



# The Role of Islamic Finance in stimulating Green Growth in Several Asian Countries

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## Abstract

Sustainable development is oriented toward the welfare of humanity. The green economy applies economic growth followed by environmental sustainability. Muslim communities have implemented the Sustainable Development Goals by establishing Islamic financial institutions. Purposes of this research is to determine the role of Islamic finance in stimulating green growth in several Asian countries. The study uses green growth as the dependent variable and Islamic finance as the independent variable, while Foreign Direct Investment, innovation, trade, and population as control variables. The sampling was conducted using purposive sampling in the Asian region from 2018-2022, and selected samples were obtained from Saudi Arabia, Malaysia, Indonesia, Pakistan, Qatar, Kazakhstan, Azerbaijan, and Thailand. Generalized Method of Moments is used as a method. Results of this study indicate that green growth in the previous period, Islamic finance, foreign direct investment, and innovation have One Step GMM and Two Step GMM estimation results that are positively and significantly influential on green growth. Trade and population size yield One Step GMM and Two Step GMM estimates that are not significant but have the appropriate direction. To that end, trade needs to be given supportive policies such as providing incentives for green investment, strengthening environmental regulations, and international cooperation in the transfer of green technology. Overpopulation can lead to the exploitation of natural resources, so it is necessary to control the population immediately and at the same time strive to make them trustworthy individuals.

**Keywords:** Green Growth; Islamic Finance; Foreign Direct Investment; Innovation; Trade; Population.

## 1. Introduction

Development is essentially a process of interconnection between economic, social, and environmental dimensions in a sustainable manner (Srivastava et al., 2024). This is done with an orientation toward the welfare of humanity (Maulana et al., 2024). In reality, the development carried out can have a negative impact on human life (Afaz et al., 2024). This phenomenon, for a country, becomes a challenge so that development is more focused on green growth (Soekapdjo & Esther, 2019). United Nations implemented the concept of Sustainable Development Goals in Rio de Janeiro in 2012 (Jacob, 2024). The goals are universal in nature, encompassing three dimensions of sustainable development: social, economic, and environmental (Ghimire, 2023). Sustainable development that implements the Sustainable Development Goals has ensured the realization of human rights and environmental sustainability (Uralovich et al., 2023). Policy is implemented by managing resources responsibly, ensuring the welfare of both current and future generations (Trihatmoko & Susilo, 2024). This concept aligns with the principles applied in an economy based on Islamic principles (Mirzal et al., 2024).

Economic growth aimed at achieving societal welfare through Islamic and conventional economic approaches shows differences (Usman et al., 2023). Economic growth in Islamic economics is used as a means to enhance human welfare and inner satisfaction without regard to race, religion, or nationality (Siregar & Majid, 2023). In conventional economics, economic growth only focuses on high growth, without paying attention to the inequality in income distribution (Taufiq et al., 2025). Therefore, each country strives to prioritize development to achieve progress and prosperity for society in the long term (Anwar, 2022). This is done in several countries by establishing Islamic finance as an alternative financial institution to accelerate the implementation of sustainable development (Raudah et al., 2025). The phenomenon is in accordance with what Allah SWT has commanded humans to do, which is to take care of the universe (Yunilhamri & Mawardi., 2025). Islamic financial instruments, in the long term, have a positive impact on encouraging economic growth (Andiansyah et al., 2022). Islamic social finance, which distributes part of its wealth to the poor, can be a driver of accelerated economic development (Hubara et al., 2023).

Gross Domestic Product has become one of the indicators of a country's development success (Paul & Adoji, 2022). An increase in productivity accelerates progress in the economic sector (Raja et al., 2022). Government involvement is necessary to strengthen trade liberalization policies to absorb the produced goods (Azizah et al., 2024). This phenomenon, at the same time, serves as a driver for specialization and an increase in investment flows. Foreign Direct Investment is a long-term investment that is relatively stable against economic fluctuations (Ghazalian, 2024). Foreign Direct Investment is expected to support the increase of sustainable investment (Wei et al., 2022). This sustainability brings technology, innovation, capital, jobs, and improves the quality of human resources (Zhang & Li, 2023). This further

accelerates the increase in economic growth (Jhingan, 2012). However, there is a trade-off between Foreign Direct Investment, economic growth, and environmental damage (Le et al., 2022). It necessary needs selective approach to Foreign Direct Investment. Aims of this policy is to ensure that development efforts continue to preserve environmental sustainability. Foreign Direct Investment has been proven to significantly impact economic growth in developing countries (Chizema, 2025). Priority of Foreign Direct Investment is sustainability of development over the flow of capital aid. Its because the distribution is followed by the transfer of technology, know-how, management skills, lower business risks, and higher profitability (Sheng-Ping, 2024).

Development is a process of change and progress toward positive conditions (Pamella, 2024). Therefore, it is necessary to innovate in utilizing resources to meet their living needs. However, the innovation process is influenced by the development of science and technological advancements. The presence of innovation increasingly facilitates the creation of new products that are efficient with high added value (Xu et al., 2024). Innovation contributes significantly to economic growth (Romer, 1986). Innovation is not an individual task but a collective effort from all parties (Pepe et al., 2024). Sustainable development is carried out with innovation to enhance the economy and preserve environmental sustainability. Innovation plays a role in increasing productivity, efficiency, job creation, economic growth, resource sustainability, as well as resilience and adaptation (Butt, 2024). The benchmarks for the success of innovation are Technical resources and Capabilities (Coutinho & Oliveira, 2024).

In globalization era, international relations are becoming increasingly integrated (Iskandarovich, 2023). This has resulted in international trade becoming increasingly important in order to boost economic growth (Soeharjoto et al., 2025). A positive economic growth trend is necessary to ensure stable and sustainable growth (Putra et al., 2025). International trade not only creates opportunities to increase income but also serves as access to technology, capital, and markets (Vijayasri, 2024). This allows the country to increase its productivity. However, in conducting international trade, countries need to ensure that the processes and products they produce are environmentally friendly. The goal is to avoid an increase in economic growth that could actually accelerate the decline in community welfare due to environmental damage, thereby preventing sustainable development (Soeharjoto, Hypon et al., 2022). Exports have a positive influence on economic growth, while imports have a negative influence on economic growth (Anwar et al., 2024). Therefore, government needs to reduce export and import of raw materials but increase the export of finished goods, in order to enhance the added value of products and improve the welfare of the community.

Large population impacts the economic growth of a country (Liu et al., 2024). Population control and the utilization of human resources have become one of the ways to address population disparities (Sari & Tiwari, 2024). Therefore, the state needs to strive for the improvement of community welfare by controlling its population. The continuously increasing population without a corresponding rise in job opportunities can lead to a higher number of job seekers, making it increasingly difficult for the community to find employment and resulting in a plunge into poverty (Soeharjoto & Oktavia, 2021). This result in increasingly lower social productivity. However, if left unchecked, it can lead to the exploitation of natural resource use (Wassie, 2020). This phenomenon ultimately accelerates environmental degradation and results in the absence of sustainable development (Soeharjoto, Salma, et al., 2022). Whether a country is advanced or not can be seen from its population growth (Lee & Song, 2025). In reality, population growth has diverse effects on the growth and performance of a country (Jasurbek, 2025).

Asian region is unique because its society has diverse characteristics while still holding onto traditions (Pramono et al., 2025). At the same time, poses a challenge in implementing the Sustainable Development Goals. Therefore, each country strives to implement a green economy. The presence of Islamic Finance, Foreign Direct Investment, trade, innovation, and population can accelerate sustainable development due to the implementation of green growth. This is a result of achieving Gross Domestic Product while considering environmental sustainability in accordance with Islamic principles, thereby preventing a decline in community welfare. It is necessary to conduct research on the role of Islamic finance in stimulating green growth in several Asian countries.

## 2. Methodology

This research is a quantitative study that uses regression with panel data. Green growth as the dependent variable and Islamic Finance as the independent variable, while Foreign Direct Investment, innovation, trade, and population are used as control variables. Sampling was conducted using purposive sampling in countries located in Asia that are listed in the Islamic Finance Country from 2018-2022. Data sources include the Green Growth Index, Islamic Finance Country Index, Global Innovation Index, and the World Bank. This research uses a quantitative approach with the dynamic panel data method. The model was analyzed using the Generalized Method of Moments (GMM) to address potential endogeneity between variables, heteroskedasticity, autocorrelation, and unobserved country-specific effects. GMM was chosen because it can produce consistent and efficient estimators for dynamic panel models with a small number of cross-sections (8 countries) and a relatively short time series (5 years). Statistical testing was conducted using the Arellano–Bond (AR) test, the Sargan / Hansen Test, and the Robustness test. As for the basic research equation model, it is:

$$GGI_{it} = \alpha_0 + \alpha_1 GGI_{it-1} + \alpha_2 IFCI_{it} + \alpha_3 FDI_{it} + \alpha_4 GII_{it} + \alpha_5 TRADE_{it} + \alpha_6 POP_{it} + \varepsilon_{it}$$

Information:

- GGI = Green Growth Index.
- GGI<sub>it-1</sub> = Previous Green Growth Index.
- IFCI = Islamic Finance Country Index.
- FDI = Foreign Direct Investment.
- GII = Global Innovation Index.
- TRADE = Trade.
- POP = Population.

## 3. Results and Discussion

Green Growth, Islamic Finance, Foreign Direct Investment, innovation, trade, and population in Asia from 2018-2022 have varied values (Table 1). Some of the Asian countries included in this study are Saudi Arabia, Malaysia, Indonesia, Pakistan, Qatar, Kazakhstan, Azerbaijan, and Thailand. The Green Growth Index from 2018-2022 had an average value of 43.07 with a standard deviation of 10.44, with the highest value of 64.08 in 2021 in Thailand and the lowest value of 27.92 in 2018 in Saudi Arabia. The Islamic Finance Country Index from 2018-2022 had an average value of 40.14 with a standard deviation of 32.39, peaking at 84.21 at 2022 in Saudi Arabia and reaching a low

of 1.17 at 2018 in Azerbaijan. Foreign Direct Investment from 2018-2022 had an average value of 0.93 with a standard deviation of 2.25, peaking at 5.42 at 2021 in Malaysia and hitting a low of -5.68 at 2022 in Azerbaijan. The Global Innovation Index from 2018-2022 had an average value of 28.49 with a standard deviation of 7.74, with the highest value of 42.68 at 2019 in Malaysia and the lowest value of 14.34 at 2020 in Kazakhstan. Trade from 2018-2022 had an average value of 76.36 with a standard deviation of 34.43, with the highest value of 146.66 at 2022 in Malaysia and the lowest value of 26.72 at 2020 in Pakistan. Population from 2018-2022 had an average value of 0.92 with a standard deviation of 0.99, with the highest value of 2.38 at 2018 in Saudi Arabia and the lowest value of -2.68 at 2021 in Qatar.

Table 1. Average, Maximum, Minimum, and Standard Deviation Values of. Green Growth Index, Islamic Finance Country Index, Foreign Direct Investment, Global Innovation Index, Trade, and Population in Asia from 2018-2022.

	GGI	IFCI	FDI	GII	TRADE	POP
AVG	43,07	40,14	0,93	28,49	76,36	0,92
MAX	64,08	84,21	5,42	42,68	146,66	2,38
MIN	27,92	1,17	-5,68	14,34	26,72	-2,65
STD	10,44	32,39	2,25	7,74	34,43	0,99

Source : Processed data, 2025.

Saudi Arabia, Malaysia, Indonesia, Pakistan, Qatar, Kazakhstan, and Azerbaijan, along with Thailand, exhibited diverse trends between 2018 and 2022. Some countries experienced increasing trends. Indonesia, Thailand, and Kazakhstan showed a growing trend in green growth. Saudi Arabia, Qatar, and Malaysia saw an increase in Islamic finance. However, the innovations implemented by some countries are fluctuating, so countries with an increasing trend can quickly support the achievement of accelerated green growth.

The One-Step GMM and Two-step GMM diagnostic tests were performed using the Arellano–Bond autocorrelation test (AR Test) and the instrument validity test with the Hansen / Sargan J-Test. The results are as follows:

Table 2: Diagnostic Test Result

Test	One-Step	Two-Step	p-value
AR(1)	-2.91	-2.85	0.004
AR(2)	0.45	0.50	0.65
J-test (Hansen)	5.32	5.10	0.25

Source : Data processed by the researcher, 2025.

The Arellano–Bond Autocorrelation Test was conducted using the AR(1) and AR(2) tests, while the instrument validity test was performed using the Hansen or Sargan J-Test. The AR(1) test had a z-value (One-Step) of -2.91 and a z-value (Two-Step) of -2.85 with a p-value of 0.004. This indicates statistically significant first-order autocorrelation at a 1 percent significance level. This is natural and indeed expected in the differential GMM model because GMM uses first differences, and differencing with respect to the error term will mechanically result in first-order serial correlation. Thus, a significant AR(1) result is not a problem, but rather an indication that the differencing transformation is working as intended. The AR(2) test has a z-value (One-Step) of 0.45 and a z-value (Two-Step) of 0.50 with a p-value of 0.65. This means there is no second-order autocorrelation (AR(2)) in the error term. This condition is very important because the main assumption of the GMM Arellano–Bond is the absence of second-order serial correlation, and a p-value greater than 0.10 means that the instruments derived from lagged endogenous variables are not contaminated by serial correlation. The GMM model is valid because first-order autocorrelation is present (as it should be), but second-order autocorrelation is not, thus meeting the instrument's validity requirements. The results of the Hansen/Sargan J-Test show that the Hansen/J-test One-Step value is 5.32 and the Two-Step value is 5.10, with a p-value of 0.25. A p-value of 0.25, which is greater than 0.10, indicates that the GMM instrument is not overfitted, the set of instruments used can be considered valid, and there is no correlation between the instrument and the error term. Therefore, the GMM model is reliable, and the coefficient estimates can be considered consistent and unbiased.

To ensure that the GMM estimation results obtained are not influenced by violations of classical assumptions and remain consistent under various model specifications, a series of robustness tests were conducted. These tests included the use of Driscoll–Kraay Standard Errors for One-Step GMM estimation and Windmeijer-corrected Standard Errors for Two-Step GMM. The use of Driscoll–Kraay Standard Errors in the One-Step model is intended to address the potential issues of heteroskedasticity, serial autocorrelation, and cross-sectional dependence, which are common in cross-country panel data. This method produces more robust estimation variants, so the significance test is not biased by non-ideal error structures. The estimation results show that the key variables remain significant after Driscoll–Kraay correction, indicating that the effects found are not an artifact of error assumption violations. In the Two-Step GMM estimation, it is very important to use the Windmeijer correction because the standard errors in Two-Step GMM are theoretically likely to be underestimated without correction. Windmeijer correction ensures that the variance of the estimator becomes more accurate and unbiased, making the t-statistic and p-value more reliable. Once again, the results show consistency in significance for the main variables, thus strengthening the model's reliability. Overall, results of the robustness test show that the direction and magnitude of the coefficients in the One-Step and Two-Step models remain stable, and the statistical significance of the main variables does not undergo substantial changes. This consistency confirms that the estimation results are robust and not sensitive to variations in estimation techniques or variance corrections. Thus, the GMM model used in this study is valid, stable, and highly reliable.

This study use Dynamic Panel GMM Arellano–Bond method to analyze the influence of green growth in the previous period, Islamic Finance, Foreign Direct Investment, Innovation, Trade, and Population on green growth. Therefore, two models were estimated using One-Step GMM with Driscoll–Kraay robust SE and Two-Step GMM with Windmeijer bias-corrected SE. Both models showed consistent coefficient patterns, indicating that the estimates are stable and not sensitive to the specification of the variance-covariance. As for the results, they are as follows:

Table 3: GMM Estimated

Variable	Coef. One-Step	SE (DK)	t-stat	p-value	Coef. Two-Step	SE (Windmeijer)	t-stat	p-value
Constanta	3.12	1.04	3.00	0.003	3.05	1.12	2.72	0.007
GGI <sub>t-1</sub>	0.52	0.12	4.33	0.000	0.51	0.12	4.10	0.000
IFCI	0.31	0.09	3.44	0.001	0.30	0.09	3.20	0.002
FDI	0.14	0.07	2.00	0.046	0.13	0.07	1.95	0.052
GHI	0.27	0.10	2.70	0.007	0.28	0.10	2.85	0.005
TRADE	0.09	0.06	1.50	0.135	0.08	0.06	1.42	0.155
PG	-0.08	0.05	-1.60	0.110	-0.07	0.05	-1.45	0.148

Source : Proceed data by researcher (2025).

In the previous period, Green Growth, Islamic Finance, Foreign Direct Investment, and Innovation had similar One-Step GMM and Two-step GMM estimation results for Green Growth. Green Growth in the previous period had a GMM one-step coefficient value of 0.52 and a p-value of 0.000, while GMM two-step had a coefficient value of 0.51 and a p-value of 0.000. This means that green growth in the previous period for one-step GMM and two-step GMM has a positive and significant effect on green growth in the subsequent period. This result is consistent with previous research indicating a persistent effect of historical green growth on subsequent green performance (Cui & Li, 2025). Countries that have implemented green growth have proven to play a significant role in the widespread development of green growth in subsequent periods. Islamic Finance has a one-step GMM coefficient value of 0.31 and a p-value of 0.001, while two-step GMM has a coefficient value of 0.30 and a p-value of 0.002. This means that Islamic Finance, in both one-step GMM and two-step GMM, has a positive and significant effect on green growth. This research aligns with previous studies showing that Islamic finance has significant capabilities to facilitate environmentally friendly financing to support green growth (Anas & Ashari, 2025). Access to environmentally friendly financing and Islamic financial inclusion has been proven to play an important role in boosting green growth. Foreign Direct Investment has a one-step GMM coefficient value of 0.14 and a p-value of 0.046, while two-step GMM has a coefficient value of 0.13 and a p-value of 0.052. This means that Foreign Direct Investment in one-step GMM and two-step GMM has a positive and significant effect on green growth. This research is consistent with previous studies showing that Foreign Direct Investment has a positive impact on green GDP for the ASEAN-6 group, but this positive effect only appears when the level of financial system development exceeds a certain threshold (Bui & Doan, 2024). Foreign Direct Investment has the potential to create jobs, transfer technology, and strengthen the productive sector, thereby promoting green growth. Innovation has a one-step GMM coefficient value of 0.27 and a p-value of 0.007, while two-step GMM has a coefficient value of 0.28 and a p-value of 0.005. This means that innovation in one-step GMM and two-step GMM has a positive and significant effect on green growth. This research aligns with previous studies showing that green technology innovation significantly drives green economic growth, with the effect varying depending on regional characteristics (Si et al., 2024). Countries with strong innovation ecosystems tend to have more equitable and high-quality green growth.

Trade and population size yield the same one-step and two-step GMM estimates, but their directions are reversed. Trade has a one-step GMM coefficient value of 0.09 and a p-value of 0.135, while two-step GMM has a coefficient value of 0.08 and a p-value of 0.155. This means that trade has a positive but insignificant effect on green growth in both one-step and two-step GMM. This research aligns with previous studies showing that trade openness has an insignificant effect on green growth (Pham & Hoai, 2024). Trade has not yet had a strong direct impact on green growth. This phenomenon can occur when trade is dominated by primary commodities, value has not yet been added, or the benefits are not distributed evenly. The population has a one-step GMM coefficient value of -0.08 and a p-value of 0.110, while two-step GMM has a coefficient value of -0.07 and a p-value of 0.148. This means that population has a negative but insignificant effect on green growth in both one-step GMM and two-step GMM. This research aligns with previous studies indicating that in the short term, population does not affect economic growth in Indonesia (Holik, 2024). Population growth does not directly hinder or promote green growth. Therefore, some countries can turn population growth into a demographic dividend, but the effect is still weak in the data from this study.

Sustainable development is implemented not only in the present but also for the future (Alamsyahbana et al., 2024). The concept of a green economy is developed for sustainable development (Houssam et al., 2023). Meaning that development carried out impacts the achievement of justice, particularly regarding welfare and environmental sustainability. This concept emerged at a time when various countries were experiencing issues of natural resource, energy, environmental, and food degradation (Newton & Cantarello, 2014). Green economy in its formulation genuinely strives to carry out conservation and restoration of environmental preservation, with a perspective based on Maqashid al-Syariah, in order to achieve welfare in this world and the hereafter (Muzaiyanah, 2022). In perspective of Islamic economics, it emphasizes the importance of a religious approach, including its legal products, which serve as a form of the caliphate's responsibility entrusted by Allah SWT to humans (Kader, 2021). With the control of Sharia, the economy aims to achieve four main objectives, namely the target results of profit in the form of material and non-material benefits, growth, sustainability, and the blessings of Allah SWT. (Firdaus & Ahmad, 2023). Dissemination of the green economy is infused with the universal values of Maqashid Syariah related to environmental issues and the objectives of Sharia in fiqh al-bi'ah, resulting in a decrease in passive attitudes among the community (An-Nisa & Cahyani, 2024). Basis of the green economy on the issue of inequality caused by the uneven distribution of green production factors can be addressed based on the principle of al-adl, which means justice, maslahah, which means public interest, and Musawah, which means equality (Nurdiana et al., 2025). This makes various emerging obstacles manageable because the objectives of Sharia are based on guidelines set by Allah SWT.

Green growth in the previous period significantly influenced the value of green growth at present. This resulted in higher green growth leading to higher green growth in the subsequent period, thus demonstrating dynamic persistence. This result supports the theories of Green Growth and Endogenous Growth, which state that environmental investment drives long-term efficiency, green innovation, and economic stability (Khan et al., 2025). The significant lag reinforces the characteristics of the dynamic adjustment process, indicating that economic benefits of green growth are not instantaneous but follow an accumulation pattern. The phenomenon occurring indicates a process of green policy consistency, which takes time to produce effects. This finding strengthens the argument that economic growth is inseparable from environmental sustainability (Teixeira et al., 2025). Green growth has been proven to have a multiplier effect on inclusive sectors such as renewable energy, green transportation, and resource efficiency. This phenomenon aligns with the Islamic principle that every action will be rewarded according to what we do (Abd-Elsalam & Binay, 2024). In Surah Az-Zalzalah 7-8, Islam teaches about the moral and spiritual cause-and-effect relationship. This means that what we "plant" in terms of effort, deeds, behavior, and intentions is what we will "reap" both in this world and the next. To that end, the country needs to maintain long-term (multi-year) programs in the form of national green plans and provide incentives for renewable energy.

The stronger the development of Islamic finance in a country, the greater the increase in green growth (Muhammed et al., 2024). Islamic finance contributes to green growth through sustainable financing, financial inclusion, ethical macroeconomic stability, and sustainability

missions aligned with Maqasid al-Shariah (Franciosi, 2025). This phenomenon is due to the fundamental principles of Islamic finance, which emphasize ethics, justice, prohibition of speculation, and investments that harm the environment (Norchaevna, 2024). Islamic finance promotes fair risk-sharing and inclusive economic development, thereby indirectly encouraging green innovation and sustainable development (Raimi et al., 2024). Countries that have successfully developed the Islamic finance sector have shown an increase in investments, particularly in green projects, thereby making a positive contribution to achieving environmental and social targets (Ahmed et al., 2015). Therefore, to support the further development of Islamic finance, it is necessary to strengthen Islamic financial regulations, encourage sharia-based green financing, integrate Islamic finance with the SDGs & ESG Agenda, and develop Islamic economic and financial literacy.

Foreign Direct Investment has become one of the effective forms of investment in boosting economic growth in a country (Osei & Kim, 2020). Countries receiving Foreign Direct Investment can obtain technology transfer, improvement in the quality of human resources, and infrastructure that supports green growth (Ali et al., 2022). However, the Green Growth Index assesses the integration between economic growth and environmental sustainability, and the relationship between Foreign Direct Investment and the Green Growth Index remains a topic of debate. Foreign Direct Investment does not have an impact on a sustainable environment (Farooq et al., 2024). This is because the incoming Foreign Direct Investment tends to focus on the extractive sector and heavy industry, which have a significant impact on environmental damage, and lack of environmental regulations in the host country. This causes Foreign Direct Investment not directed toward environmentally friendly investments, and its technology transfer has not yet implemented green technology. Although Foreign Direct Investment can increase economic activity, its contribution to green growth is still limited. Foreign Direct Investment has great potential as a source of capital and technology, but its presence does not automatically have a positive impact on the Green Growth Index. In Islamic economics, FDI is permitted as long as it meets the principles of Halal-thayyib, justice, transparency, and information openness, does not plunder local community resources, and benefits economic development (Al Mustofa & Risyda, 2025). FDI in Islam must bring mutual benefit, not foreign capital domination. This phenomenon aligns with the maqashid, which are to preserve religion, life, intellect, offspring, and property (Shakar, 2025). Government and stakeholders need to be more selective and proactive in attracting and managing Foreign Direct Investment, so that it can contribute significantly to green development (Shao et al., 2023).

At technological development era and with the increasing awareness of the environment, innovation has become the main key in achieving sustainable development (Kaletnik & Lutkovska, 2020). Innovation can enhance Green Growth because environmentally friendly technological innovations improve productivity, efficiency, policy quality, awareness, and innovative education (Nasir & Zhang, 2024). This can reduce the use of natural resources and carbon emissions, which can support green growth practices. Countries that can sustainably enhance innovation become more effective in implementing green growth strategies, thereby achieving environmentally friendly and sustainable economic growth (Lorek & Spangenberg, 2014). In Islam, innovation is understood as a process of renewal, improvement, and development that does not contradict the principles of Sharia (Mustaqim & Heryanto, 2025). Innovation is not just about creating something new, but about making changes that benefit humanity and the environment (García-Sánchez & Sampaio, 2024). This phenomenon aligns with the teachings of Islam found in Surah Ali Imran: 110, which states that Muslims must be drivers of good, including generating new and beneficial ideas. To that end, the government needs to strengthen green R&D incentives, expand the transfer of green technology from developed countries, and integrate SMEs into the innovation ecosystem to make the benefits more inclusive.

In globalization era, international trade have an important role in driving economic growth (Safi & Maurya, 2025). However, with the increasing awareness of the environment, there has been a shift in consumption patterns toward environmentally friendly products (Jänicke, 2012). Research and various studies show that trade plays a positive role in the green growth index (Gu, 2024). This because trade involves the transfer of environmentally friendly technology, increased resource efficiency, encouragement of environmental regulations and standards, as well as economic and income diversification that can harm the environment and strengthen the foundation of green growth (Meng et al., 2022). In Islam, trade holds a significant position because it serves as a means of exchanging goods and services, spreading values of justice, strengthening brotherhood among nations, and improving the welfare of the community (Pramono & Masrukhan, 2025). The main principles of trade are halal (permissible), fairness, transparency, and not harming others (Khoirudin & Azzaki, 2024). This phenomenon aligns with the teachings of Islam in Surah Al-Baqarah: 275, which states that trade is a permissible activity as long as it is fair and not exploitative. All of this requires supportive policies by providing incentives for green investments, strengthening environmental regulations, and international cooperation in green technology transfer. Thus, trade has the potential to be a driving force behind the Green Growth Index, as long as it is managed with the right policies and a high level of environmental awareness.

Rapid urbanization is a result of large population growth, leading decline in green economic growth in all countries (Kwilinski et al., 2023). Countries with large populations face challenges in maintaining the balance between economic growth and environmental sustainability (Fahrurrozi & Amrullah, 2025). However, this does not always lower green growth, especially if supported by the right strategies, such as investment in renewable energy, proper waste management, and carbon emission reduction (Risyda et al., 2025). A large population is not an absolute barrier to achieving a high Green Growth Index. For that reason, what can determine it is how a country manages its resources, implements green technology, and enacts policies that support sustainable development. Therefore, the main focus in achieving green growth should be directed toward the quality of policies and innovation, not just the size of the population. This phenomenon aligns with the teachings of Islam found in Surah Al-Baqarah: 30, which states that humans were appointed as caliphs to manage, prosper, and protect the earth. This demands intellectual, spiritual, moral, and skill development (Khairanis et al., 2025). This means that human resource development is not just about work competence, but about forming complete human beings who are environmental protectors. Government policies are needed not only for population control but also for improving the quality of human resources, and the country needs to strengthen policies toward education and skills upgrading to neutralize the negative effects of population growth.

#### 4. Conclusion

In globalization era, many countries are implementing sustainable development by adopting a green economy. In Islamic economics, the Sustainable Development Goals have been implemented by establishing Islamic financial institutions. Its role as a stimulator of green growth. This was carried out in several Asian countries such as Saudi Arabia, Malaysia, Indonesia, Pakistan, Qatar, Kazakhstan, Azerbaijan, and Thailand. Aims of this research is to determine the impact of Islamic finance, Foreign Direct Investment, innovation, trade, and population on green growth. The research was conducted using One-Step and Two-Step GMM, which have been tested for robustness with Driscoll-Kraay Standard Errors and Windmeijer-corrected Standard Errors. As for the results obtained in the previous period of green growth, Islamic finance, Foreign Direct Investment, and innovation had One-Step GMM and Two-Step GMM estimation results that were positively and significantly influential on green growth. Trade and population produced one-step GMM and two-step GMM estimates that were not significant but had the expected direction. This result aligns with the teachings of Islam that change is not brought about suddenly

or radically, but through a gradual and measured process. This principle is known as *tadarruj*, which is the concept of gradual change toward a better condition. This shows that Islam understands the social conditions of society, mental readiness, economic structure, and cultural realities. The wisdom of gradual change in Islam is to avoid social shock, build mental and spiritual readiness, strengthen the foundation of change, consider human capacity, and promote sustainable change. In future research, it is advisable to cluster green growth based on countries with similar Islamic Financial characteristics and to add mediating variables that can support green growth.

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