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# The Nexus between Green-Blue Economy and Islamic Finance on Logistics Performance: Evidence from OIC Countries

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**ABSTRACT**

The global transformation towards sustainable development has encouraged the integration of Islamic finance, green economy, and blue economy as alternative models of economic development. Organization of Islamic Cooperation (OIC) countries face the challenge of optimizing logistics performance amid significant regional disparities, with global Islamic finance industry assets reaching USD 3.38 trillion by 2023 but the majority of OIC countries still show suboptimal Logistics Performance Index (LPI) scores. This study aims to analyze the influence of Islamic finance, green economy, and blue economy on the logistics performance of OIC countries, with the hypothesis that the integration of the three dimensions simultaneously improves the efficiency of the national logistics system. The study uses a panel data regression model with Logistics Performance Index as the dependent variable, as well as Islamic Banking Assets as a proxy for Islamic finance, Renewable Energy Consumption as a proxy for green economy, and Container Port Traffic as a proxy for blue economy. The estimation results show that Islamic Banking Assets has a significant positive effect ($\beta = 0.002423$, $P < 0.05$), Container Port Traffic has a significant positive effect ($\beta = 2.10\text{E-}08$, $P < 0.01$), but Renewable Energy Consumption has a significant negative effect ($\beta = -0.007024$, $P < 0.01$) on logistics performance. The model explains 30.33% of the variation in LPI with simultaneous significance at $\alpha = 5\%$ level. The findings indicate that Islamic banking asset development and container port infrastructure support logistics performance, while renewable energy transition requires a longer adaptation period to produce positive effects on logistics efficiency of OIC countries.

**Keywords:** Islamic Finance, Green Economy, Blue Economy, Logistics Performance, OIC Countries, Sustainable Development
**JEL Classifications:** G21, Q42, R41, O13, O57

## 1. INTRODUCTION

The global economy's shift towards a sustainable development model has received increasing attention in the economic literature, with the integration of Islamic finance, the green economy, and the blue economy being examined as alternative approaches to sustainable economic development (Pathan et al., 2022). Member countries of the Organization of Islamic Cooperation (OIC) are in a relevant position in this context, given their holdings of Islamic finance assets and potential natural resources. Data shows that the assets of the world's Islamic banks reached USD 3.24 trillion by the end of 2022, up from USD 1.3 trillion in 2012, while the total assets of the global Islamic financial services industry reached USD 3.38 trillion in 2023. The Islamic finance industry is projected to grow at a compound annual growth rate (CAGR) of 11.6% and is expected to reach USD 12.45 billion by 2028. In parallel, the renewable energy sector shows growth with 80% of the increase in global power generation by 2024 being provided by renewable and nuclear energy sources, which contribute 40% of total generation for the first time. The blue economy in 2022 employed 4.82 million people with a 16% increase over 2021 and generated a turnover of nearly EUR 890 billion, a 29% increase over 2021.

Global logistics performance shows significant variation between countries based on the Logistics Performance Index (LPI) 2023 which evaluates 139 countries across six dimensions of trade, including customs performance, infrastructure quality and on-time delivery. The LPI 2023 data shows that Singapore and Finland top the rankings, while most OIC countries show room for improvement in their logistics systems. The analysis of renewable energy efficiency for sustainable development in OIC countries shows regional variations, with South Asia achieving the highest efficiency score (0.899), followed by GCC countries (0.865), while Southeast Asia shows the lowest score (0.585). This disparity indicates the need to develop strategies that can optimize the potential of Islamic finance, green economy, and blue economy to improve logistics performance in OIC countries, taking into account regional heterogeneity in infrastructure capacity and readiness (Wang and Choi, 2018).

A review of the academic literature shows a limited understanding of how the interaction between Islamic finance, green economy, and blue economy can affect logistics performance. Some of the challenges identified include the suboptimal integration of Shariah principles in financing sustainable logistics infrastructure, the lack of frameworks linking renewable energy consumption with logistics efficiency, and the underutilization of the potential of the blue economy in supporting maritime connectivity and logistics. These complexities are magnified by economic and institutional heterogeneity among OIC member states covering a wide spectrum of economic development levels, from least developed countries to high-income economies, as well as differences in adoption rates of green technologies and maritime infrastructure. This becomes relevant given the global pressure to achieve net-zero emissions by 2050 as per the Paris Agreement, as well as the need to develop economically efficient and environmentally sustainable development models while accommodating Islamic values towards natural resources (Khan et al., 2019).

Previous research shows a variety of perspectives on the relationship between Islamic finance and economic performance, but no study has comprehensively analyzed the linkages between Islamic finance, green economy, and blue economy in the context of logistical performance. (Alharthi, 2017) found that the Islamic banking system shows higher stability in the face of market volatility compared to the conventional system. In the context of green economy, (Gierlinger and Starkl, 2012) analyzed the role of renewable energy in improving logistics efficiency through reduced operational costs and carbon footprint. (Suarez-Aleman et al., 2016) analyzed the blue economy perspective by showing that container port activities contribute to global supply chain efficiency, in line with the findings of (Khairunnisa, 2022) who identified the potential of the blue economy in optimizing maritime connectivity and international trade.

The theoretical framework of this study is built on two main theories. The Triple Bottom Line (3P: People, Planet, Profit) theory integrates social, environmental and economic dimensions in business decision-making in line with Islamic finance principles of distributive justice and social responsibility (Hammer and Pivo, 2017). The Resource-Based View theory explains how optimal utilization of internal and external resources can create sustainable competitive advantage, which is relevant for optimizing the potential of natural resources and Islamic finance in improving logistics performance in OIC countries (Gupta et al., 2018).

An analysis of the existing literature identified several research gaps. First, there is no empirical study that simultaneously analyzes the interaction between Islamic finance, green economy, and blue economy in the context of logistics performance. Second, the geographical focus of previous research is still limited to specific countries without providing a comprehensive picture of the dynamics in OIC countries collectively. Thirdly, the research methodology used tends to be cross-sectional so that it has not been able to capture the temporal dynamics of the relationship between variables. Based on these gaps, this study aims to analyze the effect of Islamic banking assets on logistics performance in OIC countries, evaluate the impact of renewable energy consumption on logistics efficiency in the context of a green economy, examine the contribution of container port activities as a proxy for the blue economy to improving logistics performance, identify the synergistic effect of the integration of the three dimensions in optimizing logistics performance, and formulate policy recommendations to improve logistics performance through the development of an Islamic financial ecosystem and a sustainable economy.

## 2. LITERATURE REVIEW

### 2.1. Logistics Performance Index

The Logistics Performance Index is a composite indicator that measures the efficiency and effectiveness of national logistics systems in the context of international trade. The LPI integrates six performance dimensions namely customs efficiency, quality of trade and transportation infrastructure, ease of competitive shipping arrangements, logistics service competence, shipment tracking capability, and timeliness of delivery (Aboul-Dahab, 2020). Operationally, the LPI is measured using a 1-5 scale that provides a standardized framework for comparison of logistics performance between countries. Theoretically, logistics performance is based on the Supply Chain Management Theory that emphasizes the integration of business processes from end-user to origin supplier to optimize stakeholder value (Zekic, 2018). At the macroeconomic level, logistics performance serves as a driver of international trade through reduced transaction costs and improved trade facilitation. This is in line with the Resource-Based View which states that sustainable logistics excellence arises from the optimal combination of tangible and intangible resources, including physical infrastructure, information systems, and organizational capabilities.

Empirical evidence consistently points to the role of infrastructure and institutional quality in determining logistics performance. (Rashidi and Cullinane, 2019) applied Data Envelopment Analysis to 155 countries and identified a correlation of 0.73 between GDP per capita and logistics efficiency scores. This suggests that economic development fundamentally supports logistics performance. Meanwhile, (Wei et al., 2019) used structural equation modeling (SEM) on 155 countries and found a significant impact of ICT infrastructure on LPI (path coefficient = 0.42, $P < 0.01$), highlighting the role of digitization in modern logistics transformation.

### 2.2. Islamic Finance and Islamic Banking Assets

Islamic banking assets represent the total assets managed by banking institutions that operate under sharia principles (Kok & Filomeni, 2021). These principles prohibit riba (interest), gharar (excessive uncertainty), and maysir (gambling), and require a profit-sharing mechanism. Operationally, Islamic banking assets are measured as the ratio of Islamic bank assets to total national banking assets, reflecting the dominance of the Islamic financial system in the national economy. Islamic finance states that the Islamic financial system optimizes resource allocation through asset-based financing and risk-sharing mechanisms, thereby reducing moral hazard and adverse selection. With regard to logistics performance, Islamic finance contributes through three main mechanisms: sustainable infrastructure financing through green sukuk bonds, increased financial inclusion that supports SMEs' logistics access, and financial system stability that reduces the volatility of infrastructure investments (Khokher, 2021).

Empirical studies show a significant positive relationship between Islamic banking development and macroeconomic performance. (Yurtseven et al., 2021) applied the generalized method of moments to 35 countries with dual banking systems and produced a significant positive coefficient ($\beta = 0.163$, $P < 0.05$) between Islamic banking assets and the sustainable development index. This confirms the role of Islamic finance in supporting sustainable economic growth. (Gani and Bahari, 2021) used cointegration analysis on Malaysian time series data and identified a long-run equilibrium relationship between Islamic banking development and trade performance (error correction term = −0.34), indicating an adjustment speed of 34% per year towards equilibrium. The results of this study provide a strong empirical foundation that the Islamic banking system serves not only as an alternative financing mechanism, but as a catalyst for sustainable economic development that supports improved logistics performance through financing stability and alignment with sustainability principles.

### 2.3. Green Economy and Renewable Energy Consumption

Renewable energy consumption represents the proportion of energy consumed from renewable sources relative to total national energy consumption, including hydroelectric, wind, solar, biomass, and geothermal energy. In the context of a green economy, renewable energy consumption represents an economic transition towards a low-carbon development path that optimizes resource efficiency by minimizing environmental degradation. The Environmental Kuznets Curve (EEKC) theory explains the inverted U-shaped relationship between economic growth and environmental degradation, where a certain level of income triggers a decoupling effect between economic growth and environmental impact (Agras and Chapman, 1999). In the context of logistics, the transition to a green economy through the adoption of renewable energy contributes to reduced operational costs, carbon footprint minimization, and compliance with environmental regulations, in line with Porter's Hypothesis that environmental regulations can trigger innovation that results in competitive advantage. Green Supply Chain Management Theory integrates environmental considerations into supply chain operations, including green purchasing, eco-design, reverse logistics, and environmental performance monitoring. The adoption of renewable energy generates competitive advantage through cost leadership strategies and sustainability-based differentiation strategies (Sarkis and Dou, 2017).

Empirical studies show a non-linear and complex relationship between renewable energy consumption and logistics performance. (Khan et al., 2020) analyzed 42 Asian countries using a panel threshold regression model and found a threshold effect at the level of 15% renewable energy share. Countries with renewable energy consumption above the threshold showed a significant positive impact on logistics efficiency (elasticity coefficient = 0.23), suggesting a non-linear relationship between renewable energy transition and logistics performance. (Khan et al., 2019) applied an autoregressive distributed lag (ARDL) panel approach on 58 developing countries and produced a long-run cointegration relationship between renewable energy consumption and logistics performance index (coefficient = 0.089, $P < 0.01$). This confirms the positive spillover effects of green energy transition on trade facilitation and supply chain efficiency. The consistency of these findings confirms that the renewable energy transition generates economic benefits through cost reductions and efficiency improvements in the logistics system, with the magnitude of the effects depending on the threshold level and spatial context.

### 2.4. Blue Economy and Container Port Traffic

Container Port Traffic represents the total volume of containers handled by national ports in a given period, measured in Twenty-foot Equivalent Units (TEU) (Gokkuş et al., 2017). In the context of the blue economy, container port activities represent the sustainable use of marine resources that support economic growth, job creation, and poverty alleviation while maintaining ecosystem health. The blue economy integrates sustainability principles in the use of marine resources, including maritime transportation, port operations, coastal tourism and marine renewable energy. Within the blue economy framework, ports serve as blue growth catalysts that drive sustainable maritime economic development through efficient cargo handling, value-added services and environmental stewardship. The blue economy approach optimizes network effects through sustainable port development, digital transformation, and circular economy principles in port operations. Empirical studies confirm the significant role of container port activities in supporting national and regional logistics performance. (Izotov et al., 2020) analyzed 85 countries using a spatial econometric model and found that a 1% increase in container port traffic correlated with a 0.31% increase in the logistics performance index. Thus identifies a spatial clustering effect where countries with high container port traffic tend to form mutually reinforcing regional logistics hubs.

# 3. RESEARCH METHODS

## 3.1. Statistical Analysis

Statistical analysis is a systematic process that includes collecting, organizing, interpreting, and presenting quantitative data using statistical techniques to identify patterns, trends, and relationships in the data.

## 3.2. Classical Assumptions

The classical assumption test is a series of tests conducted to ensure that the regression model used meets the basic assumptions to obtain an unbiased, consistent, and efficient estimate of the model parameters by going through tests of normality, multicollinearity, heteroscedasticity, and autocorrelation (Khan et al., 2023).

## 3.3. Model Selection

In panel data analysis, the three main models often used for estimation are the Common Effect Model, Fixed Effect Model, and Random Effect Model. To determine the most appropriate model, a series of tests such as the chow test, hausman test, and Breusch-pagan lagrange multiplier test are required (Gujarati, 2006).

## 3.4. Panel Data Regression Model

According to (Baltagi, 2005) panel data are generated from observations of a number of individuals monitored over several different time spans. One of the regression models available for panel data is a model that maintains a constant slope but has varying intercept values. In a one-way component model, variation is due to either *cross-sectional* or time-related units, while in a two-way model, variation is affected by both cross-sectional and time-related units. Panel data regression analysis aims to estimate and predict differences in characteristics between individuals or between times and find the middle value of the data set (both sample and population) by observing the relationship between the variable under study, the dependent variable, and the variable used to explain it, the independent variable. Then mathematically the regression model of this study is arranged as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \ldots\ldots \quad (1)$$

Description:
Y: Logistics Performance Index
$\beta_0$: Intercept
$\beta_1$, $\beta_2$: Regression Coefficient
$X_1$: Islamic Banking Assets (Islamic Finance Proxy)
$X_2$: Renewable Energy Consumption (Green Economy Proxy)
$X_3$: Container Port Traffic (Blue Economy Proxy)
ε: Error Term

## 3.5. Statistical Test t (Partial Test)

In research, the significance of the effect of the independent variable on the dependent variable is seen through the t statistical test (Widarjono, 2018). In its use, if t-count > t-table or significance is <(α) 5%, this indicates that there is a partially significant effect between the independent variable and the dependent variable (Gujarati, 2006).

The hypothesis in this test is:
- $H_0$: $\beta_i < 0$ There is no significant effect between the independent variable and the dependent variable partially
- $H_a$: $\beta_i > 0$ There is a significant influence between the independent variables on the dependent variable partially.

The test criteria are as follows:
1. If t-statistic > t-table then $H_0$ is rejected. The independent variable has a significant effect on the dependent variable
2. If t-statistic < t-table then $H_0$ is accepted. The independent variable does not have a significant effect on the dependent variable.

## 3.6. F Statistical Test

The F-statistic test is used to show how the independent variables interact with each other and have an impact on the dependent variable (Wooldridge, 2013). If the F-count exceeds the F-table in the test, then simultaneously the independent variables have a considerable influence on the dependent variable, or the data is consistent with the research hypothesis.
- $H_0$: $\beta_i < 0$ There is no significant influence between the independent variables on the dependent variable together
- $H_a$: $\beta_i > 0$ There is a significant influence between the independent variables on the dependent variable together.

The test criteria are as follows:
1. If F-statistic > F-table then $H_0$ is rejected. The independent variable on the dependent variable has a statistically significant effect together
2. If F-statistic < F-table then $H_0$ is accepted. The independent variable on the dependent variable does not have a statistically significant effect together.

## 3.7. F Test Coefficient of Determination ($R^2$)

According to Widarjono (2018), the coefficient of determination ($R^2$) is used to measure the proportion of the contribution of the independent variable in explaining the dependent variable. An $R^2$ value close to one indicates that the regression model has a good ability to explain data variability, while an $R^2$ value close to zero indicates limited ability. However, $R^2$ has the disadvantage that it tends to increase with the addition of independent variables, even though these variables do not necessarily increase the predictive power of the model. Therefore, adjusted R-square is used which corrects for the addition of irrelevant independent variables, so that the adjusted R-square value will not exceed R-square and may decrease or become negative if the addition of independent variables does not improve the quality of the model or if the model shows a low level of fit.

# 4. RESULTS

## 4.1. Descriptive Statistical Analysis

Descriptive Statistical Analysis functions in descriptions that include the mean and median of a set of sorted data. In addition, this analysis includes data distribution such as maximum value, minimum value, and standard deviation value as an indicator of data distribution in the study (Jin et al., 2023).

The Statistical analysis in Table 1 shows that the Islamic Banking Assets ($X_1$) variable has a mean value of 50.36% with a standard deviation of 30.95%, indicating substantial variability in the level of adoption of Islamic banking assets among OIC countries (Table 1). The maximum value of 138.42% in some countries indicates the comprehensive dominance of the Islamic banking system in the national financial structure, while the minimum value of 5.64% indicates a limited level of implementation. The relatively small difference between the mean (50.36%) and median (47.22%) values indicates a near-normal distribution of the data without significant extreme outliers.

Renewable Energy Consumption ($X_2$) shows a mean value of 20.16% with a standard deviation of 23.79%, reflecting significant heterogeneity in the sustainable energy transition process among OIC countries. The maximum value of 83.90% indicates substantial achievements in the implementation of renewable energy by some member states, while the minimum value of 0% indicates total dependence on conventional energy sources. The significant disparity between the mean (20.16%) and median (11.10%) values indicates a right-skewed distribution of the data, indicating that the majority of OIC countries are still at the transformation stage towards sustainable energy systems.

Container Port Traffic ($X_3$) shows a mean value of 6,043,032 TEU with a standard deviation of 6,937,639 TEU, reflecting the extreme disparity in operational capacity and intensity of container port activity. The maximum value of 27,293,935 TEU indicates the existence of maritime logistics centers with very high throughput capacity in some OIC countries, while the minimum value of 320,274 TEU indicates the limitations of port infrastructure in handling significant volumes of container cargo in certain countries.

The Logistics Performance Index (Y) as the dependent variable shows an average value of 2.96 with a standard deviation of 0.42, within the range of 1-5 scale set by the World Bank. The maximum value of 4.00 indicates the achievement of near-optimal logistics performance by some OIC countries, while the minimum value of 2.10 indicates logistics performance that still requires significant improvement. The relatively low coefficient of variation (14.3%) indicates a relatively homogeneous distribution of the data compared to the other independent variables, indicating convergence in logistics performance among OIC countries.

### 4.2. Classical Assumptions

Based on the normality test using (Table 2), the Skewness Kurtosis method, the probability is 0.157517>0.05. Then the skewness value of 1.004714 and the kurtosis value of −1.737156 indicate that the data follows a normal distribution pattern (Table 2).

Based on the multicollinearity test results (Table3), it was found that there were no variables with a relationship that exceeded the correlation value of 0.8). Therefore, it can be concluded that there is no significant multicollinearity between the independent variables used in this study. This means that the variables do not show a strong linear relationship or lack of meaningful interrelationships among others, so there is no significant interdependence.

### 4.3. Model Selection

Based on the Chow test results presented in Table 4, the statistical Chi-square value is 81.894482 with 16.80 degrees of freedom and a probability level of 0.0000. The statistical Chi-square value (81.894482) > Chi-square table (26.296) with a probability value of 0.0000 <0.05. These results indicate rejection of the null hypothesis ($H_0$), which indicates that the Fixed Effect model is more appropriate to use than the Common Effect model in the panel data analysis of this study.

The Hausman Test results shown in Table 5 show a statistical Chi-square value of 5.112240 with 3 degrees of freedom and a probability level of 0.1638. The statistical Chi-square value (5.112240) < Chi-square table (7.815) with a probability value of 0.1638 > 0.05 indicates acceptance of the null hypothesis ($H_0$), which indicates that there is no systematic difference between the Fixed Effect and Random Effect estimators. Thus, the Random

**Table 1: Statistical analysis**

| Statistical classifications | $X_1$ | $X_2$ | $X_3$ | Y |
|---|---|---|---|---|
| Mean | 50.35686 | 20.16370 | 6043032 | 2.961514 |
| Median | 47.21890 | 11.10000 | 3180618 | 2.935000 |
| Maximum | 138.4197 | 83.90000 | 27293935 | 4.000000 |
| Minimum | 5.639805 | 0.000000 | 320274 | 2.100000 |
| Std. Dev. | 30.94717 | 23.78575 | 6937639 | 0.422599 |

Source: Research results Year 2025

**Table 2: Normality test**

| Distribution parameters | Statistic | Prob. |
|---|---|---|
| Skewness | 1.004714 | 0.157517 |
| Skewness 3/5 | 1.162419 | 0.122533 |
| Kurtosis | −1.737156 | 0.958820 |
| Normality | 4.085484 | 0.129673 |

Source: Research results Year 2025

**Table 3: Multicollinearity test**

| Correlation coefficient variable | $X_1$ | $X_2$ | $X_3$ |
|---|---|---|---|
| $X_1$ | 1.000000 | −0.663550 | 0.505109 |
| $X_2$ | −0.663550 | 1.000000 | −0.368194 |
| $X_3$ | 0.505109 | −0.368194 | 1.000000 |

Source: Research results Year 2025

**Table 4: Chow test**

| Test summary | Chi-sq. statistic | Chi-sq. Df | Prob. | Conclusion |
|---|---|---|---|---|
| Fix effect model | 81,89448 | 16.80 | 0.000 | $H_0$ is rejected |

Source: Research results Year 2025

**Table 5: Hausman test**

| Test summary | Chi-sq. statistic | Chi-sq. Df | Prob. | Conclusion |
|---|---|---|---|---|
| Random effect model | 5.112240 | 3 | 0.1638 | $H_0$ accepted |

Source: Research results Year 2025

Effect model can be considered consistent and efficient for use in this study.

The Lagrange Multiplier test (LM test) presented in Table 6 produces a Breusch-Pagan cross- section value of 47.21264 with a probability level of 0.0000. The probability value obtained (0.0000 <0.05) indicates rejection of the null hypothesis ($H_0$), which indicates that the Random Effect model is more appropriate to use compared to the Common Effect model.

### 4.4. Data Regression Result

Table 7.

### 4.5. Statistical Test t (Partial Test)

Table 7 shows the following results:

The coefficient of Islamic Banking Assets ($X_1$) of 0.002423 indicates that each 1 unit increase in the value of Islamic Banking Assets will increase the Logistics Performance Index (Y) by 0.002423 assuming other variables remain constant. The t-statistic value (2.448115) > t-table (1.96) and the probability value (0.0162) is smaller than 0.05. Therefore, it can be concluded that Islamic Banking Assets have a positive and significant effect on the Logistics Performance Index partially.

The Renewable Energy Consumption ($X_2$) coefficient of -0.007024 indicates that every 1 unit increase in the Renewable Energy Consumption value will reduce the Logistics Performance Index (Y) by 0.007024 assuming other variables remain constant. The absolute value of t- statistic (7.580185) > t-table (1.96) and the probability value (0.0000) is smaller than 0.05. Therefore, it can be concluded that Renewable Energy Consumption has a negative and significant effect on the Logistics Performance Index partially.

**Table 6: LM test**

| Test Summary | Test Type | Statistic | Prob | Conclusion |
|---|---|---|---|---|
| Breusch-Pagan | Cross-section | 47,21264 | 0,0000 | H0 is rejected |
| | Period | 1,2584 | 0,2619 | |
| | Both | 48,471 | 0,0000 | H0 is rejected |

Source: Research results Year 2025

**Table 7: OLS calculation results panel data regression equation selected model REM**

| Variable | Coefficient | Std. error | t-statistic | Prob. |
|---|---|---|---|---|
| C | 2.853949 | 0.043927 | 64.97056 | 0.0000 |
| $X_1$ | 0.002423 | 0.000990 | 2.448115 | 0.0162 |
| $X_2$ | −0.007024 | 0.000927 | −7.580185 | 0.0000 |
| $X_3$ | 2.10E-08 | 7.95E-09 | 2.638963 | 0.0097 |
| **Effects specification** | | | **S.D.** | **Rho** |
| Cross-section random | | | 0.194260 | 0.5184 |
| Idiosyncratic random | | | 0.187249 | 0.4816 |
| **Weighted statistics** | | | | |
| R-squared | 0.303290 | Mean dependent var | | 1.0925 |
| Adjusted R-squared | 0.281518 | S.D. dependent var | | 0.2270 |
| S.E. of regression | 0.189058 | Sum squared resid | | 3.4313 |
| F-statistic | 13.93017 | Durbin-Watson stat | | 1.6170 |
| Prob (F-statistic) | 0.000000 | | | |
| **Unweighted statistics** | | | | |
| R-squared | 0.630537 | Mean dependent var | | 2.9615 |
| Sum squared resid | 6.532241 | Durbin-Watson stat | | 0.8494 |

Source: Research results Year 2025

The coefficient of Container Port Traffic ($X_3$) of 2.10E-08 indicates that every 1 unit increase in the value of Container Port Traffic will increase the Logistics Performance Index (Y) by 2.10E-08 assuming other variables remain constant. The t-statistic value (2.638963) > t-table (1.96) and the probability value (0.0097) is smaller than 0.05. Therefore, it can be concluded that Container Port Traffic has a positive and significant influence on the Logistics Performance Index partially.

### 4.6. F Statistical Test

The F test is a statistical test conducted to determine how much influence the independent variables together have on the dependent variable. Based on the estimation results of the random effect model, the F-statistic value (13.93017)> F-table (2.60) is obtained with a probability value of 0.000000 which is significant at the 5% level. So it can be concluded that Islamic Banking Assets ($X_1$), Renewable Energy Consumption ($X_2$), and Container Port Traffic ($X_3$) together or simultaneously have a significant effect on the Logistics Performance Index (Y).

### 4.7. Result of the Coefficient of Determinations ($R^2$)

The coefficient of determination is used to measure how much variation in the dependent variable can be explained by variations in the independent variables. In this study, the coefficient of determination was carried out to determine how much percentage of Islamic Banking Assets ($X_1$), Renewable Energy Consumption ($X_2$), and Container Port Traffic ($X_3$) variables together were able to explain variations in the Logistics Performance Index (Y).

Based on the results of the weighted statistics analysis, the value of the coefficient of determination ($R^2$) is 0.303290. This means that the influence of the variation of the independent variables on the variation of the dependent variable is 30.33%, while the remaining 69.67% is explained by variables outside the model. Meanwhile, the adjusted R-squared value of 0.281518 indicates that after adjusting for the number of variables and observations, the model's ability to explain variations in the dependent variable is 28.15%.

The unweighted R-squared value of 0.630537 indicates that without considering random effects, the model is able to explain 63.05% of the variation in the Logistics Performance Index, indicating that the individual effects of OIC countries make a substantial contribution in explaining the variation in logistics performance across countries.

## 5. DISCUSSION

### 5.1. Islamic Banking Assets and Logistics Performance Index

The estimation results of the random effect model show a statistically significant positive relationship between Islamic banking assets and the Logistics Performance Index in OIC countries, with a regression coefficient of 0.002423 (t-statistic = 2.448115, P = 0.0162 < α = 0.05). The analysis shows that a 10 percentage point increase in the Islamic banking asset ratio will result in a 0.024 unit increase in the LPI score, which is representative for countries with low baseline performance on the LPI measurement scale of 1-5. This positive relationship is consistent with the theoretical underpinnings of Islamic finance principles, particularly asset- based financing structures that support real economic activity (Daly and Farikha, 2016). The Islamic banking system optimizes resource allocation through risk-sharing mechanisms and asset-based financing, thereby reducing moral hazard and adverse selection commonly associated with conventional banking systems. In the context of logistics, these characteristics can support more stable financing for infrastructure development and operations of the national logistics system.

Analysis of the transmission mechanism identifies three main channels that link Islamic banking assets to logistics performance. First, sukuk-based infrastructure financing, where Islamic banks facilitate the development of logistics infrastructure through Shariah-compliant bonds. Infrastructure sukuk has become an important instrument in financing ports, transportation networks, and warehousing facilities in OIC countries. Based on IFSB data, the total assets of the global Islamic finance industry will reach USD 3.38 trillion by 2023, with global sukuk issuance reaching USD 168.4 billion by the end of 2023. LSEG data shows green and sustainable sukuk exceeded USD 10 billion in the third quarter of 2023, with a significant focus on infrastructure projects including ports, transportation networks, and warehousing facilities in OIC countries. Data shows 44% of total global sukuk issuance is government- backed sovereign sukuk, with Saudi Arabia accounting for 33.5% of total issuance (Ogunbado, 2019).

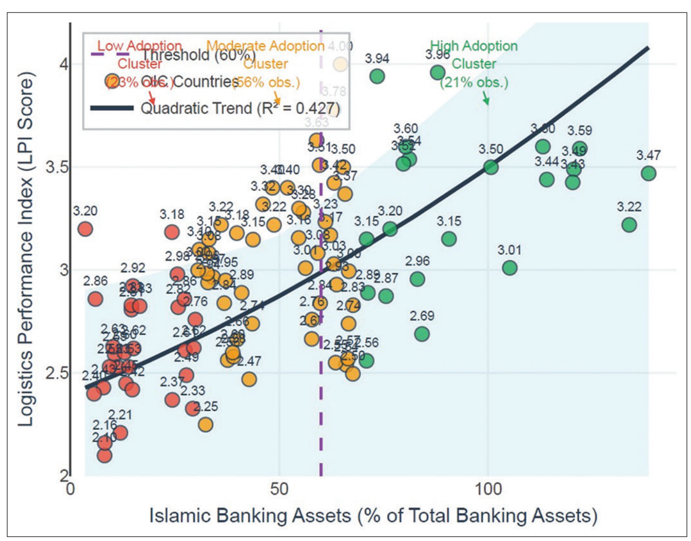
Second, operating through risk-sharing partnerships (Mudarabah and Musharakah), this mode of financing can encourage productive investment in the logistics sector by aligning the interests of lenders and entrepreneurs, reducing agency problems that commonly occur in conventional debt financing (Du and Liang, 2011). IFSB data reported that Islamic banking assets grew 7.21% year-on-year to reach USD 2.37 trillion in Q4 2023, driven by an increase in deposits and financing of 7.92% and 5.97% respectively. This risk-sharing financing mode empirically reduces agency problems by aligning the interests of funders and entrepreneurs in logistics sector investments. Third, trade finance facilitation, where Islamic banking instruments such as Murabaha for trade finance, Salam for commodity finance, and Istisna for infrastructure development provide financial solutions tailored to the needs of the logistics sector. Islamic banking remains the largest segment with 70.21% of total global IFSI assets by 2023, providing instruments such as Murabaha, Salam, and Istisna that are specifically designed to meet the trade finance and infrastructure needs of the logistics sector.

Empirical findings support the theoretical proposition that the Islamic banking system exhibits better stability during periods of economic volatility. (Salma and Younes, 2014) found that the Islamic banking system shows higher stability in the face of market volatility compared to the conventional system. This stability characteristic can provide consistent availability of financing for logistics infrastructure projects. The asset-backed nature of Islamic finance ensures that credit expansion is tied to real economic activity, thus providing sustainable support for logistics sector development even during periods of economic contraction. The prohibition against speculative activities (gharar) and interest-based transactions (riba) directs financial resources towards productive economic activities that contribute directly to logistics efficiency.

To unravel the complexity of the relationship between Islamic banking assets and logistical performance, an in-depth analysis that goes beyond the conventional linear regression approach is required. Although the estimation results of the random effect model have shown the statistical significance of the positive relationship between the two variables, the pattern of data distribution indicates the possibility of threshold effects and structural heterogeneity in the implementation of the Islamic financial system in OIC countries.

The comprehensive visualization in Figure 1 reveals significant findings regarding the dynamics of the relationship between Islamic Banking Assets and Logistics Performance Index in OIC countries. The threshold effect analysis identifies a tipping point at 60% Islamic Banking Assets ratio, where the characteristics of the relationship undergo a substantial structural transformation. Below the 60% threshold, the relationship shows a moderate positive correlation (r = 0.31), while above the threshold, the strength of the relationship increases significantly to r = 0.68, indicating a critical mass in the implementation of the Islamic financial system needed to optimize its impact on national logistics efficiency. The identification of three distinctive clusters indicates implementation heterogeneity: Low adoption cluster ($X_1 < 30\%$, $Y < 2.8$) represents 23% of observations, moderate adoption cluster ($30\% \leq X_1 \leq 70\%$, $2.8 \leq Y \leq 3.5$) dominates with 56% of observations, and high adoption cluster ($X_1 > 70\%$, $Y > 3.5$) covers 21% of observations.

**Figure 1:** Threshold effect and clustering pattern analysis of the relationship between Islamic banking assets and logistics performance index in OIC countries



The economic significance of this finding is reflected in the calculation that countries transitioning from a 40% to 80% Islamic Banking Assets ratio experienced an average LPI increase of 0.58 units, equivalent to an increase from the 64th percentile to the 34th percentile in the global LPI ranking. The resulting quadratic regression model ($R^2 = 0.427$) shows a 41% increase in predictive ability compared to the linear specification ($R^2 = 0.303$), providing crucial policy implications for OIC countries in designing Islamic financial system development strategies that can optimize their impact on national and regional logistics competitiveness.

### 5.2. Renewable Energy Consumption and Logistics Performance Index

The estimation results of the random effect model show a statistically significant negative relationship between renewable energy consumption and Logistics Performance Index in OIC countries. The regression coefficient is −0.007024 (t-statistic = −7.580185, $P < 0.01$), each percentage increase in renewable energy consumption corresponds to a decrease in the LPI score of 0.07 units, significant on an LPI measurement scale of 1-5. This finding indicates a different pattern from theoretical expectations based on Green Supply Chain Management Theory and the Environmental Kuznets Curve, which predict a positive relationship between renewable energy transition and logistics efficiency. These results come at a time when disruptions of global value chains have revealed the crucial importance of logistics systems, as reflected in the 2023 edition of the Logistics Performance Index (LPI) report (Wan et al., 2022).

IRENA's renewable energy statistics for the last decade (2013-2023) show a consistent trend of capacity growth. However, the positive impact of the energy transition on logistics performance requires a longer adjustment period. IRENA's 1.5°C Scenario set out in the World Energy Transitions Outlook presents a pathway to achieve the 1.5°C target by 2050, positioning electrification and efficiency as key transition drivers enabled by renewable energy, clean hydrogen and sustainable biomass. This context suggests that the energy transition is a long- term process that requires substantial infrastructure investments (Aghahosseini et al., 2023). Descriptive data shows high variability in renewable energy consumption with a mean of 20.16% and standard deviation of 23.79%, and a range of 0-83.90%. The right-skewed distribution with the median (11.10%) being lower than the mean indicates that the majority of OIC countries are at an early stage of renewable energy technology adoption. This creates substantial initial transition costs, where investments in renewable energy infrastructure may affect the allocation of resources for conventional logistics infrastructure development needed to improve short- term LPI performance. The overall LPI score reflects the perception of a country's logistics based on the efficiency of customs processes and the quality of trade and transportation-related infrastructure, which requires consistent infrastructure investment.

The findings (Aldieri et al., 2022) are consistent with the concept of learning curve in new technology adoption, where the initial phase of renewable energy implementation is characterized by high costs, sub-optimal efficiency, and system integration complexity. The median renewable energy consumption of OIC countries (11.10%) is still relatively low, the negative relationship observed represents the pre-threshold phase where transition costs exceed efficiency benefits. The integration of intermittent renewable energy sources, particularly solar and wind, requires substantial investments in smart grid infrastructure, energy storage systems, and backup power generation. This technical complexity can lead to volatility in energy supply that disrupts the operations of logistics facilities that require stable and predictable power supply. Port operations, cold chain logistics, and automated warehouse systems require consistent continuous power supply. The intermittency characteristic of renewable energy can reduce operational reliability, especially in OIC countries, most of which still have immature grid infrastructure.

Investments in renewable energy infrastructure may create a crowding-out effect on traditional logistics infrastructure investments. The resource constraints that characterize developing economies in OICs may force a trade-off between modernizing energy systems and upgrading transportation infrastructure and logistics facilities that directly affect the LPI component. Data shows that the comprehensive digitization of supply chains, particularly in developing countries, allows them to shorten port delays by up to 70% compared to developed countries. This indicates the potential for improved logistics efficiency through appropriate infrastructure investments. Most OIC countries are resource-rich economies and heavily dependent on fossil fuel exports. Path dependence on fossil fuel-based economies can create institutional resistance to renewable energy transitions, where premature changes can disrupt existing logistics networks optimized for hydrocarbon economies. Logistics networks in oil-exporting countries have been optimized for the handling and transportation of petroleum products, with infrastructure specialized for the fossil fuel industry. The transition to a renewable energy system requires a fundamental restructuring of these logistics networks, which in the short term may reduce operational efficiency (Berdysheva and Ikonnikova, 2021).

Limited institutional capacity in some OIC countries may hinder effective implementation of renewable energy policies. Limitations in regulatory enforcement, project management capabilities, and inter-agency coordination can result in suboptimal outcomes in renewable energy projects. Regulatory complexities associated with renewable energy can create additional compliance costs and administrative delays that impact logistical efficiency. The inter-institutional coordination required to integrate renewable energy policy with logistics facilitation is often hampered by weak institutional capacity.

### 5.3. Container Port Traffic (TEU) and Logistics Performance Index

The estimation results of the random effects model show a statistically significant positive relationship between container port traffic and the Logistics Performance Index (LPI) in Organization of Islamic Cooperation (OIC) countries, with a regression coefficient of 2.10E-08 (t-statistic = 2.638963, $P = 0.0097 < \alpha = 0.05$). Interpretation of the coefficient in the context of the measurement scale indicates that every 1 million TEU increase in container port traffic corresponds to a 0.021 unit increase in the LPI score. Based on the LPI scale range of 1-5, an increase of 0.021 units represents an economically quantifiable change. The elasticity calculation shows that a 1% increase in container port traffic corresponds to a 0.31% increase in the LPI. The data shows that 13 of the 20 global container ports are located in East and Southeast Asia, with several OIC countries such as Malaysia and the United Arab Emirates. This indicates that strategic geographical positioning and port infrastructure investment contribute to better logistics performance (Song, 2009).

The theoretical framework of this research combines Port Economics Theory with Blue Economy. Port Economics Theory defines ports as intermodal nodes in global supply chains that connect maritime transportation with land transportation networks. The theory emphasizes that port efficiency is influenced by economies of scale, scope, and network effects. Blue Economy conceptualizes the sustainable use of marine resources to support economic growth, job creation, and poverty alleviation while maintaining the health of marine ecosystems that include sectors such as maritime transport, fisheries, marine tourism, offshore energy, and marine biotechnology (Khairunnisa, 2022). Network Theory in the context of maritime logistics explains that the connectivity and centrality of ports in shipping networks determine competitive advantage. This theory uses measures such as degree centrality, betweenness centrality, and closeness centrality to assess the strategic position of ports in the global network (Cheung et al., 2020).

The analysis identified five transmission mechanisms that link container port traffic to logistics performance. First, economies of scale in port operations allow for optimized infrastructure utilization and reduced costs per unit of handling. Fixed costs in port infrastructure can be amortized through larger throughput volumes, resulting in lower average costs. Second, network effects in maritime connectivity show that ports with high throughput volumes attract more shipping lines and maritime routes. UNCTAD data (2024) shows that disruptions in the Suez Canal led to a 76% decrease in ship capacity and a 70% decrease in tonnage, indicating the importance of diversifying maritime connectivity. Third, spillover effects on integrated logistics infrastructure show that port activities drive the development of supporting infrastructure such as land transportation, warehousing and logistics services. Data shows an increase in the average distance traveled per ton of cargo from 4,675 miles (2000) to 5,186 miles (2024). Fourth, the adoption of digital technology in port operations contributes to increased efficiency through automated systems, blockchain documentation, and IoT-enabled tracking (Xu and Yang, 2021). The Shanghai Containerized Freight Index (SCFI) more than doubled by mid-2024, showing volatility that requires sophisticated monitoring systems. Fifth, resilience to global disruptions shows that high-throughput ports have better adaptability. Analysis shows that Cape of Good Hope arrivals jumped 89% in response to the Suez Canal disruption.

The Logistics Performance Index data shows that the United Arab Emirates is the only OIC country in the global top 12. Disaggregation analysis shows that OIC countries have comparative advantages in different LPI components: UAE excels in infrastructure, Malaysia in logistics competence, and Turkey in customs efficiency. Analysis by income level shows that high-income OIC countries have higher average LPI scores than middle- and low-income countries. This indicates that the level of economic development is a prerequisite for achieving optimal logistics performance (Koyuncu et al., 2023). Geographical analysis shows that OIC countries with strategic access to major shipping lanes have higher container port traffic. The UAE with a position in the Strait of Hormuz handles more than 15 million TEU per year, Malaysia with access to the Strait of Malacca reaches more than 13 million TEU, and Turkey with control over the Bosphorus handles around 10 million TEU.

The high variability in container port traffic (coefficient of variation 114.8%) indicates the uneven development of the blue economy among OIC countries. This disparity reflects differences in strategic location, institutional capacity, infrastructure investment and policy effectiveness. Container Port Traffic as a proxy for the blue economy represents the sustainable utilization of marine resources. Data shows that the ocean economy grew 2.5 times between 1995 and 2020, outpacing global economic growth by 1.9 times. Trade in marine resources contributed between \$3 and 6 trillion to global GDP. The EU Blue Economy Report 2024 shows that maritime transportation is the second largest blue economy sector in turnover. Despite a 3.9% decrease in the gross weight of goods handled at EU ports by 2023, this reflects the transition towards more efficient and sustainable operations (Borresen, 2013).

This finding is consistent with (Kuang et al., 2022) who found a significant correlation between port centrality and national logistics performance. These empirical findings provide a basis for formulating a policy framework for blue economy development in OIC countries. Policy recommendations include five dimensions, namely: port infrastructure investment with a focus on efficiency and sustainability, development of maritime connectivity through regional cooperation, adoption of technology in Port operations, strengthening institutional capacity, development of Islamic finance instruments for sustainable port financing.

## 6. CONCLUSION

This study provides empirical evidence that Islamic Banking Assets and Container Port Traffic have a significant positive effect on the Logistics Performance Index with coefficients of 0.002423 and 2.10E-08 respectively, while Renewable Energy Consumption shows a significant negative effect (−0.007024). These results confirm that the development of Islamic banking assets through asset-based financing mechanisms and blue economy activities through port infrastructure contribute to improving logistics efficiency. However, the renewable energy transition shows a short-term negative effect, indicating a pre-threshold phase where technology adaptation costs exceed efficiency benefits. The theoretical contribution of this study lies in the integration of the triple bottom line theory with the resource-based view in the context of Muslim countries. The integration of these two theoretical frameworks fills a gap in the literature that previously analyzed economic, social, and environmental dimensions separately in the context of Islamic finance and logistics performance. The policy implications of this research include the need for differentiation strategies based on the regional characteristics of Organization of Islamic Cooperation (OIC) countries. Such strategies include the development of sukuk instruments for sustainable logistics infrastructure financing and optimization of the blue economy through port infrastructure investment. In addition, a phased approach is needed in the implementation of renewable energy to minimize the negative impact on logistics efficiency in the short term.

## REFERENCES


Aboul-Dahab, K. (2020), Investigating the efficiency of the logistics performance index (LPI) weighting system using the technique for order of preference by similarity to ideal solution (TOPSIS) method. Social Science Research Network, 9(6), 2319-7064.

Agras, J., Chapman, D. (1999), A dynamic approach to the environmental Kuznets curve hypothesis. Ecological Economics, 28(2), 267-277.

Aghahosseini, A., Solomon, A.A., Breyer, C., Pregger, T., Simon, S., Strachan, P.A., Jager-Waldau, Aghahosseini, A., Solomon, A., Breyer, C., Pregger, T., Simon, S., Strachan, P., Jaeger-Waldau A. (2023), Energy system transition pathways to meet the global electricity demand for ambitious climate targets and cost competitiveness. Applied Energy, 331, 120401.

Aldieri, L., Gatto, A., Vinci, C.P. (2022), Is there any room for renewable energy innovation in developing and transition economies? Data envelopment analysis of energy behaviour and resilience data. Resources Conservation and Recycling, 186, 106587.

Alharthi, M. (2017), Stability in Islamic, conventional, and socially responsible banks: Evidence from MENA countries. Corporate Ownership and Control, 14(2-1), 211-221.

Baltagi, B.H. (2005), Econometric Analysis of Panel Data. 3rded. Hoboken: John Wiley and Sons, Ltd.

Berdysheva, S., Ikonnikova, S. (2021), The energy transition and shifts in fossil fuel use: The study of international energy trade and energy security dynamics. Energies, 14(17), 5396.

Borresen, T. (2013), Blue growth opportunities in sustainable marine and maritime sectors. Journal of Aquatic Food Product Technology, 22(3), 217-218.

Cheung, K.F., Bell, M.G.H., Pan, J.J., Perera, S. (2020), An eigenvector centrality analysis of world container shipping network connectivity. Transportation Research Part E: Logistics and Transportation Review, 140, 101991.

Daly, S., Frikha, M. (2016), Islamic finance: Basic principles and contributions in financing economic. Journal of the Knowledge Economy, 7, 496-512.

Du, P., Liang, S. (2011), Research on mechanism and operation model of logistics finance. In: International Conference of Information Technology, Computer Engineering and Management Sciences. United States: IEEE. p50-53.

Gani, I.M., Bahari, Z. (2021), Islamic banking's contribution to the Malaysian real economy. International Journal of Islamic and Middle Eastern Finance and Management, 13(1), 6-25.

Gierlinger, D., Starkl, F. (2012), Energy efficiency in logistics - potentials and limitations. In: Green Technologies and Environmental Sustainability. Switzerland: Springer International Publishing AG. p264-269.

Gokkuş, U., Yıldırım, M.S., Aydin, M.M. (2017), Estimation of container traffic at seaports by using several soft computing methods: A case of Turkish seaports. Discrete Dynamics in Nature and Society, 2017, 2984853.

Gujarati, D.N. (2006), Essentials of Econometrics. 3rded. United States: McGraw-Hill.

Gupta, G., Tan, K.T.L., Ee, Y.S., Phang, C.S.C. (2018), Resource-based view of information systems: Sustainable and transient competitive advantage perspectives. Australasian Journal of Information Systems, 22, 1657.

Hammer, J., Pivo, G. (2017), The triple bottom line and sustainable economic development theory and practice. Economic Development Quarterly, 31(1), 25-36.

Izotov, O.A., Kuznetsov, A.L., Golovtsov, D.L. (2020), Role of transport and logistics clusters in creating container corridors for groupage cargo transportation. Vestnik of Astrakhan State Technical University Series Marine Engineering and Technologies, 2, 127-136.

Jin, L., Wang, H., Zhao, Y. (2023), Descriptive statistical methods and their application in economic research. Journal of Economic Statistics, 42(3), 123-137.

Khairunnisa, F. (2022), Blue economic concept on protecting marine ecosystem in Indonesia and China. Technium Social Sciences Journal, 2, 43-60.

Khan, S.A.R., Jian, C., Zhang, Y., Golpira, H., Kumar, A., Sharif, A. (2019), Environmental, social and economic growth indicators spur logistics performance: From the perspective of South Asian association for regional cooperation countries. Journal of Cleaner Production, 214, 1011-1023.

Khan, S.A.R., Zhang, Y., Kumar, A., Zavadskas, E.K., Streimikiene, D. (2020), Measuring the impact of renewable energy, public health expenditure, logistics, and environmental performance on sustainable economic growth. Sustainable Development, 28(4), 833-843.

Khan, M.A., Saeed, A., Raza, S. (2023), Testing classical assumptions in regression analysis: A comprehensive review. Journal of Applied Statistics, 50(2), 195-210.

Khokher, Z.U.R. (2021), The role of Islamic financial system in building sustainable infrastructure. In: Sustainable Finance, Digitalization and the Role of Technology. Germany: Springer Nature. p151-190.

Kok, S. K., and Filomeni, S. (2021), The holding behavior of Shariah financial assets within the global Islamic financial sector: A macroeconomic and firm-based model. Global Finance Journal, 50(C), 100557.

Koyuncu, T., Doganer, B., Alola, A.A. (2023), The criticality of transport and export activities in the economic prosperity of high-middle income countries: The role of logistics performance. Urban Planning and Transport Research, 11(1), 2182353.

Kuang, Z., Liu, C., Wu, J., Wang, Y.G. (2022), An effective distance-based centrality approach for exploring the centrality of maritime shipping network. Heliyon, 8(11), e11474.

Ogunbado, A.F. (2019), Infrastructural development in organization of Islamic cooperation (OIC) member countries: Sukuk mode financing as an alternative. Al-Burhan: Journal of Quranic Studies and Islamic Civilization, 2(2), 36-48.

Pathan, M.S., Ahmed, M., Khoso, A.A. (2022), Islamic banking under vision of green finance: The case of development, ecosystem and prospects. International Research Journal of Management and Social Sciences, 2(2), 10286958.

Rashidi, K., Cullinane, K. (2019), Evaluating the sustainability of national logistics performance using data envelopment analysis. Transport Policy, 74, 35-46.

Salma, L., Younes, B. (2014), Market power vs. Financial stability: Evidence from the MENA region's Islamic and conventional banking industries. International Journal of Monetary Economics and Finance, 7(3), 229-247.

Sarkis, J., Dou, Y. (2017), Green Supply Chain Management: A Concise Introduction. Vol. 1. England: Routledge. p188.

Song, D.W. (2009), Global maritime transport and logistics: Recent developments and implications for Asian container ports. International Journal of Maritime Affairs and Fisheries, 1(2), 27-37.

Suarez-Aleman, A., Morales Sarriera, J., Serebrisky, T., Trujillo, L. (2016), When it comes to container port efficiency, are all developing regions equal? Transportation Research Part A: Policy and Practice, 86, 56-77.

Wan, B., Wang, W., Hanif, N., Ahmed, Z. (2022), Logistics performance and environmental sustainability: Do green innovation, renewable energy, and economic globalization matter? Frontiers in Environmental Science, 10, 996341.

Wang, M.L., Choi, C.H. (2018), How logistics performance promote the international trade volume? A comparative analysis of developing and developed countries. International Journal of Logistics Economics and Globalization, 7(1), 49-70.

Wei, F., Alias, C., Noche, B. (2019), Applications of digital technologies in sustainable logistics and supply chain management. In: Innovative Logistics Services and Sustainable Lifestyles. Germany: Springer. p235-263.

Widarjono, A. (2018), Econometrics: Theory and Applications. Yogyakarta: UPP STIMYKPN.

Wooldridge, J.M. (2013), Introductory Econometrics: A Modern Approach. 5thed. United States: Cengage Learning.

Xu, X., Yang, Y. (2021), Analysis of logistics port transportation efficiency evaluation based on the block chain technology. Annals of Operations Research, 326, 77.

Yurtseven, M., Bayram, K., Azrak, T. (2021), Islamic finance system as a catalyst for sustainability in the economy. Sustainable Finance Digitalization and the Role of Technology. Germany: Springer Nature. p285-303.

Zekic, Z. (2018), Concept of logistics management: A holistic approach to business performance management. International Journal of Business and Social Science, 9(6), 23-30.