

Mainstreaming Blue Economy Development through Islamic FinTech

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ABSTRACT

This research answers a research question how mainstreaming Islamic financial instruments for acquisition, allocation and investment (AAI) of scarce ocean resources can enhance desired future wealth of the stakeholders. The aim of this research is to infer behavioral information by collecting the data from a sample, create and deliver value to environment and stakeholders, and achieve sustainable and blue economic development goals by mitigating the burden of unethical financial obligations. In order to attain research objective following 3 hypotheses are tested. Using a deductive research approach, the study tests the impact of Islamic Financial Instruments (IFI) on sustainable and blue economy developments, impact of Islamic financial instruments on Blue Economy/Maritime (BE_MT) for sustainable development goals (SDG), and the impact of Financial Technology (FT) for Sustainable and Blue Economy Developments. Nevertheless, our hypotheses are accordingly generated to identify the factors affecting the development of blue economy by utilizing pragmatic approach and a functionalist paradigm (external, multiple, view chosen to best enable answering of research question) with the help of literature review, sample responses, and statistical methods including but are not limited to descriptive analyses, regression models, and neural network models, etc. This paper attempt to measure these constructs 1. FinTech 2. Islamic Financial Instruments 3. Sustainable and Blue Economy Development 4. Tourism 5. Islamic Finance and Sustainable Development Goals. Results justify that the IFI and FinTech are highly significant to the BE_MT development and consecutively IF and SDGs of which IFI is part of visualizing less significance, as well as, tourism which is a segment of blue economy is also less significant to blue economy. Therefore, it is not a subjective recommendation that financial institutions must transform their traditional administration, enhance their operations, acquisition, allocation and investment in the domain of maritime, specifically in developing sustainable trade and tourism infrastructure, in order to create and deliver more value to BE_MT and to global stakeholders though Islamic FinTech enabled sandbox implementation. This sustainable practice of testing and trading diversified global blue Islamic financial instruments for adapting traditional business model infrastructure will significantly reduce stakeholder's risk and unethical, and non-shariah compliant conduct of trade.

Keywords: Blue Economy, Sustainable Development, Financial Technology, Islamic Financial Institutions, Tourism.

JEL Codes: A1, G2, M1, O30

INTRODUCTION

Islamic finance is a branch of Abrahamic finance and Abrahamic finance is branch of Islamic economics which promotes the welfare of environment and human being and does not consider capital as a factor of production. More than 1850 Islamic financial institutions are performing financial operations in 90 countries. The legislation of more than 1400 years old religion of final prophet Muhammad (PBUH) teaches us "do not sell what you do not own" (Tawfik Azraka, 2021). That's why, there is a strong link between digital ownership, market risk and complying with the law (Shariah). 1,400 years ago, to some extent more than 1400 years ago, Shariah legislated number of rules and ethical codes that aim to implement SDGs such as the principles of environmental preservation, eradicating poverty and hunger (Dr. Fares Djafri, 2021).

Islamic financial instruments include but are not limited to Blue Ijara Sukuk, Blue Musharka Sukuk, Blue Murabaha Sukuk, Blue Mudarbah Sukuk, Blue Istisna Sukuk, and Blue Hybrid Sukuk.

According to Islamic finance development indicator (IFDI), the largest Islamic finance markets are based in the Gulf Cooperation Council GCC, Southeast Asia and South Asia. The International Islamic Financial Market (IIFM) is a global standard-setting body of the Islamic Financial Services Industry (IFSI) focusing on standardization of Shari'ah-compliant financial documentation. IIFM is supported by certain regulatory and government bodies such as State Bank (IIFM, 2021-22), however, The Shari'ah committee in November 2007 indicated that 85% of Sukuk issues in the Gulf Cooperation Council (GCC) do not concur with Shari'ah principles.

a properly designed regulatory prudential-supervisory framework seems essential to the orderly development and evolution of Islamic finance. Such a framework will have to be uniquely designed to distinguish it from that of a conventional system, in that it has to structure its incentive system to include both negative elements (don'ts) that specify prohibited behaviour, and positive elements (dos) that encourage and enforce recommended behaviour. Such a framework will have to be comprehensive, covering all transactions, and all financial instruments and institutions operating in the system, without exception. Therefore, in order to maintain the faith, trust, and anticipate the direction of population this study explores how FinTech can play an integral role in sustainable and blue economy development.

Technological development in the domain of IoT and FinTech commenced in 1980s, whereas, a sandbox is an older term used to reduce the spill effect and probability of loss. Technology that provides diversified law (shariah) compliant Islamic financial instrument's trading and transaction facilities is known as Islamic FinTech. Islamic FinTech driven sandbox does not offers trading opportunities on a digital interface, however, play an integral role in testing scenarios in a controlled environment with real time data.



Figure 1 Functions of FinTech

The blue economy is related to the management of resources which belongs to ocean, seas, rivers, channels, lakes etc. The blue economy is valued at about \$3trillion annually (Muhammad Usman Askari, Blue Economy of Pakistan: Challenges and Prospects, 2020). The Blue Economy presents many investment opportunities. (WTO, 2023). All activities related to the sea/ocean are elements of BE MT (Vice Admiral (R) Iftikhar Ahmed Rao HI(M), 2021). Right now, we have Karachi Port, Port Qasim, and Gawadar Port. We will need to develop new ports at Jiwani, Gadani, Ormara, and Pasni, and many others, for economic and maritime security purposes. I can assure you that as the economies of Pakistan and West Asia expand we would need more such ports and harbours (Kashmir, 2022).

Blue economy has the potential to sustainably transform the global coastline and capability to overtake green development because only 30% of our planet is land and rest 70% is mostly unexplored blue treasures. In order to create a sustainable balance Oman charts its course towards a greener energy future, aligning with United Nation's SDGs as well as launched first blue Islamic financial instrument (Blue Sukuk). Oman's nascent green hydrogen industry alone aims for \$40 billion in investment by 2030. Oman's Initiatives can secure funding through Islamic financial instruments such as green sukuk and blue sukuk (Islamic, 2024). Whereas, global sustainable assets amounted to \$30.3 trillion in 2022 which is predicted to reach \$40 trillion by 2030.

It is argued that the main reasons for the catastrophe of business are the lacking of financial development, ethical decision making and restricted accessibility of funding, lacking of investment, abnormal growth, low tactical and fiscal projection, unnecessary fixed asset administration and capital management. (Muhairi, 2024).

The research process aims to infer behavioral information for mainstreaming blue economy development through FinTech using Islamic financial instrument (blue sukuk). Due to the uniqueness of the under-research variables we find limited literature on correlated research variables. Nevertheless, the research utilized a sample to explore the significance of mainstreaming blue development through FinTech. The research explores the possibilities of filling the gap by upgrading traditional blue administrations and trade facilities using FinTech as well as test the impact of Islamic financial instruments on blue economy developments. Furthermore, study identify and discuss the barriers to implement the Islamic FinTech for blue economy development. The research contributes to a better utilization of the Islamic FinTech in traditional administrations. Contribution of this unique research is to provide an integrated analysis of unexplored perceptions that state the future direction towards utilizing Islamic FinTech for sustainable and blue economy development. Moreover, this study contributes to theory by advancing the literature on digital finance adoption through a multi-theoretical framework that captures the intersection of technological innovation, behavioral trust, and environmental consciousness (Imdadullah Hidayat-ur-Rehman, 2025).

This research is organized according to the research process. Introduction provides a sketch of the research's context and objectives, the Literature Review examines existing research on Islamic financial instruments, FinTech and blue economy, and the Theoretical Framework provide the visionary base. The Hypotheses outlines the conceptual model while the Methodology details the design, data collection process, and analysis tools employed. The Results and Analysis present findings from descriptive and neural network analyses, followed by the Discussion, which interprets the results in light of the study's objectives and existing literature. Finally, the Conclusion summarizes the key insights and implications for financial institutions, blue business administrations, regulators, policymakers, and future research.

LITERATURE REVIEW

Islamic Financial Institutions

Sustainable Business Models (SBMs) reflect the degree to which sustainability principles are embedded across firms' business model architectures. However, the mere adoption of these models does not guarantee improvements in environmental innovation capacity due to internal organizational inertia. The findings indicate that a deeper structural integration of SBM is systematically associated with greater environmental innovation capacity. Significantly, this relationship is stronger under higher levels of board effectiveness (Emma García-Meca, 2026)

Islamic Republic of Pakistan (IRPak) has approximately 1046km of coastline which is God gifted natural resource that can be transformed to secure the environment of coming generations. Cheery on top IRPak possess significant quantity of uneducated, unemployed, and undirected young generation that could become physical assets to transform the blue resources. According to (Amir, 2022) It must be acknowledged that nations aim to expand their economies with respect to the sea. According (Shahzad, 2020) most of low income (e.g. African countries, Bangladesh) and lower middle income (e.g. Indonesia and Pakistan) countries has high population growth and unequal income distribution. All such countries now must look for alternate economy e.g. blue economy.

FinTech

The Islamic FinTech landscape is still in its early stages. Over 75% of Islamic FinTechs are active in more traditional areas related to raising funds, deposits and lending, wealth management, payments and alternative finance. However, the digital banking space is gaining increased importance due to the launch of digital-only banks.

Social finance is considered a significant opportunity area for Islamic FinTech. This means potentially tapping into the multibillion-dollar Islamic social finance pool that comprises Zakat (obligatory charity), Sadaqah (voluntary charity) and Waqf (endowments). This itself has the potential to contribute anywhere upwards of \$200 billion towards social programmes and projects internationally (global-islamic-fintech-banking, 2022)

Internal governance processes play a central role in value creation (Agnes Ramey Rooroh, 2026). Therefore, a properly designed regulatory prudential-supervisory framework seems essential to the orderly development and evolution of Islamic finance. Such a framework will have to be uniquely designed to distinguish it from that of a conventional system, in that it has to structure its incentive system to include both negative elements (don'ts) that specify prohibited behaviour, and positive elements (dos) that encourage and enforce recommended behaviour. Such a framework will have to be comprehensive, covering all transactions, and all financial instruments and institutions operating in the system, without exception.

According to Abbas, Islamic financial system represents a financial structure substantially different from the dominant paradigm as well as especially most popular term FinTech are necessary to promotes nearly a one-to-one interaction between real sector and finance activities. (Abbas Mirakhor, 2009)

The need of FinTech is increasing as the population is being introduced with hand held devices, digital and plastic wallets, however, the main concern of the Islamic financial institutions is to secure FinTech from technological risks. Credit card fraud is expected to cross the figure of \$45 billion in 2026, whereas, more than 50% transactions are less than \$100. By 2030 amount of financial institutions fraud

to reach more than \$55 billion is forecasted that will certainly put a negative impact on sustainable and blue economy development. Moreover, more than \$440 billion has been lost to scams worldwide.

According to (Çizakça, 2007) Sukuk is an instrument for borrowing large amounts of cash from the public. In its most popular form, sukuk al-ijara, a triple transaction known as sale-rent-repurchase. Total global Sukuk issuance reached 2.2 Trillion from 2001 to 2024 whereas global sukuk outstanding USD 902.82 Billion as of December 2024. Malaysia, along with major players such as Saudi Arabia, Indonesia, Bahrain, Qatar, and Turkey, dominates the domestic Sukuk market, while jurisdictions like Bangladesh, Pakistan, and Jordan have seen a steady increase in issuances.

The reduced costs is another major opportunity for adoption of FinTech. These efficient and cost-effective service solutions like software as a service (SaaS) are shifting the structure from physical channels digital and mobile delivery. IFIs' partnerships with FinTech companies can improve, rationalize, and streamline IFIs' operations with less operational costs. Moreover, the "asset-light" models that FinTech companies use, can be looked by IFIs to reap the fruits of cost reduction (Irum Saba, 2019).

Sustainable and Blue Economy Development

In order to cope with blue economic disruptions blue sukuk can play an integral part, blue sukuks are categorized into asset based and asset backed. Blue sukuk can help transform and develop the 1046 KM of IRPak's coastline and archipelago. In order to make blue sukuk accessible to every citizen financial innovation are necessary. Portfolio investors will gain broader market opportunities to integrate these environmentally focused instruments into their portfolios (Nini Johana Marín-Rodríguez, 2023). The US\$1.04 billion sukuk issued by Bahri emphasizes that not just Islamic banks can be a source of financing. The US\$550 million dual-tranche Conventional/Islamic financing to Topaz Marine (arranged by HSBC and Standard Chartered Bank) shows how Islamic finance can even work together with conventional finance (IFN, 2016). However, to market these instruments FinTech play an integral role. Additionally, the results confirmed that fintech solutions, such as digital payment systems and automated financial services, significantly improved the speed and accuracy of transactions (Moh. Ikhsan, 2024).

Using Sukuk to finance large projects can motivate investors to contribute to economic development through creation and production rather than just consumption. Many non-Islamic countries and institutions are interested in the Sukuk market and the Islamic financial industry as a whole for several reasons, including: The substantial global Muslim population, which represents one-fifth of the world's population, creates a large market for financiers and investors. This demographic is increasingly interested in Shari'ah-compliant alternatives like Sukuk, which are Shari'ah-compliant alternatives to conventional bonds. The advantages of Sukuk for both issuers and investors include being an ideal financial instrument for those seeking regular investment income that can be easily liquidated (RUFAI, 2025).

According to (Hassan, 2017), we find that Sukuk and traditional investment grade bonds have longer persistence and a less pronounced conditional volatility response to market shocks; Additionally, we find that Sukuk returns are significantly less volatile compared to US and EU investment grade bonds. (Roxana Maria Badircea, 2021) indicated the fact that in the long-term there is a cointegration relation among greenhouse gas emissions, the blue economy, and economic growth. Sukuk and Islamic financial inclusion serve as dual transmission channels for sustainability, with policy implications for expanding green sukuk frameworks and integrating financial inclusion with institutional reforms (Danial Muhammad Wirdyansyah, 2026). Islamic countries must do arrangements by making favorable policies, rules, and regulations through Islamic finance industry. With appropriate use of finance, many Islamic countries would lead towards reduction of poverty and unemployment.

According to (Özkan, 2012) Turkey's economy had a current account deficit problem and has closed this gap to some extent with tourism revenues. A stable exchange rate was estimated to be helpful to close the current account deficit by not allowing a decrease in tourism revenues. Last of all, tourism revenues are expected to promote economic growth with creating a multiplying effect in the national economy.”

Pakistan’s blue resources could be transformed to bring balance the national deficits. Young generation can be utilized to transform poverty into revolutionary movement to outperform the profit benchmarks.

Ministry of Maritime Affairs must adopt a synthetic approach to establish a national blue strategy by using FinTech, regulatory sandbox, and Islamic financial instruments.

Method

Quantitative research method is used and relevant literature review supported construction of a Likert scale questionnaire to infer information in order to create and deliver value to blue environment and stakeholders, and to mitigate the burden of unethical financial obligations through Islamic FinTech. Data is collected from a sample of professional performing duties in Islamic financial institutions and financial administrations.

In order to attain research objective following 3 hypotheses are developed and tested. Hypothesis were developed to test the impact of Islamic Financial Instruments (IFI) on sustainable and blue economy developments, to test the impact of Islamic Financial Instruments on Blue Economy (BE) for SDG, and to test the impact of FinTech (Innovation in Financial Administration System) for Sustainable and Blue Economy Developments.

Based on the conceptual framework and the supporting theoretical and empirical literature, the following hypotheses are proposed to examine the relationships among FinTech (Mukhammad Idrus, 2026), sustainable and blue economy development, Islamic finance and SDGs, Islamic financial instruments, tourism, environmental sustainability as a whole.

- Ho: The behavior of the sample would be positive towards the Islamic Financial Instrument which would not insignificantly affect the Sustainable and Blue Economy Developments when aligned with FinTech.
- Ho: Sustainable and blue economy development would be significantly affected by the Tourism.
- Ho: sustainable and blue economy developments would be positively & significantly affected by the Islamic Investments in Financial Technologies.

METHODOLOGY

The analysis included an analysis to explore the current level of knowledge and understanding of the SDGs, FinTech and blue economy development. Articles, reports and policies relevant to the SDGs, FinTech, and blue economy development were also reviewed to gain detailed insights which form the basis of the studies contained within.

This research is based on pragmatic paradigm and deductive research approach which is a theory driven hypotheses. Used quantitative method for utilization of the primary data.

The questionnaire measured key constructs: (Moh. Ikhsan, 2024),

1. **FinTech:** Significance of Islamic finance and sustainable development goals (SDG) towards blue economy and maritime
2. **Blue Economy Development:** Sustainable trade and tourism infrastructure development for environmental sustainability
3. **Islamic Financial Institution:** Islamic FinTech implementation.

Data Collection

Data is collected using google form and printed 5-point Likert scale questionnaire. The responses were collected from professionals related to Islamic financial institutions, blue economy, financial technology, however, the total response rate was only 72.5 %.

Data Processing

Responses are evaluated using IBM's computer software SPSS (Statistical Package for Social Sciences) in which various statistical models are developed, including but not limited to ANOVA, Regression, Coefficient Correlation, Collinearity diagnostics, Neural network, etc. In the test we tried to analyze the behavior of the respondents towards our research variables by using Descriptive statistics, Correlation Coefficient, Collinearity and Residual Diagnostics, ANOVA, Regression & VIF using 95% confidence interval. Neural Network procedure along with various other methods that are inter linked with our research analyses to acquire valid and reliable prediction through our sample's perception was implemented for solving the subsequent research problems.

Statistical Analyses

Descriptive statistics table consist of the Mean, Standard Deviation and Number of Observations of responses of our research sample. Standard deviation rule entails that the greater the standard deviation, more disperse the responses are from the mean.

Variables	Mean	Std. Deviation	N
Blue Economy/Maritime (DV)	9.3333	2.27047	87
Islamic Finance & Sustainable Development Goals	8.5632	2.04428	87
Environmental Sustainability	8.5517	2.16074	87
Islamic Financial Instruments	8.8506	2.01465	87
Tourism	9.5862	2.52684	87
Financial Technology	8.8851	2.34979	87
Respondents	10.8506	2.94732	87

Table 1 Descriptive Statistics

Among the variables except from our respondent's demographic information Tourism has the greatest mean and standard deviation, whereas Islamic Financial Instruments has the lowest mean and standard deviation. BE_MT which is our dependent variable, its mean is slightly higher than all the independent variable except TSM and respondent's demographic information which is substantially essential but might not have the potential to influence the dependent variable individually. Furthermore, ENV SUS, FT and IFI SDGs are literally close to each other by their mean value as well as standard deviation, however IFI SDGs is more significant than ENV SUS and FinTech (FT) because of it lesser mean and standard deviation.

Pearson Correlation	BE_MT	IF & SDG	Env_Sus	IFI	Tourism	FinTech	Respondents
Blue Economy	1	0.382	0.465	0.458	0.345	0.463	0.054
Islamic Finance & SDG	0.382	1	0.426	0.368	0.507	0.188	0.194
Environmental Sustainability	0.465	0.426	1	0.433	0.441	0.427	0.232
Islamic Financial Instruments	0.458	0.368	0.433	1	0.239	0.249	0.176
Tourism	0.345	0.507	0.441	2.39	1	0.248	0.065
FinTech	0.463	0.188	0.427	0.249	0.248	1	-0.018
Respondents	0.054	0.194	0.232	0.176	0.065	-0.18	1
Sig. (1-Tailed)							
Blue Economy	.	0	0	0	0.001	0	0.308
Islamic Finance & SDG	0	.	0	0	0	0.041	0.36
Environmental Sustainability	0	0	0	0	0	0	0.015
Islamic Financial Instruments	0	0	.	0	0.013	0.1	0.051
Tourism	0.001	0	0	0.013	.	0.1	0.275
FinTech	0	0.041	0	0.01	0.01	.	0.436

Table 2 Pearson Correlation

R	R Square	Adjusted R Square	Std. Error		Change Statistics				Durbin Watson
				R Square Change	F Change	DF 1	DF 2	Sig. F Change	
0.632	0.399	0.354	1.82474	0.399	8.858	6	80	0	2.107

Table 3 Model Summary

In the Model summary R Square (Coefficient of determination), measured the proportional variability of dependent variable BE_MT. $R^2 = .399$ or 40% rounded implying that our model has slightly greater uncertainties and undefined area due to some unessential independent variables that are making our results less significant or we can conclude that $R^2 = 40\%$ entailing that the variation in our BE_MT is due to the value of our independent variables but there might be other factors that are causing the unpleasurable impact on our results instead of independent variables.

The Durbin Watson test identifying the auto correlation in the residuals or error term is 2.107 which is in range but slightly inclining towards the upper boundary.

Model	Sum of Square	DF	Mean Square	F
Regression	176.959	6	29.493	8.858
Residual	266.374	80	3.33	
Total	443.333	86		

Table 4 Analysis of Variances (ANOVA)

The regression Sum of Square 176.959 showing how effective the model is when all the independent variables are aggregately being used against the dependent variable BE_MT. A higher Sum of Square of Regression indicates that the model is poor to the extent of the higher value. When model shows insignificance, we use the Residual to see the extent of unexplained variation in the model.

This ANOVA model looks good but when the BE_MT, the dependent variable, is treated individually it shows greater significances towards IFI and FT.

The higher F-tests results at 95% confidence interval imperatively showing lower significance due to variable aggregation, generally when F- value is > 2.5 the null hypothesis is rejected. However, our

significance is lower than alpha 0.05 or 5% , which fulfils our prediction that IFI and other independent variable aggregately would have a significant impact on the BE_MT and would influence the sustainable blue economy developments through FT, therefore we are failed to reject the null hypothesis which is the behavior of the sample would be positive towards the IFI which would not affect the Sustainable and Blue Economy Developments when aligned with FinTech.

Model	B	Std. Error	Beta	t	Sig.	Tolr.	VIF
1 (Constant)	1.365	1.306		1.044	0.299		
IF & SDG	0.156	0.12	0.14	1.301	0.197	0.649	1.542
Env_Sus	0.153	0.12	0.146	1.28	0.204	0.58	1.725
IFI	0.296	0.112	0.262	2.642	0.01	0.761	1.314
Tourism	0.07	0.095	0.078	0.742	0.46	0.672	1.489
FinTech	0.279	0.094	0.288	2.963	0.004	0.793	1.262
Respondents	-0.041	0.07	-0.053	-0.58	0.563	0.907	1.103

Table 5 Coefficients

As it can be clearly seen in the coefficient table at 95% confidence interval that only Islamic Financial Instrument (IFI) and FinTech (FT) have significant impact on the BE_MT.

IFI's Sig. value 0.10 showing a favorable impact towards BE_MT along with its beta β -value .262 that means that 1% increase in IFI would positively incline BE_MT 26.2% as well as higher correlation amongst another independent variable supporting that IFI and FT correlate with the BE_MT significantly at 28.3% and 31.4%.

In Collinearity statistics High Tolerance of IFI .761 or 76.1% and FT 79.3% makes them desirable variable for BE_MT. where on the side Variance Inflation Factor (VIF) of IFI 1.314 is also significant along with FT's 1.262 VIF ,therefore, under the shadow of these results it would be a cutting edge opportunity for the for BE_MT to achieve their optimum growth by getting their investments aligned with respect of Islamic Financial Instruments and FinTech in order to achieve sustainable and blue economic development without disrupting the natural environment and biodiversity of the planet earth.

Along with various highly significant variables there are some less significant independent variables that are showing dwarf but meticulous relationship with the BE_MT.

Such as Tourism which cohere with the BE_MT because of it nature is literally showing half the significance towards BE_MT than the Environmental Sustainability (ENV_SUS) is quiescently contributing, however dwarf amount of awareness and investment is required to make these sector generate non-scurrilous amount of transparent performance with the purpose of accountable and lucid future of BE_MT.

Islamic Finance along with Sustainable development goals (IF_SDGs's) significance is 0.197 which is greater than the level of significance 0.05.

And the β -value showing 14% increase in BE_MT due to 1% increase in IF_SDGs which makes the variable vital but not as essential as IFI and FT. Tolerance and VIF values are 1.542 and 0.649 thus we failed to accept our null hypothesis

Research variable TSM's significance towards BE_MT is 0.460 which is greater than the level of significance 0.05.

And the β -value showing .078 Or 7.8% increase in BE_MT due to 1% increase in TSM which makes the variable vital but not as essential as IFI and FT are. Tolerance and VIF values are .672 and 1.489.

Second hypothesis of this research Sustainable and blue economy development would be significantly affected by the Tourism is not acceptable due to the calculated statistics which shown us that Tourism is not significantly affecting the BE_MT at or below 0.05 level of significance while being used in this model with other variables but the β -value showing .078 Or 7.8% increase in BE_MT by 1% increase in Tourism, therefore its better to conclude this result that we cannot denounce the TSM completely due to its insignificant value, however there is a breech in TSM sector to insert some cruise liners to boost the maritime tourism but it is not possible to gain the sustainable benefit to the BE_MT without greasing out the corrupt governance.

A mite of TSM has potential to increase global environmental sustainability if treated with due diligence, foremost, the Cruise Ship tourism that's not only have the ability to adopt sustaining technologies for global blue economy development as well as nebulous treasures that nature still have to uncover and offer to sustain the less fortunate of the global disrupted regions.

FT correlate 31.4% with the BE_MT positively, where .004 is its significance output which is not in the critical region and lower than the significance value 0.05. where the beta value of the FinTech is .288 entailing that the 1% increase in FinTech would cause, rounded 29% increase in the BE_MT.

These results help us rejecting the alternative hypothesis and accepting the null of our 3rd prediction of research that sustainable and blue economy developments would be positively and significantly affected by the Islamic Investments in Financial Technologies.

We now can with 95% of confidence in this context say that our first Hypothesis “The behavior of the sample would be positive towards the IFI which would not insignificantly affect the Sustainable and Blue Economy Developments when aligned with FinTech is Accepted “ and we failed to accept the null hypothesis of our second prediction of the research “Sustainable and blue economy development would not be significantly affected by the Tourism”, where at last but not least the 3rd prediction sustainable and blue economy developments would be positively & significantly affected by the Islamic Investments in Financial Technologies is significantly accepted as null.

	Respondents	FinTech	Tourism	IFI	IF_SDG	ENV_SUS
Respondents	1	0.134	0.081	-0.073	-0.115	-0.194
FinTech	0.134	1	-0.069	-0.091	0.026	-0.338
Tourism	0.081	-0.069	1	0.033	-0.398	-0.251
Islamic Financial Intruments	-0.073	-0.091	0.033	1	-0.211	-0.259
Islamic Finance and SDG	-0.115	0.026	0.398	-0.211	1	-0.149
Environmental Sustainability	-0.194	-0.338	-0.251	-0.259	-0.149	1
Respondents	0.005	0.001	0.001	-0.001	-0.001	-0.002
FinTech	0.001	0.009	-0.001	-0.001	0	-0.004
Tourism	0.001	-0.001	0.009	0	-0.005	-0.003

Table 6 Coefficient Correlations

Dimension	Eigenvalue	Condition Index	Variance Proportions						
			Constant	IF & SDG	ENV_SUS	IFI	Tourism	FinTech	Respondents
1	6.762	1	0	0	0	0	0	0	
2	0.072	9.698	0	0	0.01	0	0.05	0.15	0.58
3	0.055	11.132	0	0.12	0	0.01	0.27	0.4	0.02
4	0.038	13.362	0	0.02	0	0.62	0.17	0.13	0.16
5	0.031	14.725	0.11	0.05	0.82	0.01	0	0.07	0.01
6	0.026	16.268	0.03	0.79	0.01	0.17	0.41	0.04	0
7	0.017	19.876	0.86	0.01	0.15	0.2	0.1	0.21	0.23

Table 7 Collinearity Diagnostics

Case Number	Std. Residual	Blue Economy/Maritime	Presicted Value	Residual
24	3.318	16	9.9449	6.0551

Table 8 Case Wise Diagnostics

	Minimum	Maximum	Mean	d. Deviation	N
Predicted Value	5.0805	11.96	9.333	1.43446	87
Std. Predicted Value	-2.965	1.831	0	1	87
Standard Error of Predicted Value	0.24	0.815	0.505	0.115	87
Adjusted Predicted Value	5.0926	11.9521	9.3221	1.4468	87
Residual	-4.13726	6.05511	0	1.75994	87
Std. Residual	-2.267	3.318	0	0.964	87
Stud. Residual	-2534	3.379	0.003	1.011	87
Deleted Residual	-5.16681	6.27707	0.01124	1.93731	87
Stud. Deleted Residual	-2.625	3.626	0.006	1.031	87

Table 9 Residual Statistics

Residuals are Normally distributed of our regression model with mean -6.19 and standard deviation 0.964 i.e. closer to 1 standard deviation.

Artificial Neural Network (ANN)

Sample Training	67	77.90%
Sample Testing	19	22.10%
Valid	86	100%
Excluded	32	
Total	118	

Table 10 ANN Case Processing Summary

Approximately 78% are under training portion and then those remaining percentage of our sample is then used for testing. Neural Network Structure Diagram contains an error term, 6 independent Variable streaming information to one node (hidden layer) and the bias (error term) are subsequently streaming information to our dependent variable which is precepting weather the individual independent factors are affecting the results or behavior of our dependent variable. The vital statistic to in our model summary is percent incorrect predictions which is around 72% in Training Section and 52.6% incorrect prediction in Testing Model.

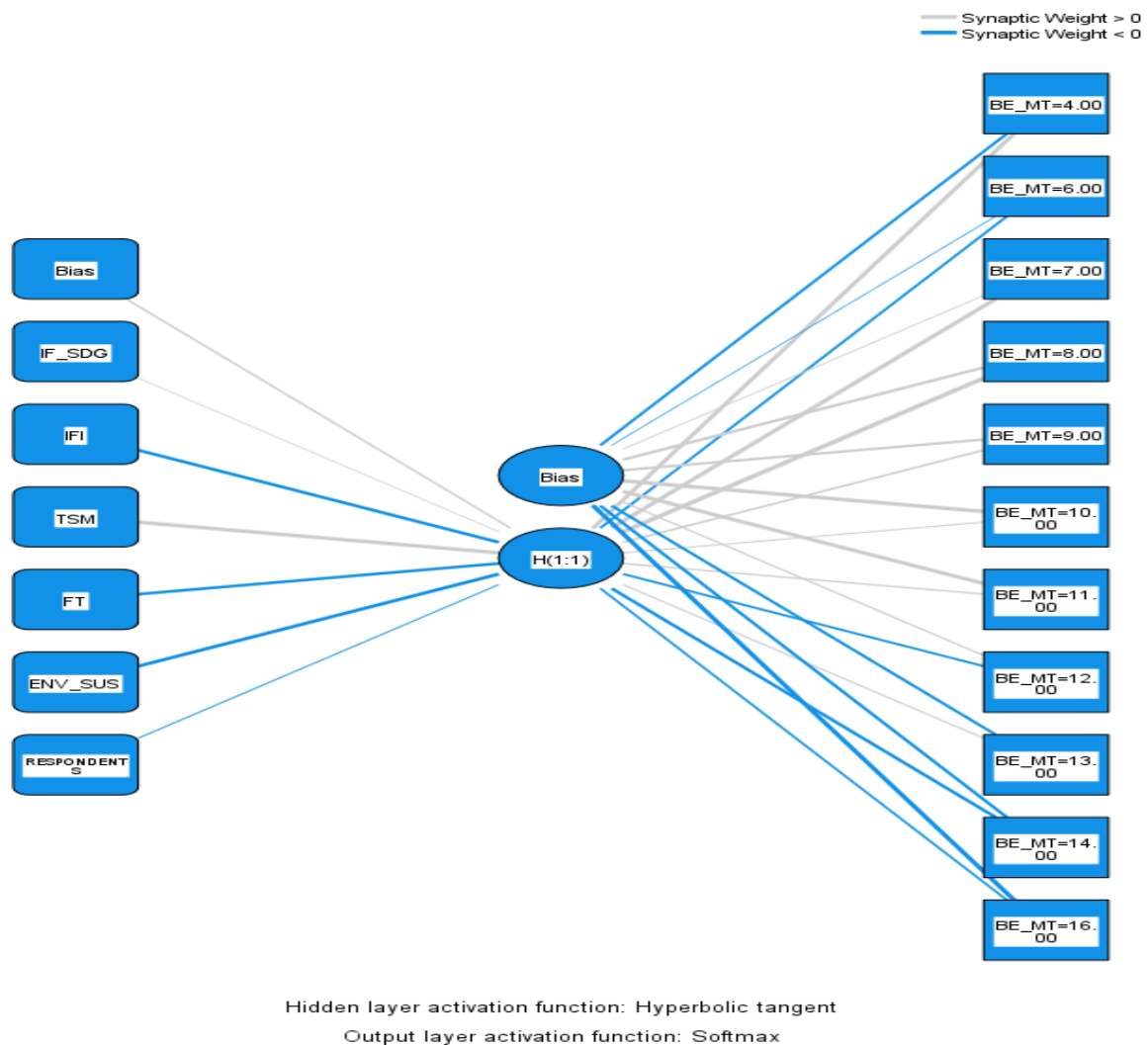


Figure 2 Neural Network

Training	Cross Entropy Error	133.431					
	Percent Incorrect Prediction	71..6%					
	Stopping Rule Used	1 Consecutive step (s) with no decrease in error					
	Training Time	00:00.4					
Testing	Cross Entropy Error	34.413					
	Percent Incorrect Prediction	52.60%					

Table 11 ANN Model Summary

	Importance	Normalized Importance
Islamic Finance and Sustainable Development Goals	0.105	29.70%
Environmental Sustainability	0.116	32.80%
Islamic Financial Instruments	0.309	87.30%
Tourism	0.049	13.70%
FinTech	0.354	100.00%

Table 12 Independent Variable (IDV) Importance 1

In important score assumption which entails that the higher the number closer to 1 more important it is and closer it is to 0 the less important.

This independent variable table which is containing the results of under-study variables, precepting, that the Islamic Finance & Sustainable Development goals variable which has nearly .105 or 10.5 percent importance in this model i.e. Islamic Finance and Sustainable development goals are not very strongly or very accurately appears to predict the BE_MT.

Next variable of our model Environmental Sustainability also not showing a significant importance to be in the model as an independent variable of BE_MT, However, it is suggestable by neural network multi-layer perceptron's variable importance table that Islamic Financial Instrument testify that it will effectively influence the dependent variable of the research.

Islamic Financial Instrument among other 5 scored .309 or 31% rounded which is 2nd highest in the model following FinTech which is on top by scoring .354 or 35.4% but perception towards Tourism resulted only .049 or .05% rounded, which is literally half of the global proportion of the Cruise ships in global ship.

In last Respondents at .067 or 7% are also not contributing enough value towards the BE_MT according to Neural Network Multilayer Perceptron Importance Table.

	Importance	Normalized Importance
Islamic Financial Instruments	0.361	100.00%
FinTech	0.339	93.80%
Tourism	0.301	83.30%

Table 13 IDV Importance 2

	Importance	Normalized Importance
Respondents	0.064	11.40%
Environmental Sustainability	0.563	100.00%
Tourism	0.373	66.20%

Table 14 IDV Importance 3

By rearranging the independent variable's location in our following model, we found an increase in the importance perception percentage towards dependent variable (Blue Economy/maritime).

	Importance	Normalized Importance
Environmental Sustainability	0	0%
Respondents	0.328	48.80%
Tourism	0.672	100%

Table 15 IDV Importance 4

	Importance	Normalized Importance
Environmental Sustainability	0	0%
Respondents	0.328	48.80%
Tourism	0.672	100%

Table 16 IDV Importance 5

By comparing actual results of respondents with the forecast of perception generated by the artificial neural network we found that shuffling the variables up and down or eliminating the less significant variables in the model enhancing the significance of same variable by making other variables slightly less significant towards BE_MT i.e dependent variable.

RESULTS AND DISCUSSION

This study examined the influence of key predictors—Islamic Financial Instruments (IFI), FinTech (FT), Tourism/Sustainable Maritime Tourism (TSM), Islamic Finance and Sustainable Development Goals (IF SDGs), Environmental Sustainability (ENV SUS), and demographic factors (Respondents)—on the Sustainable Blue Economy Maritime development (BE MT) using multiple regression analysis and a Multilayer Perceptron Neural Network. Analyses were conducted at a 95% confidence interval. The findings provide empirical insights into the drivers of sustainable blue economy initiatives, particularly the role of Islamic finance-aligned innovations.

Obtained outcomes of our hypotheses test are:

1. Fail to Reject the Null Hypothesis

Ho: The behavior of the sample would be positive towards the Islamic Financial Instrument which would not insignificantly affect the Sustainable and Blue Economy Developments when aligned with FinTech

2. Alternative Hypothesis Accepted

Ho: Sustainable and blue economy development would be significantly affected by the Tourism

3. Null Hypothesis Accepted

Ho: sustainable and blue economy developments would be positively & significantly affected by the Islamic Investments in Financial Technologies

Descriptive statistics revealed moderate to high variability in respondent perceptions. Among the research variables, Tourism/Sustainable Maritime Tourism (TSM) exhibited the highest mean and standard deviation, indicating broad awareness and diverse opinions regarding its potential in blue economy contexts. In contrast, Islamic Financial Instruments (IFI) recorded the lowest mean and standard deviation, suggesting more consistent but relatively lower perceived emphasis among respondents. The dependent variable BE MT maintained a slightly higher mean than most independent variables (except TSM), underscoring its recognized importance. Variables such as ENV SUS, FT, and IF SDGs clustered closely in both mean and dispersion, with IFI_SDGs appearing marginally more focused due to its tighter distribution.

These patterns imply that while tourism is widely acknowledged, Islamic finance instruments represent a more specialized and uniformly viewed lever for blue economy advancement.

Furthermore, the multiple linear regression model explained approximately 40% of the variance in BE_MT ($R = 0.632$, $R^2 = 0.399$, Adjusted R^2 implied similar). This moderate explanatory power

suggests that the included variables capture a meaningful portion of BE MT perceptions, but other unmodeled factors (e.g., policy frameworks, governance quality, or global economic conditions) also influence outcomes. The Durbin-Watson statistic of 2.107 falls within the acceptable range (near 2), indicating no substantial autocorrelation in residuals and supporting the reliability of the model inferences.

ANOVA results confirmed the overall model's statistical significance (F-value supporting rejection of the null at $p < 0.05$ when variables are aggregated), validating that the predictors collectively exert a meaningful influence on sustainable blue economy maritime development.

The regression coefficients highlighted two strong, statistically significant predictors at the 0.05 level:

FinTech (FT): $\beta \approx 0.288$, $p = 0.004$. A 1% increase in positive perceptions toward FinTech is associated with a ~29% increase in BE_MT favorability. FT also showed a strong bivariate correlation (31.4%) with BE_MT.

Islamic Financial Instruments (IFI): $\beta \approx 0.262$, $p = 0.010$. A 1% increase in IFI perceptions corresponds to a 26.2% uplift in BE_MT. IFI correlated at 28.3% with the outcome.

Both variables demonstrated excellent collinearity diagnostics (Tolerance > 0.76 , VIF ≈ 1.26 – 1.31), confirming they are stable and independent contributors rather than redundant.

Other variables showed weaker or non-significant effects in the full model:

IF_SDGs ($p = 0.197$, $\beta \approx 0.14$): Directionally positive but not significant at conventional levels.

TSM ($p = 0.460$, $\beta \approx 0.078$): Positive but insignificant, despite high descriptive prominence. This suggests tourism's potential is recognized but diluted when considered alongside stronger financial levers.

ENV_SUS and demographics: Limited unique contribution in the multivariate context.

These results strongly support the acceptance of hypotheses emphasizing the positive and significant role of IFI aligned with FinTech in driving BE MT. Islamic finance instruments and financial technology appear to act as synergistic enablers—offering Shariah-compliant, innovative funding mechanisms that can accelerate sustainable maritime investments without compromising environmental integrity. The non-significance of tourism in the full model does not negate its relevance; rather, it highlights the need for better integration with governance reforms and technology to realize its potential, particularly in areas like green cruise shipping and marine ecotourism.

The Neural Network analysis complemented regression findings by assessing predictive importance and non-linear relationships. The model showed moderate to poor predictive accuracy (72% incorrect predictions in training, 52.6% in testing), indicating room for model refinement or additional data. Nevertheless, variable importance rankings reinforced the regression results:

- FinTech ranked highest (~35.4% importance).
- Islamic Financial Instruments followed closely (~31% importance).
- Other variables (IF_SDGs ~10.5%, ENV_SUS lower, TSM ~5%, Respondents ~7%) contributed modestly.

- Sensitivity analyses (rearranging or reducing variables) consistently elevated the relative importance of IFI and FT, demonstrating their robustness. Residual diagnostics confirmed approximate normality (mean near zero, $SD \approx 0.964$), supporting model validity.
- The convergence between linear (regression) and non-linear (neural network) approaches strengthens confidence in the centrality of Islamic finance instruments and FinTech. These tools likely enable scalable, transparent, and ethically aligned capital flows critical for blue economy projects such as sustainable fisheries, renewable marine energy, and biodiversity-preserving infrastructure.

The findings indicate that Islamic Financial Instruments integrated with FinTech represent the most potent drivers for advancing Sustainable Blue Economy Maritime development according to respondent perceptions. This alignment offers a “cutting-edge opportunity” for ethical, innovation-driven growth that balances economic gains with environmental stewardship. Tourism, while culturally and economically salient, requires targeted interventions (e.g., anti-corruption measures and green technology adoption) to contribute more substantially.

Limitations include the moderate R^2 (suggesting additional predictors), potential response biases, and the exploratory nature of the neural network. Future research could incorporate larger samples, objective economic indicators, or longitudinal designs.

This study empirically validates the strategic importance of blending Islamic finance principles with financial technology to foster a resilient, sustainable blue economy providing actionable justification for policymakers, investors, and maritime stakeholders to prioritize these avenues.

Our research's 1st null is accepted due to insignificant relationship of Islamic finance and sustainable development goals (IFSDG) with blue economy and maritime (BEMT) due to other variables in the model which made IF&SDG insignificant. However, the obtained β (beta) value showing 14% increase in the blue economy due to 1% increase in IFSDG which makes the variable vital but not as much as Islamic financial instruments and financial technologies (IFI&FT). 2nd null hypothesis is not accepted due to Tourism's insignificant relationship with BEMT, however, the β -value showing .078 Or 7.8% increase in BEMT by 1% increase in Tourism. 3rd null hypothesis of the research is accepted due to FinTech which significantly and positively affects the BEMT. FT correlates 31.4% with the BEMT positively, whereas .004 is its significance output which is not in the critical region and lower than the significance value 0.05. where the beta value of the FT is .288 entailing that the 1% increase in FinTech would cause, rounded 29% increase in the BEMT. Our Neural Network multi-layer perceptron model results also support IFI and FT for sustainable environment and blue economy and maritime developments. Therefore, it is suggested that IFI should be utilized permanently through FT for BEMT.

The sustainable blue economy has the capability to significantly and positively deliver return on investment generation after generation when equipped ethically with FinTech. FinTech provides an innovative advantage, to use a core function of the market in order to facilitate the price comparison, vehicle for savings, and acceleration of the sustainable financial infrastructure development without sacrificing the liquidity. As well as FinTech arbitrates in capital formation and creating new real asset and liabilities with respect of keeping transaction, translation and economic exposure in optimal consideration with integrated data bases, information analytical sandboxes, and asset's ownership transferring facilities.

Offering right environmentally friendly Islamic financial product at the right time at right place and at the right price by promoting, adopting, and integrating the concept of transferring of asset ownership to the investors through FinTech i.e. Internet of things (IoT), Blockchain, and satellite positioning system driven digital interfaces in business administration can significantly and positively influence the behavior of the investors. Furthermore, according to our research findings and observations business administrations require a centrally controlled digital system (a sandbox) that could provide financial

administrators innovative alternatives to maximize the wealth of the investors, tax and zakat payment facility etc. In order to fill the gap and to mainstream IFI into maritime administration. Therefore, the study proposes a digital prototype for a sandbox for blue traders and financial administrators which I believe would sustainably, positively and significantly transform the horizon of future of transparent administration and research.

The research finds that a very common techniques used by conventional bond traders is to minimize the return variance of the shareholders by short selling the optimal number of future contracts which Islamic finance considers speculation, unethical and haram, however, Salam an Islamic Financial Instrument for the commodity's advance payment receiving is an Islamic way of doing a forward trade. A trade in which the farmer of the agricultural commodity sells its expected production to the Islamic Financial Institutions for their short term needs of their farming etc.

By doing the Salam contract a farmer makes the financial institution liable to collect and store the commodity on a specific date and a expected quantity. Financial institution collects and transfers the commodity into their ware house for the further sale with a profit.

A second option which an Islamic financial institution has is doing a wakala contract (an agency contract) in which the wakeel (an agent) do the job on the behalf of financial institution.

The wakeel (agent) collects from the farmer's farm and sells the commodity in to the market and remunerate the specified amount to the financial institution and keeps the rest either profit or loss.

The short selling contract in Islamic finance is known as Salam which is commodity based that transfers the ownership and possession before a person sells it to the other person. In Islamic shariah it is haram, unethical, illegal to sell something that you do not own, that is why, Islamic financial institutions do not conduct such trade in which the possession and the ownership is not transferred to new owner. However, there are various fatwas of shariah scholars about advance trading, according to the situation, environment and nature of the trade which sometime allows a trader to conduct trade without committing sins. A wakal contract is an example of having benefit from the advance trading contract Salam which arbitrates the Islamic financial institution without occurring any warehouse cost as well as storing for unethical profits which Islamic economics also consider unethical and illegal.

Storing commodities reduces the supply of goods, creates an artificial demand which give rise to the price of the stored commodity and causes inflation and disruption. on the contrary, interest rates fluctuate and businesses face financial distress. Therefore, there is a strong link between window dressing and interest rate fluctuations. Moreover, stored commodities do not remain fresh after a certain time period which disrupts consumer behavior and causes various health issues and ultimately put a significant burden on the national health system as a whole.

FINDINGS

Both regression and neural network results converge on a central theme: Islamic Financial Instruments (IFI) and FinTech (FT) emerge as the most potent drivers of BE_MT. These findings strongly support Maqasid Shariah principles, which prioritize ethical wealth preservation, risk-sharing, and environmental stewardship. They also align with literature on Islamic sustainable finance, demonstrating how Shariah-compliant instruments (e.g., green sukuk, murabaha-based green financing) can effectively channel capital into blue economy projects while mitigating environmental risks.

In contrast, the broader Islamic Finance and SDGs construct and Tourism/Sustainable Maritime Tourism (TSM) showed comparatively lower importance. This suggests that while the overarching Islamic finance framework is relevant, its specific instruments (IFI) deliver more targeted impact when combined with digital innovation. Similarly, tourism — despite being a major segment of the blue economy — exhibits weaker predictive power in isolation, consistent with literature emphasizing that

marine tourism's contribution to sustainability is often conditional on strong governance and integration with other sectors.

These patterns support the blended finance and Islamic FinTech literature, which argues that the fusion of ethical finance principles with technological solutions enhances transparency, efficiency, and inclusivity in funding sustainable ocean initiatives.

$R = .632$ or 63.2% and $R^2 .399$ or 40% rounded implying that our model has slightly greater uncertainties and undefined area due to independent variables that are making our results less significant. We find that $R^2 = 40\%$ entailing that the variation in our BE_MT is due to the value of our independent variables but there might be other factors that causing the unpleasurable impact on our results instead of independent variables. Despite the moderate R^2 indicating other influencing factors, the consistent prominence of Islamic Financial Instruments and FinTech across analytical methods provides strong empirical justification for their central role in advancing a sustainable blue economy. Strategic alignment of IFI with tourism development, powered by FinTech, offers a promising pathway for ethical, inclusive, and environmentally sound maritime growth.

Findings robustly affirm that Islamic Financial Instruments, when synergized with FinTech, are pivotal for advancing a sustainable blue economy. This alignment not only validates theoretical ethical finance models but offers a pragmatic pathway for economic prosperity, environmental stewardship, and social equity. Policymakers and stakeholders should prioritize these levers to harness the ocean's potential responsibly.

The Durbin Watson test identifying the auto correlation in the residuals or error term is 2.107 which is in range but slightly inclining towards the upper boundary.

By rearranging the independent variable's location in our artificial neural network model, we found an increase in the importance perception percentage towards dependent variable (Blue Economy/maritime).

By comparing actual results of respondents with the forecast of perception generated by the artificial neural network we found that shuffling the variables up and down or eliminating the less significant variables in the model enhancing the significance of same variable by making other variables slightly less significant towards BE_MT i.e dependent variable.

Findings or perception of our respondents according to Neural Network Multi-Layer perceptron visualizing that the Islamic Financial Instruments and FinTech are highly significant to the BE_MT and consecutively Islamic Finance of which Islamic Financial Instrument is part of visualizing less significance than its segment and Tourism which is a segment of Blue Economy is also less significant towards Blue Economy. Therefore, it is suggested that IFI should enhance their operation, acquisition, allocation and investment in tourism infrastructure development in order to make it more valuable to BE_MT

Prioritizing IFI-FinTech synergy can help close the substantial financing gap for SDG 14 (Life Below Water), mobilize private capital, create green jobs in coastal communities, and build climate-resilient maritime economies.

This study contributes quantitative evidence to the emerging field of Islamic blue finance, bridging conceptual discussions with empirical validation through both linear and non-linear modeling. It underscores the need for future research to include additional variables (e.g., governance indices) to improve model explanatory power.

Policymakers should design targeted incentives for Islamic FinTech products in blue economy sectors, particularly linking them to sustainable tourism infrastructure. National blue economy strategies in

coastal nations would benefit from regulatory sandboxes that facilitate IFI investments in tourism while enforcing environmental safeguards.

CONCLUSION

The empirical evidence strongly supports the proposition that Islamic Financial Instruments, when integrated with FinTech, serve as powerful enablers for advancing a resilient and sustainable blue economy. This alignment not only validates theoretical frameworks but also highlights a pragmatic pathway for ethical innovation in maritime sectors. The findings carry significant empirical and practical implications. Empirically, they provide quantitative validation—through both linear and non-linear models—for the superior predictive power of IFI-FinTech integration over standalone sectors like tourism. Practically, Islamic financial institutions should enhance their operations, acquisition strategies, allocation processes, and targeted investments in sustainable tourism infrastructure (e.g., green cruise facilities and eco-maritime projects) to amplify contributions to BE_MT. Policymakers in coastal nations are encouraged to develop regulatory frameworks, FinTech sandboxes, and incentive programs that prioritize Shariah-compliant digital financing for blue economy initiatives, thereby mobilizing investments, creating green jobs, promoting inclusivity for coastal communities, and addressing the financing gap for SDG 14 (Life Below Water). Despite these contributions, the study has limitations. The moderate R^2 value of 40% indicates that a substantial portion of variance remains unexplained by the included variables, suggesting the influence of unmodeled factors such as governance quality, policy implementation, and macroeconomic conditions. The analysis relies on perceptual data from a specific sample, which may be subject to response bias, and the neural network model exhibited moderate predictive accuracy, limiting generalizability. A sustainably equipped blue economy holds immense potential for consistent, ethical return on investment across generations. By mainstreaming IFI through FinTech, stakeholders can accelerate the transition to a blue circular economy, achieve broader Sustainable Development Goals, and mitigate intergenerational burdens from unethical debt and environmental degradation. Policymakers, financial institutions, and maritime authorities are urged to adopt and pilot such integrated digital systems to realize these transformative benefits. A centrally controlled yet inclusive digital system incorporating analytical sandboxes, integrated databases, and facilities for tax/Zakat payments would empower administrators to maximize investor wealth, minimize poverty, and promote intergenerational equity. To bridge identified gaps in maritime administration, particularly for vulnerable groups such as small-scale fishers, farmers, and blue traders, this study proposes an IoT- and algorithm-driven digital prototype. This prototype, combining Salam and Ijara financing with executive investor safeguards, prioritizes security, accessibility, and poverty alleviation, laying the groundwork for future scalable implementations. Blue economy is a vital subsystem of global economic system or vice versa, can be used as a lever to reduce poverty, inflation, environmental disruption, and achieving SDGs. However, our research findings and traditional administrative practices strongly recommends an IoT driven FinTech that can acquire, allocate investments and deliver value to stakeholders. it is recommended that investors and policy makers should mainstream blue Islamic financial instruments through FinTech for environmental sustainability and blue economy development. However, the ownership of the investor's asset must need to be recognized and transferred real time through a transparent shariah compliant system requires further research and development. The sustainable FinTech will maximize yield and return on investments and sandbox would help allocate and acquire investments and resources through what if and scenario analyses in a controlled environment. our results entail 1% increase in sustainable tourism would cause a 7.8%, and 1% increase in FinTech would cause a 28.9% increase in blue economy and maritime development. Therefore, a FinTech adoption is not an option left for mainstreaming financial instruments for maritime development but a solution to boost an economy through trade, tourism and other blue economy offerings. The greater the integration of sustainable FinTech with the stakeholders and firm's blue portfolio, the more chance there is for trade and tourism infrastructure development for achieving primary and support activities. Moreover, A multidimensional FinTech may also enhance span of governance over the areas need more attentions such as staff training, ocean restoration, automation of transport and logistics. Further research can pave a path towards sustainable IoT and

algorithm driven FinTech and sandbox testing for creating and delivering diversified primary and support value chain activities for sustainable blue economy development.

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