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Green & Blue Sukuk Integration into Financial Administration through Fintech for Global Maritime Development

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ABSTRACT

The aim of this research is to infer information to provide the stakeholders sustainable r model in the form of real asset while sustaining global environment. Economy itself is nested in the social system. Economic and social system comes under natural environment. In order to reduce the impact of anti-economic activities on environment, Islamic financial instrument's blue sukuk went under study in an econometrical model along with mediocre variables to follow research meridian that has the significant potential to enhance the probability of sustainable and blue economic development through FinTech. The research adopted a deductive (quantitative) research approach to test the hypotheses. Research is based on archival strategy, a secondary data driven research in which VAR and VECM is developed using past 18 year of time series data. Results of VECM showing insignificant relationship. However, long run equation asserts that 1% increase in global biofuel production would significantly and positively impact global FinTech investments. This research findings are that mainstreaming Islamic financial instruments (IFI) into traditional financial administration (FA) through financial technology (FT) would gradually if not abnormally sustain the future wealth of investors, and the linear shipping connectivity by developing smart ports for national and international tourism would increase biofuel demand for cruise ships and cold ironing facilities at the port. Nevertheless, a Blue Salam Sukuk is an optimal financial instrument to offer infrastructure development through FinTech to investors for a long-term wealth maximization and economic growth.

Keywords: *Global Sukuk, Global FDI, Global Tourism, Global Biofuel, Global FinTech Investment.*

INTRODUCTION

Wealth may circulate on a broad scale without remaining the exclusive domain of a handful of wealthy persons (The Holy Quran, Chapter 8, Verse59.)

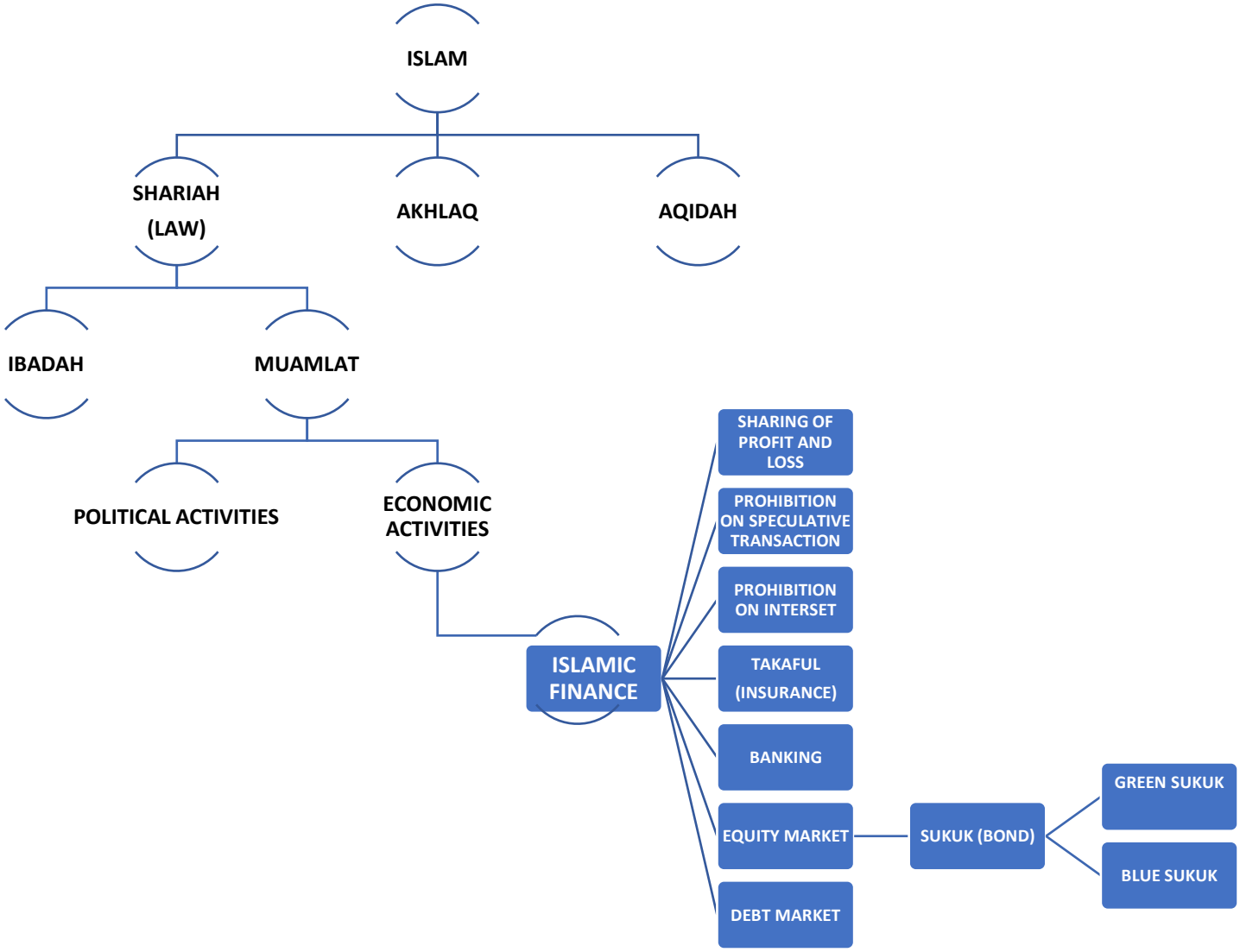


Figure 1 ISLAM AND ISLAMIC FINANCIAL INSTRUMENT (SUKUK)

The global Islamic finance industry ecosystem is driven and supported by over 1,300 Shariah scholars who represent Islamic financial institutions in 54 countries. 20 countries have centralized Shariah boards. Over 1,850 Islamic financial institutions operate in 90 countries (IILM, 2023).

The 5 principles of Islamic Finance are:

(i) The prohibition of Riba (interest)

(ii) The prohibition of Gharar and Maysir

(iii) The insistence that all funding be backed by tangible assets;

(iv) The limiting of investment to halal activities; and

(v) The sharing of profits and losses (Jamel Boukhatem, 2017).

Sukuk are securities entitling their investors' ownership in the underlying asset as well as any profits derived from that ownership. However, unlike bonds, which pay a fixed interest payment, sukuk holders receive periodic payments in the form of profit from a joint venture, lease payment, or gain from the sale of assets, depending on the structure of the sukuk (Wahyu Jatmiko, 2023)

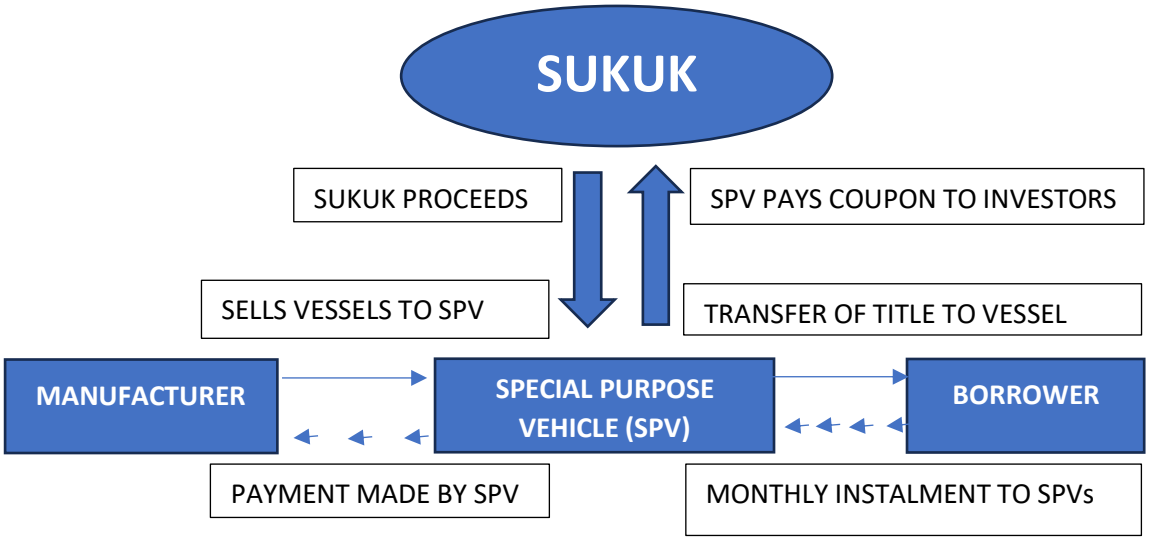


Figure 2 SUKUK PROCESS

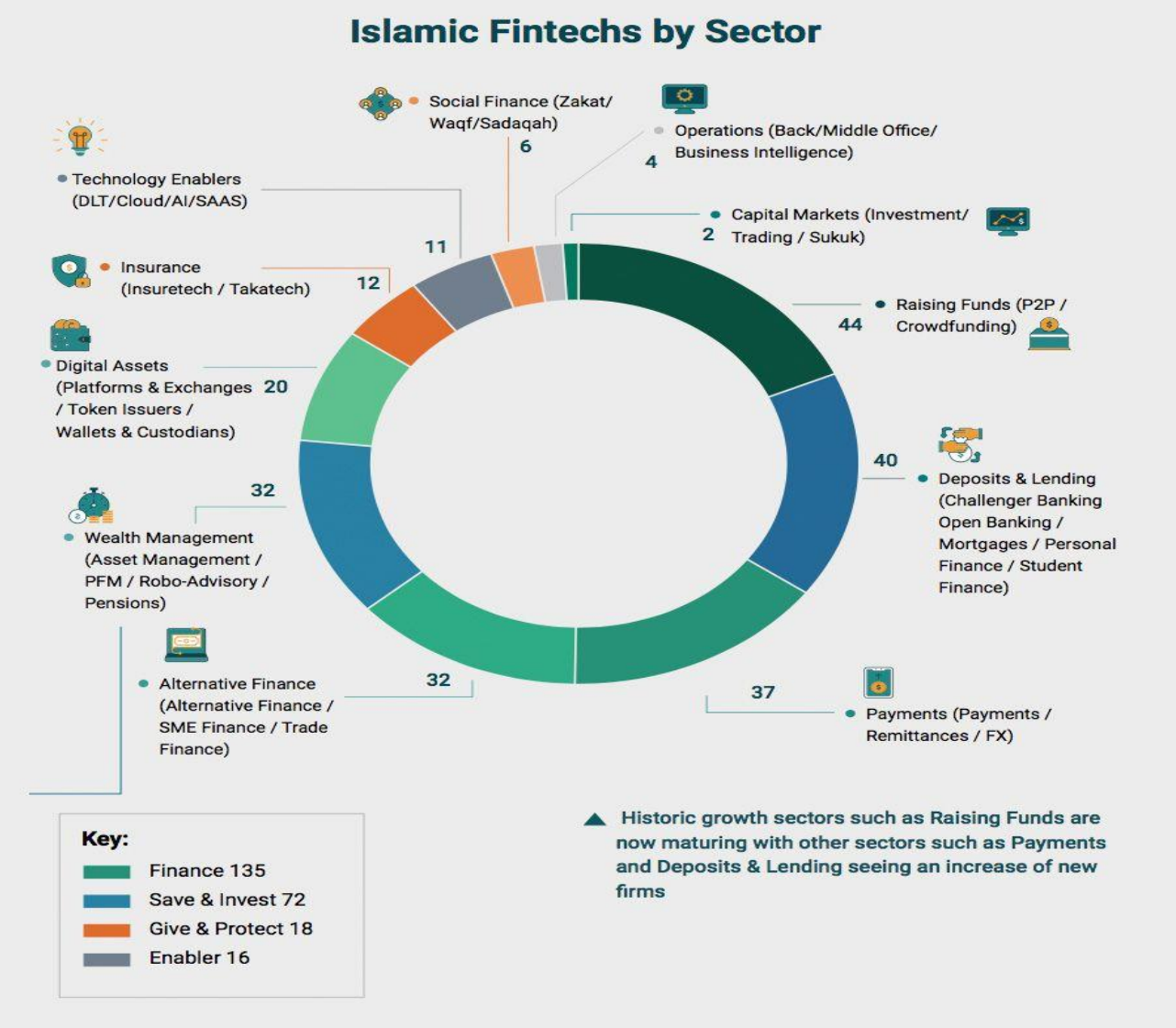


Figure 3 ISLAMIC FINTECH

Source: (Consultancy-me.com, 2026)

LITERATURE REVIEW

Global sustainable investing assets amounted to $30.5 trillion that could surpass in coming years significantly. Overall SDG Index score stands at 62.6, indicating that the IsDB group has achieved slightly over sixty percent (60%) of SDGs ((IsDBI), 2023). Sukuk outstanding are held in 29 countries while Islamic funds are managed by asset managers based in 28 countries. The top five countries account for 82% of total global assets and the top ten countries are home to 95% of total industry assets (IILM, 2023). From our analysis of the top Islamic finance markets, we see that while the Islamic banks comfortably meet Basel III Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) (IILM, 2023).

Empirically, Islamic financing has been proven to contribute significantly to national economic growth in the long term (elasticity of 0.18% per 1% increase in financing). Furthermore, the Islamic Financial Inclusion Index has also increased sharply from 9.1% (2019) to 14.8% (2023), contributing to economic equality and poverty reduction (Mardi, 2026).

The blue sukuk market is slightly newer than green. Blue Sukuk first issued in 2018, right after the green market has seen rapid growth, with more than USD $1 trillion in total issuance, and blue sukuk are poised to see a similarly strong market. As Oman charts its course towards a greener energy future, aligning with UN SDGs. Oman's nascent green hydrogen industry alone aims for $40 billion in investment by 2030. Oman's Initiatives can secure funding through instruments such as green sukuk and blue sukuk (Islamic, 2024). The blue economy has more capacity to absorb Co2 as well as exponential capability to provide food and minerals than our green economy but classes related to these should find a way to create a balance between green and blue in order to acquire sustainable blue portfolio investment without disrupting the environment and biodiversity.

Blue and green sukuk represent a dual pathway for sustainable finance, with Oman's ambitious energy and coastal targets illustrating how Islamic instruments can mobilize billions toward UN SDGs. The key challenge going forward is designing instruments that develop the blue economy without compromising marine biodiversity.

Foreign Direct Investment (FDI) involves capital flows from one country to another, granting the foreign investors extensive ownership stakes in domestic companies and assets. Attracting FDI and exports of manufactured goods are increasingly difficult to pursue for the sake of meeting internal and external obligations. A significant Sukuk program of the government to raise up to Rs700 billion inaugurated by the SBP to overcome key constraint to private investment in developing economies (Inter-agency Task Force on Financing for Development, 2024). According to a Sharia Scholar Mufti Taqi Usmani, if we are to continue to run behind the international ratings agencies, agencies that do not distinguish between halal and haram, it will never be possible for us to move forward with authentic Islamic products which actually serve the purposes of Islamic economics (Usmani, 2020). The findings indicate a negative correlation between FDI inflows and inflation. Interestingly, the correlation between FDI inflows and capital account openness stands out, reaching 71%, signifying a substantial relationship. Foreign direct investment investors might invest more in countries with credible and sound institutions while poor governance will deter inward FDI (Sisonke O. Makalima, 2024).

Attracting and sustaining FDI demands robust institutional quality, low corruption, and credible monetary policy. Developing nations like Pakistan must align large sukuk programs with authentic Islamic economic principles rather than chasing conventional rating frameworks, since governance credibility is ultimately what underwrites investor confidence.

Like Pakistan and other developing countries, Malaysian economy has slightly shifted towards industrialization and the services sector, which together contribute more than 80 percent of the GDP of the country. (Noman Arshed, 2020). The study's findings show that law enforcement and corruption significantly impact Indonesia's FDI inflows and economic growth (Indriya Fathni, 2023). Nevertheless, financial innovations are necessary to the dynamic of risk taking it ensure the stability of the system. Theory has demonstrated the stability of an equity-based, risk-sharing financial system (Abbas Mirakhor). Countries that have diversified toward services and industry — such as Malaysia and Indonesia — show that FDI performance is inseparable from rule of law and anti-corruption enforcement. Stability in financial systems is best secured through equity-based, risk-sharing models, as Islamic finance theory consistently demonstrates.

Our findings highlight that banks need to adjust their strategies according to their specific business models when implementing financial innovations and sustainability practices. The findings suggest that investment and diversified banks benefit most from combined investments in FinTech and ESG, enhancing both profitability and risk profiles (Greta Benedetta Ferilli, 2022). The convergence of FinTech, ESG principles, and Islamic banking creates a compounding benefit: stronger profitability, better risk management, and broader financial inclusion. Banks that tailor their innovation strategies to their specific business models stand to gain the most from this intersection.

The research results highlight that Islamic banks exhibit relative strengths in efficiency, profitability risk management, and liquidity compared to conventional banks, the convergence of innovative Fintech solutions with Islamic finance principles offers a promising avenue for financial inclusion and sustainable banking practices (Sri Wahyuni, 2024).

The Islamic Finance Council UK estimated an additional US$30-50bn of capital towards the SDGs can be raised through green and sustainability sukuk (Islamic Finance Council, 2021). Nevertheless, Sukuk must ensure that Sukuk holders have complete ownership in real assets (Usmani, 2020).

The Islamic FinTech landscape is still in its early stages. Over 75% of Islamic FinTech 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).

Islamic FinTech holds the potential to unlock over $200 billion in social finance through zakat, sadaqah, and waqf — alongside an additional $30–50 billion via sustainability sukuk — provided that instrument authenticity is maintained and sukuk holders retain genuine ownership of underlying real assets.

The IsDB group supports the implementation of this transformative agenda. The 2030 Agenda aspires to achieve 17 high level Sustainable Development Goals (SDGs) and 169 specific targets. These aspirations for human dignity, and ‘to leave no one behind’, is fully in line with the principles and objectives of development from an Islamic perspective (ISDB, 2023). The IsDB's alignment of the 2030 Agenda with Islamic development principles reflects a coherent convergence: the SDG goal of leaving no one behind mirrors the maqasid al-shariah. The remaining gap of nearly 40% of SDG achievement underscores the urgency of scaling Islamic multilateral development tools.

The global renewable energy capacity has reached new heights, Saudi Arabia’s future in renewable energy appears promising. The Vision 2030 initiative has set ambitious goals for renewable energy capacity, signaling the kingdom’s commitment to a green and prosperous future. (Al-Gahtani, 2024). Environmental management practices are meant to influence firm performance (Alaa Garad, 2024)Bioenergy is a form of renewable energy. It is a sustainable and versatile energy source that is generated through the conversion of biological materials into various forms of energy, including heat, electricity, and biofuels.

Bioenergy plays a crucial role in reducing greenhouse gas emissions, promoting energy security, and transitioning to more environmentally friendly energy systems. Biofuel can contribute significant amount of environmental sustainability through Tourism. Tourism is a socio-economic phenomenon that begins with an economic decision about how to use leisure time and savings and has economic aspects such as investment, consumption, employment, exports, and government revenues. Pakistan's abundant and diverse biomass sources — from agricultural waste to municipal solid waste — position the country well for a bioenergy transition.

Developing this sector offers a concrete pathway to energy security and greenhouse gas reduction while leveraging existing rural and agricultural infrastructure. The overall socio-political conducts have generally not geared up in the wider horizon of the national interest. Majority feel that if a neutral government administrator is appointed at union council level, then there will be improvement in governance (Rasheed, 2001).

Sustainable tourism, supported by biofuel adoption and smart infrastructure, generates multiplier effects across employment, investment, and exports. Economies like Turkey and the UAE demonstrate that stable exchange rates, revenue diversification, and strategic tourism development can significantly close current account deficits and boost GDP growth.

Dubai is building smart port on sand to facilitate the sustainable tourism sector along with its hospitality sector, In Q1 2022, the UAE's hotels welcomed nearly six million visitors, earned total of AED 11 billion in revenue (uae-tourism, 2023). According to (Özkan, 2012) Turkey's economy had a current account deficit problem and has closed this gap, to some extent, with tourism revenues. Moreover, 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.

Islamic Republic of Pakistan has approximately 1000km of coastline which is full of natural beauty that foreigners can experience. As well as natural resources such as coral reefs, minerals and a cherry on top a huge quantity of undirected young generation.

Not just Karachi, Thatta's potential for smart tourist infrastructure development positively and significantly contribute to blue economic development, although, according to (Quazi, 2014) the level of corruption can affect the locational advantage of a host country. With cruise lines pursuing an ambitious sustainability agenda, cruises are one of the safest ways to travel. Global cruise capacity is expected to grow by at least 10% between 2024 and 2028. trade openness can make countries more vulnerable to exogenous shocks making growth more volatile and weaker in the long-term. (CLIA, 2024).

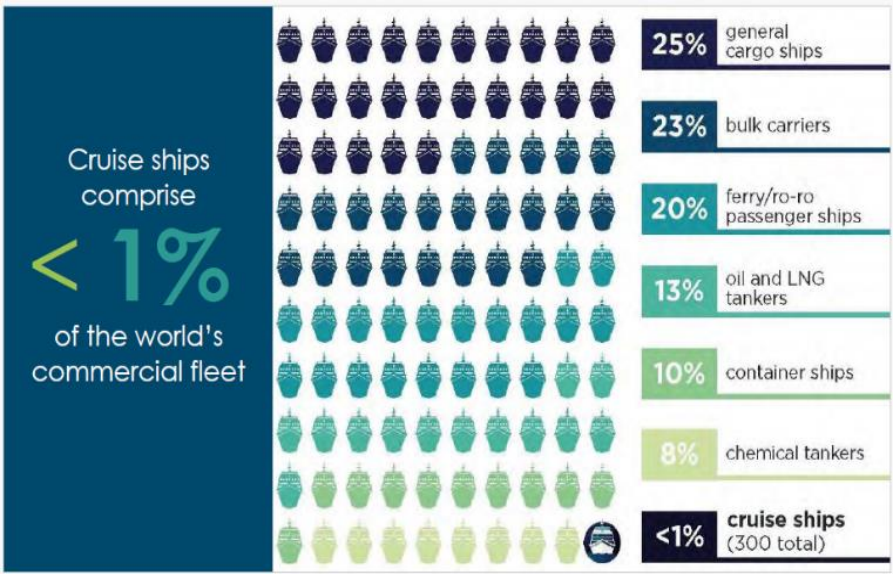


Figure 4 PERCENTAGE OF GLOBAL SHIPS

Pakistan's coastline, young demographic, and rich marine resources constitute a significant, largely untapped blue economy. Governance reform and corruption reduction are prerequisites for converting these natural advantages into sustainable FDI and smart tourism infrastructure, particularly in underutilized areas like Thatta.

Pakistan is the first Muslim country who opened their embassy in China and made a way through Pakistan for Chinese Muslim to go KSA and perform their religious obligation.

Former president and Army Chief General Zia Ul Haq, few decades ago, made a remarkable effort by operating the ports for the Chinese Muslims to perform the pilgrimage to the Holy Mosque, Makkah, Kingdom of Saudi Arabia (KSA).

Respondents indicated an interest in maritime connectivity. Tourists, on the other hand, are very interested in a boat connection. (Marina Zanne, 2025). Standardized coefficient beta of Tourism with dependent variable Blue economy resulted .078 which means that 1% increase in Tourism would Significantly and positively affect the blue economy by 8% rounded (Raza, 2026).

Tourism with a technological advantage would cause significant impact on the competitors. Technology is reshaping the way financial markets operate. SQL language and relational database systems are tools for managing, organizing and retrieving data to prevent fraud and facilitate reconciliation for the organization (Hina Yasin, 2010). Similarly, the advent of cutting-edge technologies such as distributed ledger technology or artificial intelligence has the potential to impact market practice and market structure significantly (ICMA, 2024). With global cruise capacity set to grow by at least 10% through 2028 and traveler interest in maritime connectivity rising, Pakistan's ports and coastal cities have a strategic window to position themselves in the cruise tourism market. Sustainable port development paired with trade openness, managed carefully to avoid vulnerability to external shocks, could significantly accelerate blue economic development.

FinTech is necessary for cruise tourism to sustain the environment, security of travelers and blue economy. A close collaboration between the sustainable port for achieving maximum linear tourist connectivity and environmental sustainability can play an integral part through FinTech.

Over fifty countries have introduced regulatory sandboxes to foster financial innovation. Firms entering the sandbox see an increase of 15% in capital raised post-entry. Their probability of raising capital increases by 50%. We thereby provide supportive evidence that sandboxes achieve one of their key goals: to help young FinTech raise capital and spur innovative activity. This finding suggests that sandboxes could become a successful policy tool for harnessing the benefits of financial innovation (Giulio Cornelli, 2023) As a result, effective data management and maintaining high quality contribute to improving customer experience, reducing operational costs, and increasing sustainable profitability (Hossein Mostafa, 2024). FinTech is not merely a convenience tool — it is critical infrastructure for sustainable tourism, port security, and blue economy governance. Regulatory sandboxes have proven effective at helping young FinTech firms raise capital and innovate, while robust data management reduces costs and improves customer outcomes across financial and tourism ecosystems.

We found that soundness of banks, quality of educational system and burden of government system have a positive impact to the nominal GDP per capital (Magdalena Ziolo, 2017) It is argued that the main reasons for the catastrophe of business are the lacking of financial development, and capital management (Muhairi, 2024). Nevertheless, the usage of debit and credit cards suggests that banks should be more proactive and innovative in their offerings, so that the customers may feel more comfortable and secure in the usage of plastic money. Despite of the continuous increase in plastic card users, there still exist much potential in Islamic Republic of Pakistan market to be utilized by banks (Maher, 2019).

In addition, attracting relevant foreign investment also supports sustainable economic growth. These findings indicate that policies that promote banking stability, prudent exchange rate management, and effective use of external debt can support sustainable economic growth (A. Harits Fadilah, 2024). Furthermore, lowering tariffs on low-carbon technologies can further enhance trade and FDI in green technologies. This is especially important for middle- and low-income countries where such tariffs remain high (Zeina Hasna, 2023). Sound banking systems, investment in education, and prudent exchange rate and debt management are mutually reinforcing pillars of sustainable economic growth. Policymakers in developing economies must prioritize reducing the government regulatory burden and

closing capital management gaps to prevent systemic business failure and support long-term GDP growth.

METHODOLOGY

Data Collection

The timeseries data for econometric models was collected from the World Development Indicators (WDI) available at (https://databank.worldbank.org/source/ world-development-indicator) (Baltagi, 2021).

Data Measurement Tool(s)

- Basic model for data analysis $y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$
- Logged residual (cointegrating equation) $\varepsilon_{it} = ECT = y_{it} - \alpha - \beta X_{it}$

(Richard G. Anderson, 2006)'s Model is further extended by inserting under study variables using computer-based software. Includes but not limited to Microsoft's Office and EViews, etc.

Research Paradigm

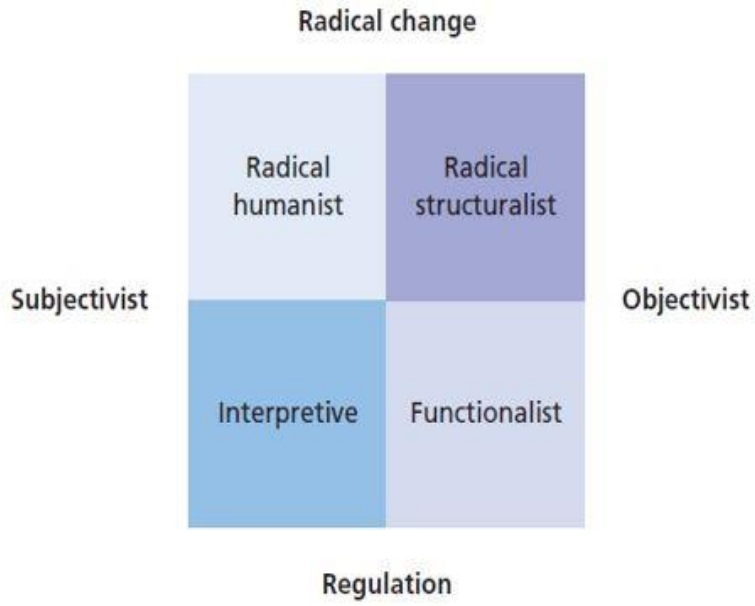


Figure 5 RESEARCH PARADIGM

Methodology

A pragmatic approach (Philosophy)and a functionalist paradigm (External, multiple, view chosen to best enable answering of research question) has been taken under research process with the help of world bank data, literature, and the statistical methods. The functionalist paradigm is located on the objectivist and regulatory dimensions. Objectivism is the ontological position (Ontology: the researcher's view of the nature of reality or being) you are likely to adopt if you are operating with this paradigm. The functionalist paradigm would be an evaluation study of a communication strategy to assess its effectiveness and make recommendations as to the way in which it may be made more effective (Mark Saunders, 2009).

Research is based on archival strategy, a secondary data driven research in which VAR and VECM is developed using past 18 year of time series data. Vector autoregression (VAR) was introduced by Sims (1980) as a technique that could be used by macroeconomists to characterize the joint dynamic behavior of a collection of variables. After running regression tests of variables, Standard and Breakpoint Dickey Fuller unit root test was run to check the stationary and non-stationary conditions of variables. After Unit root test a VAR model was developed. 2 lag length criteria selected due to increased size of the variables. And summary of cointegrating variables generated. Then Johansen Cointegration test also took place to see the cointegrating relationship. Finally, a VECM is developed to infer and estimate the significance of our under-study variables. The research framework is designed to achieve research objectives to find the solution to the global environmental problem and delivering recommendations to the policy makers.

Research Variable(s)

Global Sukuk Issuance, Global FDI, Global Tourism, Global Bio Fuel Production, Global FinTech Investment.

Objective(s)

Developing a Vector error correction model (VECM to provide maritime stakeholders an alternative business model for sustainable investment and development.

Research Questions

1. Will a long-term equilibrium relationship among the factors of our VECM positively and significantly influence FinTech?

2. How Global Sukuk Issuance would create a significant impact on global environmental sustainability?

Research Hypotheses

- H1. Global Sukuk Issuance has significant and positive affect to the FinTech Investment
- H2. Global FDI has significant and positive affect to the FinTech Investment
- H3. Global Tourism has significant and positive affect to the FinTech Investment
- H4. Global Bio Fuel Production has significant and positive affect to the FinTech Investment
- H5. Given variables will develop significant VECM

In order to achieve objective, test hypotheses, and answer research questions statistical techniques are used (Prof. Sher Muhammad Chaudhry, 2010).

Data Processing

Standard & Breakpoint Dickey Fuller Unit Root Test

Global Sukuk Issuance (GSI)

GSI has a unit root. It also shows in the that the statistics is not starting from zero or from its origin, it means it is non-stationary as well as the p-value is greater than 0.05, since variable is non-stationary it confirms that it is not I (0), i.e. stationary at level 1 but it maybe I (1) or I (2). however, by checking unit root at first difference the p-value 0.0123 entails that the global sukuk issuance is significant at first difference, it confirms that the variable global sukuk issuance is I(1) in nature.

After running the Break point unit root test to see any structural breaks in the data we got the p-value greater than 0.05 and global sukuk issuance has a unit root.

Null Hypothesis: GLOBAL_SUKUK_ISSUANCE has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.218780	0.6369
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

Null Hypothesis: D(GLOBAL_SUKUK_ISSUANCE) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.848214	0.0123
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

FinTech (FT)

The p-value of standard URT is greater than >0.05 at level one but at first difference it is less than <0.05 which entails that the statistic is significant and the data is non-stationary

Null Hypothesis: GLOBAL_FINTECH_INVESTMENT has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.988254	0.7264
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

Null Hypothesis: D(GLOBAL_FINTECH_INVESTMENT) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.636186	0.0005
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

Foreign Direct Investment (FDI)

The p-value of standard URT is greater than >0.05 at level one but at first difference it is less than <0.05 which entails that the results are significant and the data is non-stationary

Null Hypothesis: GLOBAL_FDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.123384	0.0438
Test critical values:	1% level	-3.886751	
	5% level	-3.052169	
	10% level	-2.666593	

Null Hypothesis: D(GLOBAL_FDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.809050	0.0018
Test critical values:	1% level	-3.920350	
	5% level	-3.065585	
	10% level	-2.673460	

Bio Fuel Production (BFP)

The p-value of standard URT is greater than >0.05 at level one but at first difference it is less than <0.05 which entails that the results are significant and the data is non-stationary

Null Hypothesis: GLOBAL_BIO_FUEL_PRODUCTION has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.941248	0.7451
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

Null Hypothesis: D(GLOBAL_BIO_FUEL_PRODUCTION) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.240383	0.0066
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

Vector Auto Regressive (VAR) Estimates

Where, V is for vector and 4 equations are treated simultaneously, AR stands for Auto Regressive Where all the (IV) individual variables are in lag form.

	GLOBAL_FI...	GLOBAL_S...	GLOBAL_BI...	GLOBAL_FDI
GLOBAL_FINTECH_IN...	0.355322 (0.38027) [0.93439]	0.007165 (0.11849) [0.06047]	6.93E-08 (7.3E-07) [0.09538]	-3.690381 (3.71633) [-0.99302]
GLOBAL_FINTECH_IN...	-0.165911 (0.35436) [-0.46820]	0.148301 (0.11042) [1.34312]	3.44E-07 (6.8E-07) [0.50804]	-4.215757 (3.46306) [-1.21735]
GLOBAL_SUKUK_ISSU...	-0.135930 (0.67192) [-0.20230]	0.962196 (0.20937) [4.59578]	7.26E-07 (1.3E-06) [0.56576]	-12.03034 (6.56652) [-1.83207]
GLOBAL_SUKUK_ISSU...	0.226321 (0.61594) [0.36744]	-0.625728 (0.19192) [-3.26030]	4.28E-07 (1.2E-06) [0.36323]	10.99967 (6.01947) [1.82735]
GLOBAL_BIO_FUEL_P...	-30002.43 (161843.) [-0.18538]	18753.82 (50429.3) [0.37188]	0.889399 (0.30930) [2.87557]	-2453462. (1581663) [-1.55119]
GLOBAL_BIO_FUEL_P...	123546.0 (144954.) [0.85231]	12878.40 (45166.7) [0.28513]	-0.043482 (0.27702) [-0.15696]	2829226. (1416606) [1.99719]
GLOBAL_FDI(-1)	-0.051037 (0.02853) [-1.78862]	-0.000115 (0.00889) [-0.01294]	-2.01E-08 (5.5E-08) [-0.36861]	-0.050739 (0.27886) [-0.18195]
GLOBAL_FDI(-2)	0.025448 (0.02987) [0.85198]	-0.009123 (0.00931) [-0.98021]	1.30E-07 (5.7E-08) [2.27013]	-0.461981 (0.29191) [-1.58262]
C	-8.01E+10 (1.6E+11) [-0.51526]	1.89E+10 (4.8E+10) [0.38969]	65301.36 (296989.) [0.21988]	3.28E+12 (1.5E+12) [2.16078]
R-squared	0.831869	0.961389	0.980902	0.668738
Adj. R-squared	0.639719	0.917263	0.959076	0.290153
Sum sq. resids	1.75E+22	1.70E+21	6.39E+10	1.67E+24
S.E. equation	5.00E+10	1.56E+10	95580.44	4.89E+11
F-statistic	4.329275	21.78713	44.94115	1.766414
Log likelihood	-410.2586	-391.6018	-199.5732	-446.7323
Akaike AIC	52.40733	50.07522	26.07165	56.96654
Schwarz SC	52.84191	50.50980	26.50623	57.40112
Mean dependent	9.64E+10	1.26E+11	2388063.	1.87E+12
S.D. dependent	8.33E+10	5.42E+10	472473.7	5.80E+11
Determinant resid covariance (dof adj.)		1.07E+75		
Determinant resid covariance		3.91E+73		
Log likelihood		-1446.436		
Akaike information criterion		185.3045		
Schwarz criterion		187.0428		
Number of coefficients		36		

VAR Lag Order Selection Criteria

2 lag length criteria selected due to increased size of the variables, to make the model uncomplicated and used the third Linear model where the Trace and the Max-Eigen value is 1.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1506.350	NA	1.15e+77	188.7938	188.9870	188.8037
1	-1469.118	51.19415*	8.85e+75	186.1398	187.1055	186.1892
2	-1446.436	19.84692	6.37e+75*	185.3045*	187.0428*	185.3935*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Firstly, there are more than 0 cointegration relationships in selected variables. And secondly Johansen Cointegration Test showing significance 0.0255 <0.05 means there are more than 0 cointegration relationship. Thirdly, the p-value is greater than 0.05 at 0.0894 is confirming that it is insignificant and there is no more than 1 cointegration in chosen variables. Its confirmed that there is long run relation. Therefore, we rearranged the equation to obtain our results,

$$Y - \hat{Y} = \varepsilon_{it} = ECT = y_{it} - \alpha - \beta X_{it} = Error$$

Rearranging,

$$Y = \hat{Y} + Error$$

Where,

$$Y = Global\ FinTech\ Investment = Intercept(c) + \beta 1 Global\ Sukuk\ Issuance + \beta 2 Global\ Bio\ Fuel\ Production + \beta 3 Global\ Foreign\ Direct\ Investment + Error$$

$$Global\ FinTech = 2.35\ Intercept - 0.00000\ Global\ Sukuk\ Issuance + 69183\ Global\ Bio\ Fuel\ Production - 0.046 Global\ Foreign\ Direct\ Investment$$

$$Y = Global\ FinTech = 69{,}185.304$$

Now we can entail with the help of the statistical outcome that the Global Sukuk Issuance has neutral effect on the Global FinTech Investment when other variables are aggregatedly disrupting in the model. Where as, Global Bio Fuel Production enormously & positively affecting the Global FinTech Investment. At last but not least the Global Foreign Direct Investment negativly affecting the Global FinTech Investment according to the calculated data of past 18 years.

t-value = Slop/Standard Error

If the t-value is > 1.96 then the particular variable is significant

- t-value of the Global Sukuk Issuance = 0.00000 / 1= 0
- t-value of the Global Bio Fuel Production = 69,185.304 / 25524.3 = 2.71
- t-value of the Global Foreign Direct = 69,185.304 / 0.02675 = 5.477

Hence, it is proved that the Bio Fuel production with the value of 2.71 has significant effect on the Global Fintech Investment, as well as, Global FDI with t-value greater than 1.96 at 5.477. Although separately Global Sukuk Issuance has significant impact but in this model with global bio fuel production and global FDI, Global sukuk is imposing neutrality on Global FinTech Investment.

Vector Error Correction (VEC) Estimates

Cointegrating Eq:	CointEq1			
GLOBAL FINTECH IN...	1.000000			
GLOBAL_SUKUK_ISSU...	4.152843 (0.82716) [5.02059]			
GLOBAL BIO FUEL P...	-362757.9 (94687.4) [-3.83111]			
GLOBAL_FDI(-1)	0.319134 (0.06131) [5.20517]			
C	-3.51E+11			
Error Correction:	**D(GLOBAL ...**	**D(GLOBAL ...**	**D(GLOBAL ...**	**D(GLOBAL ...**
CointEq1	-0.052177 (0.08612) [-0.60587]	-0.087364 (0.03313) [-2.63737]	3.15E-07 (1.4E-07) [2.27388]	-2.634680 (1.02758) [-2.56397]
D(GLOBAL FINTECH I...	-0.177024 (0.32226) [-0.54931]	-0.035318 (0.12396) [-0.28492]	-3.54E-07 (5.2E-07) [-0.68387]	1.472417 (3.84528) [0.38292]
D(GLOBAL_SUKUK_IS...	0.040025 (0.58479) [0.06844]	0.388867 (0.22494) [1.72876]	-5.09E-07 (9.4E-07) [-0.54235]	-3.169316 (6.97780) [-0.45420]
D(GLOBAL BIO FUEL...	-123419.8 (146276.) [-0.84374]	-5730.218 (56265.0) [-0.10184]	0.108221 (0.23497) [0.46057]	-2848689. (1745383) [-1.63213]
D(GLOBAL_FDI(-1))	-0.034349 (0.02859) [-1.20154]	0.019761 (0.01100) [1.79713]	-1.20E-07 (4.6E-08) [-2.62004]	0.116832 (0.34111) [0.34251]
C	2.51E+10 (2.4E+10) [1.03409]	1.17E+10 (9.3E+09) [1.24821]	86914.07 (39042.4) [2.22615]	3.38E+11 (2.9E+11) [1.16544]
R-squared	0.432736	0.521719	0.538032	0.477428
Adj. R-squared	0.149104	0.282578	0.307047	0.216142
Sum sq. resids	2.75E+22	4.07E+21	7.10E+10	3.92E+24
S.E. equation	5.25E+10	2.02E+10	84279.46	6.26E+11
F-statistic	1.525695	2.181639	2.329301	1.827222
Log likelihood	-413.8781	-398.5913	-200.4133	-453.5458
Akaike AIC	52.48477	50.57392	25.80166	57.44323
Schwarz SC	52.77449	50.86364	26.09138	57.73295
Mean dependent	1.32E+10	1.13E+10	110875.0	-6.35E+10
S.D. dependent	5.69E+10	2.38E+10	101244.2	7.07E+11
Determinant resid covariance (dof adj.)		1.38E+75		
Determinant resid covariance		2.10E+74		
Log likelihood		-1459.891		
Akaike information criterion		185.9864		
Schwarz criterion		187.3384		
Number of coefficients		28		

$Y - \hat{Y}$ = Error

Error = 0 means equilibrium

$Y - \hat{Y} = 0$

$Y = \hat{Y}$

Long Run Equation:

Global FinTech = 3.51 Intercept- 4.153Global Sukuk Issuance + 362757.9 Global Bio Fuel Production - 0.32Global Foreign Direct Investment.

Global FinTech = 362756.937

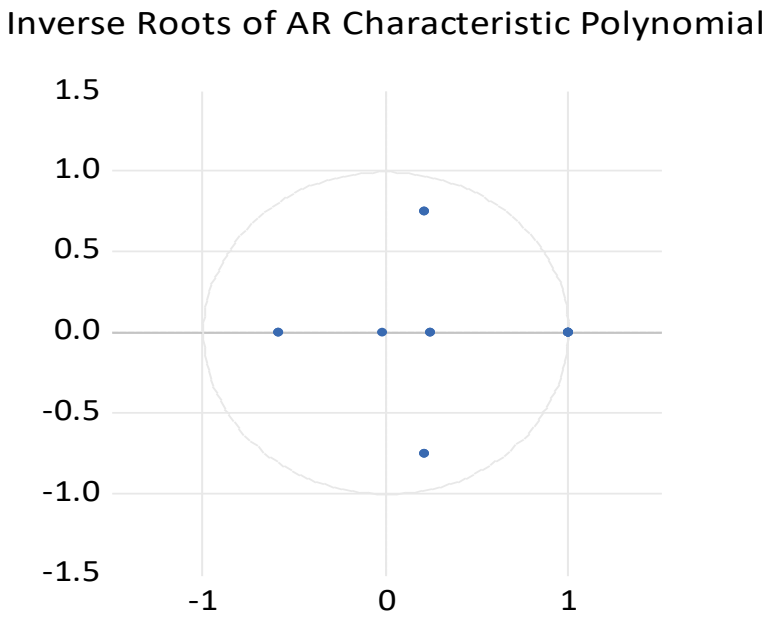
In our short run equation we obtained the cointegration coefficent in the VEC table, which is underlined, and the value is -0.60587.

After switching the negative sign into positive It became 0.60587. The obtained value is not in between 0 and -1, so according to the assumption the results are insignificant that means that the independent variables in the models cannot significantly influence the Investment in Financial Technologies, as well as, low R-squared value also nail the results which means that the model and its variables are not appropriate to influence the Investment in FinTech.

This p-value of Jarque-Bera Test also showing significance which means that model is not appropriate, one way to solve it and make the model fit is to go back and take natural Log in in order to solve it. Another way to solve this problem is by taking central limit theorem if the sample is greater than 30 and assume that the model is normally distributed.

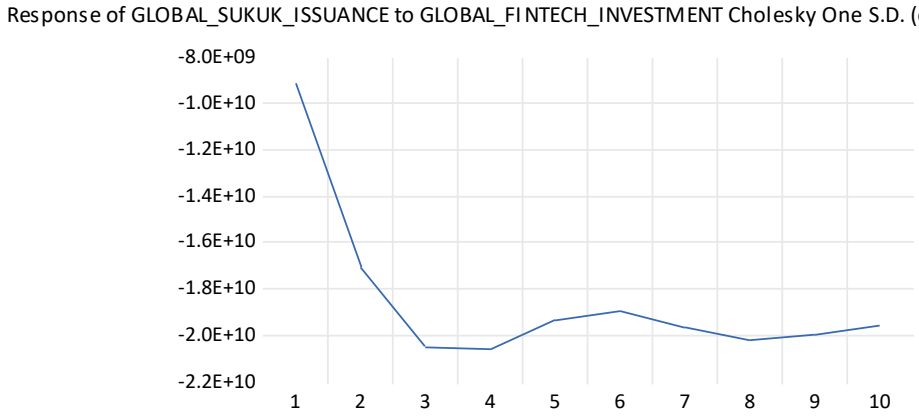
Stability Test

After completing the model, we draw a Lag Structure AR root graph. Since, all the dots are inside meaning that the model is stable. Ideally no dots should be outside or on the circle. 6 dots mean that there are 6 lags in the model.

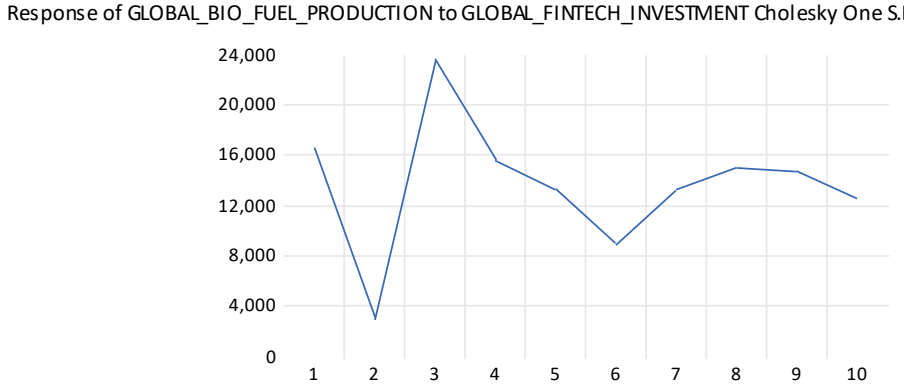


In the short run the independent variables are not significantly impacting our dependent FinTech variable same as we already find in previous tests where R squared was very low, however, in Granger causality test while changing dependency we got the results that the only Global Foreign Direct Investment amongst other selected variable is significantly influencing the Global Bio Fuel Production, therefore we can conclude that the 2 independent variables of our model Global FDI causing Global BFP significantly in short run where on the long run there is no causal relationship among Global FinTech and independent variable Global Sukuk Issuance, Bio Fuel Production and Global Foreign Direct Investment.

Impulse Response Function

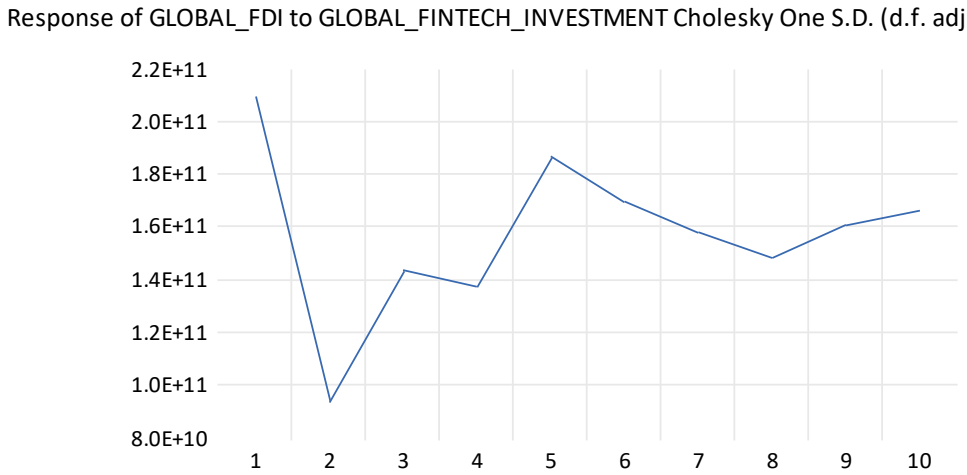


This graph is showing that when 1% of Global Sukuk Issuance shock is given the Global FinTech Investment experienced decline until 4th shock there it inclined and declined on 6th shock and then at 8th shock it inclined. This clearly shows that after every 2nd shock right after forth shock the movement is



symmetrical.

The movement showing a decline after 1st shock and a huge incline after 2nd. decline from 24k to around 16k is recorded on 3rd shock and it continue to decline until 6th where is started make an upward shift and until 8th it started declining, surprisingly at the same spot where it started a curvy decline on 4th shock.



This also showing an up and down movement in the graph of the 1% of shock response of Global FDI to Global FinTech Investment.

RESULTS

- H1. Global Sukuk Issuance has Insignificant and negative affect to the FinTech Investment which means accepting the alternative hypothesis and failed to reject the null.
- H2. FDI has Insignificant and negative affect to the FinTech Investment which means accepting the alternative hypothesis and failed to reject the null.
- H3. TOURISM has Insignificant but positive affect to the FinTech Investment, as a result we failed to accept the null hypthesis
- H4. Bio Fuel Production has significant and positive affect to the FinTech Investment which made us accept the null hypothesis.
- H5. Given variable for VECM (Global Sukuk Issuance, Global Foreign, Global Bio Fuel Production, Global Fintech) did not create a significant VECM therefore, alternative is accepted.

For fulfilling our objective, we ran various test in order to achieve the VEC. VEC model in which we found after switching the negative sign into positive, that became 0.60587 which is not between 0 and -1 and according to the assumption it is insignificant that means that the independent variables in the models cannot be used to influence the Investment in Financial Technologies significantly as well as low R-squared value also nailed the results which mean that the model and its variables are not appropriate to influence the Investment in FinTech.

After finding that our model is not equipped with significant variables we for our personal satisfaction and for further analysis ran VEC residual correlation LM test, Jarque Berra Normality test, heteroskedasticity and stability test. However, our model was not appropriate but findings of these study through other statistical operation testify that Global Bio Fuel production is significantly and positively impacting the FinTech Investments. That is why it is suggested to public Agriculture universities, renewable energy producers, and financial institutions that they must enhance their operations towards Bio Fuel Production and Renewable Energy development through Blue Salam Sukuk offering in order to allocate and invest in sustainable infrastructure for the purpose of environmental and financial sustainability. Nevertheless, (Aam Slamet Rusydianaa, 2021) asserts that important foundations needed in the development of blue sukuk are regulatory aspects, feasible underlying projects, investors, and inter-institutional coordination, respectively.

CONCLUSION

Sustainability requires institutional integrity. Whether mobilizing sukuk capital for SDGs, attracting FDI into coastal infrastructure, or deploying regulatory sandboxes for financial innovation, the enabling conditions are consistent sound governance, authentic instruments, inclusive technology, and cross-sectoral collaboration. Pakistan, in particular, locates at a strategic intersection of these opportunities and faces both the challenge and the opportunity to translate its natural, demographic, and geographic assets into a resilient, Shariah-aligned sustainable economy. Our understudy variables in our VECM would not perform as insignificantly as they are performing together, however, little manipulation through moderating variables would make them significant to the extent where environmental and blue economy developments could be aligned with Islamic financial instruments and Fintech for the purpose of achieving maximum value objectives to deliver to the stakeholders. The finding of this research entails that bio fuel production enhancing the FinTech investment. On the other hand, if biofuel is produced using trees, specifically 10years old 200 fruit trees that's a minimum requirement of a single household's Co2 absorption. A country will be able to achieve zero hunger goal, significantly reduce poverty, and increase GDP as a whole. This study recommends development of smart ports like Dubai World Port to support the trade and tourism objective according to Maqasid al Sharia, Paris Agreement and SDGs. Digital Salam Sukuk facility for trade and tourism can substantially produce more than enough bio fuel and environmental sustainability, as well as economic growth and social welfare. Moreover, further research on Digital Salam Sukuk Development can be organized by integrating blockchain ledger, IoT, and FinTech for achieving Maqasid al Sharia and Sustainable Development Goals for sustainable environment and blue economy developments.

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