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Digital Literacy and Cashless Payment: Evidence from Indonesia

Ahmad Pudin Syari[1], Etika Karyani[1,2], Putra Pamungkas[1,2,*], and Aldy Fariz Achsanta[1,2,]
[1]Faculty of Economics and Business, Universitas Sebelas Maret, Solo, Indonesia
[2]Center for Fintech and Banking, Universitas Sebelas Maret, Solo, Indonesia

Abstract. *Digital financial literacy is an important factor in a person's economic behavior. A person who has a high level of digital literacy will use financial services to obtain the maximum benefit from the financial services used. In payment behavior, a person with a high level of literacy will use the payment system that provides the most financial benefits. However, there are various literatures that provide varying results regarding the impact of digital financial literacy on payment system usage. Therefore, in this study, we empirically examine the impact of digital financial literacy on the use of payment systems, especially cashless at the provincial level in Indonesia. We use 136 observations per province year for the period 2019 - 2022 to test our empirical model covering 34 provinces. We find that overall, digital financial literacy has no effect on the use of non-cash payment systems.*

Keywords: *Financial literacy, digital, cashless, payment, financial literacy*

1. Introduction

Technology has made a significant impact on the economic landscape in financial literacy. Financial technology can be a solution in accelerating market development towards financial inclusion (Telukdarie & Mungar, 2023). Innovations in technology have increased the capacity to deliver financial services that can improve digital financial literacy (OECD, 2020). However, the impact of digital financial services on savings, loans, and investments is tempered by digital financial literacy. Therefore, digital financial literacy is essential to ensure that people can easily access financial products and services for financial inclusion (Angeles, 2022).

Digital financial literacy has become an important issue in financial management, especially in Indonesia. The many innovations in the fintech field have created a variety of new options for citizens (Putri et al., 2022). This makes the ability to make financial decisions even more crucial. The significant influence of technology has changed the economic landscape in financial literacy (Telukdarie & Mungar, 2023). Technology has a significant impact on people's access to financial services (Angeles, 2022; P. Morgan et al., 2019). (Lo Prete, 2021) explains that there is an influence of the level of digital financial literacy on decisions to use financial services such as non-cash payment systems. The impact of digital financial literacy on the use of non-cash payment systems has mixed results in previous empirical studies. Based on several studies conducted in the U.S., Europe, and Africa, it shows the influence of digital financial literacy on the use of software for financial services (Seldal & Nyhus, 2022; Świeck, 2018).

Digital financial literacy is a set of competencies that includes elements of financial literacy and digital skills to increase welfare by utilizing digital financial products and services effectively and responsibly (Andreou & Anyfantaki, 2020). Digital financial literacy can be visualized as a multidimensional concept that includes:

*Corresponding author. Email: putra.pamungkas@outlook.com
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knowledge of digital financial products and services, awareness of digital financial risks, digital financial risk management, and knowledge of consumer rights and redress procedures (P. J. Morgan et al., 2019).

The research on digital financial literacy and cashless payment systems benefits academic institutions by informing curriculum development and providing a new measurement matrix. Financial institutions can use these insights to create inclusive products, engage customers, and assess risks. Government agencies can develop policies to enhance digital literacy, support digital inclusion, and promote cashless payments, leading to economic efficiency, innovation, and social equity. Overall, the study advances knowledge and offers practical tools to improve financial practices and policies, contributing to a more inclusive and efficient financial ecosystem.

2. Literature Review/ Hypotheses Development

Digital financial literacy is a set of competencies that includes elements of financial literacy and digital skills to increase welfare by utilizing digital financial products and services effectively and responsibly (Andreou & Anyfantaki, 2020). According to Bhandari and Deaves, digital financial literacy is the ability of individuals to decide and manage financial resources wisely, which begins with knowing, understanding, believing, to being skilled and actively involved in managing finances for welfare (Bhandari et al., 2008). Digital financial literacy can be visualized as a multidimensional concept that includes: knowledge of digital financial products and services, awareness of digital financial risks, digital financial risk management, and knowledge of consumer rights and redress procedures (P. Morgan et al., 2019). Digital financial literacy reflects the level of education and increases the likelihood of using digital financial products and services to improve financial access (Hasan et al., 2021).

According to (Da et al., 2015a) internet search behavior can reflect individual behavior in the real world. With this assumption, digital financial literacy can be measured directly through internet search behavior. Search volume index (SVI) such as Google Trends can be used to find search volume related to digital financial literacy. Studies on how digital financial literacy affects people's payment behavior have different views. Some argue that literacy has an influence on payment behavior with information openness due to technological developments. Others argue that literacy has no effect on a person's choice of payment method.

Based on the results of the study (Matita & Chauma, 2021), there is a positive effect of literacy on the use of mobile financial services. The likelihood of use will increase with increasing digital financial literacy which shows the relevance of digital financial literacy in expanding the use of mobile phones for financial services. (Świecka et al., 2021) found that knowledge about finance has a significant impact on an individual's choice of payment method. Individuals with higher levels of digital financial literacy will tend to choose to use non-cash payment systems. But the other research shows that there is no correlation between digital financial literacy and the use of payment system (Estisia Pratiwi & Saefullah, 2022; Marcotty-dehm, 2021; Zakiyyah et al., 2020).

3. Methodology

The data used in this study are sourced from Bank Indonesia (BI), Central Bureau of Statistics (BPS), and Google Trends search volume engine (SVI). We obtain 136 observations per province year for the period 2019 - 2022 to test our empirical model covering 34 provinces.

Digital financial literacy

To find information and knowledge about financial management, digital media is a place that presents a variety of information that can be accessed easily by anyone (Telukdarie &

Mungar, 2023). Therefore, the use of search volume index to see how people's behavior in searching for information related to financial management on the internet can reflect the level of digital financial literacy (Da et al., 2015). There are four main topics in determining the keywords used to measure the level of digital financial literacy such as: financial services, knowledge of financial risks, financial risk management, and knowledge of consumer rights and redress procedures.

Table 1.
Digital Financial Literacy Matrix

Knowledge Financial products and services	**Digital financial risks**	**Risk management**	**Consumer rights and redress procedures**
Mobile Banking	Phising	Riskmatriks	Negotiation
E-money	Pharming	PIN	Mediation
QRIS	Spyware	Internet security	Badan Consumer Protection Agency
Cryptocurrency	Scam	Backup data	Consumer Rights
Paylater	hacking	Password	Court
Securities Online	Spyware		
Peer to peer lending	Doxing		
Crowdfunding			
E-wallet			

Cashless payment system
We use three financial services that are often used as a reference for using non-cash payment systems such as ATMs, credit cards, and e-money. The three financial services are used because they are available as banking services, so there is a guarantee for consumers when making transactions through these services. We use data obtained from the Payment System and Financial Market Infrastructure (SPIP) Statistics report issued by Bank Indonesia (BI).3.2 Econometric specification

To examine the effect of digital financial literacy on the use of non-cash payment systems. first we do the chow test, hausman test, and langrange multiplier test to find out the best model that can be used. after.

The econometric model is as follows:

$$ATM_{it} = \beta_0 + \beta_1 DFL_{it} + \sum_m \theta_m \text{Control}_{it} + \varepsilon_{it} \quad (1)$$

$$Credit\ Card_{it} = \beta_0 + \beta_1 DFL_{it} + \sum_m \theta_m \text{Control}_{it} + \varepsilon_{it} \quad (2)$$

$$E - money_{it} = \beta_0 + \beta_1 DFL_{it} + \sum_m \theta_m \text{Control}_{it} + \varepsilon_{it} \quad (3)$$

Where DFL is digital financial literacy per province collected from search volume engine (SVI), we expect a positive influence of digital financial literacy on the use of non-cash payment system represented by ATM, credit cards, and E-money. Therefore, digital financial literacy can encourage the use of technology to improve people's ability in digital-based financial management.

Table 2.
Descriptive Statistics

Variable	Definition	obs	mean	std	max
DFL_index	Digital financial literacy	136	1,557093426	0,998651804	6,484739126
TP	Total population in Indonesia	136	7982,15	11204,526	49405,8
NBO	Number of branch offices	136	104,8602941	114,8684383	471
ATM	ATM/Debit amount in millions	136	6,259411765	9,703203348	44,96
CC	Credit card amounts in millions	136	0,495367647	1,105819561	6,13
EM	E-money amount in millions	136	2,429288039	9,516122559	95,0093771

We also use control variables in equations (1-3). We include population as a variable to see how population growth can affect the use of cashless payment systems. With an increase in population, the number of non-cash payment system users will increase. We also include the number of branches of banks to see the role of banks in promoting non-cash payment systems.

Table 3.
Choosing Model

Test	ATMs	Credit Cards	E-Money
Chow	0.0002	6.3320	0.0220
Hausman	0.0000	0.0771	0.0000
LM	0.0000	1.0972	0.0000

4. Findings and Discussion

Based on rigorous statistical analyses including the Chow test for structural stability, the Hausman test for endogeneity, and the Langrange multiplier test for omitted variable bias, it has been conclusively established that the model pertaining to ATMs and E-money is best suited for estimation employing the Fixed Effect Model, whereas the model concerning Credit Cards demonstrates superior fit and efficiency under the Random Effect Model framework. As shown in Table 2, digital financial literacy has no effect on the use of non-cash payment systems. The level of digital financial literacy that is not balanced with the level of financial inclusion is thought to be a strong underlying factor (Estisia Pratiwi & Saefullah, 2022). The ease of access provided by non-cash payment systems has a higher role to encourage individuals to use non-cash payment systems.

Table 4
Baseline Regression

	Atm	Credit card	E-money
const	0.8853	0.0002**	0.3491
	(0.1446)	(-3.7649)	(0.9409)
DFL_index	0.2747	0.0482*	0.4189
	(-1.0983)	(1.9945)	(0.8118)
NBO	0.0660	0.0004**	0.1890
	(-1.8593)	(3.6061)	(-1.3228)
TP	0.0004**	0.3039	0.4011
	(3.6826)	(-1.0321)	(0.8433)

Note: t statistics in parentheses *$p < 0.05$, ** $p < 0.01$,

If we refer to table 3.2, it can be seen that the average digital financial literacy in Indonesia is low. Despite having a low level of digital financial literacy, people still use non-cash payment systems. The view of a safe and trustworthy payment system is the main factor in using non-cash payment systems (Zakiyyah et al., 2020).

Table 5.
Excluding Provinces in Java Island

	Atm	**Credit card**	**E-money**
const	0.1291	0.0409*	0.0015**
	(-1.5290)	(-2.0689)	(-3.2603)
DFL_index	0.1504	0.9681	0.0313*
	(1.4481)	(-0.0401)	(2.1808)
NBO	0.1700	0.0040**	0.3197
	(1.3810)	(2.9414)	(0.9994)
TP	0.0000**	0.0177**	0.1099
	(5.0355)	(2.4064)	(1.6115)

Note: t statistics in parentheses *p < 0.05, ** p < 0.01,

To reduce the bias caused by the concentration of population in Java Island, we conduct a separate estimation that does not include the provinces in Java Island, which can be seen in Table 3. If the provinces in Java are excluded, the estimation shows similar results where the level of digital financial literacy has no impact on the use of cashless payment systems in Indonesia.

We found that an increase in the number of banking branches affects the number of users of cashless payment systems. Other factors such as guaranteed security because there is a banking office not far from where a person lives. This makes any problems that occur in the non-cash payment system can be handled immediately at the nearest branch office. Security and guaranteed customer service are other factors that can influence the use of non-cash payment systems (Marcotty-dehm, 2021).

Discusion

In this study, we examined the relationship between digital financial literacy and the use of cashless payment methods. Contrary to our initial hypothesis, the findings indicate that there is no significant correlation

between these two variables. This section discusses potential reasons for this lack of correlation, acknowledges the limitations of the secondary sources utilized, and addresses the underdeveloped matrix measurement of digital financial literacy.

The adoption of cashless payment systems is influenced by a variety of factors, including perceived ease of use, trust, perceived usefulness, social influence, facilitating conditions, and rewards. These factors are crucial in determining the likelihood of individuals adopting and using cashless payment methods (Namahoot & Boonchieng, 2023; Putri Ramadhanti et al., 2022).

It is imperative to acknowledge the limitations inherent in the secondary sources utilized for this study. The data sources may not comprehensively capture the nuances of digital financial behavior across different demographics and regions. Furthermore, the matrix used to measure digital financial literacy remains underdeveloped, potentially lacking the precision needed to accurately reflect individuals' capabilities and understanding. This underdevelopment could lead to an oversimplification of digital financial literacy, failing to account for the diverse competencies that contribute to effective use of digital financial tools.

5. Conclusions

The lack of a strong correlation between digital financial literacy and the use of cashless payment methods highlights the multifaceted nature of financial behavior. While digital financial literacy is undoubtedly important, its impact on the adoption of cashless payment methods is mediated by other significant factors. Moreover, the limitations of the secondary sources and the underdeveloped matrix measurement of digital financial literacy must be addressed in future research to develop a more nuanced understanding of this relationship. Future research should explore these factors in greater detail to develop more comprehensive strategies for promoting digital financial inclusion.

Based on the findings and limitations discussed, we propose the following policy recommendations focused on enhancing digital financial literacy:

1. *Comprehensive Digital Financial Education Programs:*
   Develop and implement comprehensive education programs that cover a wide range of digital financial topics. These programs should include practical training on using digital financial tools, understanding digital transactions, and managing online financial security.
2. *Customized Learning Approaches:*
   Tailor digital financial literacy programs to meet the needs of different demographic groups. For example, programs for older adults might focus more on basic digital skills and security, while programs for younger users could emphasize advanced digital financial products and investment options.
3. *Focus on Security and Fraud Prevention:*
   Emphasize education on digital security practices and fraud prevention. As digital financial transactions increase, it is crucial for users to understand how to protect themselves from cyber threats and financial fraud.

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