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FOSTERING SUSTAINABLE ISLAMIC FINANCIAL DEVELOPMENT: EVIDENCE FROM ZAKAT FUNDS IN SELECTED COUNTRIES

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ABSTRACT

This study aims to examine the influence of IQ and GI on IFD, utilizing zakat as the primary proxy. Specifically, it investigates the roles of these variables in strengthening the Islamic financial sector particularly its social dimension. This research employs a quantitative approach using panel data analysis to test the hypothesis. The empirical results demonstrate that IQ has a positive and significant impact on IFD, confirming that robust institutions are essential prerequisites for optimizing the management and distribution of zakat funds. Conversely, GI was found to have an insignificant effect on IFD in the observed countries. The finding of GI's insignificance implies a theoretical and practical gap, suggesting that the integration of environmental sustainability aspects within the current Islamic finance ecosystem is not yet mature and requires further strengthening to become a driver of growth. Regulators and policymakers are urged to prioritize institutional governance reforms to bolster public trust in zakat institutions, while simultaneously designing strategic incentives to effectively integrate environmental sustainability principles into disbursement mechanisms. Enhancing institutional quality and integrating environmental concerns into zakat management will foster public confidence among muzaki, ensuring that Islamic social funds serve not merely as short-term economic safety nets, but also contribute to ecosystem preservation for the sustainable well-being of future generations. This study is uniquely positioning zakat as a proxy for Islamic Financial Development, distinct from the banking-centric view. Additionally, it offers how Green Innovation interacts with the Islamic social finance sector.

***Keywords**: Islamic Financial Development, Zakat, Institutional Quality, Green Innovation, Economic Freedom*.

I. INTRODUCTION

The contribution of Islamic Finance Development (IFD) to supporting economic growth in several Muslim countries has shown significant results in recent years. In 2024, Islamic finance experienced extraordinary growth, with the industry value reaching US$5.98 trillion, an annual increase of 21% (ICD, 2025). Islamic finance is inherently aligned with realizing the Sustainable Development Goals (SDGs) because it is based on Sharia principles that emphasize justice and sustainability. Through distribution instruments such as *zakat*, *infaq*, and *sadaqah*, Islamic finance can alleviate poverty and build a stable, inclusive financial system.

However, the growth of Islamic Finance Development remains dominated by the Islamic banking sector. According to the *Islamic Finance Development Report 2025*, Islamic banking accounts for 72% of the Islamic finance industry's total assets, with the largest contributions coming from Iran, Saudi Arabia, and Malaysia. A study by Butt et al. (2023) states that the Islamic banking sector and the Islamic capital market are the most important sub-sectors supporting the growth of Islamic finance. Data indicates that the banking sector grew by 6.5%, reaching 2,10 billion, while the Islamic capital market is projected to be worth 930,3 billion or 30.5% of the total value of Islamic finance assets globally (Butt et al., 2023).

Meanwhile, the social dimension, which is a fundamental element of Islamic economics, has not been extensively explored in empirical studies. Reports from Islamic Finance Development indicate that sustainability indicators in the Islamic finance sector, including zakat funds, have the lowest coverage among all IFD dimensions, with 60% of countries receiving a score of zero. Achieving higher scores generally depends on a country's level of Islamic finance development. The disparity is clear: the IFD's very high growth is largely driven by banking assets, while the performance of the 'sustainability' sector, which plays a fundamental role in achieving social welfare, remains very low. This condition illustrates that the capacity of the economic structure and the level of philanthropic concern among Muslims are still weak.

In this study, institutional quality plays a pivotal role in driving the growth of Islamic Financial Development (IFD). Several aspects encompassed within the rule of law component, such as government effectiveness, control of corruption, and regulatory quality, are influential in building public trust in zakat institutions. Numerous studies have confirmed that a country's institutional quality significantly influences the growth of Islamic finance, as robust institutions can enhance financial stability and performance (Alawi et al., 2022; Danlami et al., 2023; Khan et al., 2020, 2022; Poon et al., 2021). Specifically, Alawi et al. (2022) examined the influence of institutional quality and financial innovation on financial development across 17 developing countries during 1990–2020. The study's findings confirm that high institutional quality can support the performance of the financial sector in emerging markets.

Khan et al. (2020) examined the impact of institutional quality on financial development, particularly in the banking and stock markets, across 15 Emerging and Growth-Leading Economies (EAGLEs) during 1996–2016. The study's findings indicate that a country's institutional quality influences the expansion of financial development. Specifically, several components of institutional quality, namely political stability, government effectiveness, and the rule of law, were proven to have a positive and significant effect on financial growth. Khan et al. (2022) examined the impact of institutional quality on financial sector development using a multidimensional assessment covering depth, access, and efficiency across 85 Emerging and Developing Economies (EMDEs) from 1996 to 2018. The findings revealed that the rule of law, control of corruption, and regulatory quality are positively and significantly associated with financial sector performance.

Furthermore, Danlami et al. (2023) examined the stability of Islamic banks in the context of Islamic social finance across four countries (Bangladesh, Bahrain, Indonesia, and Malaysia) for the period 2006–2019. The study revealed a strong influence of institutional quality on the stability of Islamic banks. Although prior literature has confirmed the fundamental role of institutional quality in supporting financial sector performance, significant empirical and theoretical gaps remain that this study seeks to address. Most existing studies focus on assets in Islamic banking. Furthermore, most of these studies have not integrated the *green innovation* variable, which constitutes an essential issue within the Islamic economic framework for supporting environmental sustainability.

Therefore, this study offers novelty by focusing on identifying *zakat* as the primary proxy for Islamic Financial Development, thereby providing a macro perspective specifically on the growth of Islamic social finance. Additionally, it provides a comprehensive analysis of the synergy between institutional quality and green innovation incorporating control variables such as economic freedom and Gross Domestic Product (GDP) on Islamic Financial Development (IFD) across selected Muslim countries, namely Bangladesh, Egypt, Indonesia, Iran, Jordan, Kuwait, Malaysia, Pakistan, Qatar, Saudi Arabia, Turkey, and the United Arab Emirates.

This study makes two primary contributions. First, it enriches the literature by exploring the growth of Islamic Financial Development, particularly zakat funds, in relation to a country's institutional quality. Second, this study guides regulators to expand zakat fund optimization to support environmental sustainability through green innovation, which is inherently aligned with the fundamental concepts of Islamic economics. The remainder of this paper is structured as follows: Section 1 presents the introduction, Section 2 covers the literature review, Section 3 details the methodology, Section 4 presents the results, Section 5 provides the discussion, and Section 6 outlines the conclusion and recommendation.

II. LITERATURE REVIEW

Islamic Financial Development

The development of Islamic Finance Development (IFD) as a variable, is examined for impact on economic growth. The index captures broader dimensions of the Islamic finance industry, namely quantitative development, knowledge, Corporate Social Responsibility (CSR), governance, and awareness. Thomson Reuters developed the IFD itself due to its advantage in capturing various aspects of Islamic financial development. This study explains that financial development is followed by economic growth. The literature offers little discussion of the link between Islamic finance and economic growth. This is because the Islamic financial system is driven by a religious ideology, which is not inherently linked to a country's economic development.

Within a country, policies and regulations can help individuals and companies make informed investment decisions. Therefore, the relationship between institutional quality and financial development needs to be considered. According to the Theory of Law and Finance, over time, countries' legal origins influence the development of their legal systems, which, in turn, help determine economic growth. Meanwhile, financial development will be a major factor driving economic growth (Mensi et al., 2020).

The Islamic Finance Development Index (IFD) is a comprehensive measurement tool that assesses the depth and maturity of the Islamic finance sector. The IFD expands the definition of financial development beyond mere asset volume metrics by integrating five key dimensions, encompassing operational performance, ethical framework, and knowledge ecosystem. These aspects include: Quantitative Development/Financial Performance of the Islamic Finance Sector; Governance in the Islamic Finance Sector; Corporate social responsibility/sustainability in the Islamic Finance Sector; Knowledge sharing about Islamic Finance; and Awareness creation about Islamic Finance.

In this study, the IFD variable used, with an aspectual approach focused on the ethical and social responsibility dimension, namely Corporate social responsibility/sustainability in the Islamic finance sector. This indicator reflects the Islamic sector's commitment to social and environmental goals, measured through disclosed Corporate Social Responsibility (CSR) reporting, Zakat and Qardh al Hasan (funds distributed to charity) activities, and ESG (Environmental, Social, and Governance) reporting. This also includes the volume of ESG funds and ESG Sukuk in circulation.

Integrating zakat within the broader Islamic financial framework can provide the necessary social financing to support underserved communities, while developing Islamic financial markets can ensure sustainable economic growth and financial inclusion (Butt et al., 2023). Optimal impacts in the development of Islamic finance and effective management of zakat funds include increasing public awareness, improving zakat collection and distribution mechanisms, and aligning zakat initiatives with broader economic and social development goals (Butt et al., 2023; Haji-Othman et al., 2021).

Zakat is an Islamic obligation that redistributes wealth and alleviates poverty. Zakat is a religious obligation that helps individuals in society assist those in need, including people experiencing poverty. While this instrument has great potential to promote poverty alleviation, it does not absolve the government of its obligation to create prosperity. Zakat plays a crucial role in promoting social justice and economic development, reducing the wealth gap between the rich and the poor, thus fostering a more just and equal society (Sarea, 2020). Zakat also does not replace government spending on welfare or the government budget for disaster management (Nurzaman, 2020).

Zakat is expected to fulfill the needs of life and can be transferred to those who are more capable, especially close relatives and neighbors of the individual concerned (Denas Hasman Nugraha, 2021). ZIS funds can stimulate economic growth by facilitating economic development. High distribution of ZIS funds will impact economic growth. High distribution, coupled with superior human resources, can increase community productivity because ZIS is channeled not only for consumption but also for working capital. Thus, the income and productivity of those entitled to receive it increase. Studies show that zakat can make a significant contribution to the Sustainable Development Goals (SDGs) by financing specific programs aimed at social, political, and economic development (Haji-Othman et al., 2021; Sarea, 2020).

Institutional Quality

In promoting growth and development, higher institutional quality is important for a country. Research by Assi et al. (2020) and Nguyen (2022) explains that institutional quality reduces imperfect information uncertainty, thus supporting effective financial development. Conversely, weak institutions will impact financial and economic growth. This is because institutional quality measures aspects of corruption, transparency, and accountability. Institutional quality relates to the country's scope and to how information accountability can support Islamic financial development, particularly in CSR and Zakat. Institutional quality comprises political stability, voice and accountability, regulatory quality, the rule of law, government effectiveness, and control of corruption (World Bank, 2021). Hence, the impact of institutional quality on social financing and the stability of IBs might depend on its effectiveness in a particular country (AlAjmi et al., 2023).

The relationship between institutional quality and the development of Islamic finance has garnered increasing attention in recent literature. Institutional quality encompasses various dimensions such as governance, regulatory frameworks, legal consistency, and adherence to the rule of law, which collectively create an environment conducive to the progression of financial systems. Understanding how these factors influence the development of Islamic finance is critical, especially as Islamic finance operates under distinctive principles that may be facilitated or impeded by institutional frameworks. Research by Muhammed et al. emphasizes the paramount importance of high institutional quality in fostering Islamic finance development. Their findings suggest that well-developed institutions are instrumental in reducing uncertainty (gharar) and enhancing trust in financial transactions, which are essential components for the successful operation of Islamic finance (Hidayat & Salsabila, 2024). The authors argue that quality institutions also promote financial liberalization, as countries with robust institutional frameworks are likely to attract trade openness and foreign investment, further enriching the Islamic finance landscape.

Expanding on this, the study by Basyariah et al. focuses on the development of Sukuk (Islamic bonds) across several OIC (Organization of Islamic Cooperation) countries. They employ a global-governance-indicator approach to empirically demonstrate how government quality impacts Sukuk development, particularly within the Indonesian context. Their study shows that strong governance

correlates positively with Sukuk issuance and growth, thus reinforcing the role of institutional quality as a catalyst for Islamic finance (Basyariah et al., 2020). Furthermore, they point out that enhancing Islamic financial literacy is vital, as their research identifies disparities in awareness between Islamic banking and Sukuk in Indonesia.

Insights from Uddin and Mohiuddin regarding the institutional and regulatory landscape of Islamic social finance in Bangladesh further emphasize the crucial role of institutional frameworks. Their analysis of Zakah, awqaf, and Islamic microfinance reveals how institutional inefficiencies and regulatory challenges can obstruct the effectiveness of Islamic finance initiatives aimed at alleviating poverty (Uddin & Mohiuddin, 2020). They propose policy reforms to modernize such institutions, facilitating better functionality for Islamic finance and enhancing its contributions to social development. In addition, Harahap illustrates the broader context of Islamic finance's role in sustainable economic development, highlighting regulatory and institutional frameworks as significant barriers that limit the potential of Islamic finance, particularly for supporting green projects and infrastructure (Harahap, 2024). Harahap asserts that without strong and coherent regulatory systems, Islamic finance's ability to innovate and adapt to global sustainability objectives may be compromised. Research by Hasan et al. reinforces the interplay between Islamic financial inclusion and economic development; their findings indicate substantial correlations between institutional quality including governance and regulatory effectiveness and the advancement of Islamic financial services in countries like Indonesia and Iraq (Hasan et al., 2024).

Their analysis emphasizes that fostering a supportive institutional environment is essential for enabling the full realization of the potential of Islamic finance. Collectively, the literature establishes that high-quality institutions are fundamental in creating an environment conducive to Islamic finance development. Effective governance, regulatory clarity, and legal enforcement bolster the operational framework for Islamic financial institutions, contributing to their resilience and growth. As a result, policymakers are encouraged to prioritize the strengthening of institutional reliability to facilitate the widespread adoption and expansion of Islamic finance systems, thus maximizing their potential for broader economic and social benefits. Thus, based on the explanation, this study has the hypothesis as follow below:

H1: Institutional Quality (IQ) has a positive and significant relation towards Islamic Finance Development (IFD)

Green Innovation

In research, Awan et al. (2022) explain that rapid technological change contributes to increased greenhouse gas emissions. This contradicts research; Cuerva et al. (2014) explain that the potential for R&D spent on technology supports green innovation. This research aligns with Hussain et al. (2022), who explain that green innovation has a stronger impact in regions with higher research and development (R&D) spending on clean technologies, suggesting a direct link between innovation and emission reductions. Thus, green innovation or environmental technology innovation refers to investments in new products, R&D, and cost-effective technologies to improve energy efficiency, reduce fossil fuel consumption, and increase production capacity (Hasanov et al., 2021).

Green innovation supports economic growth without compromising environmental sustainability. Green innovation is recognized as a key driver of sustainable development because it refers to technological innovation activities aimed at reducing environmental impacts, increasing resource efficiency, and driving green transformation (Cisneros Chavira et al., 2023). A defining characteristic of green innovation is its ability to balance economic performance with environmental impact. This

environmentally balanced economy can boost economic growth at the lowest environmental cost compared to information and communication technology innovation (Chen et al., 2022). Green technology innovation drives real-sector efficiency and creates a sustainable economic ecosystem aligned with the principles of Maqashid Sharia, thereby facilitating the expansion of Islamic social financial instruments, such as zakat, to operate more effectively in poverty alleviation and environmental preservation.

In discussions about the impact of green innovation on the development of Islamic finance, some studies show that this impact may not be significant. Specifically, although green innovation aims to improve sustainability in business practices, its interaction with Islamic finance in some contexts shows inconsistent results. For example, Butt et al., (2023) show that the development of Islamic finance can have a positive impact on economic growth, but in the context of green innovation, the situation becomes more complex because there are varying results in recent studies. On the other hand, Ayu & Wati (2022) state that although environmental and sustainability targets are important to integrate into financial models, there are significant challenges in adopting these practices due to regulatory and sharia compliance constraints, which impact financial decisions in this sector. These findings indicate that green innovation may be a useful addition but is not always crucial for sharia-based financial development. Khatib highlights the challenges in integrating accounting standards that are in line with sharia principles; uncertainty in the recognition and reporting of green innovations may result in a less urgent response from Islamic financial institutions (Khatib, 2018). Thus, based on the explanation, this study has the hypothesis as follow below:

H2: Green Innovation has a positive and significant relation towards Islamic Finance Development

III. METHODOLOGY

Data

This study selected 12 countries as sample units of analysis, taking into account several factors, including countries that focus on the quality of Islamic social financial institutions and green innovation. This study examined data from 2010 to 2024, considering that this period captures the dynamics of industry development during structural transformation. In addition, this period also represents an important phase of governance reform, acceleration of green innovation, and significant growth in the Islamic finance industry, particularly after the 2015 Paris Agreement and the pandemic. Thus, the 2010–2024 range provides a strong empirical basis for assessing the relationship between institutional quality, green innovation, and the development of Islamic finance.

Based on previous empirical investigations, prior scholarly research employed an institutional framework utilizing two distinct sources, namely the Worldwide Governance Indicators (WGI) as presented by Kaufmann (2015), and the International Country Risk Guide (ICRG) provided by the PRS group. According to (Siong Hook Law; W. N. W. Azman-Saini, 2012), the world governance indicators (WGI) indicators are deemed to possess a higher degree of accuracy compared to alternative indicators due to their comprehensive geographical coverage. The score ranges from 0 to 100, with higher scores indicating superior institutional quality and indicators. Previous studies have utilized WGI indicators as demonstrated by Kaufmann (2015) and Bermpei et al. (2018). For institutional variables, data were

collected from the Country Governance database, which contains six indicators, including government effectiveness, regulatory quality, rule of law, voice and accountability, political stability and absence of violence, and corruption control.

There are two important sources that provides data on the Economic Freedom Index : The Heritage Foundation and the publication of Economic Freedom of the World (EFW) from Fraser Institute. The Heritage Foundation data was used for this research and acquired to economic freedom including government integrity, tax burden, government spending, fiscal health, business freedom as well as labour freedom by monetary freedom by trade freedom by investment freedom and financial freedo. 0 to 100 higher the value, greater the economic freedom and activity.

This study obtains a number of control variables, including Economic Freedom and Gross Domestic Product (GDP) from the Heritage and World Bank database to measure country-level variables in relation to the financial system.

Variable Spesification and Model Development

The endogenous variable in this study is Islamic Finance Development (IFD), which has five dimensions: financial performance of the Islamic finance sector, governance in the Islamic finance sector, CSR, knowledge about Islamic finance, and awareness about the Islamic finance sector. This study focuses more on the CSR dimension because it is closely related to the sustainability aspect, where the total value of each country's zakat funds is the benchmark, as this is in accordance with research. (Muhammed et al., 2024).

Institutional quality and green innovation serve as explanatory variables. Indicators of institutional quality are derived from the country governance database that includes government effectiveness, voice and Accountability, political stability and violence, quality regulation, rule of law, and anti-corruption measures. This study also establishes a measure of institutional quality by averaging the six indicators (al-marhubi. fahim, 2004; Bjørnskov, 2006; Easterly, 2010; Ilyina & Samaniego, 2011; Moore, 1986). To reduce high intercorrelations between variables, six indicators are combined into a single, more comprehensive index. Besides, Green innovation is used as the second explanatory variable where Green innovation refers to all types of innovation that aim to reduce environmental impacts, use resources sustainably, and promote energy efficiency and environmentally friendly tools.

Additionally, this study uses similar measurements in terms of economic freedom indicators as a control variable which aggregate various variables reflecting property right, government size, rule of law and efficiency of regulation and market openness into single index. According to Assi et al. (2020) and Yang et al. (2023) , it is of interest to develop a unified index for economic freedom indicators, which are both comparable in magnitude and cover a wide range of dimensions. In addition, GDP also serves as a control variable in this study. GDP is a measure of a country's total economic output over a specific period, usually one year. GDP represents the market value of all final goods and services produced within a country. GDP is used as an indicator of overall economic health and the size of a country's economy (Badan Pusat Statistik, 2025).

After careful examination of the data, this study considers the panel method analysis as a suitable technique. The panel regression technique enables the simultaneous consideration of cross-sectional and time series variations, making it a valuable tool for controlling individual- specific factors that remain constant over time. This approach demonstrates an appropriate method for handling dependencies among latent variables, which has the potential to introduce bias in estimations. The aforementioned approach has been employed in prior research of Hassan et al., Khalid and Shafiullah, Khan et al (Hassan et al.,

2011; Léon & Weill, 2017; Siong Hook Law; W. N. W. Azman-Saini, 2012). The model's construction is represented by the equation provided below:

$$Y_{it} = \alpha_{it} + \beta X_{i_t} + \beta Z_{i_t} + \mu_{it} \quad (1)$$

Where Y_it is the dependent variable which measures the Islamic financial development, X is the explanatory variable, Z is control variables (i.e., economic freedom and GDP), i and t denote country and time, respectively. The estimation using Eq. (1) refers to following specific model of explanatory variables stated as follows:

$$IFD_{it} = \alpha_{it} + \beta_1 (GE, RQ, RL, VA, PV, CC)_{it} + \beta_2 GI_{it} + \beta_3 Z_{it} + \mu_{it} \quad (2)$$

$$IFD_{it} = \alpha_{it} + \beta_1 (IQI\_id)_{it} + \beta_2 GI_{it} + \beta_3 Z_{it} + \mu_{it} \quad (3)$$

Using Islamic financial development (IFD) as the dependent variable, the study estimates two different models. In the first model (Equation 2), the model combines economic freedom (EF), technological development (TD), and each of the institutional quality indicators, including government effectiveness (GE), regulatory of quality (RQ), rule of law (RL), political stability and absence of violence (PV), voice and accountability (VA), and control of corruption (CC). In the second model, the model uses the exact measurement but employs a single broader index for six institutional quality indicators (IQI). The model selection is conducted across eight models using both FEM and REM, guided by the results of the Hausman test, a choice reinforced by robustness testing detailed in the Appendix 1 regarding multicollinearity.

Notably, this study does not employ diagnostic tests for normality, autocorrelation, or heteroscedasticity. This decision is rooted in the explanation provided by Gujarati & Porter (2009) , asserting that classical assumptions are dispensable in panel data analyses due to fundamental disparities between panel data models and time series data. These disparities facilitate a more comprehensive exploration of trends and relationships between variables.

IV. RESULTS AND DISCUSSION

Table 1 presents the descriptive statistics regarding the data characteristics and all variables employed in this study. The Islamic Finance Development (IFD) variable, proxied by *zakat*, exhibits a mean of 4.07×10^7 with a very wide dispersion, as reflected by the large standard deviation. This substantial range underscores significant disparities in the level of Islamic financial development among the 12 Muslim countries sampled.

Table 1. Descriptive Statistic

Variable	Obs	Mean	Std. dev.	Min	Max
ifd	180	4.07e+07	1.59e+08	0	1.13e+09
iq_id	180	29.01111	16.61661	1	57
gi	177	1937.65	3436.699	0	15769
ef	177	58.24294	15.86351	0	78
gdp	176	6.98e+11	1.01e+12	0	4.99e+12

Source: Author's calculation

Furthermore, the institutional quality variable reveals a mean of 29.01 with considerable variation, illustrating the heterogeneity in governance performance across these nations. Moreover, the green innovation variable shows substantial variation, with a mean of 1,937.65 and a high standard deviation, suggesting that green innovation is concentrated in only a few countries. Additionally, the control variables, economic freedom and GDP, display considerable ranges, with mean values of 58.24 and 6.98, respectively; this confirms significant gaps in the financial size and capacity of each country. Overall, these descriptive statistics reveal strong heterogeneity across institutional, innovation, and economic dimensions, indicating that the countries within the panel operate under diverse structural conditions.

Panel Regression Result

Table 2 presents the regression results examining the influence of institutional quality and green innovation on Islamic Finance Development (IFD), proxied by zakat funds. In general, the regression model provides important insights into the factors affecting IFD across the 12 sampled Muslim countries. The institutional quality (IQ) variable shows a positive, significant relationship, indicating that higher institutional quality in a country can enhance the growth of Islamic finance (specifically, zakat) in the sampled nations. This significance underscores the pivotal roles of government effectiveness and corruption control in supporting the efficacy of zakat fund collection as a component of IFD.

Table 2. Panel Regression Result

Source	SS	df	MS	Number of obs	=	176
				F(4, 171)	=	2.53
Model	1.8608e+17	4	4.6520e+16	Prob > F	=	0.0424
Residual	3.1445e+18	171	1.8389e+16	R-squared	=	0.0559
				Adj R-squared	=	0.0338
Total	3.3306e+18	175	1.9032e+16	Root MSE	=	1.4e+08

ifd	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
iq_id	2631234	1184883	2.22	0.028	292354.2	4970114
gi	-2466.597	3276.464	-0.75	0.453	-8934.121	4000.928
ef	-2060071	1108041	-1.86	0.065	-4247270	127128.2
gdp	.0000253	.0000114	2.22	0.028	2.77e-06	.0000479
_cons	6.44e+07	4.24e+07	1.52	0.131	-1.94e+07	1.48e+08

Source: Author's calculation

Conversely, the green innovation (GI) variable exhibits a negative, insignificant coefficient (0.453), suggesting that green innovation has not yet made a significant contribution to zakat fund growth within the IFD framework. Similarly, the control variable, economic freedom (EF), also shows a negative relationship with IFD. This result indicates that a country's level of financial independence does not have a significant influence and is not a primary determinant of zakat fund growth in the sampled countries. Meanwhile, GDP demonstrates a positive, significant influence, indicating that a country's economic capacity plays a crucial role in strengthening the Islamic financial sector. Overall, these regression results confirm that institutional quality, green innovation, and the control variables, economic freedom (EF) and

GDP, are key factors driving the development of Islamic finance, particularly the performance of zakat funds in Muslim countries.

Robustness Test

This study conducts a robustness test using both fixed-effect and random-effect models to achieve a more comprehensive assessment of consistency. Table 5 presents the results indicating that most variation in the model is driven by within-country changes over time, although the within R-squared remains relatively low (0.1124). Overall, the model is statistically significant, as shown by the F-statistic (F(4,160) = 5.07, p = 0.0007), meaning that the independent variables jointly explain a meaningful portion of the variations in IFD. The variable iq_id shows a positive and statistically significant effect (β = 7.93e+06, p = 0.001), suggesting that improvements in institutional quality strongly increase IFD inflows. In contrast, ef has a negative and significant coefficient (β = –5.42e+06, p = 0.000), implying that higher economic efficiency is associated with lower IFD, which may reflect structural shifts in investment allocation or changes in FDI composition within the sampled countries. The variable gdp also exerts a positive and significant effect (β ≈ 0.0000932, p = 0.001), indicating that economic growth is an important driver of rising IFD. Meanwhile, **gi** is statistically insignificant (p = 0.533), indicating no strong evidence that government investment growth influences IFD in this model. The rho value of 0.424 shows that approximately 42% of the total variance is explained by unobserved country-specific effects, confirming the appropriateness of using a fixed-effects approach.

Table 3. Fixed Effect Model

```
Fixed-effects (within) regression               Number of obs      =       176
Group variable: country                         Number of groups   =        12

R-squared:                                      Obs per group:
     Within  = 0.1124                                         min =        14
     Between = 0.0364                                         avg =      14.7
     Overall = 0.0448                                         max =        15

                                                F(4,160)           =      5.07
corr(u_i, Xb) = -0.6504                         Prob > F           =    0.0007
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ifd	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
iq_id	7931025	2308102	3.44	0.001	3372751	1.25e+07
gi	4371.303	6991.079	0.63	0.533	-9435.39	18178
ef	-5424662	1385692	-3.91	0.000	-8161268	-2688056
gdp	.0000932	.0000287	3.25	0.001	.0000366	.0001498
_cons	4.30e+07	3.89e+07	1.11	0.270	-3.37e+07	1.20e+08
sigma_u	1.016e+08					
sigma_e	1.182e+08					
rho	.42495157	(fraction of variance due to u_i)				

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F test that all u_i=0: F(11, 160) = 5.91                     Prob > F = 0.0000
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Source: Author's calculation

The random-effects GLS estimation indicates that the explanatory variables collectively have a statistically significant impact on IFD, as reflected by the Wald chi-square value of 15.43 (p = 0.0039). The R-squared values show modest explanatory power, with the within (0.1104), between (0.0398), and overall (0.0478) values suggesting limited variation explained by the model. The coefficient for iq_id is positive and statistically significant (β = 5.83e+06, p = 0.001), indicating that stronger institutional quality is associated with higher IFD across countries. Meanwhile, ef exhibits a negative and significant coefficient (β = –4.08e+06, p = 0.001), suggesting that increases in economic efficiency are associated

with reduced IFD. This may reflect sectoral restructuring or changes in investor priorities within the sampled economies. The variable gdp also shows a positive and significant effect (β = 0.0000599, p = 0.003), confirming that higher economic output serves as a key driver of IFD. In contrast, gi remains statistically insignificant (p = 0.638), implying that government investment growth does not exert a discernible influence on IFD under the random-effects specification. The estimated rho value (0.304) indicates that roughly 30% of the variance is attributable to unobserved country-level characteristics, supporting the assumption that random effects capture meaningful cross-sectional differences.

Table 4. Random Effect Model

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Random-effects GLS regression                   Number of obs     =       176
Group variable: country                         Number of groups  =        12

R-squared:                                      Obs per group:
     Within  = 0.1104                                         min =        14
     Between = 0.0398                                         avg =      14.7
     Overall = 0.0478                                         max =        15

                                                Wald chi2(4)      =     15.43
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =    0.0039
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ifd	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
iq_id	5833204	1787151	3.26	0.001	2330452	9335956
gi	2510.453	5336.18	0.47	0.638	-7948.269	12969.17
ef	-4084061	1225538	-3.33	0.001	-6486071	-1682052
gdp	.0000599	.00002	2.99	0.003	.0000207	.0000991
_cons	5.51e+07	4.46e+07	1.24	0.216	-3.22e+07	1.42e+08
sigma_u	78125180					
sigma_e	1.182e+08					
rho	.30400655	(fraction of variance due to u_i)				

Source: Author's calculation

Institutional Quality and Islamic Finance Development

The research findings indicate that institutional quality has a positive and significant influence on Islamic financial development, as proxied by zakat funds. This finding confirms that high-quality governance within a country, encompassing government effectiveness, political stability, control of corruption, and regulatory quality, can drive high performance in the development of the Islamic financial sector, particularly in the collection of zakat funds. Robust institutional quality reflects a high level of public trust, driven by transparency, thereby ensuring that zakat regulations are implemented consistently. Effective governance can foster increased zakat fund collection by managing in an accountable and efficient manner. These results align with findings from several prior studies (Akmal et al., 2024; Al-Faruq et al., 2024; Basyariah et al., 2020; Danlami et al., 2023; Muhammed et al., 2024).

Al-Faruq et al. (2024) explain that a robust governance framework within a zakat institution can strengthen public trust, thereby enhancing the effectiveness of Islamic social fund management and directly improving zakat fund collection performance. This finding aligns with Danlami et al. (2023), who confirmed that institutional quality moderates the relationship between the stability of Islamic financial institutions and the enhancement of Islamic social funds (zakat and sadaqah). From a broader macroeconomic perspective, Basyariah et al., 2020; Muhammed et al., 2024) assert a positive and significant relationship between institutional indicators, such as government effectiveness and the rule of law, and the development of Islamic financial assets; this ultimately supports the creation of a conducive

ecosystem for Islamic financial instruments, including zakat. Furthermore, Akmal et al. (2024) reveal a strong relationship between corporate governance and Islamic financial performance. This reflects the critical importance of regulatory oversight and anti-corruption measures as absolute prerequisites for the sector's progress. Collectively, these studies validate that a healthy institutional environment not only enhances the operational efficiency of zakat institutions but also ensures the sustainability of Islamic financial development as a whole.

Green Innovation and Islamic Finance Development

Research indicates that the influence of green innovation on Islamic financial development is generally insignificant and inconsistent. (Butt et al., 2023) noted mixed results regarding green innovation, despite Islamic finance having a positive impact on economic growth. Ayu & Wati (2022) added that regulatory constraints and Sharia compliance remain primary challenges in integrating environmental targets into financial models, rendering green innovation not yet considered crucial. Additionally, uncertainty regarding Sharia-compliant accounting standards for green reporting hinders the development of financial products that support such innovation (Khatib, 2018). For example, (Butt et al., 2023) show that the development of Islamic finance can have a positive impact on economic growth, but in the context of green innovation, the situation becomes more complex because there are varying results in recent studies. On the other hand, (Ayu & Wati, 2022) state that although environmental and sustainability targets are important to integrate into financial models, there are significant challenges in adopting these practices due to regulatory and sharia compliance constraints, which impact financial decisions in this sector. These findings indicate that green innovation may be a useful addition but is not always crucial for sharia-based financial development. Khatib highlights the challenges in integrating accounting standards that are in line with sharia principles; uncertainty in the recognition and reporting of green innovations may result in a less urgent response from Islamic financial institutions (Khatib, 2018). This has the potential to hinder the development of financial products that support green innovation, demonstrating that even though there is a need for green innovation, such efforts do not always produce significant results.

On the other hand, analysis by Wang and Zhong (2024) shows how digital transformation can create opportunities for green innovation, but this is often separate from the more traditional Islamic financial framework. Several studies indicate that digitalization does not always lead to positive outcomes that support Islamic finance practices. Therefore, awareness of the importance of green innovation has not yet been fully realized to produce a significant impact in advancing the Islamic finance sector. Gani & Bahari (2021) also found that the interaction between Islamic finance and economic growth does not always yield positive results regarding the application of green innovation, necessitating further alignment. Although digital transformation offers opportunities, Wang dan Zhong (2024) demonstrated that digitalization is often detached from traditional Islamic finance frameworks and does not necessarily significantly support these practices.

Empirically, the negative impact of Green Innovation on zakat development is attributed to high green technology 'transition costs' that suppress the short-term profitability of business actors, thereby reducing the zakat calculation base. This is exacerbated by the green economy sector's lack of maturity in generating large-scale profits, as well as a disconnect between zakat instruments and environmental initiative.

V. CONCLUSION AND RECOMMENDATION

This study concludes that economic capacity and institutional quality, reflected in political stability and government effectiveness, play a vital role in driving the performance of the Islamic social finance sector across 12 selected Muslim countries. The empirical findings confirm that robust governance is an absolute prerequisite for creating an optimal zakat ecosystem, whereas the insignificance of the green innovation and economic freedom variables highlights a tangible gap between the theoretical narrative of a pro-environment Islamic economy and the reality on the ground. Consequently, policy implications urge regulators to prioritize institutional reforms to build public trust, while simultaneously designing strategic incentives to integrate environmental sustainability principles into zakat distribution mechanisms to ensure relevance amidst global climate challenges. To enrich these insights, future research is recommended to expand the analytical scope by incorporating more specific environmental indicators, conducting comparisons between philanthropic instruments such as waqf, applying qualitative approaches to deeply explore the barriers to green innovation adoption, adding control variables like inflation, and increasing the number of countries and years to achieve more comprehensive results.

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VI. APPENDIX

Table 5. Multicolinearity Test

Variable	VIF
IQ_id	**3.57**
EF	**2.96**
GDP	**1.28**
GI	**1.21**
Mean VIF	**2.26**

Source: Author's calculation