



Print ISSN: 1738-3110 / Online ISSN 2093-7717
 JDS website: <http://accesson.kr/jds>
<http://doi.org/10.15722/jds.23.03.202503.45>

Impact of Digital Financial Product Distribution on Economic Growth: Empirical Study in Asian Countries*

Anh PHAN¹, Tra Thi Huong LE²

Received: October 15, 2024. Revised: November 22, 2024. Accepted: February 14, 2025

Abstract

Purpose: The purpose of this study evaluates the impact of digital financial product distribution on economic growth in 19 Asian countries from 2014 to 2023. **Research design, data and methodology:** By employing the research method of regression analysis using panel data from the World Bank and the IMF, the research assesses digital finance's influence through three models focusing on mobile money accounts, digital payments, and internet penetration. **Results:** The results reveal that mobile money accounts and digital payments positively impact economic growth, highlighting their role in promoting financial inclusion and economic activity. Conversely, internet usage shows a negative correlation, suggesting that increased connectivity alone does not uniformly drive growth and may present challenges such as digital inequalities and market disruptions. **Conclusion:** The findings underscore the necessity for a robust digital finance framework that balances innovation with regulatory oversight to maximize economic benefits. Policy recommendations include enhancing digital infrastructure, fostering financial literacy, and promoting regional collaboration to build a more inclusive digital finance ecosystem. This research contributes to the understanding of digital finance's diverse effects on economic growth and offers practical insights for policymakers aiming to optimize digital financial service adoption, thereby fostering sustainable development across varying economic contexts in Asia.

Keywords: Digital finance, Distribution, Economic growth, Asian countries, Mobile money, Digital payments.

JEL Classification Code: E44, G21, O11, O33.

1. Introduction

The relationship between digital finance and economic growth has attracted considerable academic attention in recent years. Financial inclusion, a key component of digital finance, plays a pivotal role in fostering economic development by expanding access to credit, savings, and investment opportunities. Studies have shown that digital financial services contribute to increased productivity,

reduced transaction costs, and enhanced efficiency in the financial sector, ultimately leading to higher economic growth rates (Ernst & Young, 2017). Furthermore, digital distribution is essential for reaching clients, providing services, and spurring innovation in the fintech sector, which is a quickly changing world. The way financial products and services are disseminated and used has been completely transformed by digital distribution channels, which have transformed everything from banking and payments to lending and investment management (Shenoy,

*The authors received funding from the Banking Academy of Vietnam for this research.

1 First Author. Banking Research Institute, Banking Academy of Vietnam. phananh@hvn.edu.vn

2 Corresponding Author. Banking Research Institute, Banking Academy of Vietnam. tralth@hvn.edu.vn

© Copyright: The Author(s)

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

2024). However, despite the growing interest in digital finance, research on its direct impact on economic growth, particularly in Asian economies, remains limited.

This study aims to fill this gap by conducting an empirical analysis of the impact of digital financial product distribution on economic growth in 19 Asian countries over a 10-year period (2014–2023). By examining various aspects of digital finance, including mobile money accounts, digital payments, and internet usage, the study provides a comprehensive assessment of how these factors influence economic growth. The research focuses on both demand-side and supply-side perspectives, exploring how consumers' use of digital financial services and the availability of financial infrastructure contribute to growth.

The significance of digital finance lies not only in its potential to drive economic growth but also in its ability to reshape traditional financial systems. The rise of fintech companies, mobile banking platforms, and blockchain-based solutions has challenged the dominance of conventional banking institutions and introduced new business models. This shift has profound implications for financial stability, regulation, and consumer protection, making it essential to understand the broader impact of digital finance on economic systems.

In the context of Asia, where economic development varies significantly across countries, digital finance offers a unique opportunity to bridge the financial inclusion gap. For instance, while countries like Singapore and South Korea have well-established digital finance ecosystems, others, such as Vietnam and Bangladesh, are still in the early stages of digital financial adoption. This disparity presents both challenges and opportunities for policymakers seeking to harness the potential of digital finance to accelerate economic growth and development.

The objective of this paper is to empirically assess the impact of digital finance on economic growth in Asian countries, using data from the World Bank and the IMF. The study employs three regression models to evaluate the effects of various digital finance factors on growth, with a focus on mobile money accounts, digital payments, and internet penetration. The findings contribute to the growing body of literature on the role of digital finance in promoting economic development and offer policy insights for governments and financial institutions aiming to foster a more inclusive and dynamic financial ecosystem.

The paper is structured as follows: Section 2 reviews the relevant literature on digital finance and economic growth. Section 3 presents the methodology and data sources used in the empirical analysis. Section 4 discusses the results of the regression models and their implications for digital finance and economic growth in Asian countries. Finally, Section 5 concludes with policy recommendations and suggestions for future research.

2. Literature Review

2.1. Overview of digital financial product distribution and economic growth

To date, many definitions of digital finance have been put forward. According to the World Bank (2023), digital finance is the use of mobile, internet, and other new technologies to deliver formal financial services to consumers and small businesses, who are often excluded from the formal financial system. According to Moody (2023), digital finance is a process of transforming traditional financial services using new and emerging technologies, which will transform the financial sector in the coming years by changing the way market participants invest, raise finance, and transfer money. According to the European Commission (2023), digital finance is a term used to describe the impact of new technologies on the financial services industry. It includes a range of products, applications, processes, and business models that have transformed how traditional banking and financial services are delivered. In summary, all definitions of digital finance state that digital finance is the application of digital technologies to improve and develop traditional financial services into new digital financial services that are more convenient, faster, more transparent, more accessible, and cheaper.

Moreover, in terms of finance, digital distribution refers to the process of delivering financial products and services through digital channels such as websites, mobile applications, and online platforms. In the fintech industry, digital distribution has become indispensable, enabling financial institutions and startups to reach a wider audience, enhance the customer experience, and streamline operations (Shenoy, 2024). By leveraging technology and data-driven insights, digital distribution transforms traditional banking and financial services into agile, customer-centric experiences.

To date, most financial services have been digitized. Through research, we found that the scope of digital finance is divided into four main groups: Payments and transfers, savings and investments, loans and financing, and risk management.

Table 1: Digital Financial Products and Services

Financial services	New digital financial products and services
Payments and transfers	Mobile Payments, Mobile Money, Mobile PoS Peer-to-Peer (P2P) Payments Business-to-Business (B2B) Transactions Digital Wallets, E-Wallets, Mobile Wallets Digital Currency, Virtual Currency

Financial services	New digital financial products and services
Savings and investments	Mobile Banking Micro-Savings and Micro-Investing Apps Mobile Market Funds Blockchain Stocks and Bonds Online Brokers Mobile Trading Crowdfunding Social Trading
Loans and financing	Crowdsourcing and Alternative Finance Crowdfunding (crowd lending, P2P lending, social lending) Online business lending Blockchain bonds E-leasing E-invoicing E-payments Credit scoring and modeling
Risk management	Digital or Electronic Insurance P2P Insurance Friendsurance Online Business Insurance Smart Contracts Regtech, Suptech Crypto Asset Exchange e-KYC Digital ID

Source: The Evolution of Financial Services in the Digital Age (2021)

The concept of economic growth has many different interpretations. According to Oxford University Press (2009), economic growth is "an increase in economic output, usually expressed as an increase in a country's income. Countries have different economic growth rates mainly due to differences in population growth, investment, and technical progress". According to the World Bank (1940), economic growth is "an increase in the real value of an economy over time. This may include an increase in the production of goods and services, GDP growth, or income growth". In addition, the International Monetary Fund (IMF) (1945) defined economic growth as "the increase in the value of goods and services produced by a country over a period of time". In addition, according to the Reserve Bank of Australia (RBA), economic growth is understood as "the increase in the size of a country's economy over a period of time. The size of an economy is often measured by the total production of goods and services in the economy, called gross domestic product (GDP)". According to the Institute of Strategy and Financial Policy in Vietnam, economic growth is defined as "the increase in wealth (assets) over a period of time". Thus, the concept of economic growth is expressed in many different ways. However, in general, economic growth is the increase in goods and services in an economy, often measured by gross domestic product (GDP).

2.2. The Relationship between Digital Financial Product Distribution and Economic Growth

In recent years, there have been many studies on the relationship between financial and economic growth, mainly through the theories of financial deepening and financial growth. However, research on digital finance and economic growth is still limited. Currently, studies are focusing more on the impact of digital finance on the imbalance between consumption, income and growth (Liu et al., 2021; Yu et al., 2022; Yu & Wang, 2021). However, we can see their impacts in the following three aspects. First, digital finance has played an essential role in increasing people's access to financial services. Second, digital finance contributes to improving the quality, stability, and productivity of the financial sector. Third, digital finance promotes innovation and entrepreneurship of new business models and advanced technologies.

First, digital finance helps improve people's access to and use of financial products and services, thereby significantly improving their income and quality of life. The theoretical foundation for the relationship between digital finance and financial inclusion is based on the premise that a large proportion of the population owns (or has) a mobile phone (Syed et al., 2021). Sapovadia (2018) points out that the use of mobile phones and internet services for online payments in developing countries also promotes financial literacy and increases financial inclusion. This has facilitated easier access to finance for people and improved resilience to financial challenges, especially in areas where access to financial services is limited. Galor et al. (1993) and Honohan (2004) believe that the development of digital finance means that all participants in the economic system can easily access formal financial services, such as bank deposits, credit, and insurance. For organizations, the more advanced technology is, the more access to finance is increased, helping employees to be fully informed and increase financial capabilities. Therefore, digital finance will change traditional financial institutions by improving technology, reducing costs, expanding access to the financial sector, and improving the efficiency of the financial system (Syed et al., 2021). In some areas without banks or ATMs, customers can still get the necessary financial support through devices such as computers and mobile phones (Liu et al., 2021). Thus, digital finance can provide more convenient and efficient financial services to people and population groups. This is beneficial to improving the efficiency of financial services for the real economy and sharing the fruits of economic development for everyone (Xi & Wang, 2023).

Furthermore, many studies have aimed to determine whether digital finance contributes to improving efficiency, transparency, and productivity in financial products and

services. Specifically, according to Ernst and Young (2017), technological advances in recent years related to mobile phones and internet access have facilitated improvements in the cost and delivery of banking and financial services, especially in the retail and consumer sectors. As a result, suitable financial products have been provided at low costs and in convenient ways. These financial products and services impact the economy through the connectivity of financial products and services, affordability and convenience of services, as well as growth in the banking sector and banking efficiency (Daud, 2023). The increase in the number of mobile phones and other digital devices has further enhanced the adoption of digital payments in emerging countries (Ramli & Hamzah, 2021). ICT-enabled technologies such as mobile payments, mobile wallets, online payments, and branchless banking have improved financial inclusion and financial inclusion (Niebel, 2018; Karakara & Osabuohien, 2020).

In addition, the globalization of the financial sector through technological advancements can positively affect the stability and sustainable development of the financial sector and cause adverse effects. On the positive side, some studies have concluded that the development of digital financial services will contribute to reducing operating costs. It increases the speed of financial transactions and supports the creation of an environment for stable and secure transactions. It also ensures proper monitoring and supervision of financial transactions (Pazarbasioglu et al., 2020). Pazarbasioglu and Mora (2020) argue that the expansion of digital financial services also increases the proportion of the unbanked population in formal banking, thereby diversifying market risks and promoting financial sector stability. However, on the negative side, digital finance also creates opportunities for systemic risks. Hodula and Pfeifer (2018) assert that various factors cause systemic risk or business risk, such as institutional linkages, financial market connectivity, macroeconomic conditions, and the size of the financial sector. In agreement with this view, Ozili (2018) concludes that although digital finance helps accelerate financial inclusion, it also poses some risks. For example, easy credit increases non-performing loans, and excessive use of fintech increases digital risks such as data theft, payment system disruptions, etc. (Vives, 2019). Therefore, timely and strict regulatory mechanisms need to be strengthened to avoid increasing systemic risk.

Ultimately, digital finance is the key to the development of a business model or the breakthrough of a startup. By facilitating the application of new technologies in an increasingly technological era, digital finance can create historic changes for the financial industry and other industries. Boot et al. (2021) argue that the rapid dissemination of inclusive digital finance can restructure the business model of traditional banks horizontally and

vertically. Li et al. (2023) argue that digital finance can solve the problem of misallocation of capital and improve financial efficiency, as well as promote corporate innovation by minimizing related financial challenges. In line with the above studies, Yang et al. (2022) assert that inclusive digital finance has a positive impact on corporate innovation, creating opportunities for implementing corporate innovation projects. Currently, most studies believe that the development of digital finance can stimulate economic development. However, the level of economic development of a country is related to the level of financial access of that country. The results of digital financial inclusion not only promote economic growth but also effectively improve the stability of the financial system and bring increasingly broader opportunities to society, which improves the living standards and well-being of low-income groups, thereby continuously promoting economic growth (Imam & Kpodar, 2016; Brander, 2006; Hu et al., 2020; Swamy & Vighneswara, 2014).

3. Methodology

The authors collected data from 19 Asian countries over a 10-year period from 2014 to 2023. The data were collected from the World Bank's Global Findex and World Development Indicators databases, and the IMF's Financial Access Survey.

By referring to the research model of Khera et al. (2021), we analyzed 03 regression models to assess the impact of digital financial product distribution on economic growth. In which, model (1) evaluates the overall impact of digital finance on economic growth; model (2) assesses the effect of factors on the customer side (demand side) using digital financial services on economic growth; model (3) evaluates the impact of factors on the side of digital financial service providers (supply side) on economic growth.

$$\begin{aligned}
 GROWTH_{i,t} = & \beta_0 + \beta_1 INTERNET_{i,t} + \beta_2 ATMpc_{i,t} + \\
 & \beta_3 DrCard_{i,t} + \beta_4 BankBr_{i,t} + \beta_5 mmac_{i,t} + \beta_6 dtpay_{i,t} + \\
 & \beta_7 INITIAL_INCOME_{i,t-1} + \beta_8 INVESTMENT_{i,t} + \\
 & \beta_9 POPULATION_{i,t} + \beta_{10} TRADE_{i,t} + \beta_{11} URBAN_{i,t} + \\
 & \beta_{12} GE_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 GROWTH_{i,t} = & \beta_0 + \beta_1 INTERNET_{i,t} + \beta_2 DrCard_{i,t} + \\
 & \beta_3 mmac_{i,t} + \beta_4 dtpay_{i,t} + \\
 & \beta_5 INITIAL_INCOME_{i,t-1} + \beta_6 INVESTMENT_{i,t} + \\
 & \beta_7 POPULATION_{i,t} + \beta_8 TRADE_{i,t} + \beta_9 URBAN_{i,t} + \\
 & \beta_{10} GE_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

$$\begin{aligned}
 GROWTH_{i,t} = & \beta_0 + \beta_1 INTERNET_{i,t} + \beta_2 ATMpc_{i,t} + \\
 & \beta_3 BankBr_{i,t} + \\
 & \beta_4 INITIAL_INCOME_{i,t-1} + \beta_5 INVESTMENT_{i,t} + \\
 & \beta_6 POPULATION_{i,t} + \beta_7 TRADE_{i,t} + \beta_8 URBAN_{i,t} + \\
 & \beta_9 GE_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t}
 \end{aligned}
 \tag{3}$$

Where GROWTH is the economic growth; INTERNET is the proportion of the population using the internet; ATMpc is the number of ATMs; DrCard is the proportion of people over 15 years old using debit cards; BankBr is the

number of commercial bank branches; mmac is the proportion of adults with mobile money accounts; dtpay is the proportion of adults who have made or received digital payments in the year; INITIAL_INCOME is the initial per capita income of a country; INVESTMENT is the investment-to-GDP ratio; POPULATION is the population growth rate; TRADE is the ratio of total trade to GDP; URBAN is the urbanization rate; GE is government expenditure as a percentage of GDP. The definitions and measurements of the variables are presented in Table 2.

Table 2: Variable Explanation

Variable	Definition	Measurement	References
Dependent variable			
GROWTH	Economic growth rate	GDP growth rate	Kuznets (1930), World Bank (1940)
Variables of interests			
INTERNET	Percentage of population using the Internet	Individuals using the Internet (% of population)	Khera et al. (2021)
ATMpc	Number of ATMs	ATMs per 100,000 adults	Aamir Aijaz Syed et al. (2021)
DrCard	The proportion of people over 15 years old using debit cards	The percentage of people over 15 years old using debit cards (%)	Shen et al. (2021)
BankBr	The number of commercial bank branches	Number of commercial bank branches per 100,000 adults	Shen et al. (2021)
mmac	The proportion of adults with mobile money accounts	The percentage of adults who has a mobile money account (%)	Khera et al. (2021)
dtpay	The proportion of adults who made or received a digital payment in the past year	The percentage of adults who made or received digital payments in the past year (%)	Banna & Alam (2021)
Control variables			
INITIAL INCOME	The initial per capita income of a country	Natural logarithm of GDP per capita (constant 2015 USD)	Daud (2023)
INVESTMENT	The investment-to-GDP ratio	Total capital formation to GDP	Daud (2023)
POPULATION	The population growth rate	Annual population growth	Daud (2023), Yaqin et al. (2023)
TRADE	The ratio of total trade to GDP	Total exports and imports of goods and services on GDP	Daud (2023), Yaqin et al. (2023)
URBAN	The urbanization rate	Urban population to total population	Liu et al. (2021), He et al. (2022)
GE	Government expenditure as a percentage of GDP	Government spending on goods and services to meet community consumption needs on GDP	Yaqin et al. (2023)

To solve the research problems, we used the synthesis, analysis and statistical methods based on the World Bank and IMF data and used graphs, tables and illustrations to increase the visualization of the study. In addition, to analyze the regression model, we conducted Breusch-Pagan Lagrange (LM) and Hausman tests to select the most suitable model among 3 models: Pooled Ordinary Least Square (POLS), Fixed Effect model (FEM), Random Effect model (REM), then applied the Feasible Generalized Least Square (FGLS) model to overcome the defects of autocorrelation and heteroskedasticity.

4. Results and Discussion

4.1. Descriptive Statistics

The results of descriptive statistical analysis show that for the dependent variable GROWTH (growth rate), the mean value is 0.037, the minimum value is -0.214, and the maximum value is 0.138. This means that the average economic growth rate of Asian countries in the data set is 3.7%. This figure indicates that the economies of Asian countries are growing relatively steadily. The variable INTERNET has a mean value greater than 0.5, indicating that the internet penetration and usage level in Asia is

relatively high. The variables ATM and BankBr have very small mean values, indicating that the average number of ATMs and bank branches is relatively low. This reflects that the banking and financial system in Asia needs to be further developed to meet the demands of the people. In addition,

the mean value of the variable TRADE is close to 1, indicating that Asia's level of trade openness is relatively high, which means that Asian countries are actively participating in the global economy.

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
GROWTH	190	0.0369957	0.0445608	-0.213999	0.1378737
INTERNET	190	0.5231149	0.2685245	0.018	1
ATM	190	0.0004233	0.0003024	6.06e-06	0.0011779
DrCard	190	0.354189	0.2806496	0.017047	0.9350083
BankBr	190	0.0001626	0.0001453	0.0000274	0.0007123
mmac	190	0.0878044	0.1081848	0.0016379	0.5999989
dtpay	190	0.4190533	0.2837142	0.0416823	0.9740934
INITIAL INCOME	190	8.49298	1.002808	6.95654	11.1178
INVESTMENT	190	0.2536591	0.0634339	0.0535948	0.5327571
POPULATION	190	0.0121638	0.0175727	-0.0417034	0.1179402
TRADE	190	0.9903248	0.6942006	0.2470158	3.670418
URBAN	190	0.5915127	0.225876	0.21415	1
GE	190	0.1254486	0.0391823	0.0236014	0.2250891

4.2. Regression Analysis

The study conducted a regression of the impact of each digital financial product distribution variable on the dependent variable of economic growth (GROWTH), presented in 03 research models (in Section 3). For each model, we carried out a test of three regression models, POLS, FEM, and REM, to select the most optimal model. Then, we tested the model's defects and conducted a FGLS test to amend these defects. Finally, we obtained results on the impact level of independent variables on the dependent variable in each model.

First, the study conducted Wald and Hausman tests to select the most suitable model. Finally, we concluded that the FEM is more appropriate and effective than the OLS and REM. Next, we conducted a test for model defects, and the results showed that the model had heteroscedasticity and autocorrelation. The study also carried out a test for multicollinearity through the VIF (variance inflation factor), the results demonstrated that the coefficients were small and the average value was less than 10. This means that the model had low multicollinearity, which did not affect the model's estimation results.

Finally, the FGLS model is applied to correct the autocorrelation and heteroscedasticity. The results in Table 4 show that in the overall regression model (Model (1)), only two variables related to digital finance, INTERNET and mmac, have a statistically significant impact on economic growth. The variable INTERNET has a negative impact at the 5% significance level, and the variable mmac positively affects GROWTH at the 1% significance level.

Table 4: Regression Results of Model (1)

	POLS (1)	FEM (2)	REM (3)	FGLS (4)
INTERNET	-0.0337* (-1.91)	-0.102*** (-3.10)	-0.0375* (-1.80)	-0.0366** (-2.48)
ATM	13.84 (0.79)	97.18** (2.03)	22.03 (0.90)	4.465 (0.28)
BankBr	-25.16 (-0.78)	-121.1 (-0.46)	-22.53 (-0.44)	-8.179 (-0.22)
mmac	0.0579 (1.46)	0.106** (2.43)	0.0633 (1.55)	0.0821*** (3.31)
dtpay	-0.0228 (-0.90)	-0.0219 (-0.65)	-0.0338 (-1.12)	-0.0220 (-1.57)
INITIAL INCOME	-0.000601 (-0.08)	0.240*** (5.38)	0.00632 (0.59)	-0.00435 (-0.79)
INVESTMENT	0.163*** (2.75)	0.323*** (3.66)	0.242*** (3.36)	0.0962** (2.14)
POPULATION	0.313 (1.60)	-0.133 (-0.67)	0.284 (1.43)	0.0693 (0.61)
TRADE	0.00998 (1.51)	0.00783 (0.27)	0.00664 (0.61)	0.00998** (2.02)
URBAN	-0.0393 (-1.43)	-1.201*** (-3.13)	-0.0438 (-1.07)	-0.0139 (-0.73)
GE	-0.0561 (-0.57)	-0.905*** (-4.43)	-0.174 (-1.28)	-0.0544 (-0.69)
_cons	0.0378 (0.75)	-1.231*** (-3.71)	-0.0179 (-0.24)	0.0747** (1.96)
N	190	190	190	190
R-sq	0.251	0.357		

t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The results in Table 5 indicate that in the regression model of demand-side factors (Model (2)), only three variables, INTERNET, mmac, and dtpay, have a statistically significant impact on economic growth. Of which, INTERNET has a negative impact at the 1% significance level. Similarly, dtpay has a negative effect at the 10% significance level. On the contrary, mmac positively associates with GROWTH at the 1% significance level. For the control variables, the results show that only the variables INVESTMENT and TRADE have a statistically significant impact on economic growth at the 5% significance level.

Table 5: Regression Results of the Demand-side Factor Model (Model (2))

	POLS (1)	FEM (2)	REM (3)	FGLS (4)
INTERNET	-0.0237* (-1.70)	-0.0962*** (-3.04)	-0.0278 (-1.58)	-0.0332*** (-2.61)
mmac	0.0470 (1.30)	0.0869** (2.20)	0.0501 (1.34)	0.0793*** (3.53)
dtpay	-0.0180 (-0.91)	-0.0130 (-0.38)	-0.0240 (-0.98)	-0.0213* (-1.70)
INITIALINCOME	0.00178 (0.29)	0.241*** (5.57)	0.00645 (0.72)	-0.00378 (-0.77)
INVESTMENT	0.165*** (2.83)	0.275*** (3.25)	0.230*** (3.31)	0.0952** (2.24)
POPULATION	0.306 (1.62)	-0.146 (-0.73)	0.277 (1.41)	0.0709 (0.63)
TRADE	0.0105 (1.60)	0.0148 (0.51)	0.00841 (0.85)	0.0104** (2.12)
URBAN	-0.0520** (-2.22)	-1.052*** (-2.77)	-0.0521 (-1.55)	-0.0176 (-1.02)
GE	-0.0634 (-0.69)	-0.846*** (-4.20)	-0.142 (-1.14)	-0.0612 (-0.82)
_cons	0.0204 (0.46)	-1.318*** (-4.10)	-0.0190 (-0.30)	0.0716** (2.16)
N	190	190	190	190
R-sq	0.248	0.338		

t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6 illustrates that INTERNET and ATM are the two variables that significantly influence economic growth. In which, INTERNET has a negative impact at the 5% significance level. On the contrary, the variable ATM has a positive effect at the 10% significance level. Regarding the control variables, the results indicate that except for POPULATION and TRADE, the remaining variables significantly affect economic growth. In which, INITIAL INCOME and INVESTMENT have a positive impact on GROWTH at the 1% significance level; URBAN and GE have a negative impact on GROWTH at the 5% and 1% significance level, respectively.

Table 6: Regression results of the supply-side factor model (Model (3))

	POLS (1)	FEM (2)	REM (3)	FGLS (4)
INTERNET	-0.02467 (-1.49)	-0.0988*** (-2.99)	-0.025 (-1.36)	-0.0987** (-2.50)
ATM	4.0703 (0.27)	93.09* (1.93)	6.692 (0.32)	93.09* (1.87)
BankBr	-19.88 (-0.65)	-370.8 (-1.51)	-22.76 (-0.50)	-370.8 (-0.95)
INITIALINCOME	-0.000867 (-0.13)	0.2341*** (5.26)	0.00326 (0.34)	0.2341*** (4.53)
INVESTMENT	0.163*** (2.92)	0.3418*** (3.84)	0.228*** (3.40)	0.3418*** (3.67)
POPULATION	0.3102 (1.58)	-0.1248 (-0.62)	0.294 (1.49)	-0.1248 (-0.92)
TRADE	0.0100018 (1.52)	0.02406 (0.85)	0.00753 (0.75)	0.02406 (0.90)
URBAN	-0.0531** (-2.07)	-0.9258 (-2.54)	-0.0572 (-1.56)	-0.9258** (-2.50)
GE	-0.043005 (-0.45)	-0.7835*** (-3.96)	-0.125 (-0.98)	-0.7835*** (-4.78)
_cons	0.0406 (0.88)	-1.342*** (-4.22)	0.00406 (0.06)	-1.342*** (-4.26)
N	190	190	190	190
R-sq	0.251	0.332		0.332

t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In summary, the quantitative results demonstrate the impact of each independent variable in each model on the dependent variable, GROWTH. First of all, INTERNET has a negative impact on GROWTH. This reflects that the higher the proportion of the population using the internet in a country, the lower the economic growth rate of that country. Although this result is contrary to the authors' expectation that the impact of all variables related to digital financial product distribution on economic growth is positive, the above results are still statistically significant, implying that policy measures to increase economic growth through Digital Finance should not completely ignore this variable. Moreover, the results on the negative impact of the proportion of the population using the internet on economic growth are still partially explained in some prior studies. Acemoglu et al. (2000) analyze the impact of the internet and information technology on economic growth from a historical and political perspective. They argue that although information technology can create new opportunities and increase access to information, it can increase inequality and create adverse social reactions, which affects economic growth. Previously, Van Alstyne and Brynjolfsson (1996) argued that in some cases, the internet can generate fragmentation and isolation, rather than creating a global community. This can negatively affect economic growth by

reducing the connectivity and efficiency of global markets. In addition, Autor and Dorn (2013) stated that the development of the internet and information technology has contributed to the fragmentation of the labor market, leading to a greater distinction between high-skill and low-skill based jobs, which may cause consequences by affecting economic growth and income inequality.

Three variables related to digital financial product distribution, *ATMpc*, *mmac*, and *dtpay*, all have a positive impact on *GROWTH*. First, *ATMpc* has a positive impact on *GROWTH*, which shows that the higher the number of ATMs per 100,000 adults in a country, the higher the economic growth of that country. This finding is also different from the previous study by Barro et al. (2007) but similar to the study by Ozturk and Ullah (2022), which also found a positive impact of the number of ATMs on the economic growth of OBRI countries. *mmac* has a positive effect on *GROWTH*, indicating that the higher the proportion of adults with mobile money accounts, the better the economic growth. This result is consistent with the findings of Demircuc-Kunt et al. (2018), who analyzed the relationship between mobile money account ownership and economic growth. They showed that countries with a high proportion of adults owning mobile money accounts tend to have better economic growth. In addition, Dupas and Robinson (2013) evaluated the impact of providing mobile money accounts to Kenyans on small business activities. Their findings suggested that mobile money account ownership can increase business opportunities and enhance economic growth in the community. In addition, Jack & Suri (2014) examined how the use of mobile money services in Kenya has affected risk sharing and reduced transaction costs in the community. They concluded that the development of mobile money has increased business opportunities and economic growth. Finally, *dtpay* positively affects *GROWTH*, indicating that the higher the proportion of adults who have made or received digital payments in the year, the higher the economic growth of a country. This finding is similar to the study by Shen et al. (2021), in which the proportion of adults who have made or received digital payments in the year was used to calculate the digital finance index, and they found a positive relationship between digital financial inclusion and economic growth.

The control variables *INITIAL INCOME*, *INVESTMENT*, *TRADE* have a positive impact on *GROWTH*. Thus, it can be interpreted that the higher a country's initial per capita income, the higher its investment-to-GDP ratio, and the higher its total trade-to-GDP ratio, the better its economic growth rate. This result is also consistent with the findings of Barro (1991), Easterly and Rebelo (1993), Rodriguez and Rodrik (2000), Dollar & Kraay (2004), and Daud (2023). On the contrary, the two control

variables, *URBAN* and *GE*, have a negative impact on *GROWTH*, showing that the higher the urbanization rate and the higher the government spending of a country, the lower its economic growth rate. This result is a new finding of this study and is relatively different from previous studies such as Ahmad et al. (2021) and Chengying et al. (2022).

5. Conclusions

This study provides empirical evidence on the impact of digital financial product distribution on economic growth in 19 Asian countries, highlighting both the opportunities and challenges presented by digital financial innovations. The findings suggest that while mobile money accounts and digital payments positively influence economic growth, internet usage exhibits a negative correlation with growth. These results indicate that while digital finance has the potential to boost economic activity, its effects are not uniform across all components, and careful consideration must be given to the specific digital finance services and infrastructure in place. The positive impact of mobile money accounts and digital payments underscores the importance of expanding access to digital financial services, particularly in regions with limited traditional banking infrastructure. By promoting financial inclusion and enabling consumers and businesses to participate more actively in the formal economy, these services can drive growth and improve living standards. The negative correlation between internet usage and economic growth, however, suggests that simply increasing internet access is not sufficient to guarantee positive economic outcomes. This may be due to the uneven quality of internet services, regulatory challenges, or the potential for digital disruptions that adversely affect economic stability. Based on the findings, several policy recommendations emerge. First, governments should focus on creating a favorable regulatory environment for digital finance, ensuring that fintech companies and traditional financial institutions can operate within a framework that promotes innovation while safeguarding financial stability. Second, investment in digital infrastructure, particularly in underserved areas, is crucial to expanding the reach of digital financial services. Finally, efforts to improve financial literacy and consumer awareness of digital finance products will be essential to maximizing the economic benefits of digital finance.

In conclusion, digital finance offers significant potential for economic growth in Asian countries, but its successful implementation requires a holistic approach that addresses both supply-side and demand-side factors. By fostering a robust digital finance ecosystem, policymakers can unlock new opportunities for growth and development, contributing to the overall economic prosperity of the region.

Furthermore, the study still has several limitations that need to be addressed. First, in terms of research scope, data was only collected for 10 years in 19 Asian countries, due to limited available data. Second, regarding the measurement of economic growth, the topic only uses the available index, the World Bank's GDP growth index, and has not yet developed its own index for measurement. Third, when measuring digital financial product distribution, we only focus on certain aspects such as accessibility, availability, usage level, ownership rate of financial products and services, etc., without considering other aspects such as financial consumer protection; the level of access to other financial products and services such as insurance, pensions, financial services for agricultural and rural areas. Further research is needed to overcome these limitations, explore the long-term effects of digital finance on different sectors of the economy, and identify the specific conditions under which digital finance can most effectively drive economic growth.

References

- Acemoglu, D., & Robinson, J. A. (2000). Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective. *Quarterly Journal of Economics*, 115(4), 1167-1199.
- Ahmad, M., Majeed, A., Khan, M. A., Sohaib, M., & Shehzad, K. (2021). Digital financial inclusion and economic growth: Provincial data analysis of China. *China Economic Journal*, 14(3), 291-310.
- Autor, D. H., & Dorn, D. (2013). The growth of low-skill service jobs and the polarization of the US labor market. *American Economic Review*, 103(5), 1553-1597.
- Banna, H. & Alam, M.R. (2021). Is digital financial inclusion good for bank stability and sustainable economic development? Evidence from emerging Asia. *ADB Working Paper Series*, No. 1242.
- Barro, R. J. (1991). Economic growth in a cross section of countries. *The quarterly journal of economics*, 106(2), 407-443.
- Boot, A, Hoffmann, P., Laeven, L. & Ratnovski, L. (2021), Fintech: what's old, what's new? *Journal of Financial Stability*, 53(2021), Article 100836.
- Brander, J. A. (2006). The effect of ethical fund portfolio inclusion on executive compensation. *Journal of Business Ethics*, 69(4), 317-329.
- Chengying, H., Ke, H., Zhang, W., & Qingcheng, H. (2022). Dynamic efficiency of China's commodity futures market through the lens of high frequency data. *International Journal of Financial Engineering*, 9(1), 2141012.
- Daud, S. N. M. (2023). Financial inclusion, economic growth and the role of digital technology. *Finance Research Letters*, 53, 103602.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2018). *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*. The World Bank.
- Dollar, D., & Kraay, A. (2004). Trade, Growth, and Poverty. *The Economic Journal*, 114(493), F22-F49.
- Dupas, P., & Robinson, J. (2013). Savings constraints and microenterprise development: Evidence from a field experiment in Kenya. *American Economic Journal: Applied Economics*, 5(1), 163-192.
- Easterly, W., & Rebelo, S. (1993). Fiscal policy and economic growth: an empirical investigation. *Journal of Monetary Economics*, 32(3), 417-458.
- Ernst and Young (2017). EY FinTech Adoption Index 2017. *Ernst & Young Global Limited*.
- Galor, O. & Zeira, J. (1993), Income Distribution and Macroeconomics. *The Review of Economic Studies*, 60, 35-52.
- Hodula, M. & Pfeifer, L. (2018), Fiscal-monetary-financial stability interactions in a data-rich environment. *Review of Economic Perspectives*, 18, 195-224.
- Honohan, P. (2004), Financial Development, Growth and Poverty: How close are the links?. *World Bank Policy Research Working Paper* 3203,1-31.
- Hu, Y., Liu, C., & Peng, J. (2020). Financial inclusion and agricultural total factor productivity growth in China. *Economic Modelling*, 96(1).
- Imam, P., & Kpodar, K. (2016). Islamic banking: Good for growth? *Economic Modelling*, 59, 387-401.
- Jack, W., & Suri, T. (2014). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review*, 104(1), 183-223.
- Karakara, A.A.W. & Osabuohien, E. (2020), ICT adoption, competition and innovation of informal firms in West Africa: A comparative study of Ghana and Nigeria. *Journal of Enterprising Communities: People and Places in the Global Economy*, 14, 397-414.
- Khera, P., S. Ng, S. Ogawa, & R. Sahay (2021), Is Digital Financial Inclusion Unlocking Growth?. *IMF Working Paper*, No. 21/xx, International Monetary Fund, Washington, D.C.
- Li, Y.R., Sun, G.L., Gao, Q. & Cheng, C.M. (2023), Digital financial inclusion, financial efficiency and green innovation. *Sustainability*, 15(3) , p.1879.
- Liu, Y., Luan, L., Wu, W., Zhang, Z. & Hsu, Y. (2021), Can digital financial inclusion promote China's economic growth?. *International Review of Financial Analysis*, 78 (2021), 101889.
- Niebel, T. (2018), ICT and economic growth—Comparing developing, emerging and developed countries. *World Development*, 104, 197-211.
- Oxford University Press (n.d), *Overview Economic Growth*, retrieved from <https://www.oxfordreference.com/display/10.1093/oi/authority.20110803095741367>
- Ozili, P.K. (2018), Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18, 329-340.
- Ozturk, I. & Ullah, S. (2022), Does digital financial inclusion matter for economic growth and environmental sustainability in OBRI economies? An empirical analysis. *Resources, Conservation and Recycling*, 185, October 2022, 106489.
- Pazarbasioglu, C. & Mora, A.G. (2020), Expanding Digital Financial Services Can Help Developing Economies Cope with Crisis Now and Boost Growth Later; *World BankVoices (Blog): Washington, DC, USA*.
- Pazarbasioglu, C., Mora, A.G., Uttamchandani, M., Natarajan, H., Feyen, E. & Saal, M. (2020), Digital Financial Services; *World Bank: Washington, DC, USA*.

- Ramli, F.A.A. & Hamzah, M.I. (2021), Mobile payment and e-wallet adoption in emerging economies: A systematic literature review. *Journal of Emerging Economies and Islamic Research*, 9, 1–39.
- Rodriguez, F., & Rodrik, D. (2000). Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. *NBER Macroeconomics Annual*, 15(1), 261-338.
- Shen, Y., Hua, W., & Hueng, C.J. (2021). Digital Financial Inclusion and Economic Growth: A Cross-country Study. *Procedia Computer Science*, 187(2021), 218–223.
- Swamy & Vighneswara. (2014). Financial inclusion, gender dimension, and economic impact on poor households. *World Development*, 56, 1–15.
- Syed, A.A., Ahmed, F., Kamal, M.A. & Trinidad Segovia, J.E. (2021), Assessing the Role of Digital Finance on Shadow Economy and Financial Instability: An Empirical Analysis of Selected South Asian Countries. *Mathematics* 2021, 9, 3018.
- Van Alstyne, M., & Brynjolfsson, E. (1996). *Electronic Communities: Global Village or Cyberbalkans?*. Proceedings of the International Conference on Information Systems (ICIS).
- Vives, X. (2019), Digital disruption in banking. *Annu. Review of Financial Economics*, 11, 243–272.
- Xi, W. & Wang, Y. (2023), Digital financial inclusion and quality of economic growth, *Heliyon*, 9(9), September 2023, e1973.
- Yang, Y., Shi, S.H. & Wu, J.J. (2022), Digital financial inclusion to corporation value: the mediating effect of ambidextrous innovation. *Sustainability*, 14(24), Article 16621.
- Yaqin, M. & Safuan, S. (2023), Digital Finance for Financial Inclusion and Inclusive Growth. *Digital Transformation in Business and Society*, 164-177.
- Yu, C., Jia, N., Li, W. & Wu, R. (2022), Digital inclusive finance and rural consumption structure - evidence from Peking University digital inclusive financial index and China household finance survey, *China Agricultural Economic Review*, 14(1), 165-183.
- Yu, N. & Wang, Y. (2021), Can digital inclusive finance narrow the Chinese urban-rural income gap? The perspective of the regional urban-rural income structure. *Sustainability*, 13(11).