

DETERMINANTS OF DIGITAL FINANCIAL LITERACY: AN EMPIRICAL STUDY IN THE CONTEXT OF DEVELOPING ECONOMY

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Abstract

This study proposed four major constructs – digital financial knowledge, digital financial risk awareness, digital financial risk control and consumers' data protection, and explores the relationships with digital financial literacy. This study employed an empirical approach based on a structured questionnaire survey to collect quantitative data. Total 357 data were collected through convenience sampling technique. As well, in order to fulfill the research objective, four hypotheses are formed. PLS-SEM techniques were used to assess the suggested or propose hypothesis. The results revealed that digital financial knowledge, digital financial risk awareness, digital financial risk control and consumers' data protection have significant and positive relationships with digital financial literacy. Therefore, investing resources to increase digital financial knowledge, digital financial risk awareness, digital financial risk control and consumers' data protection is helpful to enhance digital financial literacy. This study provides valuable insights for policy-makers, practitioners and users to emphasizing the necessity of digital financial literacy in orders to achieve inclusive and sustainable financial and economic growth.

Keywords: Digital Financial Literacy, digital financial knowledge, digital financial risk awareness, digital financial risk control and consumers' data protection.

1. Introduction

Financial literacy (FL) is extensively recognized as a basic life skill that empower individuals to make informed and effective financial decisions, by this means contributing to their overall financial well-being within an increasingly complex financial environment (OECD, 2013). Both scholars and practitioners alike emphasize that financial literacy consider as a vital instrument for promoting financial inclusion and enhancing long-term financial protection (Lyons, Kass-

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Hanna, & Fava, 2021). Lusardi & Mitchell (2014) explained that financially knowledgeable individuals are able to take healthier plan for the future, save money, invest wisely, and handle their money effectively through a variety of means, such as annuities, loans, and other investment portfolios. Financial literacy defined as the knowledge and understanding of financial perceptions and risks, combined with the skills and confidence to implement such knowledge for effective financial decision-making in diverse contexts (PISA, 2022). This capacity ultimately supports both individual and societal financial health and fosters active participation in the economy. Consistent with this view, prior studies (Huston, 2010; Atkinson & Messy, 2011; OECD, 2013; Garg & Singh, 2018) highlight that financial literacy is shaped by multiple interrelated factors, including financial knowledge, skills, awareness of financial products and services, attitudes toward money management, and responsible financial behavior.

However, Lyons et al., (2021) suggest that during the Covid-19 pandemic, peoples maintain the social distance. In that situation, people significantly depend on digital financial services. These services, primarily carried via digital channels in particular, mobile applications and online platforms, have transformed the way individuals' access, manage, and engage with financial products, thereby underscoring the increasing significance of digital financial literacy (DFL) in the post-pandemic financial landscape. Also, due to the exponential growth in the information and communications technology (Toader et al., 2018) extensive usage of mobile handsets and shifting customer expectations from traditional to digital financial services have encourage to understand the digital financial literacy (Horner & Cunnane, 2017). Furthermore, over 650 million adults globally still unattended in formal financial institutions and services. Conversely, almost 50% percent of the adults in Bangladesh are unbanked (Global Findex, 2025). As well as, According to the Financial Inclusion Insights (2018) program by InterMedia Research, the financial literacy rate in Bangladesh stood at approximately 28 percent as of December 2023. This indicates that over 70 percent of Bangladeshis lack essential financial knowledge, with only a small segment of the population demonstrating a sound understanding of key financial concepts. According to Bangladesh Bank (2019) study, 61 percent of people do not use their cell phone to transfer money, and the majority of people rely on commercial agents for financial service. In addition, the study found that only 14 percent of consumers are familiar with insurance markets, while 42% are unaware of insurance coverage programs (Karim, 2020).

However, prior study has only specifically examined financial literacy without analyzing DFL in depth. Further, there are few empirically supported DFL determinants documented in the literature. Therefore, people's ability to use the digital platform to save and spend money may be impacted by the absence of DFL. Previous studies (Hsiao et al., 2016; Chu et al., 2017; Ameliawati & Setiyani, 2018; Zulaihati et al., 2020) have demonstrated that financial literacy significantly influences individuals' financial behaviors, particularly in relation to saving and spending patterns. Lyons and Kass-Hanna (2021) further established a connection between financial literacy and digital literacy, emphasizing that their intersection gives rise to the concept of digital financial literacy (DFL). Previous studies have outlined several key dimensions of DFL, highlighting its growing relevance in

modern financial systems (OECD, 2017). Despite this growing attention, limited number of empirical studies have examined or validated the specific determinants and dimensions of digital financial literacy. Traditional frameworks and measurement approaches for financial literacy are increasingly seen as insufficient for capturing the complexities of financial behaviors in digital contexts (Lyons & Kass-Hanna, 2021a). This gap emphasizes the necessity for a more wide-ranging understanding of DFL as a distinct and evolving construct that integrates financial knowledge with digital competencies.

Furthermore, the majority of earlier research has been done from developed economics (Tiwari et al., 2020; Kho et al., 2018). Rather, peoples' digital activity in a developing economy (for example, Bangladesh) is not similar to the developed economy of Asia and Western (Babar, 2017). Data shows that, presently just 1% of the regular payment is occurred via digital ways, while this percentage is more than sixty percent (60%) in the advanced economics (Digital Finance Forum BD, 2021). Tiwari et al., (2020) suggest that study required to conduct within the framework of developing nations and there is required to do empirical test to all drivers of digital financial literacy. Moreover, this research paper focused a methodological gap in the existing studies regarding elements of digital financial literacy. It has been marked that most prior research on determinants of DFL didn't adequately address the complex relationships among the constructs. In addition to, few studies have exhaustively investigated the reliability, validity and robustness of analysis (Lyons & Kass-Hanna, 2021a).

Despite these expansions, disparities continue. Digital transactions increased by 17% in 2024, but growth was concentrated in Dhaka, highlighting spatial inequality (The Business Standard, 2024). The rural-urban digital divide remains stark: only 36.5% of rural residents used the internet compared with 71.4% in urban areas (The Daily Star, 2024). Such divides reflect that access does not equal effective use. Without adequate literacy, individuals remain vulnerable to fraud, data misuse, and exclusion from secure financial participation. In light of this, the current study proposes to empirically investigate and examine the dimensions of DFL in Bangladesh. Four dimensions are emphasized: digital financial knowledge, digital financial risk awareness, digital financial risk control, and consumer data protection.

The article has been structured in the subsequent manner. Section one provides a concise introduction about the research topic. After that, in the following segment, authors design the literature review and to develop the hypotheses. The researchers addressed the research methods in detail in the following section. Later, data analysis and outcomes, followed by a detailed discussion and conclusion have been outlined. At lastly, the study was finished with a discussion of its limitations and directions for future research.

2. Literature Review

2.1. Digital Financial Literacy

Traditional financial literacy has been defined as the capability to understand financial concepts and take sound financial choices (Lusardi & Mitchell, 2014). However, with the rise of digital financial services (DFSs), these definitions are

inadequate. Digital financial literacy integrates financial knowledge with digital competencies such as online navigation, risk awareness, and data protection (Lyons & Kass-Hanna, 2021a; OECD, 2017). Tony and Desai (2020) followed suit, combining the concepts of finance literacy with digital platforms; as a result, digital financial literacy may be defined as financial literacy in digital financial technology (Respati et al., 2023). It has been a focus of government, financial services providers and the public due to the growing of digital financial services (Lyons, et al., 2019). The importance of digital financial literacy (DFL) has increased substantially in the digital era, as noted by Morgan et al. (2019a). DFL is inherently linked to individuals' knowledge and competencies related to online purchasing, digital payments, and online banking activities (Prasad et al., 2018). According to the OECD/INFE (2018), digital financial knowledge is a multidimensional construct that integrates both financial and digital competencies. Similarly, Tony (2020) emphasized that financial literacy forms the foundation of digital financial literacy, which extends traditional financial understanding by incorporating digital components. The concept of DFL merges two distinct but interrelated domains—digital literacy and financial literacy—each encompassing specific attributes, products, and risk factors (Chetty et al., 2017). Scholars have proposed multiple frameworks to conceptualize and measure DFL. For instance, Morgan et al. (2019a) identified four key dimensions: knowledge of digital financial products and services, awareness of digital financial risks, ability to monitor and control digital financial risks, and understanding of consumer data protection. In contrast, Rajdev et al. (2020) examined DFL through three dimensions, while Lyons and Kass-Hanna (2021a) suggested a broader five-dimensional model consisting of basic knowledge and skills, awareness, practical know-how, decision-making, and self-protection. Collectively, these studies underscore that digital financial literacy is an evolving construct that bridges financial capability with digital proficiency, enabling individuals to effectively and safely engage in digital financial ecosystems. This lack of consensus highlights the need for a holistic framework. Acquiring digital financial literacy is crucial for individuals to use digital financial services effectively and to discern the inherent hazards accompanying the widespread adoption of these technological advancements. Despite the pervasive integration of digitalization into all aspects of daily life, more knowledge is still needed about the impact of digitalization on individuals' financial habits and subsequent financial literacy (Koskelainen et al., 2023). Moreover, much of the present evidence comes from developed economies (Kho et al., 2018; Sampaio et al., 2017), where institutional safeguards are stronger. In developing economies, adoption patterns differ significantly (Babar, 2017; Digital Finance Forum BD, 2021). This contextual gap motivates the present study.

2.2. Knowledge of Digital Financial Products and Services

Knowledge of digital financial products and services—often referred to as digital financial knowledge—represents an individual's fundamental understanding of various digital financial tools and platforms. According to Morgan et al. (2019), this knowledge can be categorized into four primary domains: (1) payments, including e-money, smartphones, e-wallets, and cryptocurrencies; (2) asset management, encompassing internet banking, digital brokers, robo-advisors, and mobile trading

applications; (3) alternative finance, such as crowdfunding and peer-to-peer (P2P) lending; and (4) other financial services, including e-insurance. This understanding enables individuals to recognize, compare, and effectively utilize different digital financial services. Individuals who possess financial literacy are able to efficiently manage their finances, make informed investment choices, adopt a saving-oriented mindset and capitalize on recently introduced financial goods and service (Lontchi et al., 2023).

Empirical evidence suggests that individuals with higher levels of financial literacy are better equipped to engage with digital financial products such as mobile banking, internet banking, and e-wallets (Königsheim, Lukas, & Nöth, 2017). Conversely, Gerrard et al. (2006) found that a lack of financial knowledge discourages consumers from adopting digital financial services. Building a strong foundation in financial knowledge thus facilitates the effective use of digital financial tools and promotes confidence in digital transactions. Furthermore, research by the World Bank highlights that low financial literacy levels can complicate the use of financial products, while greater access to financial services contributes to broader economic participation. Grohmann et al. (2018) emphasized that financial inclusion is influenced by the accessibility and understanding of digital financial services and products. Similarly, Banerjee et al. (2017) argued that raising awareness enhances financial inclusion by encouraging the use of formal financial products. Widodo et al. (2022) also found a direct and positive relationship between financial literacy and the usage of digital financial products. Abdallah et al. (2024) highlight knowledge regarding digital financial products significantly enhance the consumers' readiness to adopt and use digital financial services. Lyons and Kass-Hanna (2021b) identified both awareness and knowledge of financial products and services as key components of financial literacy, while Shen et al. (2018) and Ramakrishna (2011) confirmed that financial education positively influences financial behavior, ultimately driving demand for financial services. In light of this evidence, the present study proposes the following hypothesis:

H₁: Knowledge of digital financial products and services positively influences the digital financial literacy.

2.3. Digital Financial Risk Awareness

Digital financial risk awareness means consumers are understand to different type's potential digital financial risks (like, phishing, pharming, spyware, personal data theft, hacking, and other cyber risks) that might occurs when people use digital financial services (Morgan et al., 2019). Financial technology (fintech) expansion increases the financial risk that may harmful for financial well-being (Prasad & Meghwal, 2017; Georgios & John, 2020). Users' level of awareness about risks allied with digital financial services will enhance through digital financial literacy (Abbasi & Weigand, 2017). Lower levels of digital literacy will have a limited understanding of risk and reward concepts across various categories of asset (Panos et al., 2020). However, awareness does not always translate into behavior. Liew et al. (2020) observed that many rural consumers in Malaysia were aware of risks but lacked skills to act against them. This suggests the need to distinguish between risk awareness (cognitive recognition of threats) and risk control (behavioral responses such as

securing data, monitoring accounts, or avoiding phishing). Prior research rarely studies these together, a gap addressed in this study. Hence, this study proposed the following hypothesis:

H₂: Digital financial risk awareness positively influences the digital financial literacy

2.4. Digital Financial Risk Control

Morgan et al. (2019a) explained that monitoring of digital financial risk is linked to knowing of how to secure consumers' personal data. Digital financial literacy plays a crucial role in preventing and controlling fraudulent activities and costly errors (Liew et al., 2020). Higher levels of digital financial literacy can help reduce the likelihood of incorrect financial transactions, fraud, phishing, hacking, online financing trap and unauthorized data use (Pakojwar & Uke, 2014; Kwan, 2020; Putri et al., 2022). While financial technology offers numerous benefits—such as convenience and efficiency—it also introduces challenges, including increased financial risks and the potential for careless consumer behavior. Therefore, the study presented the following hypothesis:

H₃: Digital Financial Risk Control positively influences the digital financial literacy

2.5. Consumers' Protection

The term consumers' protection or knowledge of customer rights and compensation processes means to understand the basic rights and in what way to acquire redress when they fall into the victim to deception (Morgan et al., 2019). Consumers' self-protection includes protects themselves from online frauds and scams, furthermore the capability to identify and keep away from fraud associated with digital financial service (Lyons & Kass-Hanna, 2021a). In the digital context, consumer's rights and redress procedures is a significant dimension of digital financial literacy (Rajdev et al., 2020). Protecting oneself against fraudulent transactions enhances overall financial well-being (Choung et al., 2023). Therefore, the authors proposed the below hypothesis:

H₄: Consumers' Protection positively influences the digital financial literacy

3. Research Framework

The present study hypothesizes that digital financial knowledge, digital financial risk awareness, digital financial risk control, and consumer data protection each have a positive and significant association with digital financial literacy. These relationships are depicted in the conceptual framework shown in Figure 1.

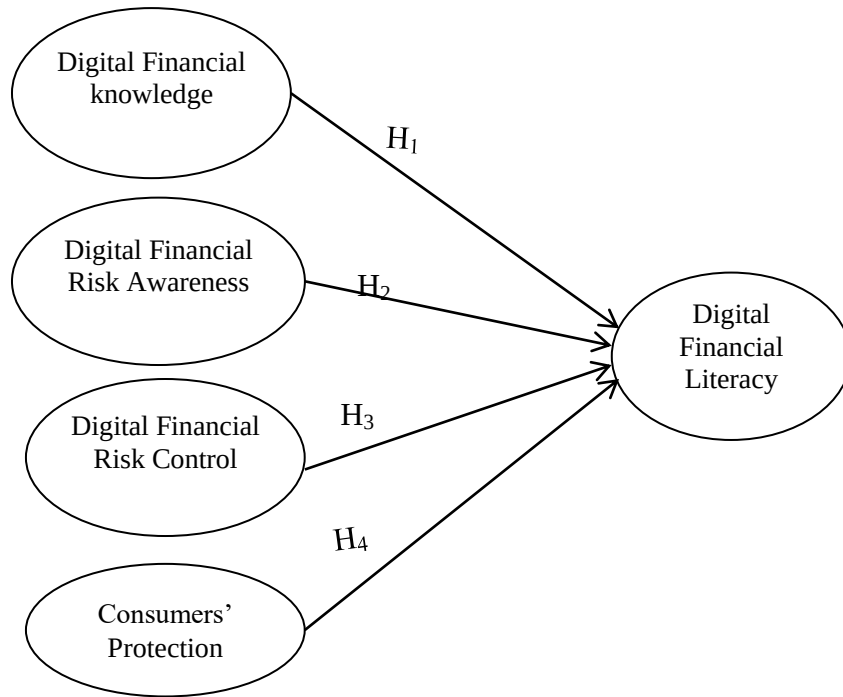


Figure 1. Proposed Research Framework

4. Research Methodology

4.1. Research design

The study was conducted in Bangladesh and followed a quantitative approach. The Structural Equation Modeling (SEM) was carried out to investigate the effects of digital financial knowledge, digital financial risk awareness, digital financial risk control, and consumer data protection as causes of digital financial literacy. According to Sekaran and Bougie (2016), gathers data for a specific objective within a defined period should be classified as a cross-sectional. In line with the concept, it is clear that the proposed research adopts a cross-sectional design.

4.2. Research instrument

The measurement scale has been developed from the literature of prior studies. A total of four latent variables were used to measure the digital financial literacy. All variables have been adapted from Morgan et al. (2019) and Prasad & Meghwal (2017). Total 20 questions or items were used to measure the elements of digital financial literacy. The questionnaire items were derived from previously validated measurement scales presented in prior studies (Liew et al., 2020; Lyons & Kass-Hanna, 2021a), with wording modifications. Then, each construct is developed using appropriate indicators such as digital financial Literacy, digital financial knowledge on products & services, digital financial risk awareness, digital financial risk control and consumers' data protection have 4 indicators, 5 indicators, 4 indicators, 4 indicators and 3 indicators, respectively.

4.3. Questionnaire design

This study relied on both primary and secondary data sources to achieve its research objectives. The primary data were collected through a structured questionnaire survey consisting of 24 items organized into two main sections. The first section focused on gathering demographic and background information about the respondents, including gender, age, educational level, and occupation. The second section was designed to measure respondents' levels of digital financial literacy across various dimensions. All items in the questionnaire were evaluated using a five-point Likert scale, where 1 indicated "strongly disagree" and 5 represented "strongly agree." The use of this scale allowed respondents to express the degree of their agreement with each statement, providing a nuanced understanding of their perceptions and experiences related to digital financial literacy.

4.4. Sample size

Previous study emphasized that maintaining an adequate sample size is essential to minimize estimation bias in Structural Equation Modeling (SEM) and to ensure that the sample accurately reflects the characteristics of the population under study (Loehlin & Beaujean, 2016). When the population size is unknown, Hair et al. (2010) recommend determining the minimum sample size by multiplying the total number of measurement items by ten. In this study, there were 20 items, resulting in a minimum sample requirement of 200 respondents. Furthermore, a power analysis was performed using G*Power software (Faul et al., 2007) following the parameters proposed by Gefen et al. (2011)—effect size (f^2) = 0.15, statistical power = 0.80, α = 0.05, and four predictors—which produced a minimum sample estimate of 85. Consequently, 357 valid responses were obtained for this study, a number deemed adequate for reliable generalization of the findings to the broader population.

4.5. Sampling and data collection process

Data for this study were gathered from individual respondents using a structured questionnaire survey. A convenience sampling method, which falls under the category of non-probability sampling, was adopted to select participants. Malhotra and Dash (2016) recommend the use of non-probability sampling when the target population is not formally listed or easily accessible. In total, responses were received from 423 participants. After an initial screening process, 66 questionnaires were omitted due to incomplete or invalid responses, leaving 357 valid and usable questionnaires for analysis. This final sample size was considered appropriate for the purposes of the study.

4.6. Data analysis tools

The study employed SEM to explore the relationships among digital financial literacy (DFL), digital financial knowledge, digital financial risk awareness, digital financial risk control, and consumer data protection. Data were first coded and organized, and descriptive statistical analyses were carried out using SPSS version 26. Subsequently, the PLS-SEM technique was applied through SmartPLS version 4.0. This method was employed to conduct confirmatory factor analysis (CFA), assess composite reliability, verify the validity of measurement items, confirm discriminant validity across constructs, and evaluate the proposed research hypotheses.

5. Empirical Data Analysis & Results

5.1. Demographic Profile Analysis

The analysis for this research was conducted using 357 valid and complete responses obtained from the administered questionnaires. Table 1 presents the demographic profile of the respondents. Most of the participants (61.06%) were male, with the majority aged under 37 years, and a large proportion possessed either undergraduate or graduate-level education.

Table 1: Respondents' Profile

Variables	Groups	Frequency	Percentages (%)
Gender of the respondents	Male	218	61.06%
	Female	139	38.94%
Age of the respondents	18-22	21	5.88%
	23-27	80	22.41%
	28-32	95	26.61%
	33-37	107	29.97%
	Above 38	54	15.13%
Education	SSC	5	1.40%
	HSC	43	12.05%
	Under Graduation	169	47.34%
	Graduation	136	38.09%
	MPhil/PhD	4	1.12%
Profession	Students	30	8.40%
	Employed	143	40.05%
	Unemployed	45	12.61%
	Businessmen	85	23.81%
	Housewife	54	15.13%

Source: Survey

5.2. Measurement Model Assessment

To test the proposed research model, Structural Equation Modeling (SEM) was applied, utilizing the Partial Least Squares (PLS) technique to analyze both the measurement and structural components. The evaluation of the measurement model involved assessing construct reliability along with the convergent and discriminant validity of the five constructs incorporated in the study.

5.2.1. Construct Reliability Test

Reliability is assessed through Cronbachs' alpha and composite reliability. The results are illustrated in the table 2. All the values of Cronbachs' alpha for each constructs met the cut-off value 0.70 and composite reliability (CR) values of each construct also satisfied the benchmark 0.70 recommended by Hair et al., (2016). Therefore, results represent the model has satisfactory internal consistency.

5.2.2. Convergent validity

In accordance with the guidelines proposed by Hair et al. (2017), convergent validity was assessed through factor loadings, average variance extracted (AVE), and composite reliability (CR). The outcomes of the confirmatory factor analysis (CFA), presented in Table 2, indicate that all measurement indicators met the required thresholds, confirming satisfactory convergent validity. The factor loading of most of the items were 0.7. But, due to low factor loading two (2) items were removed.

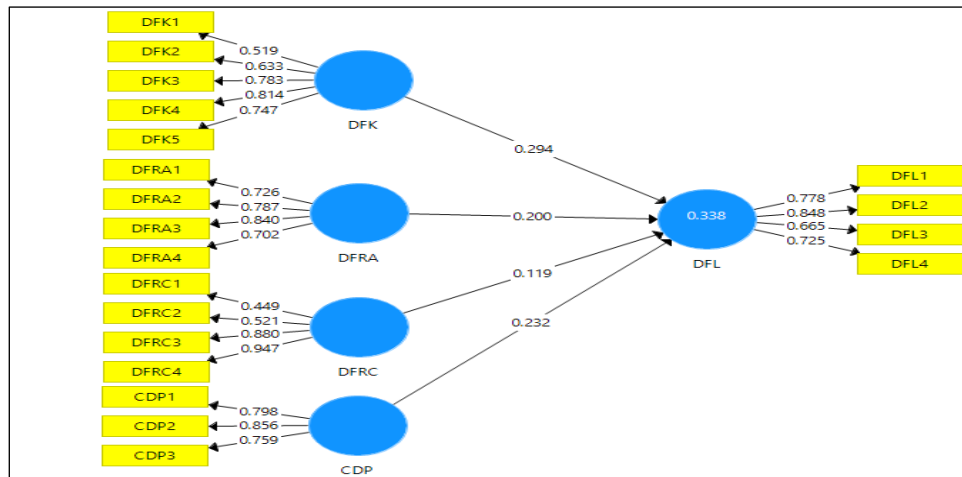


Figure 02: Initial Measurement Model

According to Hair et al. (2016), when both composite reliability (CR) and average variance extracted (AVE) exceed their respective threshold values, factor loadings between 0.50 and 0.70 are considered acceptable. In this study, the CR values for all latent constructs were above the recommended minimum of 0.70 (Hair et al., 2017), and the AVE values for all constructs exceeded the suggested standard value or benchmark 0.50 (Hair et al., 2019). Therefore, all criteria for establishing convergent validity were satisfactorily met.

Table 2: Measurement Model Evaluation

Variables	Initial Node	Factor Loading	Cronbachs' alpha	Composite Reliability	AVE
Digital Financial knowledge	DFK-1:	0.519	0.755	0.830	0.501
	DFK-2:	0.633			
	DFK-3:	0.783			

	DFK-4:	0.814			
	DFK-5:	0.747			
Digital Financial Risk Awareness	DFRA-1:	0.726	0.774	0.849	0.586
	DFRA-2:	0.787			
	DFRA-3:	0.839			
	DFRA-4:	0.702			
Digital Financial Risk Control	DFRC-1:	0.449	0.814	0.913	0.840
	DFRC-2:	0.521			
	DFRC-3:	0.888			
	DFRC-4:	0.944			
Consumers' Data Protection	CDP-1:	0.798	0.730	0.847	0.649
	CDP-2:	0.856			
	CDP-3:	0.759			
Digital Financial Literacy	DFL-1:	0.778	0.752	0.842	0.573
	DFL-2:	0.849			
	DFL-3:	0.664			
	DFL-4:	0.726			

5.2.3. Discriminant Validity

Discriminant validity was assessed using two established methods: the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. According to Fornell and Larcker (1981), discriminant validity is confirmed when the square root of the Average Variance Extracted (AVE) for a construct is greater than its correlations with other constructs. This requirement was met in the current analysis, indicating that all constructs were distinct from one another. Nonetheless, more recent studies have argued that the Fornell–Larcker criterion alone may not always provide a sufficient assessment of discriminant validity. Therefore, following the recommendation of Henseler et al. (2015), the HTMT ratio was also calculated. The HTMT values for all latent constructs were below the threshold of 0.85, supporting the conclusion that discriminant validity was satisfactorily established. The corresponding results are presented in Tables 3 and 4.

Table 3: Fornell–Larcker Criterion

	CDP	DFK	DFL	DFRA	DFRC
CDP	0.805				
DFK	0.455	0.708			

DFL	0.436	0.483	0.757		
DFRA	0.406	0.306	0.384	0.765	
DFRC	-0.090	0.192	0.146	0.003	0.916

Table 4: Heterotrait-Monotrait Ratio (HTMT)

	CDP	DFK	DFL	DFRA	DFRC
CDP					
DFK	0.612				
DFL	0.562	0.577			
DFRA	0.541	0.348	0.466		
DFRC	0.107	0.250	0.188	0.058	

5.3. Structural Model Assessment

The hypothesized relationships between the constructs were empirically examined through the structural model. Following the recommendations of Hair et al. (2017), the model evaluation included an examination of the Variance Inflation Factor (VIF), coefficient of determination (R^2), standardized path coefficients, and t-statistics generated through a bootstrapping process with 5,000 resamples. Furthermore, model's predictive relevance (Q^2) and effect size (f^2) were assessed to evaluate its explanatory strength and predictive accuracy. The outcomes of the structural model assessment are summarized in Table 5. In total, four hypotheses were empirically tested.

5.3.1. Check multicollinearity

The authors first examined the potential issue of multicollinearity through the variance inflation factor (VIF). The analysis revealed that VIF values for the structural paths were less than 3.30, aligning with the recommendation of Petter et al. (2007). Furthermore, VIF values below 5.00 indicate an acceptable level of collinearity recommended by Hair et al. (2017). Therefore, the result signifying there is no multicollinearity problems.

5.3.2. Determination of coefficient (R^2)

The analysis revealed that the R^2 value for the endogenous variable, digital financial literacy, was 0.336 (see Figure 3), which demonstrating a satisfactory level to define the propose model's in-sample explanatory power (Hair et al., 2017).

5.3.3. Strength of effect

According to Cohen's (1988) guidelines, effect sizes (f^2) of 0.02, 0.15, and 0.35 represent small, moderate, and large effects, separately. The result of f^2 analysis indicate that the supported hypotheses demonstrated acceptable and meaningful effect sizes, as presented in Table 5.

5.3.4. Hypotheses testing

The results of the statistical analysis indicated that all proposed hypotheses were supported. Specifically, the standardized path coefficient for digital financial knowledge was $\beta = 0.296$, $t = 5.102$, $p < 0.001$, demonstrating a statistically significant positive influence on digital financial literacy. Similarly, digital financial risk awareness showed a significant positive relationship ($\beta = 0.200$, $t = 2.952$, $p < 0.003$), as did digital financial risk control ($\beta = 0.109$, $t = 2.370$, $p < 0.018$) and consumer data protection ($\beta = 0.230$, $t = 3.030$, $p < 0.003$). The results confirm that all i.e. four hypotheses H_1 , H_2 , H_3 , and H_4 were empirically supported.

Table 5: Evaluation of Structural Model

Hypotheses	Path Relationships	Std.Beta	Std.Error	t-values	P-values	BCI-LL	BCI-UL	f^2	VIF	Decision
H_1	DFK-> DFL	0.296	0.058	5.102	0.000	0.183	0.405	0.095	1.383	Accepted
H_2	DFRA-> DFL	0.200	0.068	2.952	0.003	0.063	0.329	0.049	1.225	Accepted
H_3	DFRC-> DFL	0.109	0.046	2.370	0.018	0.004	0.191	0.017	1.083	Accepted
H_4	CDP -> DFL	0.230	0.076	3.030	0.003	0.076	0.373	0.055	1.455	Accepted

Moreover, the blindfolding procedure was used by the authors to examine the predictive relevance (Q^2) of the path model with an omission distance of 5-10 in PLS (Akter et al., 2011). The value of Q^2 indicating the models' capability to predict (Henseler et al., 2009).

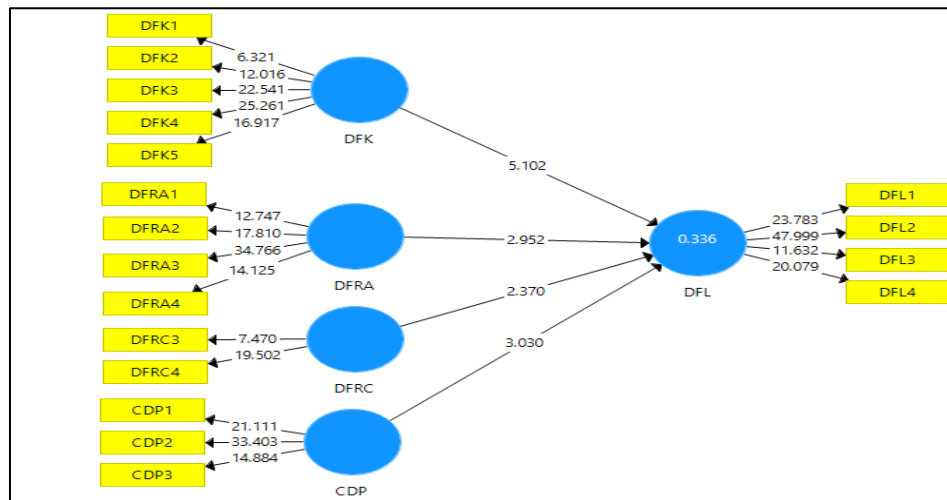


Figure 03: Structural Model

The study found that Q^2 values for endogenous constructs i.e. digital financial literacy ($Q^2 = 0.175$) is greater than zero (0) signifying that the model has satisfactory capability to predict. Hair et al. (2014) recommended that Q^2 values of 0.02, 0.15, and 0.35 indicate that an endogenous construct possesses small, medium, and large levels of predictive relevance, respectively.

6. Discussion and Conclusion

This study explored the primary determinants of digital financial literacy (DFL) within the context of a developing economy, focusing on Bangladesh. The results revealed that four key factors—knowledge of digital financial products and services, awareness of digital financial risks, ability to manage digital financial risks, and understanding of consumer data protection—exert a significant and positive influence on digital financial literacy. These outcomes are consistent with previous research (Lyons & Kass-Hanna, 2021b; Morgan et al., 2019) and underscore the vital importance of promoting digital financial literacy across the population. Enhancing individuals' DFL not only facilitates broader access to formal financial services but also improves their capacity to utilize these services effectively, thereby advancing sustainable financial inclusion.

Additionally, the result supports the hypothesis (H_1) that knowledge of digital financial products and services has positive and significant relationship with digital financial literacy. This result aligns with the previous findings (Liew et al., 2020; Morgan et al., 2019). But remaining three dimensions has differed from the results of previous (Liew et al., 2020). This result may differ due to the methodological issues, analysis done through the descriptive statistics on the other side current study verified the cause-effect relationship among the constructs via structural equation modeling. As well as existing study done the research on various groups like, farmers, students and households etc. current study consider the unit of analysis is heterogeneous. Finally, also economy context is differed. Current study suggests that knowledge is required to use digital financial services or products (Putri et al. 2022). Hence, it indicates that the customers who find knowledge on different digital financial products and services that help to compare the merits and demerits of different digital financial services including the fundamental functions of digital financial services. Sine previous studies (Park, 2011) recommended that user knowledge exposed the strong predictive powers on other three dimensions particularly on security, confidentiality control activities. The current research inspire the government, bankers and other financial institutions in Bangladesh to stay their effort towards making massive awareness for financial products and services with regard to easily access the digital financial services.

Moreover, the study supports the hypothesis (H_2 & H_3) that digital financial risk awareness and digital financial risk control has a significant influence on digital financial literacy. Since findings indicates in the era of fintech, for enjoying the digital financial services, online shopping, online payment and investment through digital platform individual must have the awareness about digital financial risk to elude online frauds, cyber-attacks, illegal usage of data and making costly errors. On the other side, they must have the knowledge on how to control the spamming, phishing and personal identification number. These are critical because such risk may generate unpredicted and huge losses. This result consistent with previous research findings, digital financial literacy prevent to consumers from falling financial scam, and frauds (Lyons & Kass-Hanna, 2020).

Besides, the study supports the hypothesis (H_4) that awareness of consumer rights and redress procedures i.e. consumers' data protection has a substantial influence on

digital financial literacy. This outcome reveals that consumers must be aware about what their rights are and how to manage compensation. Since the current scam in banking sectors and financial markets in Bangladesh as well as in the worldwide have focused the necessity for satisfactory consumer protection and digital financial literacy for sustainability in the financial sector.

The results of this research reveal that in the contemporary financial technology (fintech) landscape, financial and digital literacy alone are not sufficient to ensure the effective adoption and use of digital financial services (DFS). Digital financial literacy (DFL) plays a pivotal role as an enabling factor that enhances individuals' ability to access and utilize digital financial tools and platforms. Furthermore, DFL exerts a significant influence on essential financial behaviors such as saving, borrowing, and risk management. The empirical findings confirm that four major dimensions—knowledge of digital financial products and services, awareness of financial risks, competence in managing digital financial risks, and understanding of consumer data protection—positively and substantially affect digital financial literacy. Strengthening these dimensions not only promotes greater financial inclusion but also fosters improved individual financial well-being.

7. Implications

7.1. Methodological Contribution

The PLS technique was used to make predictions and evaluate a confirmatory model in this research, which was carried out on the cutting-edge statistical tool SmartPLS 4.0. Most of the prior research on determinants of digital financial literacy primarily concentrated on the descriptive statistics analysis. However, current study investigates the causal relations to get more insights concerning the results obtained from path model examination.

This study advances the literature on digital financial literacy in three ways. First, it empirically validates four distinct yet interconnected dimensions of DFL—knowledge, risk awareness, risk control, and data protection—in the context of a developing economy. While prior studies have largely examined financial literacy or digital literacy separately, this research integrates both perspectives to define and measure DFL more holistically. Second, the application of PLS-SEM provides stronger evidence of causal relationships than descriptive approaches commonly used in earlier works. This methodological rigor enhances the reliability and validity of the findings and offers a replicable framework for future studies. Third, by focusing on Bangladesh, the study contributes contextual evidence to a domain heavily dominated by research in developed economies, thus addressing a geographical imbalance in the literature.

7.2. Managerial implications

The term financial literacy is not a fresh term around the world as well as in developing economy like Bangladesh. However, the term financial literacy and digital financial literacy is not so far differences in the context of goal. There is a difference in the way of financial service delivery. The authors recommend knowledge of digital financial products and services helps to make confident among the customers' which will lead to awareness about digital financial risks and control

techniques, finally how to protect data in the digital platform. So, the important managerial implication for managers is to emphasis on the knowledge of digital financial products and services for ensuring the usage level of digital financial products and services which shows the substantial changes in the financial inclusion hence contributing in financial well-being of individual and whole economy in the era of digital. Therefore, when manager design the digital financial literacy, must recognize the digital financial literacy along with consumer safety as a significant policy agenda for effective financial inclusion.

8. Study limitations and Directions for Future Research

The present research is directed on urban citizens in Bangladesh. In future, this investigation may be duplicated in village zones in Bangladesh and as well as other countries since it is provided an effective base for more empirical research in future. Previous study indicated that the magnitude of digital financial literacy is significantly diverge by age and education but gender does not produce a significant variation between male and female respondents. Therefore, in future research may be conducted on gender as a categorical moderating variable also current study suggest that profession or job status may be also a moderating variable.

References

- Abbasi, T., & Weigand, H. (2017). The impact of digital financial services on firm's performance: a literature review. *arXiv preprint arXiv:1705.10294*.
- Akter, S., D'Ambra, J. and Ray, P. (2011). "Trustworthiness in mHealth information services: an assessment of a hierarchical model with mediating and moderating effects using partial least squares (PLS)", *Journal of the American Society for Information Science and Technology*, 62, (1), pp.100–116.
- Atkinson, A., & Messy, F. A. (2011). Assessing financial literacy in 12 countries: An OECD/INFE international pilot exercise. *Journal of Pension Economics and Finance*, 10(4), 657–665.
- Ameliawati, M., and R. Setiyani. (2018). "The Influence of Financial Attitude, Financial Socialization, and Financial Experience to Financial Management Behavior with Financial Literacy as the Mediation Variable." *KnE Social Sciences* 3 (10): 811–832.
- Ariadi, R., M. I. Malelak, and D. Astuti. (2015). "Analisis hubungan financial literacy dan demografi dengan investasi, saving, dan konsumsi." *Fenesta* 3 (1): 7–12.
- Babar, Z.M. (2017). "Digital divide: concepts and reality in Bangladesh", *Journal of Business*, 2 (2). pp. 24-33.
- Banerjee, A., Kumar, K., & Philip, D. (n.d.). Financial Literacy, Awareness and Inclusion. (2017).
- Bangladesh Bank. (2019). *Survey on Impact Analysis of Access to Finance in Bangladesh*. Retrieved from: https://www.bb.org.bd/pub/research/sp_research_work/srw1903.pdf. Pp.1-40.
- Choung, Y., Chatterjee, S. and Pak, T.-Y. (2023), "Digital financial literacy and financial well-being", *Finance Research Letters*, 58, p. 104438.
- Chetty, K., et al., (2017). Bridging the digital divide: measuring digital literacy. *Economics Discussion Papers, No 2017-69*. Kiel Institute for the World Economy. <http://www.economics-ejournal.org/economics/discussionpapers/2017-69>,
- Chu, Z., Z. Wang, J. J. Xiao, and W. Zhang. (2017). "Financial Literacy, Portfolio Choice and Financial Well-Being." *Social Indicators Research* 132 (2): 799–820.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*, Erlbaum, Routledge, Hillsdale, NJ.

- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2021). *The global finindex database 2021: The Global Finindex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19*, World Bank Group. Retrieved from: <https://www.worldbank.org/en/publication/globalfinindex/Report>
- Digital Finance Forum BD (2021), *Webinar: Interoperability of MFS in Bangladesh: Opportunity and Challenges*, 6 June, available at: <https://www.youtube.com/watch?v5MprOcUPzhwk> (accessed 6 July 2021).
- Faul, F., Erdfelder, E., Lang, A.G. and Buchner, A. (2007), "G* Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences". *Behavior Research Methods*, 39(2), pp. 175-191.
- Fin-Biz. (2018). Financial Inclusion Key Enabler to Prosperity. *A Publication of Institute for Inclusive Finance and Development*, 1(1). Pp.7.
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, 18 (1), pp. 39-50.
- Gefen, D., Rigdon, E.E. and Straub, D. (2011), "Editor's comments: an update and extension to SEM guidelines for administrative and social science research", *MIS Quarterly*, 35(2), pp. 03-14.
- Gerrard, Philip, J. Barton Cunningham, and James F. Devlin. (2006). Why Consumers Don't Use Internet Banking: A Qualitative Study. *Journal of Services Marketing*, 20(3) 160–68.
- Grohmann, A., Klühs, T., & Menkhoff, L. (2018). Does financial literacy improve financial inclusion? Cross country evidence. *World Development*, 111, 84–96. <https://doi.org/10.1016/j.worlddev.2018.06.020>
- Garg, N., and Singh, S. (2018). "Financial Literacy among Youth." *International Journal of Social Economics* 45 (1): 173–186.
- Georgios A. Panos & John O. S. Wilson (2020) Financial literacy and responsible finance in the FinTech era: capabilities and challenges, *The European Journal of Finance*, 26:4-5, 297-301, DOI: 10.1080/1351847X.2020.1717569
- Hair, J.F., Jr.; Black, W.C.; Babin, B.J.; Anderson, R.E. (2010). *Multivariate Data Analysis*, 7th ed.; Pearson Education: Edinburgh, UK.
- Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, Sage Publication, Los Angeles.
- Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling*, Sage, Thousand Oaks, California.
- Hair, J.F., Risher, J.J., Sarstedt, M., and Ringle, C. M. (2019). "When to use and how to report the results of PLS-SEM", *European Business Review*, 31 (1), pp.2-24.
- Henseler, J., Ringle, C. and Sinkovics, R. (2009). 'The use of partial least squares path modeling in international marketing', *Advances in International Marketing (AIM)*, 20, pp.277–320.
- Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, 43 (1), pp.115-135.
- Hsiao, Y.-J., S.-J. Lin, and C. Dambaravdan. 2016. "Financial Literacy, Savings Behavior, and Retirement Planning in Taiwan." *Cross-Strait Financial Quarterly*, 4 (2): 1–22.
- Koh, F., Phoon, K.F. and Ha, C.D. (2018), "Digital financial inclusion in South east Asia", *Handbook of Blockchain, Digital Finance, and Inclusion*, Academic Press, London, 2, pp. 387-403.
- Horner, S., & Cunnane, P. (2017). Value of Fintech.
- Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs*, 44(2), 296–316. <https://doi.org/10.1111/j.1745-6606.2010.01170.x>

- Islam, M. (2022). Financial Literacy in Bangladesh: Financial Literacy between the distinct demographic and socio-economic groups in Bangladesh, BBS RPDC Opinion Piece. *Research & Professional Development Centre (RPDC), BRAC Business School*. Retrieved from: <https://bbsrpd.c.com/opinion-piece/details/financial-literacy-in-bangladesh-1/>
- Königsheim, C.; Lukas, M.; & Nöth, M. (2017). Financial Knowledge, Risk Preferences, and the Demand for Digital Financial Services. *Schmalenbach Business Review*, 18(4), 343-375.
- Koskelainen, T., Kalmi, P., Scornavacca, E. and Vartiainen, T. (2023), "Financial literacy in the digital age—a research agenda", *Journal of Consumer Affairs*, 57 (1), pp. 507-528.
- Karim, A. (2020). Aging population and the necessity of financial literacy: Bangladesh perspective. *The independent*. (20th November, 2020). Retrieved at: 6th June, 2022. <https://m.theindependentbd.com/post/256172>
- Kwan, K.M., Review of James Kellenberger's Religious Epiphanies across Traditions and Cultures. *European Journal for Philosophy of Religion*, 2020. 12(1).DOI: <https://doi.org/10.24204/ejpr.v12i1.3271>.
- Loehlin, J. C., & Beaujean, A. A. (2017). *Latent Variable Models: An Introduction to Factor, Path, and Structural Equation Analysis* (5th ed.), Routledge. New York.
- Liew, T., Lim, P., & Liu, Y. (2020). DIGITAL FINANCIAL LITERACY: A CASE STUDY OF FARMERS FROM RURAL AREAS IN SARAWAK. *International Journal of Education and Pedagogy*, 2 (4). 245-251.
- Lusardi, A. and Mitchell, O. S., (2014). "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature* 52: 5–44.
- Lyons, A. C., Kass-Hanna, J., Zucchetti, A., & Cristobal C. (2019). Leaving no one behind: Measuring the multidimensionality of digital literacy in the age of AI and other transformative technologies.
- Tony, N. and Desai, K. (2020), "Impact of digital financial literacy on digital financial inclusion", *International Journal of Scientific and Technology Research*, 9, pp. 1911-1915.
- T20 Japan Policy Brief. Prepared for 2019 G20 Summit by T20 Japan, Task Force 7: The Future of Work and Education in the Digital Age. <https://t20japan.org/policy-briefmultidimensionality-digital-literacy/>
- Lontchi, C.B., Yang, B. and Shuaib, K.M. (2023), "Effect of financial technology on SMEs performance in Cameroon amid covid-19 recovery: the mediating effect of financial literacy", *Sustainability*, 15(3), p. 2171
- Lyons, A. C., & Kass-Hanna, J. (2020). Rebuilding the livelihoods of forcibly displaced populations using digital financial inclusion. *T20 Saudi Arabia Policy Brief*. Prepared for 2020 G20 Summit by T20 Saudi Arabia, Task Force 6: Economy, Employment, and Education in the Digital Age. https://t20saudi-arabia.org.sa/en/briefs/Pages/Policy-Brief.aspx?pb=TF6_PB7
- Lyons, A. C., & Kass-Hanna, J. (2021a). A methodological overview to defining and measuring "digital" financial literacy. *Financial Planning Review*. 4:e1113. <https://doi.org/10.1002/cfp2.1113>
- Lyons, A., Kass-Hanna, J., & Fava, A. (2021b). Impact of fintech development on savings, borrowing, and remittance: A comparative study of emergency economics. *Forthcoming*, <https://doi.org/10.2139/ssrn.3689142>
- Malhotra, N.K. and Dash, S. (2016), *Marketing Research: An Applied Orientation*, 7th ed., Pearson India Education Services, Bengaluru.
- Morgan, P. J., Huang, B., & Trinh, L.Q. (2019). The Need to Promote Digital Financial Literacy for the Digital Age.
- OECD. (2013). Financial literacy and inclusion. Financial literacy & education. *Organization for Economic Co-operation and Development*. <https://doi.org/10.1787/9789264254855-en>

- OECD. (2017). G20/OECD INFE Report on Adult Financial Literacy in G20 Countries, OECD. Retrieved from: <https://www.oecd.org/finance/g20-oecd-infe-report-adult-financial-literacy-in-g20-countries.htm>
- OECD/INFE, (2018). "OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion," OECD, no. March, 2018.
- Park, Y.J. (2011). Digital Literacy and Privacy Behavior Online. *Communication Research*, 40(2), 215- 236.
- Pakojwar, S. and N.J. Uke, (2014). Security in online banking services—A comparative study. *Int. J. Innov. Res. Sci. Eng. Technol*, 3: p. 16850-16857.DOI: <https://doi.org/10.15680/IJIRSET.2014.0310079>.
- Panos, G.A.; Karkkainen, T.; and Atkinson, A., (2020). Financial literacy and attitudes to cryptocurrencies. *Working Papers in Responsible Banking & Finance* 26, Business School - Economics, University of Glasgow. Available at SSRN: <http://dx.doi.org/10.2139/ssrn.3482083>
- Petter, S., Straub, D., and Rai, A. 2007. "Specifying Formative Constructs in Information Systems Research," *MIS Quarterly*, 31:4, pp. 623-656.
- PISA. (2022). PISA 2021 financial literacy analytical and assessment framework, OECD Publishing, Paris. Retrieved from: <https://www.oecd.org/pisa/sitedocument/PISA-2021-Financial-Literacy-Framework.pdf>
- Prasad, H., Meghwal, D.; and Dayama, V. (2018). Digital financial literacy: a study of households of Udaipur. *Journal of Business and Management*, 5: p. 23-32.DOI:<https://doi.org/10.3126/jbm.v5i0.27385>.
- Putri, A. M., Damayanti, S. M., & Rahadi, R. A. (2022). DIGITAL FINANCIAL LITERACY IN INDONESIA: A LITERATURE REVIEW. *CENTRAL ASIA and the CAUCASUS English Edition*, 23(1), 4191–4203. <https://doi.org/10.37178/ca-c.23.1.318>
- Respati, D.K., Widyastuti, U., Nuryati, T., Musyaffi, A.M., Handayani, B.D. and Ali, N.R. (2023), "How do students' digital financial literacy and financial confidence influence their financial behavior and financial well-being?", *Nurture*, 17 (2), pp. 40-50.
- Rajdev, A. A., Modhvadiya, T., Sudra, P., (2020). An Analysis of Digital Financial Literacy among College Students. *Pacific Business Review International*, 13 (4). pp.32-40.
- Ramakrishnan, R. (2011). Financial Literacy-The Demand Side of Financial Inclusion, 26th *SKOCH Summit 2011 Swabhimani-Inclusive Growth and Beyond*. pp.1-16.
- Rasoolimanesh, S.M., Taheri, B., Gannon, M., Vafaei-Zadeh, A. and Hanifah, H. (2019), "Does living in the vicinity of heritage tourism sites influence residents' perceptions and attitudes?", *Journal of Sustainable Tourism*, 27 (9), pp. 1295-1317.
- Sekaran, U. and Bougie, R. (2016). *Research Methods for Business: A Skill-Building Approach*. 7th Edition, Wiley & Sons, West Sussex.
- Shen, Y., Hu, W., & Hueng, C. J. (2018). The effects of financial literacy, digital financial product usage and internet usage on financial inclusion in China. *MATEC Web of Conferences*, 228 (05012). EDP Sciences. <https://doi.org/10.1051/mateconf/201822805012>
- Sampaio, C.H., Ladeira, W.J. and Santini, F.D.O. (2017), "Apps for mobile banking and customer satisfaction: a cross-cultural study", *International Journal of Bank Marketing*, 35 (7), pp. 1133-1153.
- The Business Standard. (2024, May 14). Bangladesh handles over 8% of global daily mobile money transactions.
- The Daily Star. (2024, Feb 22). Internet shows stark rural-urban divide.

- Tiwari, C.K.; Gopalkrishnan, S.; KAUR, D.; PAL, A. (2020). Promoting Financial Literacy through Digital Platforms: A Systematic Review of Literature and Future Research Agenda, *Journal of General Management Research* 7 (2), pp. 15–26.
- Toader, E., Firtescu, B.N., Roman, A., Anton, S.G. (2018). Impact of information and communication technology infrastructure on economic growth: An empirical assessment for the EU countries. *Sustain.* 10, 1–22. <http://dx.doi.org/10.3390/su10103750>
- Tony, N., and Desai, K. (2020). “Impact of Digital Financial Literacy on Digital Financial Inclusion.” *International Journal of Scientific and Technology Research*, 9 (1): 1911–1915.
- Widodo, J.; Hasnawati, S.; Hendrawaty, E. (2022). The Effect of Financial Literacy, the use of Digital Financial Products, and the use of the internet against Financial Inclusion in Indonesia. *SSRG International Journal of Economics and Management Studies*, 9 (5), 1-11, <https://doi.org/10.14445/23939125/IJEMS-V9I5P101>
- World Bank. (2025). The Global Findex Database 2025. Washington, DC: World Bank.
- Zulaihati, S., S. Susanti, and U. Widyastuti. (2020). Teachers’ Financial Literacy: Does It Impact on Financial Behavior?, *Management Science Letters* 10 (3): 653–658.

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