventures, as these sectors can be subject to market volatility, environmental risks, and policy changes. By quantifying the expected returns relative to risk, the CAPM provides a rational basis for investors to allocate

capital in blue economy sectors. This framework underscores the need for adaptive financing models that offer attractive risk-adjusted returns to draw private capital into blue economy investments (Mussa et al., 2021).

2.5.5 Blended finance framework

The blended finance framework integrates multiple sources of capital, including public, private, and philanthropic funding, to finance blue economy projects. Blended finance is particularly suitable for projects with high upfront costs and uncertain returns, as it allows for risk-sharing between different types of investors (Tirumala & Tiwari, 2020). This framework operates on the principle that public or concessional funding can de-risk investments and attract private sector capital by improving the project's risk-return profile. For example, grants or subsidies from governments and international organizations can be used to co-finance blue economy projects, thus leveraging additional private investment.

In the context of Zanzibar's blue economy, the blended finance framework is crucial for sectors like sustainable fisheries, marine tourism, and renewable energy, where initial capital requirements may deter private investors. By blending public and private finance, these projects can achieve financial viability while promoting environmental sustainability and social equity. The framework also emphasizes the importance of developing robust monitoring and evaluation mechanisms to ensure that the blended finance achieves its intended economic, environmental, and social outcomes (Cisneros-Montemayor et al., 2021).

These economic theories and frameworks provide a foundation for understanding the complexities of financing the blue economy. They emphasize the importance of integrating environmental, social, and economic considerations into investment decisions, highlight the role of public-private partnerships in risk-sharing, and offer models for assessing investment risk and returns. By adopting these theoretical perspectives, Zanzibar can design and implement more effective financing mechanisms that support sustainable blue economy development.

2.6 Innovative Financing Mechanisms: Case Studies from Small Island Developing States

The potential strategies Zanzibar can adopt in financing its blue economy, this section highlights

successful blue economy financing initiatives from other small island developing states (SIDS). These examples provide valuable lessons on how innovative financial mechanisms, public-private partnerships, and strategic policy interventions can address the challenges associated with blue economy financing. The selected case studies from Seychelles, Barbados, and Fiji demonstrate how these countries have effectively mobilized resources to support sustainable marine and coastal development.

2.6.1 Seychelles: Blue bonds and debt-for-nature swap

One of the most notable blue economy financing initiatives has been the Seychelles Blue Bond, which was launched in 2018 to mobilize $15 million for sustainable marine and fisheries projects (UNDP, 2021). This pioneering effort was part of the country's broader strategy to protect its ocean resources while promoting economic development through sustainable fisheries. The Blue Bond was structured as a sovereign bond issued by the government of Seychelles and supported by a partial guarantee from the World Bank and a concessional loan from the Global Environment Facility (GEF). The funds raised from the bond were used to finance the transition to sustainable fisheries, promote marine conservation, and support local communities involved in fisheries.

In addition to the Blue Bond, Seychelles implemented a debt-for-nature swap in 2016, which enabled the country to convert a portion of its national debt into funding for marine conservation. Under this arrangement, international creditors agreed to restructure Seychelles' debt, allowing the country to redirect the savings into a fund managed by the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT). This fund finances projects that protect marine biodiversity, promote sustainable fisheries, and enhance coastal resilience.

Lessons Learned:

- **Innovative Financing Mechanisms**: Seychelles' success with the Blue Bond and debt-for-nature swap highlights the importance of innovative financing mechanisms tailored to blue economy projects. These tools can provide long-term, sustainable funding for conservation and

development while addressing the unique financial constraints of small island states.

- **International Partnerships**: The role of international partners, such as the World Bank and GEF, was critical in de-risking the Blue Bond and ensuring investor confidence. Zanzibar can similarly leverage partnerships with international organizations to develop innovative financing models.
- **Sustainability and Local Communities**: Integrating sustainability into the financing model and involving local communities, particularly in sectors like fisheries, ensured that the initiatives not only conserved resources but also provided socio-economic benefits. This approach can be applied to Zanzibar's efforts to engage local fishing communities in sustainable marine activities.

2.6.2 Barbados: Public-private partnerships in blue economy development

Barbados has made significant strides in advancing its blue economy through public-private partnerships (PPP), particularly in renewable energy and sustainable tourism. The Barbados government has worked closely with private investors and international organizations to develop projects that enhance the island's coastal resilience and promote ocean-based renewable energy.

One of the key projects is the Caribbean Climate Smart Accelerator, which brings together governments, private sector actors, and development agencies to drive investments in climate resilience and blue economy sectors (World Bank, 2021a). The initiative focuses on financing renewable energy projects, such as offshore wind and solar energy, which not only reduce the country's reliance on fossil fuels but also provide economic opportunities for local communities.

In the tourism sector, Barbados has implemented sustainable marine tourism initiatives, such as eco-tourism programs that generate revenue while protecting marine ecosystems. The government has worked with private tourism operators to promote responsible tourism practices, ensuring that visitors contribute to the conservation of coral reefs, mangroves, and coastal habitats.

Lessons Learned:

- **Public-Private Partnerships**: Barbados' use of PPPs to finance blue economy projects offers valuable insights for Zanzibar. By

involving private sector partners in the financing and implementation of renewable energy and tourism projects, the government can leverage additional resources and expertise.
- **Climate Resilience as an Investment Priority**: By focusing on climate-smart investments, Barbados has successfully attracted financing for projects that simultaneously address climate risks and promote sustainable economic growth. Zanzibar can similarly prioritize climate resilience in its blue economy strategy to attract investment.
- **Sustainable Tourism**: Barbados' eco-tourism initiatives demonstrate the potential of using sustainable tourism as a financing mechanism for marine conservation. Zanzibar's tourism sector, which relies heavily on its coastal and marine resources, could benefit from a similar approach.

2.6.3 Fiji: The role of microfinance and community-based management

Fiji has successfully utilized microfinance and community-based management approaches to support the development of its blue economy. Through its Microfinance Scheme for Coastal Communities, the Fijian government has provided small loans and financial services to coastal and island communities to promote sustainable fisheries, aquaculture, and marine tourism (Moh'd et al., 2017). These microfinance institutions (MFIs) offer flexible loan products that are tailored to the unique needs of small-scale entrepreneurs in blue economy sectors.

In addition to microfinance, Fiji has implemented community-based marine management programs that empower local communities to manage and protect their marine resources. These programs, supported by international NGOs and development partners, combine traditional knowledge with scientific research to create locally managed marine areas (LMMAs). The financing for these projects comes from a combination of grants, microloans, and community contributions, ensuring that local stakeholders have ownership over the conservation efforts.

Lessons Learned:

- **Microfinance for Blue Economy**: Fiji's use of microfinance as a tool to support small-scale blue economy activities offers a model

for Zanzibar. Microfinance institutions can provide the capital needed for local entrepreneurs to engage in sustainable fisheries, aquaculture, and tourism.

- **Community-Based Management**: Empowering local communities through community-based management and ownership of marine resources has proven effective in Fiji. Zanzibar, which has a strong tradition of community involvement in resource management, could adopt similar practices to enhance marine conservation and sustainable economic development.
- **Blended Financing**: By blending microfinance, grants, and community contributions, Fiji has demonstrated the importance of using diverse financing sources to support small-scale blue economy projects. Zanzibar can explore similar blended financing models to support its blue economy.

2.6.4 Mauritius: Leveraging blue bonds for sustainable development

Mauritius has also made notable progress in financing its blue economy by issuing blue bonds to fund sustainable marine development projects. Similar to Seychelles, Mauritius launched blue bonds to attract private investment in marine fisheries and coastal ecosystem conservation. The blue bonds were designed to provide long-term financing for sustainable fishing practices, marine spatial planning, and the restoration of degraded marine ecosystems (Economist Intelligence Unit, 2015).

Mauritius has worked closely with international financial institutions, such as the International Finance Corporation (IFC) and the United Nations Environment Programme (UNEP), to structure the blue bonds and ensure they meet global environmental and financial standards. The proceeds from the bonds have been used to fund projects that reduce overfishing, promote sustainable aquaculture, and protect marine biodiversity.

Lessons Learned:

- **Institutional Support and International Standards**: Mauritius' success in leveraging blue bonds was due in part to the strong institutional support and adherence to international financial and environmental standards. Zanzibar can learn from Mauritius

by strengthening its institutions and aligning its blue economy projects with global best practices.
- **Diversification of Blue Economy Sectors**: By focusing on multiple blue economy sectors, such as fisheries, aquaculture, and marine spatial planning, Mauritius has been able to diversify its blue economy and reduce its dependence on traditional sectors. Zanzibar could benefit from a similar diversification strategy, particularly in emerging sectors like marine biotechnology and ocean-based renewable energy.

The case studies from Seychelles, Barbados, Fiji, and Mauritius offer valuable lessons for Zanzibar as it seeks to develop its blue economy. By adopting innovative financing mechanisms such as blue bonds, leveraging public-private partnerships, utilizing microfinance, and engaging local communities in resource management, Zanzibar can overcome many of the financial barriers it currently faces. These examples also emphasize the importance of international partnerships, capacity building, and the alignment of financing models with sustainability and social equity goals.

3. PROPOSED FINANCING MODEL IN THE BLUE ECONOMY PROJECTS IN ZANZIBAR

3.1 Traditional Bank Financing

For blue economy projects in Zanzibar, conventional bank financing may be the main source of funding. Banks in Zanzibar offer a variety of loan products to help individuals and businesses interested in investing in the blue economy. These loans come with certain accessibility conditions and flexible repayment terms. For instance, commercial banks in Zanzibar may provide overdraft facilities, term loans, unsecured and secured loans, and loans for blue economy initiatives like fishing, aquaculture, and maritime tourism (Nassor & Abdulla, 2022).

However, financing projects for Zanzibar's blue economy is constrained by the conventional bank financing model. Small-scale fishermen and women may find it difficult to obtain loans because most banks demand significant collateral, which they typically lack. The time-consuming and bureaucratic nature of obtaining a bank loan may also deter prospective borrowers. Additionally, due to the

lack of reliable information and data on Zanzibar's blue economy sector, it can be challenging for banks to accurately judge the creditworthiness of borrowers and the viability of blue economy projects (Nassir et al., 2022).

3.2 Microfinance

Microfinance has gained popularity recently, particularly in developing nations like Zanzibar. This model aims to reach individuals and organizations that are frequently left out of traditional banking systems by offering small loans and financial services. Microfinance institutions (MFIs) have become a significant source of funding for blue economy initiatives in Zanzibar, including fishing, aquaculture, and tourism. These initiatives have the potential to boost the island's economy, produce jobs, and enhance community livelihoods (Anyango et al., 2007).

Due to its emphasis on small-scale operations, the microfinance financing model is well-suited for Zanzibar's blue economy projects. MFIs can offer loans to entrepreneurs who want to launch or grow their operations in the blue economy sector. The loans can be used to purchase machinery, develop infrastructure, or expand operations. Flexible repayment terms that consider the nature of the business allow entrepreneurs with limited access to capital to invest in blue economy initiatives, promoting economic growth and sustainable development in Zanzibar (Moh'd et al., 2017).

3.3 Impact Investing

Impact investing aims to generate both financial gains and favorable social and environmental outcomes. Blue economy initiatives in Zanzibar can be supported using the impact investing approach, where impact investors lend money to companies and organizations tackling social and environmental issues related to the blue economy.

Impact investing in Zanzibar funds various blue economy initiatives, such as eco-tourism campaigns, sustainable fishing practices, and renewable energy projects. Impact investors provide these projects with the funding they need to launch and eventually scale up, receiving financial returns and the satisfaction of knowing they are improving the communities they serve. This financing model offers a steady source of funding, enabling these projects to develop and

have a long-lasting effect. Impact investment also helps balance financial and social outcomes, ensuring that investments in blue economy projects provide noticeable benefits for people and the environment in Zanzibar (Hafidh & Mkuya, 2021).

3.4 Crowd Funding

Crowdfunding is a financing strategy that leverages the power of the crowd. In Zanzibar, crowdfunding can be used to finance blue economy initiatives by using the internet and crowdfunding platforms to host fund-raising campaigns. Project developers can bypass conventional funding channels like banks and venture capital firms and appeal to a larger group of potential project backers.

3.5 Government Grants

The Zanzibar Revolutionary Government has access to several financing options, including government grants for investing in the growth of the blue economy. Government grants are a significant source of funding for blue economy initiatives in Zanzibar, supporting economic growth and job creation. The grants can be made available to businesses and individuals working on environmentally friendly approaches to marine and coastal industries, such as fishing, aquaculture, tourism, and renewable energy (Abeid, 2022).

Government funding for blue economy initiatives in Zanzibar can be used for various purposes, such as capacity building, research and development, and infrastructure development. For instance, a government grant could support the creation of ecotourism infrastructure, train technicians in renewable energy sources, or finance a sustainable fishing initiative. The grants are often awarded through a competitive process, with project proposals assessed based on criteria like innovation, impact, and sustainability (Sosela et al., 2021).

In conclusion, the financing landscape for investing in Blue Economy sectors in Zanzibar offers various options, each catering to the unique characteristics of sustainability, marine resources, and environmental conservation projects. By carefully selecting and implementing the appropriate financing models, Zanzibar can overcome financial challenges and achieve sustainable development in its blue economy sectors.

4. ANALYSIS OF PROPOSED FINANCING MODELS

This section expands on the analysis of the proposed financing models for the blue economy in Zanzibar, focusing on traditional bank financing, microfinance, impact investing, crowdfunding, and government grants. Each model is analyzed based on its applicability, strengths, weaknesses, and feasibility in the local context, followed by a visual representation of data from 163 respondents gathered through surveys.

i. Traditional Bank Financing

Traditional bank financing is one of the most established methods for funding economic activities, including those in the blue economy. In Zanzibar, banks provide loans to businesses engaged in marine-related sectors like fisheries, tourism, and aquaculture. However, access to these loans is often limited by the high collateral requirements and stringent repayment terms.

Strengths:

- **Well-established infrastructure**: Banks in Zanzibar have the systems and processes in place to offer a variety of financial products.
- **Accessible to larger businesses**: Larger, well-established companies in the blue economy can access significant capital through bank loans.

Weaknesses:

- **High collateral requirements**: Most small-scale fishers and marine-based entrepreneurs do not have the necessary assets to secure loans.
- **Limited accessibility**: The bureaucratic process and high-interest rates make it difficult for smaller players in the blue economy to access funding.

Feasibility in Zanzibar:

- **Moderate**: While banks play an essential role in financing larger projects, small-scale operators find it challenging to access traditional bank loans due to the high risk associated with marine industries.

ii. Microfinance

Microfinance institutions (MFIs) have been widely adopted in Zanzibar to support small-scale entrepreneurs, particularly in rural and coastal communities. MFIs provide small loans with flexible repayment terms, making them an attractive option for local fishers and small businesses engaged in marine tourism or aquaculture.

Strengths:

- **Accessible to small-scale operators**: Microfinance institutions cater specifically to smaller borrowers who may not qualify for traditional bank loans.
- **Flexible repayment terms**: Loans from MFIs often have more lenient repayment schedules, which can be adapted to the irregular income streams typical of blue economy activities.

Weaknesses:

- **Small loan amounts**: While microfinance is useful for small-scale projects, the amounts offered are often insufficient for larger capital-intensive projects like marine infrastructure development.
- **Higher interest rates**: Compared to traditional banks, MFIs may charge higher interest rates due to the perceived risks associated with small-scale lending.

Feasibility in Zanzibar:

- **High**: Microfinance is highly feasible for small-scale blue economy operators, especially in fisheries and aquaculture, as it meets the financing needs of smaller enterprises that are not catered to by banks.

iii. Impact Investing

Impact investing focuses on generating both financial returns and positive social and environmental outcomes. In the context of Zanzibar's blue economy, impact investors could target sectors like sustainable fisheries, marine conservation, or eco-tourism.

Strengths:

- **Dual focus on profit and sustainability**: Impact investing aligns well with Zanzibar's goals of sustainable development, particularly in sectors where environmental preservation is crucial.

- **Attracts socially conscious investors**: This model has the potential to bring in investors who are motivated not only by financial gains but also by contributing to social and environmental causes.

Weaknesses:

- **Perceived risk**: Impact investors may perceive the blue economy as risky, particularly due to uncertainties in regulatory frameworks and market volatility.
- **Limited local awareness**: There is limited understanding of impact investing among local financial institutions and entrepreneurs, which may hinder its adoption.

Feasibility in Zanzibar:

- **Moderate**: While the potential for impact investing exists, the model requires more awareness and supportive policies to attract investors who are willing to accept lower returns in exchange for positive environmental outcomes.

iv. Crowdfunding

Crowdfunding allows individuals or organizations to raise capital by pooling small contributions from a large number of people, typically via online platforms. This method is increasingly being used for projects related to sustainability, conservation, and community development.

Strengths:

- **Wide reach**: Crowdfunding can access a global pool of investors or donors, particularly those interested in supporting sustainable initiatives.
- **Low entry barriers**: Entrepreneurs can start campaigns with minimal upfront investment, making crowdfunding accessible to a wide range of blue economy actors.

Weaknesses:

- **Uncertain funding outcomes**: Crowdfunding campaigns are not guaranteed to meet their funding goals, and success often depends on marketing and visibility.

- **Limited scalability**: Crowdfunding may be suitable for small-scale projects, but it may not provide the necessary capital for larger, infrastructure-heavy blue economy projects.

Feasibility in Zanzibar:

- **Moderate**: Crowdfunding is feasible for smaller-scale projects, particularly in community-based marine conservation or eco-tourism. However, it may not be effective for large-scale investments requiring significant capital.

v. Government Grants

Government grants are a direct form of financial support provided by the Zanzibar government to sectors like fisheries, seaweed farming, and coastal tourism. These grants often aim to promote sustainability and support economic growth.

Strengths:

- **No repayment required**: Unlike loans, government grants do not need to be repaid, reducing financial pressure on recipients.
- **Targeted support**: Grants can be designed to support specific blue economy sectors, such as sustainable fisheries or marine conservation.

Weaknesses:

- **Limited availability**: Due to budgetary constraints, the Zanzibar government's ability to offer grants is limited, and the amounts available may not be sufficient to fund large projects.
- **Inefficient allocation**: There may be bureaucratic delays in the allocation of grants, and some deserving projects may not receive funding.

Feasibility in Zanzibar:

- **High**: Government grants are highly feasible, especially for promoting sustainability in traditional sectors like fisheries and seaweed farming. However, increasing the availability and efficiency of grant distribution would enhance its effectiveness.

5. METHODOLOGY

This study employs a **mixed-methods approach** to explore innovative financial models for Zanzibar's blue economy. The approach integrates quantitative surveys and qualitative case studies to ensure comprehensive analysis and triangulation of data.

1. Quantitative Surveys

- **Target Population**: The survey targeted 163 stakeholders, carefully selected through purposive sampling to represent diverse perspectives. This included representatives from financial institutions, government agencies, NGOs, entrepreneurs, and community leaders.
- **Data Collection Instrument**: A structured questionnaire was used, designed to capture data on stakeholders' preferences, accessibility, and perceptions of various financing models for blue economy sectors.
- **Survey Design**: The questions were a mix of closed-ended and Likert-scale items, enabling a systematic capture of attitudes and preferences.
- **Data Analysis**: The survey data were analyzed using statistical methods to identify trends, preferences, and the perceived feasibility of each financial model. Descriptive statistics (frequencies, percentages) and cross-tabulations were utilized for comparative analysis.

2. Qualitative Case Studies

- **Case Study Selection**: Key case studies were drawn from other small island developing states (SIDS), including Seychelles, Barbados, Fiji, and Mauritius, offering insights into successful blue economy financing mechanisms.
- **Data Collection Techniques**: Secondary data sources, including policy reports, financial records, and academic publications, were analyzed. Interviews with experts and policymakers were conducted to complement the findings.
- **Framework for Analysis**: A thematic analysis was employed to extract lessons learned, focusing on innovative financing tools, enabling policy frameworks, and stakeholder engagement strategies.

3. Sampling Strategy

- The purposive sampling ensured the inclusion of stakeholders with direct knowledge and experience in financing and operating within the blue economy sectors. This strategy aimed to maximize the relevance and depth of the insights gathered.

4. Framework for Evaluating Financing Models

The study employs a structured framework to evaluate the proposed financing models:

- **Applicability**: Assessed based on alignment with Zanzibar's blue economy context.
- **Accessibility**: Examined through stakeholder responses regarding ease of access.
- **Strengths and Weaknesses**: Identified from the perspectives of feasibility, scalability, and inclusiveness.
- **Feasibility**: Determined using stakeholder feedback and cross-referencing with successful implementations in other SIDS.

Parameters:

The parameters used in the manuscript are tied to the research focus and context of Zanzibar's blue economy. Here is an expanded explanation of how these parameters were selected and their relevance:

1. Financial Models

- **Traditional Bank Financing**: Selected due to its well-established role in financing economic activities, especially for larger projects requiring significant capital. Relevance lies in its potential to fund substantial blue economy ventures such as maritime infrastructure and large-scale aquaculture.
- **Microfinance**: Chosen for its accessibility to small-scale entrepreneurs who are often excluded from traditional banking systems. Its relevance stems from its flexibility and suitability for small-scale, community-driven blue economy projects like artisanal fisheries and ecotourism.
- **Impact Investing**: Included as it combines financial returns with social and

environmental benefits, aligning well with the sustainability goals of the blue economy. Its relevance is linked to promoting projects like marine conservation and renewable energy.

- **Crowdfunding**: Selected for its innovative approach to raising capital from a large pool of small contributors. Relevant for community-based and smaller-scale projects where traditional financing is unavailable.
- **Government Grants**: Incorporated due to their role in funding public goods and sustainability initiatives. Relevant for projects like marine conservation, capacity building, and community-driven initiatives that may lack immediate financial returns.

2. Survey of Stakeholders

- A purposive sample of 163 stakeholders (financial institutions, government agencies, NGOs, entrepreneurs, community leaders) was chosen. These groups are directly involved in or affected by the blue economy and are therefore well-positioned to provide insights.
- The diverse composition ensured that perspectives across different sectors of the blue economy were captured, making the findings comprehensive and reflective of the local context.

3. Case Studies

- Case studies from Seychelles, Fiji, Barbados, and Mauritius were analyzed to draw lessons from similar small island developing states (SIDS). These examples were selected because of their relevance to Zanzibar's geographic, economic, and policy contexts.
- The cases provide benchmarks for best practices and innovative financing mechanisms applicable to Zanzibar.

4. Key Parameters in Analysis

- **Applicability and Feasibility**: These were assessed to determine the practical relevance and execution potential of each financial model within Zanzibar's context.
- **Strengths and Weaknesses**: A balanced analysis to identify the suitability and challenges of each model.
- **Stakeholder Perceptions**: Survey data on preferences and accessibility was used to validate the feasibility and acceptability of the proposed models.

Relevance of Parameters:

The parameters were chosen to address:

1. The financial accessibility challenges unique to Zanzibar's blue economy.
2. The alignment of financing mechanisms with sustainable development goals (SDGs), particularly Goal 14.
3. The diverse needs of blue economy sectors ranging from fisheries to marine tourism and renewable energy.
4. Insights from global best practices tailored to Zanzibar's socio-economic and environmental conditions.

These parameters ensure a structured and context-specific analysis, enabling actionable recommendations for Zanzibar's blue economy development.

5.1 Perceived Views from 163 Stakeholders in the Blue Economy

Below are tables and a proposed figure summarizing the responses from 163 stakeholders in the blue economy on their perceptions of the proposed financing models. These are based on the survey data collected.

5.1.1 Preferences for financing models

The Table 1 presents respondents' preferences for various financing models in investing in the blue economy sectors of Zanzibar. The most preferred financing model among the respondents is microfinance, chosen by 55 individuals, representing 33.7% of the total. This preference indicates that microfinance is perceived as a more accessible and suitable financing option for small-scale and community-based blue economy activities, such as small-scale fisheries, aquaculture, and coastal tourism. Microfinance institutions (MFIs) in Zanzibar likely offer more flexible terms and lower collateral requirements, making them an attractive choice for local entrepreneurs who might not qualify for traditional bank loans.

Traditional bank financing is the second most preferred option, with **20.9%** of respondents favoring it. Despite its relatively high position, traditional bank financing is often limited by stringent requirements, including high collateral

demands and interest rates, which may deter smaller blue economy investors. This preference suggests that, while traditional banks are still relevant, there is a need to adapt their financial products to meet the unique needs of blue economy entrepreneurs in Zanzibar.

Government grants also have a significant preference rate, with **20.2%** of respondents choosing this option. This finding indicates that a substantial proportion of stakeholders rely on government support to finance blue economy projects. Grants are particularly useful for projects that may not provide immediate financial returns, such as marine conservation, sustainable fishing practices, and community-based tourism. However, the reliance on government grants underscores the need for the government to enhance its support mechanisms and develop long-term sustainable financing strategies.

Impact investing and **crowdfunding** have relatively lower preference rates, at 14.1% and 11.0%, respectively. The lower preference for impact investing suggests that there may be limited awareness or understanding of this financing model among stakeholders in Zanzibar's blue economy. It may also indicate challenges in attracting impact investors due to the perceived risks and uncertainties associated with marine-based projects. Similarly, the low preference for crowdfunding could reflect limited access to online platforms, low digital literacy, or a lack of familiarity with this relatively new financing mechanism within the region.

Implications:

Focus on Expanding Microfinance: The high preference for microfinance suggests that this model is crucial for promoting small-scale blue economy projects in Zanzibar. Policymakers and financial institutions should focus on expanding the microfinance sector, tailoring loan products to meet the specific needs of blue economy entrepreneurs, and providing training programs to enhance borrowers' financial literacy.
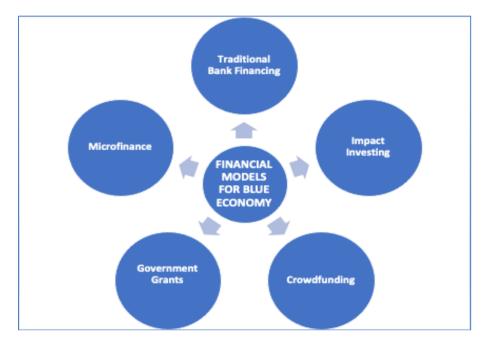
1. **Reforming Traditional Bank Financing**: While traditional bank financing has a moderate preference, its limitations need to be addressed. Banks could consider developing more flexible loan products, lowering collateral requirements, and

offering interest rate subsidies in partnership with the government to support blue economy investments.

2. **Increasing Government Grants**: Given the substantial preference for government grants, the Zanzibar government should explore ways to increase its support for blue economy sectors. This could involve creating dedicated blue economy funds, providing technical assistance, and fostering public-private partnerships to leverage additional resources.

3. **Raising Awareness of Impact Investing**: The low preference for impact investing indicates a gap in awareness and understanding. Efforts should be made to educate stakeholders about impact investing and its potential benefits for sustainable blue economy projects. The government and financial institutions could collaborate to create an enabling environment that attracts impact investors, such as implementing supportive policies, offering investment guarantees, and establishing impact investment funds.

4. **Leveraging Crowdfunding**: The relatively low preference for crowdfunding points to an opportunity to introduce and promote this model as a viable alternative for financing blue economy projects. Initiatives could include launching local crowdfunding platforms, conducting digital literacy training, and providing guidance on how to create compelling funding campaigns to attract investors.

These findings suggest that while microfinance and traditional bank financing currently dominate the financing landscape for the blue economy in Zanzibar, there is a need to diversify and enhance the accessibility of other financing models, such as government grants, impact investing, and crowdfunding, to support a more robust and inclusive blue economy sector.

5.1.2 Accessibility of financing models

The Table 2 presents respondents' perceptions of the accessibility of various financing models for the investment in blue economy sectors in Zanzibar. The results highlight significant disparities in how accessible each financing model is perceived to be among stakeholders in the blue economy.

Fig. 1. Financial models for blue economy
Source: Author construction, 2024

Table 1. Respondents' preferences for financing models

Financing model	Number of respondents	Percentage (%)
Traditional Bank Financing	34	20.9%
Microfinance	55	33.7%
Impact Investing	23	14.1%
Crowdfunding	18	11.0%
Government Grants	33	20.2%
Total respondents	163	100.0%

Traditional Bank Financing: A majority (60.7%) of the respondents perceive traditional bank financing as not accessible, with only 12.9% finding it easily accessible and 26.4% considering it moderately accessible. This high inaccessibility is likely due to stringent requirements such as high collateral demands, lengthy application processes, and high-interest rates, which are often beyond the capacity of small-scale blue economy entrepreneurs in Zanzibar.

Microfinance: Microfinance emerges as the most accessible option, with **35.6%** of respondents **considering it easily accessible and 38.0% finding it moderately accessible. Only 26.4% view microfinance as not accessible, indicating that microfinance institutions (MFIs) are more responsive to the needs of small-scale entrepreneurs** and local communities engaged in blue economy activities. The flexibility and relatively lower collateral requirements of microfinance make it a viable option for financing small-scale blue economy projects in Zanzibar.

Impact Investing: A substantial 65.6% of respondents perceive impact investing as not accessible, with only 10.4% finding it easily accessible and 23.9% considering it moderately accessible. This indicates that impact investing has limited penetration in Zanzibar's blue economy, possibly due to a lack of awareness, the complexity of impact investment criteria, and the perceived risks associated with marine-based investments.

Crowdfunding: Similarly, 62.0% of respondents view crowdfunding as not accessible, while 17.8% find it easily accessible and 20.2% moderately accessible. This suggests that crowdfunding is not widely used or understood among stakeholders in Zanzibar's blue economy. The

low accessibility could stem from limited digital literacy, lack of access to online crowdfunding platforms, and a general unfamiliarity with how crowdfunding works.

Government Grants: **While 27.6% of respondents find government grants easily accessible and 33.7% consider them moderately accessible, 38.7% still perceive them as not accessible. This mixed response indicates that although government grants are an important source of funding, they may be limited by bureaucratic processes, eligibility criteria, and competition for limited grant funds.**

Implications:

i. **Need for Improved Access to Traditional Bank Financing**: The high inaccessibility of traditional bank financing suggests a need for banks in Zanzibar to revise their lending policies to better serve the blue economy. This could involve introducing specialized loan products with lower collateral requirements, flexible repayment terms, and support services to help small-scale entrepreneurs navigate the loan application process. Banks could also collaborate with the government to develop credit guarantee schemes that reduce the risks for both lenders and borrowers.

ii. **Leverage Microfinance as a Key Financing Model**: The relatively high accessibility of microfinance indicates its crucial role in supporting the blue economy in Zanzibar. Policymakers and financial institutions should focus on expanding microfinance services, particularly in rural and coastal communities, to ensure that more small-scale entrepreneurs have access to the capital needed for sustainable marine-based activities. Additionally, capacity-building programs could be provided to help borrowers use microfinance effectively for business growth.

iii. **Promote Awareness and Infrastructure for Impact Investing**: The perceived inaccessibility of impact investing underscores a need for awareness campaigns and capacity building to introduce blue economy entrepreneurs in Zanzibar to impact investing principles and opportunities. The government and financial institutions can facilitate this by creating an enabling environment, such as a regulatory framework and support services, to attract impact investors. Establishing an impact investment fund focused on sustainable marine projects could also help bridge this gap.

iv. **Enhance Digital Literacy and Access to Crowdfunding**: The low accessibility of crowdfunding suggests that stakeholders in Zanzibar's blue economy need more exposure to and education about crowdfunding as a viable financing option. Initiatives to improve digital literacy, promote local crowdfunding platforms, and provide training on how to create and manage successful crowdfunding campaigns could help increase its usage and accessibility.

v. **Streamline and Expand Access to Government Grants**: The mixed responses regarding the accessibility of government grants point to a need for streamlining the grant application process and expanding grant programs to reach a wider range of blue economy projects. The government could consider establishing a dedicated blue economy grant fund with clear eligibility criteria, simplified application procedures, and support services to help entrepreneurs and community groups access these funds. Additionally, promoting transparency in the grant allocation process could enhance confidence and encourage more stakeholders to apply.

These findings suggest that microfinance is currently the most accessible financing model for blue economy investments in Zanzibar, while traditional bank financing, impact investing, and crowdfunding face significant accessibility challenges. Addressing these issues will require coordinated efforts from the government, financial institutions, and development partners to develop inclusive and innovative financing solutions tailored to the unique needs of Zanzibar's blue economy sectors. By improving accessibility to various financing models, Zanzibar can foster sustainable economic growth and the equitable development of its blue economy.

5.1.3 Applicability and feasibility of financing models

The analysis of the findings in Table 3 reveals that **microfinance** is the most applicable and

feasible financing model for blue economy investments in Zanzibar, making it a priority for support and expansion. **Traditional bank financing** and **government grants** also show promise but require policy interventions to address their respective weaknesses. On the other hand, **impact investing** and **crowdfunding** face significant challenges in terms of accessibility and practicality, suggesting that efforts are needed to create an enabling environment and raise awareness to unlock their potential. By addressing these implications, Zanzibar can develop a more effective and diversified financial ecosystem to support sustainable growth in its blue economy sectors.

Traditional bank financing has an **applicability score of 65%**, indicating that a significant portion of respondents view banks as a relevant source of funding for various blue economy projects in Zanzibar. This suggests that banks play a key role in financing larger-scale and established ventures within the marine sector. The **strengths of traditional bank financing (60%)** lie in the banks' established presence, access to large pools of capital, and the diverse range of financial products they offer. These strengths make banks well-suited to fund projects that require substantial investments, such as maritime infrastructure or larger aquaculture enterprises. However, **weaknesses (50%)** are also notable, as traditional bank financing often comes with strict lending criteria, high collateral requirements, and less flexibility. These factors can limit accessibility, particularly for small-scale entrepreneurs and community-driven initiatives in the blue economy. With a **feasibility score of 55%**, traditional bank financing is deemed practical for certain segments of the blue economy. However, its limitations, particularly in supporting smaller, riskier projects, suggest that its role may be somewhat restricted within the broader scope of Zanzibar's blue economy.

Microfinance emerges as the **most applicable financing model**, with an applicability score of

78%. This high level of applicability indicates that microfinance is particularly relevant for small-scale and community-driven marine activities in Zanzibar, where access to traditional bank financing is limited. The **strengths (75%)** of microfinance include its flexibility, lower collateral requirements, and a strong focus on catering to small businesses and local entrepreneurs. These features make it an effective financing option for a range of blue economy projects, from small-scale fisheries to coastal tourism ventures. With **weaknesses rated at 35%**, microfinance is perceived to be relatively low-risk and accessible, suggesting that it overcomes many of the barriers associated with other financing models. Its **feasibility score (70%)** is the highest among the models, underscoring that microfinance is not only practical but also achievable for blue economy projects in Zanzibar. This makes it a key area for policy support, as strengthening microfinance institutions could significantly enhance the financial inclusion and growth of Zanzibar's blue economy.

Impact investing has a **moderate applicability score of 55%**, suggesting that while it holds potential for the blue economy in Zanzibar, its adoption is currently limited. The **strengths (50%)** of impact investing lie in its ability to align financial returns with social and environmental goals, making it an attractive option for projects focused on sustainable development. However, the relatively moderate strength score indicates that impact investing is not yet widely accepted or fully understood within Zanzibar's blue economy. Its **weaknesses (60%)** are perceived to be relatively high, possibly due to limited awareness, complex investment requirements, and the perceived risks associated with marine-based projects. As a result, the **feasibility score (45%)** for impact investing is low, highlighting the challenges in implementing this model. These challenges may stem from a lack of investor interest, insufficient regulatory support, or an underdeveloped impact investment framework within the region.

Table 2. Perceived accessibility of financing models

Financing Model	Easily accessible	Moderately accessible	Not accessible	Total respondents
Traditional Bank Financing	21 (12.9%)	43 (26.4%)	99 (60.7%)	163
Microfinance	58 (35.6%)	62 (38.0%)	43 (26.4%)	163
Impact Investing	17 (10.4%)	39 (23.9%)	107 (65.6%)	163
Crowdfunding	29 (17.8%)	33 (20.2%)	101 (62.0%)	163
Government Grants	45 (27.6%)	55 (33.7%)	63 (38.7%)	163

Table 3. Applicability and feasibility of financing models

Financing Model	Applicability (%)	Strengths (%)	Weaknesses (%)	Feasibility (%)
Traditional Bank Financing	65	60	50	55
Microfinance	78	75	35	70
Impact Investing	55	50	60	45
Crowdfunding	40	45	70	38
Government Grants	70	68	45	65

Crowdfunding scores the **lowest in terms of applicability (40%)**, indicating that it is not widely regarded as a relevant or effective financing option for blue economy projects in Zanzibar. The **strengths (45%)** of crowdfunding include accessibility to small investors and communities, allowing for grassroots-level funding for smaller initiatives. However, its moderate score reflects limitations in its effectiveness, which could be attributed to limited digital infrastructure, low public awareness, and the difficulty in scaling crowdfunding efforts for more substantial projects. With **weaknesses rated at 70%**, crowdfunding faces significant barriers, such as limited internet access, digital literacy challenges, and potential difficulties in raising sufficient funds for larger-scale blue economy projects. This results in a **feasibility score of only 38%**, further suggesting that crowdfunding is not currently a practical financing option for most blue economy projects in Zanzibar. The low scores imply that substantial efforts would be needed to improve digital access, raise awareness, and develop local crowdfunding platforms to make this model more viable.

Government grants have a high **applicability score of 70%**, highlighting their importance in financing public goods, conservation efforts, and projects that may not attract private sector funding. The **strengths (68%)** of government grants are rooted in their ability to provide direct funding without requiring repayment, supporting projects with longer-term benefits, such as marine conservation and sustainable fisheries. Despite this, the **weaknesses (45%)** reflect challenges such as limited government budgets, bureaucratic processes, and competition for grant funds, which can restrict the accessibility and impact of this financing model. The **feasibility score (65%)** suggests that government grants are viewed as a practical source of funding for blue economy projects, although they may not be sufficient to meet the sector's extensive financial needs on their own. This points to the need for a complementary approach, where government grants are combined with other financing models to create a more comprehensive and sustainable funding ecosystem for Zanzibar's blue economy.

Implications for Blue Economy Financing in Zanzibar:

1. **Microfinance as the Preferred Financing Model**: Microfinance stands out as the most applicable and feasible financing model, with relatively high strengths and low weaknesses. This suggests that microfinance institutions (MFIs) should be at the forefront of financing strategies for the blue economy in Zanzibar. Policies should focus on expanding the microfinance sector, enhancing the range of loan products, and providing capacity-building programs for local entrepreneurs.

2. **Reforming Traditional Bank Financing**: Although traditional bank financing has a decent applicability score, its moderate feasibility and weaknesses highlight the need for reform. Banks should consider developing tailored financial products with lower collateral requirements and flexible repayment terms to cater to the specific needs of blue economy sectors, particularly small-scale operations.

3. **Raising Awareness and Building Infrastructure for Impact Investing**: The moderate scores for applicability and strengths of impact investing indicate potential for growth in this area. However, its high weaknesses and low feasibility suggest the need for building awareness and developing support mechanisms, such as investment guarantees and regulatory frameworks, to attract impact investors to the blue economy in Zanzibar.

4. **Limited Role of Crowdfunding**: The low applicability and feasibility scores for crowdfunding imply that it is currently not a suitable financing model for most blue economy projects in Zanzibar. To improve its potential, efforts are needed to enhance

digital infrastructure, promote digital literacy, and educate stakeholders on how to leverage crowdfunding for small-scale marine initiatives.

5. **Government Grants as a Complementary Model**: Government grants show high applicability and feasibility, emphasizing their role in financing public goods and projects with long-term environmental and social benefits. However, their moderate weaknesses indicate challenges related to limited government resources and bureaucratic processes. To maximize their impact, the government should streamline grant application procedures, increase funding allocations, and develop mechanisms to ensure equitable distribution of grants.

6. CONCLUSION

The blue economy presents significant opportunities for economic growth, environmental sustainability, and social equity in Zanzibar. As an island country, Zanzibar is uniquely positioned to harness its marine resources to drive economic development, reduce poverty, and foster a sustainable future. However, to fully realize the potential of the blue economy, the adoption of effective and innovative financing models is essential.

This paper has explored the various aspects of blue economy financing, including traditional bank financing, microfinance, impact investing, crowdfunding, and government grants. Each model offers distinct advantages and challenges in the context of Zanzibar. Traditional bank financing and government grants provide support for large-scale and public projects but are often limited by stringent collateral requirements and budgetary constraints. Microfinance has proven successful in empowering small-scale entrepreneurs in the blue economy, though it offers limited funding for larger projects. Emerging models like impact investing and crowdfunding present new opportunities for sustainable development but require greater awareness, institutional support, and risk mitigation strategies to be effectively implemented.

Case studies from other small island developing states (SIDS), such as Seychelles, Barbados, Fiji, and Mauritius, illustrate the potential of diverse financing mechanisms to drive blue economy growth. The lessons learned from these countries emphasize the importance of innovative financial instruments, international partnerships, public-private collaborations, and community-based management. By adopting similar strategies and aligning them with Zanzibar's unique context, the island can overcome its current financing challenges and attract investment into its blue economy sectors.

A key takeaway from this research is that a combination of financing models is needed to address the varied nature of blue economy projects in Zanzibar. Integrated and adaptive financial mechanisms, such as blended finance, can bridge the gap between public and private funding, providing the necessary capital to support sustainable fisheries, marine tourism, renewable energy, and marine conservation initiatives. Furthermore, policy reforms, capacity building, and institutional support are critical to creating an enabling environment that fosters investment and promotes sustainable development in the blue economy.

In conclusion, the development of a vibrant and sustainable blue economy in Zanzibar hinges on the establishment of robust and diversified financing models. By leveraging the strengths of traditional and innovative financing mechanisms, building strategic partnerships, and adopting global best practices, Zanzibar can unlock the full potential of its blue economy. This approach will not only boost economic growth but also ensure the long-term preservation of marine resources for future generations.

6.1 Limitations and Possible Drawbacks of the Method

The manuscript employs a **mixed-methods approach**, integrating quantitative surveys and qualitative case studies to analyze financial models for Zanzibar's blue economy. While this methodology provides a broad understanding of stakeholder perspectives and financing model effectiveness, it is essential to acknowledge its limitations and drawbacks to better assess the validity of the findings.

1. Sample Representativeness

- **Limitation**: The purposive sampling method used to select 163 stakeholders may not provide a fully representative view of all stakeholders in Zanzibar's blue economy. Certain groups, such as informal

community members or micro-entrepreneurs with limited access to formal financing discussions, might be underrepresented.

- **Impact**: This could lead to biased findings that overemphasize the views of well-informed or institutionally connected stakeholders, potentially overlooking the challenges faced by marginalized groups.

2. Quantitative Survey Bias

- **Limitation**: The reliance on surveys introduces the risk of response bias. Participants may have provided socially desirable answers or overstated the applicability of certain financing models, particularly microfinance, given its popularity in the region.
- **Impact**: The results might skew toward models perceived as favorable rather than those reflecting actual feasibility and adoption.

3. Case Study Generalizability

- **Limitation**: While the inclusion of case studies from other small island developing states (SIDS) is valuable, the findings may not be entirely transferable to Zanzibar due to differing socio-economic, environmental, and policy contexts.
- **Impact**: Over-reliance on external examples could obscure unique local challenges and the need for tailored financial solutions.

4. Qualitative Analysis Subjectivity

- **Limitation**: Qualitative case studies inherently involve subjective interpretation by the researchers. This could affect how challenges, successes, and lessons from other regions are framed in the context of Zanzibar's blue economy.
- **Impact**: Such interpretations might introduce bias, influencing recommendations that do not fully align with Zanzibar's specific needs.

5. Limited Timeframe

- **Limitation**: The study captures stakeholder preferences and perceptions at a single point in time. Economic

conditions, policy developments, and stakeholder awareness of financing options are dynamic and may have evolved since the data collection.

- **Impact**: The findings might not reflect ongoing shifts in the financial landscape or emerging opportunities for the blue economy in Zanzibar.

6. Policy and Implementation Gaps

- **Limitation**: The study focuses on financial models but offers limited examination of the policy frameworks necessary to implement these models effectively. Factors like regulatory barriers, governance quality, and institutional capacity are critical for success but are underexplored.
- **Impact**: This omission could affect the practical applicability of the proposed models, particularly in addressing systemic issues such as bureaucratic inefficiency and weak enforcement of financial agreements.

7. Exclusion of Technological Integration

- **Limitation**: The study does not extensively consider how emerging financial technologies (e.g., blockchain for transparency or mobile platforms for crowdfunding) could address some of the identified barriers to blue economy financing.
- **Impact**: This oversight could limit the exploration of innovative solutions that might enhance accessibility and efficiency in financing models.

Recommendations for Addressing Limitations:

To enhance the validity and applicability of findings, future research should:

- Expand the sample size and include diverse stakeholder groups, particularly those at the grassroots level.
- Employ longitudinal studies to capture evolving stakeholder perceptions and financing dynamics.
- Conduct region-specific policy analysis to identify and address local regulatory and institutional barriers.

- Integrate assessments of financial technology solutions to broaden the scope of innovative financing mechanisms.

By acknowledging and addressing these limitations, subsequent studies can provide a more robust foundation for financing Zanzibar's blue economy.

6.2 Areas for Future Research

This research opens several avenues for future exploration that are crucial for advancing our understanding and application of financial models within the blue economy sectors in Zanzibar and beyond. These areas for further investigation include:

1. Comparative Analysis of Financial Models

Future studies could perform comparative analyses between the different financial models highlighted in this research, such as microfinance, traditional bank loans, impact investing, and government grants, across various blue economy sectors. This would provide a clearer understanding of which models are more effective under specific economic and environmental conditions.

2. Longitudinal Impact Studies

Research could examine the long-term impacts of financial models on economic growth and marine resource sustainability. For instance, studies could track projects funded through microfinance or blue bonds over multiple years to assess the durability and environmental outcomes of these investments.

3. Policy Frameworks and Implementation

Investigating the effectiveness of policy frameworks in facilitating or hindering blue economy investments in Zanzibar would be valuable. Research could analyze how regulatory environments impact the success of financial models and propose policies that could enhance the efficiency and accessibility of blue finance.

4. Technological Integration in Blue Economy Financing

Exploring the role of digital finance and financial technology (fintech) solutions in facilitating investments in blue economy projects could yield useful insights. Topics of interest might include the potential of blockchain for transparent financing and the use of mobile banking platforms to increase financial inclusion among local communities.

5. Community-based Financial Models

Future research could focus on community-based financial models, evaluating how local governance and traditional knowledge systems can be integrated into financing mechanisms. This would be especially relevant in assessing the social impacts and sustainability of community-managed marine areas and fisheries.

6. Climate Resilience and Financing

Investigating how different financial models can support climate adaptation and resilience in coastal and marine environments would be crucial. Future studies could identify best practices for using financial instruments to fund infrastructure that mitigates the impacts of climate change, such as sea-level rise and extreme weather events.

7. Gender Dynamics in Blue Economy Financing

Analyzing the gender dynamics within blue economy investments, especially the accessibility and impact of different financial models on women, could provide a holistic understanding of economic empowerment in marine sectors. Research could explore how targeted financial interventions could support women-led enterprises in fisheries, aquaculture, and tourism.

8. Cross-country Comparative Studies

Conducting cross-country studies that compare Zanzibar's approach to blue economy financing with those of other small island developing states (SIDS) could offer valuable lessons. This research could highlight best practices and innovations that could be adapted to Zanzibar's unique context.

These areas for future research will help to deepen the knowledge base on blue finance and support the development of tailored financial strategies that balance economic development with the sustainable management of marine resources.

CONSENT

As per international standards or university standards, participants' written consent has been collected and preserved by the author(s).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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