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The Effect of Digital Transformation on the Islamic Financial Sector: A Study on the 11 Largest Halal Industry Countries in 2018-2022

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ABSTRACT

Islamic finance is an important instrument in offering crucial support for the resilience of global economy after the failure of the capitalist economic system in 1998. The institutions showed good ability and sustainability during a period marked by negative trends in conventional banks. The halal industry, as an aspect with a major influence on the growth of Islamic finance, was considered inseparable from the role of digitalization. This was evidenced by the achievement of a world economic output of USD 193 billion through job creation to drive global growth. In addition, important instruments in digitalization with a major impact on the economy played a significant role in the growth of the sector. Therefore, this research aimed to determine the influence of the determining factors shaping the relationship between digital economy and Islamic finance. A quantitative approach was adopted through panel data regression analysis to examine digital instruments within 11 of the world's highest halal industrial countries. The results showed that valuable input for the government and financial institutions in developing strategies and policies for the growth of Islamic finance was provided through digital economy. In this context, appropriate policies were designed to facilitate innovation and growth by understanding the influence of the digital economy.

1. INTRODUCTION

Islamic finance is a structured approach to managing assets and transactions based on the principle of justice. According to the Ministry of Finance (2021), the concept is developed as an important instrument within economic growth initiatives. In this context, a crucial role is stated in enhancing the global economy, particularly in times of crisis, such as the effects of the 1998 capitalist economic paradigm. Islamic financial institutions showed resilience, maintaining vitality and relevance even though conventional banks were affected by adverse spreads (Kolistiawan, 2017). The industry globally increased by 10.6% in 2021-2022 after decreasing in 2020 (S&P Global, 2021). Countries with a significant presence in the halal industry, such as Malaysia, Saudi Arabia, the United Arab Emirates, Indonesia, Bahrain, Kuwait, Iran, Jordan, Oman, Qatar, and Pakistan, increased the growth of global Islamic finance. According to the State of the Global Islamic Economy (SGIE) Report (2019), the Muslim population reached 1.8 billion people. The Compound Annual Growth Rate (CAGR) predicted that the halal industry will increase by 6.2% in 2018-2024 with great opportunities and contributions within the Islamic finance development (Nisponi & Hidayati, 2021).

Although previous literature has highlighted the importance of digitalization in Islamic finance, a significant gap remains in understanding how digital instruments specifically impact the development of Islamic finance in countries with the most advanced halal industries. This study seeks to fill this gap by analyzing the effects of digitalization instruments such as connectivity, the percentage of internet users, internet server security, and financial account ownership on Islamic finance. By doing so, this research provides a novel contribution by identifying the most crucial digitalization factors for the growth of Islamic finance in a global context. The industry with a significant influence on Islamic finance development is inseparable from the role of digitalization, which has a very large and broad impact on the economy. The convenience offered in the digital era provides people with flexibility in transacting, thereby increasing the value of e-commerce sales. According to the Statista report, the total value of global e-commerce sales

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reached USD 5.7 trillion in 2022 and is expected to be USD 8.1 trillion in 2026 (Statista, 2022). Another positive impact of digitalization was the achievement of world economic output of USD 193 billion through job creation to drive global economic growth (Republika, 2017).

As the adoption of digital technology accelerates worldwide, including in countries with significant Muslim populations, the urgency of this research becomes increasingly apparent. The COVID-19 pandemic has further accelerated digital transformation in the financial sector, including Islamic finance, underscoring the importance of a deep understanding of how digitalization impacts this sector. With the growing use of digital technology in the halal industry and Islamic finance, this research is particularly relevant in the context of ongoing global economic transformation. Technological developments have enabled the Islamic finance industry to adopt digital solutions in line with Sharia principles to provide safe and efficient services. In this context, advanced security systems, including data encryption, double authentication, and artificial intelligence technology, protect transactions under Sharia principles. Digitalization increases accessibility to services and provides confidence to stakeholders. Digital technology can increase accessibility to Islamic financial services, improve operational efficiency, facilitate transactions, ensure security, and open opportunities for innovation in products and services. In addition, digitalization plays a key role in changing the economic landscape at large. The Islamic financial system integrated with technology must also be consistent with the standards of Islamic financial contracts. This is because the concept of Islamic finance is different from conventional finance. In Islamic finance, transactions containing gharar, maysir, ikhtikar, tadlis, and riba are forbidden, and must refer to the main purposes of Sharia, namely maqashid Sharia (Nurfalah & Rusydiana, 2019).

Important instruments with a broad impact on global economic growth should also play a significant role in the Islamic finance sector. Meanwhile, convenience and security are the aspects of digitalization instruments that play a significant role and positively affect the system of Financial Technology (Kamil, 2020; Sumadi et al., 2022; Prameswari et al., 2021). Abdillah (2023) also reported the influence of important instruments in 48 Asian countries from 2005-2021, where internet users had a higher role in the growth of Islamic finance through home cable networks. According to Karneli et al. (2023), Sharia-compliant digitalization plays a role in managing the huge potential of the Islamic economy to provide alternative finance during the COVID-19 pandemic. Numerous studies have validated the important role of digitalization in the development process of the Islamic financial industry. Al-Smadi (2023) proved that digital finance increased financial inclusion in MENA countries. Ningrum et al. (2023) and Asrah et al. (2024) concluded that digital transformation in banking information systems had a positive effect on transaction decisions in Islamic banks. The position of Indonesia can be strengthened in the Islamic economy to achieve efficiency, effectiveness, and sustainable growth through the application of technology in the Islamic capital market sector (Auliah et al., 2023). In addition, inclusive digital transformation is an urgent necessity carried out on a massive scale by increasing the technological capabilities of Islamic banking (Anggreni & Taufiq, 2022).

This study specifically aims to analyze the impact of digital connectivity on the development of Islamic finance in countries with the most advanced halal industries. It seeks to identify the role of internet user percentages in supporting financial inclusion within the Islamic finance sector, evaluate the effectiveness of internet server security in maintaining Sharia compliance in digital financial transactions, and assess the impact of digital financial account ownership on the growth of Islamic finance. By understanding these dynamics, the research intends to provide valuable input for governments and financial institutions in crafting strategies and policies that support the growth of Islamic finance through the digital economy. This, in turn, will facilitate innovation and promote sustainable development within the sector.

2. LITERATURE REVIEW

Islamic Finance

Islamic finance constitutes an integral segment of economic instruments grounded in Sharia principles, primarily characterized by the prohibition of riba and unethical practices in line with religious teachings. This system shows profit-loss sharing, where gains and losses are jointly connected by the participating parties (Maulidiyah &; Maika, 2023).

In recent years, the sector has experienced rapid growth, specifically in member countries of the Organization of Islamic Cooperation (OIC). Countries such as Indonesia, Malaysia, UAE, and Bahrain ranked highest in the Global Islamic Economy Report (2022) index, reflecting substantial advancements in Islamic finance sectors.

The development is also influenced by the level of public literacy and awareness about Islamic financial products. Financial literacy includes knowledge, skills, and confidence in the institutions and products. The industry offers a wide range of products and services, including Islamic banks, insurance, bonds, investments, and mutual funds. The existence of these options allows individuals and companies to meet financial needs in line with the religious principles professed (Cupian et al., 2021).

Islamic finance has a positive impact on economic growth in Indonesia and other countries. In 2022, the value of assets reached IDR 2,375.84 trillion, growing by 15.87% from the previous year at IDR 2,050.44 trillion (OJK, 2022). This value exceeded the growth in 2021 reaching 13.82% year on year (yoy) (OJK, 2021). The growth showed the potential of the Islamic finance industry to exceed conventional financial markets. Islamic finance also provides benefits in terms of the level of prudence and selectivity of contracts in transactions. This has become a significant breakthrough for Muslim countries and also gained recognition around the world. The growth shows a commitment to following the principles of Islamic ethics and spirituality in the world of business and investment. Therefore, Islamic finance continues to play a key role in promoting sustainable economic growth.

Digital Economy

The digital economy represents a paradigm shift in information technology, altering the industrial landscape and the economy. The evolution has provided an opportunity for economic expansion by increasing innovation and the adoption of business practices. Previous research showed that the digital economy, facilitated by internet utilization, had a positive influence on economic growth (Masfiatun et al., 2023; Prastyaningtyas et al., 2021). According to several theoretical and empirical analyses, the Internet can increase economic growth by promoting the adoption of innovation and efficient business processes (Purnomo &; Adhitya, 2021; Supriyanto, 2023).

In the Islamic finance industry, digital economy plays an important role in increasing growth. Digital-based banking services easily accessible to customers can be provided with the rapidly developing information and communication technology. For example, online-based Islamic banking services and mobile applications allow customers to make transactions and investments, as well as access financial products more practically.

The development of the digital economy also provides benefits in increasing financial literacy and public awareness about Islamic products and services. The Internet allows easy access to information and education on Islamic finance and principles, as well as the effective use of Islamic products. This increases public awareness about the potential and benefits of Islamic finance to increase demand for products and services. With the widespread internet and the adoption of information and communication technology (ICT), the digital economy continues to have the potential to increase economic growth.

Halal Industry

The concept of halal includes the process of producing goods and products in line with Islamic sharia (Rahmawati et al., 2022; Prayuda et al., 2023). The scope of halal is limited to the consumption aspect and covers all stages of production and services in Islam (Rahmawati et al., 2022). The term ‘halal’ has a connection with ‘toyyib,’ which means good (Azam &; Abdullah, 2020) and the concept includes actions permitted by Sharia law, which are beneficial for humanity.

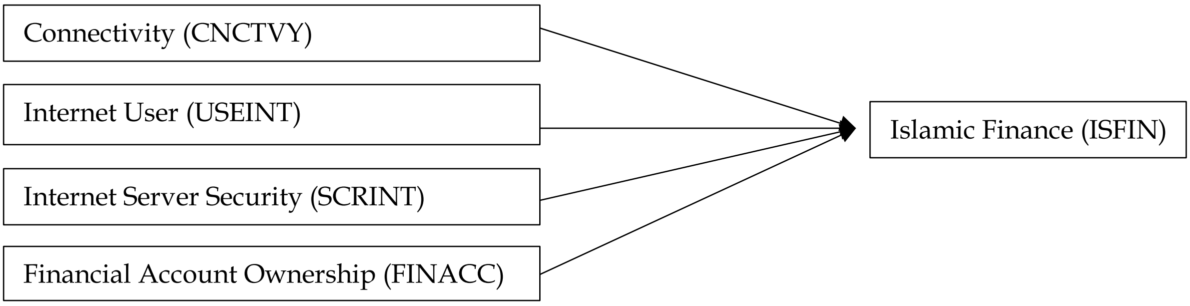
The functions and objectives of the halal industry include the implementation of Law No. 33 of 2014 concerning Halal Product Assurance to ensure the freedom of individuals to practice the respective religions. In this context, the state is mandated to enhance protection and assurances regarding halal products. Article 1 of Law No. 33 of 2014 defines products as goods and services pertaining to food, beverages, drugs, cosmetics, chemical products, biological products, genetic engineering products, and items used or consumed by the population (Camila, 2013).

The halal industry is subjected to significant development, extending beyond products to include various aspects of lifestyle. The Indonesia Halal Lifestyle Center (IHLC) states that the six sectors prioritized by the government include food and beverages, clothing, tourism, entertainment and media, pharmaceuticals, and cosmetics. According to the State of the Global Islamic Economy (SGIE) Report (2022), the halal industry covers 6 sectors, namely finance, food and beverages, fashion, pharmaceuticals and cosmetics, tourism, media, and recreation. In 2022, Indonesia occupied the fourth position in SGIE ranking after Malaysia, Saudi Arabia, and the United Arab Emirates. Indonesia ranked sixth, third, and ninth in the Islamic finance, modest fashion, and pharmaceutical sectors. However, it was not in the Top 10 for Muslim-friendly tourism and entertainment media (Perindustrian, n.d.).

The SGIE reports reflect the results of an in-depth research describing the development of the Islamic economy. The data includes the latest developments and trends in the halal industry. The information presented is reliable and up-to-date, as well as summarizes crucial aspects in the global development of the halal industry.

Research Framework

In the literature review and conclusions, the digital economy had a significant influence on increasing economic transformation, specifically in the Islamic Financial Industry. This research used digital economy indicators from World Bank sources, focusing on four main variables, namely Connectivity, Internet Users, Internet Server Security, and Financial Account Ownership, and the framework used is presented below:



Research Hypotheses

Based on the description of previous research, the hypotheses to be tested are formulated as follows:

H1. Connectivity as an indicator of the digital economy has a significant influence on the growth of Islamic Finance.

H2. Internet User as an indicator of the digital economy has a significant influence on the growth of Islamic Finance.

H3. Internet Server Security as an indicator of the digital economy has a significant influence on the growth of Islamic Finance.

H4. Financial Account Ownership as an indicator of the digital economy has a significant influence on the growth of Islamic Finance.

3. METHODS

This research employed a quantitative approach to address the research objectives, utilizing panel data regression analysis as the primary method. The choice of panel data regression is particularly suitable for this study due to its ability to handle both cross-sectional and time-series data, allowing for a more nuanced examination of the relationship between digital transformation and Islamic finance across multiple countries. According to Gujarati & Porter (2009), panel data analysis provides greater informational depth, effectively mitigates collinearity among variables, and enhances efficiency compared to other analytical methods. Alternative methods, such as time-series or cross-sectional analysis, were considered; however, they were deemed less appropriate due to their limitations in capturing the dynamic interactions over time and across different countries. Panel data regression, therefore, offers a more robust framework for analyzing the longitudinal impact of digital transformation on Islamic finance. The entire sample includes 55 observations and the operational definition of each variable is as presented in Table 1.

In this research, each country's Islamic Finance score was set as the dependent variable. The four independent variables used to describe the development of the digital economy were Connectivity, Internet Users, Internet Server Security, and Financial Account Ownership. In the process of panel data regression analysis, the best model was determined through several models such as the Chow and Hausman tests. Subsequently, the following OLS model was first established to continue the model test process:

$$\boldsymbol{ISFIN_{it} = \beta_0 + \beta_1 CNCTVY_{it} + \beta_2 USEINT_{it} + \beta_3 SCRINT_{it} + \beta_4 FINACC_{it} + \varepsilon}$$

Notes:
β0 = Constant
β1,..., β4 = independent variables' constants
ISFIN = Islamic Finance
CNCTVY = Connectivity
USEINT = Internet User
SCRINT = Internet Server Security
FINACC = Financial Account Ownership
i = 11 sample countries
t = Period 2018-2022
Ɛ = Error estimation

Table 1. Operational Definition of Variables

Variable	Definition	Unit	Source
Islamic Finance (ISFIN)	The score representing the development of the Islamic finance industry used as a reference to assess the development of Islamic finance in various countries	Point	State of the Global Islamic Economy Report
Connectivity (CNCTVY)	The number of telephone and broadband connections that describe the quality of digital economy connectivity	Per 100 People	World Bank
Internet User (USEINT)	The percentage of individuals who use the internet	Percent	World Bank
Internet Server Security (SCRINT)	The number of secure infrastructure servers	Per Million People	World Bank
Financial Account Ownership (FINACC)	The number of secure infrastructure servers.	Percent	Data Reportal

4. RESULTS AND DISCUSSIONS

Results

A descriptive statistical test is conducted to determine the general description of the five variables as follows:

Table 2. Descriptive Statistical Test

Variable	Mean	Std. Dev.	Min	Max
ISFIN	95.4490	75.4775	30	426.9
CNCTVY	13.4670	8.7407	1.08	32.04
USEINT	82.2985	25.0191	15.34	100
SCRINT	1367.68	2120.91	28.72	9091.51
FINACC	68.2414	21.8278	16.30	94

The descriptive statistical test resulted in some preliminary information, including the mean, standard deviation, minimum, and maximum values. Specifically, the minimum and maximum values of Islamic Finance were at 30 and 426.9, representing Iran and Malaysia in 2020 and 2022, respectively. The minimum and maximum scores of connectivity per 100 people belonged to Pakistan and United Arab Emirates in 2021 and 2022, respectively. Regarding the percentage of the population using the Internet, the highest percentages were found in Saudi Arabia, United Arab Emirates, Bahrain, Oman, and Qatar, while the lowest was in Pakistan.

For the Internet Server Security per 1 million people, the highest value was in Malaysia with a value of 9091.51. Therefore, Malaysia and Pakistan had the highest and lowest security server infrastructure. For the percentage of the population with financial accounts, the country with the highest percentage of financial account ownership was Iran in 2018 at 94%, while the lowest was Pakistan.

The Cartesian planes showed that Malaysia achieved the highest Islamic Finance score out of the 11 countries with the best halal industry performance from 2018 – 2022 due to excellent Information and Communication of Technology (ICT) infrastructure. The country was classified within quadrant I, meaning that ICT infrastructure was positively correlated with Islamic Finance scores. To determine the effect of the independent variables on the dependent, a regression analysis of panel data was carried out. Subsequently, the determination of the best model was performed before conducting the analysis.

Based on Table 3, the best model was the Fix Effect Model (FEM) and the conclusion was supported by the results of the Chow test. FEM (Prob < 0.05) was confirmed by the Hausman test with Prob < 0.05 as the preferred model (Widarjono, 2018), hence the panel regression model to be performed was FEM.

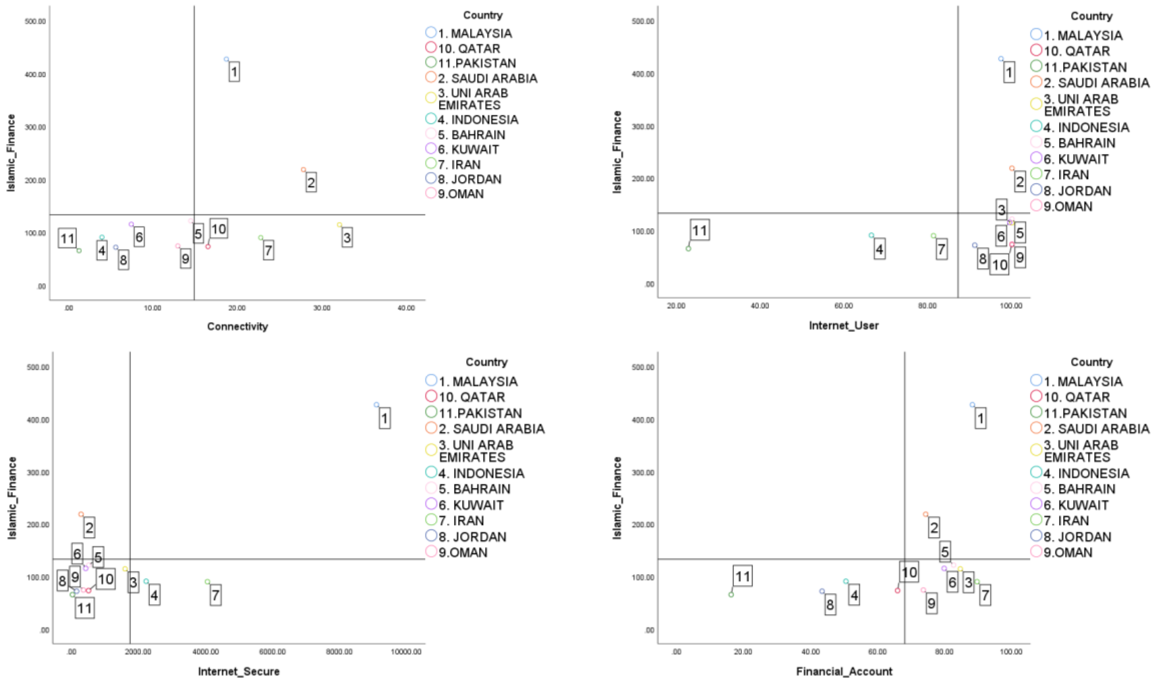


Figure 1. Distribution of Islamic Finance and Digital Economy (2022)
Sources: SGIE Report, Data Reportal, World Bank (2022)

Table 3. Panel Model Test

Model Test	F-Statistic	Prob
Uji Chow	5.6081	0.0000
Hausman	20.7616	0.0004

Table 4. Fix Effect Test Results

Variable	Coef	Std. Err.	Prob
CONS	-421.4194	310.6399	0.205
CNCTVY	17.0260	1.9609	0.000***
USEINT	1.1133	0.5466	0.069*
SCRINT	0.0317	0.0162	0.080*
FINACC	2.2356	4.1942	0.606
Period 2018 – 2022			
Prob F-statistic		0.0000	
R-squared		0.6211	

*, **, and *** significant at alpha levels of 10%, 5%, and 1%

The results of data processing produced the FEM panel regression model equation as follows:

$$\boldsymbol{ISFIN_{it} = -421.4194 + 17.0260CNCTVY_{it} + 1.1133USEINT_{it} + 0.0317SCRINT_{it} + \varepsilon}$$

The R-squared value was 62.11%, suggesting that the combination of independent variables explained the effect on the dependent variable (Islamic Finance). The value of Prob (F-statistic) was 0.0000 lower than the alpha value of 0.05 since the independent variables had a simultaneous effect on the dependent variable. Partially, financial account ownership (FINACC) was not significant at the alpha levels of 1/5/10%, unlike the other variables. Every telephone and broadband connection per 100 people (CNCTVY) could increase Islamic Finance by 17.0260 points. Additionally, an increase in the number of internet users (USEINT) could raise the value by 1.1133 points. An increase in secure server infrastructure (SCRINT) per 1 million people also enhanced the score by 0.0317 points.

The results showed that the digital economy and the optimization of Information and Communication of Technology (ICT) are very important in promoting the progress of Islamic Finance. The dimensions of connectivity, percentage of people using the internet, and server security have a positive direction or influence. Therefore, digitalization of the economy and optimization of ICT can drive the progress of Islamic Finance.

Discussion

The Effect of Connectivity Percentage on Islamic Finance

At the global level, the development of digital connectivity significantly impacted Islamic Finance. The Connectivity Percentage (CNCTVY) calculated based on the average value of telephone and broadband connections per 100 people, showed the significance of the Islamic Finance variable. In this context, the development of digital connectivity and the intensification of internet use had an important role in strengthening the Islamic Finance ecosystem. Accessibility through connectivity effectively increased access to Islamic Finance services, creating a strong foundation for the growth of the sector.

Fitroh and Syakarna (2023) made a significant contribution by stating that technology supports the development of financial products and services in line with the needs of the community through increased connectivity and interaction. The adoption of technologies such as payment services, e-wallets, and digital banking also has a positive impact on increasing the accessibility of financial services (Dz., 2018). Therefore, digital transformation through increased connectivity has a positive impact on customer experience and financial inclusivity.

According to (Qothrunnada, 2023), the evolution of information and communication technology has fostered globalization, facilitating rapid electronic communication that transcends geographical distances and time constraints. This phenomenon has played an important role in the transformation of the Islamic financial sector, contributing significantly to the evolution. In this context, seamless connectivity is a crucial element reshaping the business and economic landscape, while maximizing the positive potential presented by the Industrial Era 4.0 within the Islamic Finance sector.

The Effect of the Percentage of Internet Users on Islamic Finance

The results reported that the Percentage of Internet Users had a positive and significant impact on Islamic Finance. This is because increasing individual access to the Internet provides greater opportunities for people to engage in Islamic Finance activities (Basrowi et al., 2020).

The Percentage of Internet Users enhances innovation and financial inclusion (Alnsour, 2023). In addition, participation can also be increased in Islamic financial products and services without geographical restrictions or physical constraints. The presence of individuals online creates opportunities to provide services that are more personalized and focused on the unique needs of customers. However, an increase in the Percentage of Internet Users requires efforts to improve financial literacy and public understanding of Islamic Finance principles (Antara et al., 2016). In this context, governments, institutions, and relevant stakeholders must collaborate in developing education programs. These programs are essential to ensure that the growth of Islamic Finance is sustainable and delivers optimal benefits to society.

The Effect of Internet Server Security on Islamic Finance

Based on the processing results, a secure server infrastructure per 1 million people (SCRINT) can increase the Islamic Finance score by 0.0317 points. The security of transactions and the protection of customer funds in Islamic finance depend on a strong Internet server security infrastructure. A good security system is important to protect customer funds from potential threats such as hacking and identity theft. Meanwhile, internet security includes safeguarding data and ensuring compliance with Sharia principles. Ethical aspects, such as privacy and fairness, are important concerns in Islamic finance.

Internet security supports infrastructure as a fundamental pillar for sustaining Islamic finance. Furthermore, secure and reliable services can be delivered to customers through the adoption of advanced infrastructure. The results are in line with Dewi et al. (2018), where security-related variables have a positive and significant effect on interest in transacting using BSM Mobile Banking. According to Nur

Khotijah et al. (2022), security influences the customer satisfaction of mobile banking users. Meanwhile, Aziz et al. (2015) stated that the perception of security and privacy as well as risk had a significant relationship with the behavioral intentions of Muslim users to use E-Commerce transactions. The security factor in the Islamic financial industry must be a top priority. Therefore, the industry must create a secure financial system, develop effective security strategies, and ensure compliance with Sharia principles.

5. CONCLUSION

In conclusion, this research was carried out to analyze the influence of Economic Digitalization and ICT Infrastructure on Islamic Finance. The results showed that connectivity, such as Broadband and Telephone connections, with the percentage of the population using the internet and server security, had a significant positive influence in promoting the growth of Islamic Finance. Therefore, advances in digital connectivity and internet use could play an important role in strengthening the Islamic Finance ecosystem. Increased accessibility through strong connectivity, represented by Broadband and Telephone connections, facilitated public access to the services. In addition, the high level of internet penetration also contributed positively by providing wider and easier access to engage in Islamic Finance activities. In this context, good internet server security also played a key role in building public trust in online transactions. The findings of this research have important implications for policymakers and practitioners in the Islamic finance sector. Enhancing digital infrastructure, particularly broadband connectivity, and promoting digital literacy are crucial steps to ensure inclusive and secure access to Islamic financial services. Furthermore, the active participation of regulators in collaboration with the private sector to enhance server security is essential for maintaining public trust.

Given the significant role of digital connectivity, policymakers should consider strategies to improve ICT infrastructure and integrate these advancements into the broader framework of Islamic finance. This may include developing policies that encourage the adoption of digital solutions, increasing investments in secure digital platforms, and fostering partnerships between public and private sectors to support the growth of the industry. Future research could explore the impact of emerging technologies, such as blockchain and artificial intelligence, on Islamic finance. Additionally, investigating the role of digital financial literacy in different demographic groups could provide valuable insights into how to further enhance the accessibility and security of Islamic financial services.

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