Islamic Digital Finance Innovation and Financial System Development: Empirical Evidence OIC Countries

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ABSTRACT

Purpose — *This research is here to answer the question, what is innovation influencing digital finance to develop Islamic finance systems in OIC countries?*

Method — The research approach uses a quantitative approach, panel data regression model with samples of country OIC of Top 20 by Gift member from 2005-2022. Data in the form of secondary data obtained from the official website of the World Development Indicator, World Bank Global Financial Development and World Governance. Model testing using help application STATA statistics 17.

Result — *Research results show that innovation has a significant influence on digital finance as ATM and Bank Branches to the development of Islamic financial systems as financial development in OIC member countries.*

Novelty — *Through findings It can be concluded that it is actually utilization of technology in the industrial finance sector, especially Islamic finance, is capable of triggering development of financial systems in countries OIC members and get a place among your society Originality/Novelty: There is no research on Islamic financial innovation and the Islamic financial system using panel data in OIC countries. Digital developments and the level of demand for the fintech market in OIC countries are the reasons for researchers to raise this issue.*

Keywords: Innovation Islamic Finance, Digital Finance, Development System Finance, OIC

INTRODUCTION

Digital finance has been found to have substantial implications for equity by contributing to poverty reduction, enhancing consumption levels, and fostering the ownership of financial assets (Lin & Zhang, 2023) . Furthermore, technological advancements significantly contribute to the advancement of modern financial innovation (Achieng et al., 2015) . Over the last two decades, the financial industry has seen substantial changes as a result of the introduction of financial technology. The adoption of different digital financial services, including automated teller machines (ATMs), mobile payment systems, internet banking, and blockchain technology, is made possible via the use of information and communications technology (ICT) platforms. These platforms play a crucial role in facilitating the transition process (Konheim, 2016; Lashitew et al., 2019; Scott et al., 2017) . According to Faure (2013) , a financial system refers to institutional arrangements that cover credit creation and borrowing of money by non-financial institutions, firms and individuals, and financial intermediation, which eases funds transfer and makes funds available to the deficit units; and establishment of markets in shares and debt securities to allocate money and price efficiently.

A developed financial system holds the capability to absorb disturbances and reduce macroeconomic inequality, depending on the level of achievement of some of its functions, such as risk diversification, lowering financial constraints and information asymmetries (Bernanke et al., 2009) . The purpose of this study is to address the inquiry about the impact of innovation in digital finance impacts the advancement of Islamic finance in Organization of Islamic Cooperation (OIC) member nations.

METHOD

This research uses a measured quantitative approach with analysis panel data regression. Secondary data sources sourced from the world bank consisting of from innovation sourced digital finance from global financial development, next variable development finance sourced from world governance indicators since 2005 – 2022 with amount population of the 14 OIC countries that entered in the Top 20 by Gift Index Scores. The following is the equation model regression in this research:

$$fdi_{it} = \alpha + \beta_1 ATM_{it} + \beta_2 BB_{it} + \beta_3 GE_{it} + \beta_4 RQ_{it} + \beta_5 ROL_{it} + \varepsilon_{it}$$

Researcher use tool help Stata 17 software in this research. As for step the steps we took is as following

Step 1: Descriptive statistics test

This testing is purposeful for give data information concise (Sholihin & Anggraini, 2021) .

Step 2: Stationarity test

Testing stationary aim to know change in mean variance in throughout time. We use unitroot test ADF approach yeah introduced by Dickey & Fuller, (1981). Degrees confidence α is used of 1%, 5% and 10%.

Step 3: Multicollinearity Test

Objective in this test is to know connection because consequence between variable independent and dependent.

Step 4: Determining the regression model

Determining the most appropriate regression model must through 3 stages, namely test chow for see comparison command effect with fixed effect method, then Hausman test to see comparison of fixed effect method and random effect method, and finally Test Breusch -Pagan Langrange Multiplier (LM) to compare the random effect method with the command effect.

HYPOTHESIS DEVELOPMENT

Mobile money (MM) and Automated Teller Machine (ATM) are insignificant but exhibit positive and inverse relationship with financial development respectively. The hypothesis is that mobile, money payments, automated teller machines (ATMs), and branch banks have an influence on the development of the financial system.

H_1 : ATM has a significant effect on fdi

H_2 : MM has a significant effect on fdi

RESULTS AND DISCUSSION

This study uses data on financial development as financial deppining (fdi) and digital financial innovation as ATM and Bank Branches (BB). Government effectiveness (GE), Regulatory Quality (RQ) and Rule of Law (ROL) as control variables. The research data period is from 2005-2022. The following is a description of static variables in this study.

Variables	N	Mean	elementary school	Min	Max
fdi	211	0.983	0.0152	0.931	1,013
ATM	211	676.9	2,639	0.129	15,477
BB	211	110.1	378.3	3,781	1,784
GE	211	0.101	0.726	-1,213	1,501
RQ	211	-0.00119	0.695	-1,709	1,149
ROLLER	211	-0.0557	0.637	-1,179	0.978

Source: Data Are Processed

Stationary Tests

The stationary test utilized is increased Dickey Morefull or known as ADF with the condition that in the event that the p-value is littler than the centrality level, at that point H null is rejected.

Variables	Prob Value	Decision
Fdi	0.0000	Stationary
ATM	0.1939	Stationary notes
BB	0.9863	Stationary notes

GE	0.0200	Stationary
RQ	0.3294	Stationary notes
ROLLER	0.7433	Stationary notes

Source: Data are processed

Based on the results of the level test or I (0), the probability value of all variables consisting of ATM, BB, RQ and ROL is greater than 0.05, so the table above shows that the data is not stationary. So it is necessary to test the first level of differencing stage I (1). The results of the data stationarity test will be presented in the table below.

Variable s	Prob Value	Decision
ATM	0.0000	Stationary
BB	0.0000	Stationary
RQ	0.0000	Stationary
ROLLER	0.0000	Stationary

Multicollinearity Test

Variables						
(1) fdi	1,000					
(2) ATMs	-0.030	1,000				
(3) BB	-0.053	0.970	1,000			
(4) GE	0.548	-0.020	-0.038	1,000		
(5) RQ	0.390	0.026	0.024	0.894	1,000	
(6) ROL	0.501	0.072	0.067	0.890	0.915	1,000

Multicollinearity table shows the results of multicollinearity diagnosis in the data, which consists of financial dependency (FDI), ATM, Bank Branches, Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (ROL). The correlation coefficient value in the table below shows results that are smaller than 0.85, so the model above is free from multicollinearity problems between independent variables.

Panel Data Regression Analysis

Model*	Test	Prob.	Results	Decision
Dependent Variables: ATM BB	Chow (OLS: FEM)	0.2762	*Fixed Effect Method*	***Random effects method***
Dependent Variables: ATM BB **Variable Controls:** GE	Hausman (REM: FEM)	0.0005	*Random effects method*	
	L.M (CEM: REM)	0.0000	*Random effects method*	

RQ

ROLLER

The estimated model selection in this research has gone through three test stages, namely the Chow test, Hausman test and Langrange Multiplier. From these three stages, the estimation results show that the best model used is the random effect method.

Variables	(OLS) Fdi	(REM) Fdi	(FEM) Fdi
ATM	0,000*	0,000***	0,000
	(0.000)	(0.000)	(0.000)
BB	-0.000	-0.000**	-0.000
	(0.000)	(0.000)	(0.000)
GE	0.011***	0.011***	0.010*
	(0.004)	(0.004)	(0.005)
RQ	-0.001	-0.001	0,000
	(0.004)	(0.007)	(0.008)
ROLLER	-0.003	-0.003	-0.004
	(0.004)	(0.009)	(0.010)
Constant	0.982***	0.982***	0.990***
	(0.004)	(0.003)	(0.010)
Observations	211	211	211
R-squared			0.093
Number of Countries	14	14	14

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table 6 shows - that second variable independent namely ATM and Bank Branches (BB) has influence to development system finance in some countries OIC members with controlled by some variable namely GE, RQ, and ROL. Presence variable ATM capable in a way significant influential against FD with every wear it One percent capable increase development development system financial in some country OIC members amounted to 0.012 percent. Whereas the use of Bank Branches (BB) has an effect negative significant where every increase One percent BB use is capable lower development system finance as large as 0.001 percent in some neagra OIC member.

CONCLUSION

Progress technology has create room new in development industry finance Islam in Muslim countries. This research shows that it turns out ATMs online significant influential postive to financial development as financial development (fdi). Findings to confirm that the presence of ATMs is encouraging development system finances Islam in a number of country OIC member. However, it's different case with the presence of Bank Branches (BB) which are direct pointing out influence negative to development system finances in countries.

In this research, author realize that this article does not escape from lack. Like, amount variables used still spelled out A little and not yet completely represent him innovation Islamic digital financial in a way overall, total sample country that still is A little because many country OIC members who are not yet have complete data related removed variable. By Therefore, it is expected can become inspiration to the researchers in Century coming for more explore more explicit And deep with do addition variable new, quantity country or area continent with No only focused to country OIC members. However, you can add non-OIC countries that have development industry finance enough fast.

REFERENCES

1. Achieng, O.C., Karani, K.P., & Tabitha, N. (2015). Financial Innovation and the Future of Financial Intermediation. *International Journal of Education and Research*, *3* (5), 385–396.
2. Bernanke, B.S., Gertler, M., & Gilchrist, S. (2009). *The Financial Accelerator in a Quantitative Business Cycle Framework Three Features Model: Credit Market Frictions Model Assumptions* (Vol. 1, Issue 1).
3. Dickey, D., & Fuller, W. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root Author (s) : David A . Dickey and Wayne A . Fuller Published by : The Econometric Society Stable URL : http://www.jstor.org/stable/1912517 REFERENCES Linked references are available. *Econometrica*, *49* (4), 1057–1072.
4. Faure, A. (2013). *Financial Systems: an Introduction*. Quoin Institute (Pty).
5. Konheim, A.G. (2016). Automated teller machines: their history and authentication protocols. *Journal of Cryptographic Engineering*, *6* (1), 1–29. https://doi.org/10.1007/s13389-015-0104-3.
6. Lashitew, A. A., van Tulder, R., & Liasse, Y. (2019). Mobile phones for financial inclusion: What explains the diffusion of mobile money innovations? *Research Policy*, *48* (5), 1201–1215. https://doi.org/10.1016/j.respol.2018.12.010.
7. Lin, H., & Zhang, Z. (2023). The impacts of digital finance development on household income, consumption, and financial asset holding: an extreme value analysis of China's microdata. *Personal and Ubiquitous Computing*, *27* (4), 1607–1627. https://doi.org/10.1007/s00779-022-01667-z.
8. Scott, S. V., Van Reenen, J., & Zachariadis, M. (2017). The long-term effect of digital innovation on bank performance: An empirical study of SWIFT adoption in financial services. *Research Policy*, *46* (5), 984–1004. https://doi.org/10.1016/j.respol.2017.03.010.
9. Sholihin, M., & Anggraini, PG (2021). *Research Data Analysis Using Stata Software* (A. Prabawati (ed.); 1st ed.). ANDI.