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Towards Digital Transformation: The Role of Digital Literacy and Behavioral Drivers in Embracing E-Business Solutions among Microfinance Institutions

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Abstract

Digital literacy (DL) is a critical determinant of individual intentions toward adoption of technology in the digital era. However, scholarly research on the role of DL in shaping individual behavior toward the intention to embrace Electronic Business Solutions (EBS) within microfinance institutions (MFIs) remains limited. This study seeks to extend the Theory of Planned Behavior (TPB) by integrating the Diffusion of Innovation (DOI) Theory to develop a novel framework (DOI-TPB) for understanding the role of DL in shaping individual behavior regarding the intention to adopt EBS. The study examines this relationship among 229 respondents from MFIs in Mwanza, Tanzania, with data collected via self-administered questionnaires distributed through Google Forms. Employing structural equation modeling (SEM), the empirical findings indicate that DL positively and significantly strengthens the relationships between the three core TPB components: attitude, subjective norms, perceived behavioral control, and the intention to embrace EBS. The extended DOI-TPB model demonstrates that DL not only influences these TPB constructs but also enhances the model's overall explanatory power. The study concludes by offering practical recommendations for strategically promoting DL within the financial sector to facilitate more effective adoption of EBS.

Keywords: Digital Transformation, Digital Literacy, Behavior Drivers, Microfinance Institutions, E-business Solutions

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SDG alignment
SDG 4: Quality Education – Promotes digital literacy and skills development to support technology adoption

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Introduction

Microfinance institutions (MFIs) are understood differently across nations, reflecting variations in policy, financial infrastructure, and socio-economic contexts (Jalil, 2021; Kimaro, 2023). In Tanzania, MFIs provide financial services to individuals, low-income households, and small-scale entrepreneurs who are often excluded from mainstream banking because of limited collateral and formal credit histories (Kimaro, 2023). Their importance is reflected in the sector's growing institutional presence. According to the Bank of Tanzania (BoT, 2025), by December 2024, Tanzania had 2,342 Tier II microfinance service providers, 964 SACCOs, and 58,926 community microfinance groups, providing 62,312 microfinance access points nationwide. This increased from 50,881 access points in 2023, indicating continued expansion of the subsector. MFIs therefore remain important to financial inclusion, entrepreneurship, and Tanzania's broader socio-economic development (Songorwa & Mashenene, 2024).

The significance of these institutions to individuals, communities, and the national economy is evident. Their ability to fulfil these roles, however, largely depends on how effectively they adapt to the evolving business environment by managing their operations (Mia, Dalla Pellegrina, & Wong, 2022). To remain sustainable and responsive to customer needs, MFIs must adopt technological tools and systems that facilitate the integration of e-business solutions (EBS), enhancing efficiency and strengthening competitiveness in the financial sector (Ananga, Nyang'au, & Mwalili, 2024). Accordingly, MFIs, like other financial service providers, are required to implement a variety of operational solutions, including credit management systems, mobile banking platforms, financial advisory services, and customer relationship management tools, among others (Alqabbani, Almuwais, Benajiba, & Almoayad, 2021). Such innovative solutions are vital for streamlining internal processes and for effective response to diverse client needs while maintaining resilience in technologically more advanced financial markets.

The effectiveness of these tools further illustrates how technological adoption can bridge the gap between service demand and institutional capacity, as the rapid proliferation of internet technologies has accelerated these changes and reshaped the operational landscape of MFIs worldwide (Aminah, Wiryono, & Sudrajad, 2024). The financial sector, traditionally characterized by physical infrastructure and manual processes, has been fundamentally transformed by the adoption of EBS (Joseph, 2022). These operational solutions have redefined service delivery, expanded outreach to previously underserved populations, and improved efficiency, thereby underscoring the crucial role of digital transformation in modern financial intermediation (Daowd et al., 2021; Mia, 2023; Santhosh Kumar & Aithal, 2024).

The extent to which these EBS technologies are adopted and effectively utilized is shaped by multiple factors (Santhosh Kumar & Aithal, 2024). Organizational determinants such as leadership support (Hermes & Hudon, 2019), the availability of financial and technological resources (Mwashiuya & Mbamba, 2020), institutional culture toward technological adoption and usage (Iqbal et al., 2025), and

regulatory frameworks (Lin & Sung, 2025) play a central role in shaping how financial institutions engage with new technologies. Empirical studies have shown that these factors significantly influence the extent, speed, and effectiveness of technology adoption within the financial sector. Yet, while digital literacy (DL) is crucial in the intention to embrace e-business (Moorthy & Sahid, 2022), its role in enhancing individual behavior (IB) towards the intention to use EBS remains underexplored in Tanzanian MFIs. Understanding these individual-related dimensions is essential, as they critically determine the success of digital transformation initiatives in the financial sector.

Drawing from the Theory of Planned Behavior (TPB), previous scholars have emphasized social-psychological factors such as individual attitude (AT), subjective norms (SNs), and perceived behavioral control (PBC) as determinants of behavior intention in technology adoption (Buhmann, Rialp-Criado, & Rialp-Criado, 2024; Hagger, Cheung, Ajzen, & Hamilton, 2022; Waiswa et al., 2025). Yet, findings in this domain remain inconclusive. For instance, some studies argue that these factors significantly influence individual intentions to embrace EBS in transpotation sector (Buhmann et al., 2024), while others demonstrate limited or non-significant effects (Hagger et al., 2022). In response to such mixed evidence, scholars have increasingly recognized DL as a crucial factor that may shape behavior intentions in various context (Ezeudoka & Fan, 2024). However, existing research has largely focused on individual employees, underestimate the strategic significance of DL in strengthening both institutional and workforce initiatives in the digital era.

Despite the growing body of literature on IB and intentions to adopt and use technology, there remains a notable lack of empirical studies that provide strategies for financial institutions to address the key motivating factors for adopting EBS. Existing findings are largely conceptual and focus predominantly on psychological factors. They often overlook the role of DL as a reinforcing determinant of individual intentions toward EBS (Ezeudoka & Fan, 2024; Hagger et al., 2022; Iqbal et al., 2025; Mwashiuya & Mbamba, 2020). Consequently, these findings may have limited implication to the Tanzanian financial sector, where variations in technological infrastructure and cultural dynamics present unique contextual challenges. Such differences highlight a need for research tailored to Tanzanian MFIs, particularly in examining how DL shapes IB and their intentions to embrace EBS. Answer to this gap, this study intends to address the following research questions: (1) How does DL impact the core TPB concepts (AT, SN, and PBC) among MFI employees? (2) To what extent do these TPB constructs, improved by DL, affect the intention to adopt EBS?.

Theoretical Model

The TPB**,** as advanced by Ajzen (1991), has gained notable recognition in explaining IB intentions across multiple fields. The theory is based on the premise that human actions are reasoned and planned, where individuals weigh possible outcomes before engaging in a particular behavior. Scholars have widely employed its principal concepts that are AT, SN, and PBC in examining individual intentions toward performing a behavior (Bosnjak, Ajzen, & Schmidt, 2020). In financial settings, TPB provides valuable insights into how its psychological factors influence intention to perform a certain behavior. This makes the theory particularly relevant for MFIs, which are individually centered and depend heavily on the behavioral intentions of employees in adopting EBS. However, given inconclusive findings in prior literature, integrating the Diffusion of Innovation (DOI) Theory by Rogers, Singhal, and Quinlan (2014) is essential to conceptualize DL as a key innovation-related factor that complements TPB's explanatory power.

Building on this foundation, it stands to reason that while TPB's constructs offer robust insight into individual intentions, their application in isolation has produced inconsistent results across different contexts. This is particularly because scholars frequently rely on the TPB's three psychological constructs: AT, SN, and PBC to predict intentions without considering complementary factors (Bosnjak et al., 2020). Yet, many of these studies have applied TPB leading to contradictions in findings. This limitation highlights a need for theoretical integration that incorporates additional perspectives to harmonize results and provide contextual explanations. Such integration is particularly significant in financial institutions, where continuous technological transformation, driven by the rapid proliferation of internet-based services, is reshaping both service delivery and organizational practices (Dorfleitner, Forcella, & Nguyen, 2022).

In response to the limitations of TPB when applied in isolation, the Diffusion of Innovation (DOI) Theory provides a complementary perspective by capturing the role of DL, which TPB alone doesn't sufficiently explain. DOI highlights how DL can be strategically leveraged to shape IB by functioning as a critical enabling factor that strengthens the relationship between psychological determinants and the intention to perform specific behaviors. Theorizing DL through the lens of DOI advances TPB's explanatory power by framing DL not merely as an individual competency but as a catalytic mechanism that influences how individuals perceive, evaluate, and adopt emerging EBS. Consequently, integrated model of TPB and DOI, which links psychological drivers of e-business adoption with DL, provides comprehensive understanding of the determinants shaping the uptake of EBS in microfinance settings. This synthesis not only addresses the theoretical limitations inherent in applying TPB independently, but also situates DL at the intersection of IB and institutional EBS, thereby enhancing its relevance in the continuously evolving digital transformation.

Hypothesis Development

In TPB, AT, SN, and PBC are linked to the intention to adopt EBS. On the other hand, DOI theorizes the integrated model through the lens of DL intended to extend TPB's explanatory power by positioning DL as a catalytic factor that strengthens the link between psychological determinants and intention to EBS.

Digital Literacy, Attitude, and Intention to Embrace EBS

Attitude represents an individual's evaluative judgment regarding the performance of a specific behavior. Favorable AT increases the likelihood of behavioral intention, whereas unfavorable AT diminishes it (Hasan & Suciarto, 2020). AT is therefore a critical driver of individuals' performance of a certain behavior, including adoption behaviors (Safari, Bisimwa, & Buzera Armel, 2022). Furthermore, DL has been demonstrated to shape individual AT by influencing decision-making processes and fostering positive dispositions toward targeted behaviors (Bogdanov, 2022; Uludağ, 2023). Empirical evidence consistently indicates that DL is positively associated with individual AT, which, in turn, positively affects intention to perform a behavior (Setiawan, Effendi, Santoso, Dewi, & Sapulette, 2022; Sun, Liu, & Lu, 2023). Moreover, Setiawan et al. (2022) reported that individuals with higher financial DL not only exhibit prudent saving and spending behaviors but also demonstrate increased engagement with digital financial services. Their study highlights that financial DL enhances individuals' AT for navigating digital financial platforms, leading to more informed financial decisions and greater financial inclusion.

Proficiency in digital technologies has proved to positively influence individuals' AT toward performing specific behaviors. For instance, Bogdanov (2022) reported that higher levels of financial DL significantly increase the likelihood of adopting digital financial services, as individuals perceive such behaviors as both beneficial and manageable. Similarly, Uludağ (2023) demonstrated that greater DL enhances users' willingness to engage with mobile health applications, highlighting the role of digital skills in shaping favorable behavioral AT. In line with this, Lee and Chow (2020), drawing on the Theory of Reasoned Action, examined the impact of consumer AT on intentions to participate in online fashion renting through a survey of 300 consumers in the United States. Their structural path analysis revealed that consumer AT constitutes a significant predictor of intention to engage in online fashion renting. Based on this theoretical foundation, two hypothesized relationships are proposed:

H1a: Digital literacy is positively associated with individual attitude.

H1b: Attitude is positively associated with the intention to adopt EBS.

Digital literacy, Subjective Norms, and Intention to Embrace EBS

Subjective Norms (SN) are defined as perceived social pressures shaping individual decisions and actions (Soliman, 2021). These pressures reflect the social-psychological influence of one's environment, which can play a critical role in guiding behavior acceptance or performance. In the case of EBS, such influence may stem from DL and peer insights regarding the value of EBS in MFIs. When integrated with DL, SN exert a significant influence on IB and, consequently, on the intention to adopt EBS, as individuals with higher digital competence are more inclined to interpret social expectations regarding technological adoption in a favorable manner (Mohammadrezaei, Meredith, & McNamara, 2023).

For example, Ananga et al. (2024) investigated the acceptance of social media applications within educational contexts, finding that SN significantly influenced students' intention to engage with social media for educational activities. However, SN were employed to assess the extent to which students adopt social media for educational purposes. Based on survey responses from 310 students in the United Arab Emirates and analyzed using partial least squares-structural equation modeling (PLS-SEM), the findings indicate that SN significantly influence students' intentions to engage with social media for educational activities. Consistent with these results, subsequent research by Kabakus, Bahcekapili, and Ayaz (2025) highlights the crucial role of DL in technological adoption, demonstrating that individuals with higher DL are better equipped to navigate, evaluate, and utilize digital tools, thereby amplifying the effect of social influences such as SN on intention to embrace EBS.

In the healthcare sector, a study by Xie, Zhang, and Zhu (2025) revealed that nurses' perceptions of social pressure from peers and supervisors positively influenced their intention to use information and communication technology (ICT) in hospital settings. Similarly, in the banking sector, research by Dat and Hang (2023) found that SN significantly affected bank customers' intentions to embrace online banking services, highlighting the role of social influence in financial technology adoption. While these studies provide valuable insights into the impact of SN on technology acceptance, they were conducted independently and did not consider the role of DL. However, subsequent research suggests that DL may amplify the effect of SN on individuals' intentions to adopt EBS, as proficiency in digital skills enables a more favourable interpretation of social influences. This leads to the formulation of the following hypotheses:

H2a: Digital literacy is positively associated with individual subjective norms.

H2b: Subjective norms is positively associated with the intention to adopt EBS.

Digital literacy, Perceived Behavior Control, and Intention to Embrace EBS

Perceived Behavioral Control (PBC) represents an individual's assessment of the ease or difficulty of performing a given action, shaped by their self-evaluated capabilities (Hagger et al., 2022). Greater PBC strengthens individuals' confidence in their ability to execute a behavior, thereby increasing the likelihood of actual performance (Ahadiat, Ribhan, Maydiantoro, & Dwi Kesumah, 2021; Bosnjak et al., 2020).

Within MFIs, when employees perceive themselves as sufficiently capable of integrating financial operations with EBS, they encounter fewer obstacles, exhibit higher PBC, and demonstrate a stronger intention to adopt such technologies (Ahadiat et al., 2021). This emphasizes the importance of cultivating PBC to promote both employee and institutional intentions to embrace EBS, particularly in MFIs where digital transformation is pivotal for enhancing operational efficiency and service delivery.

Empirical studies have consistently demonstrated the significant role of PBC in shaping intentions to adopt electronic systems. For instance, Lee and Chow (2020), using structural equation modeling with a sample of 300 U.S. consumers, found that PBC significantly predicted the intention to participate in online fashion renting. Similarly, Park, Chen, and Cheng (2021) reported that nurses' perceptions of control over using information and communication technology positively influenced their intention to adopt these tools in hospital settings. In the banking sector, Anouze and Alamro (2020) found that customers' PBC regarding online banking services significantly affected their intention to adopt these technologies. Complementing the findings, DL is highlighted as a critical factor that enhances PBC. For instance, Bogdanov (2022) found that higher levels of financial DL improved PBC over financial services, while Sun et al. (2023) demonstrated that greater DL increased users' confidence in engaging with mobile health applications. Collectively, these studies suggest that DL not only directly influences adoption intention but also strengthens PBC, thereby indirectly shaping the intention to embrace EBS.

Based on empirical evidence, this study hypothesizes that both PBC and DL significantly influence individuals' intention to adopt EBS within MFIs. Specifically, higher levels of DL are associated with strengthened PBC, which in turn increases the likelihood of intending to embrace EBS (Sun et al., 2023). This interplay highlights the necessity of considering both PBC and DL simultaneously to develop a clearer prediction for this study. Based on the reviewed literature, the following hypotheses are proposed for the study:

H3a: Digital literacy is positively associated with individual perceived behavior control.

H3b: Perceive behavior control is positively associated with the intention to adopt EBS.

Materials and Methods

Participants and Procedure

Adopting a positivist philosophical stance and a deductive approach, this study quantitatively examined the impact of IB on the intention to adopt EBS and the moderating role of DL within MFIs in Mwanza City. Data were collected from one key informant per institution using an online questionnaire via Google Forms. The data collection took place between June and August 2024, a period that coincides with the driest season in Mwanza, when field operations are relatively stable due to minimal rainfall (Njotto, Senyoni, Cronie, & Stensgaard, 2025). Importantly, MFIs are more widely spread across Mwanza compared to commercial banks, providing small businesses with easier access to loans despite their limited collateral capacity (Aminah et al., 2024). These contextual conditions collectively make Mwanza an appropriate setting for examining IB, DL, and intentions to adopt EBS within the microfinance sector.

Ethical approval was obtained from the government under the Ministry of Finance under approval / reference number MOF/RES/2026/015 before data collection. The study adhered to the principles of voluntary participation, confidentiality, anonymity, and informed consent. Before completing the online questionnaire, all 299 participants received information about the study purpose, participation requirements, confidentiality, and their right to withdraw at any time without penalty. Informed consent was obtained electronically through Google Forms, where participants confirmed their voluntary agreement to participate before accessing the questionnaire. No identifying information was collected, and the data were used solely for the research purposes and securely stored. Participation was entirely voluntary, and participants could discontinue the survey at any stage.

A pilot study involving 40 participants was conducted to assess the validity and clarity of the survey items. The results were satisfactory; however, four items were slightly modified for clarity, two from AT, one from PBC, and one from EBS. No items were dropped, and the revised questionnaire was used for the main data collection. The initial section of the questionnaire collected information on respondent tenure, familiarity with digital systems, and institutional history. Following established methodological recommendations (Mbanaso, Abrahams, and Okafor (2023), respondents with less than three years of experience were excluded to ensure the data were from individuals with sufficient expertise in microfinance and digital engagement. The section focused on institutional experience and responses from participants who did not meet the minimum threshold of experience were similarly excluded from the final analysis by Gekombe, Tumsifu, and Jani (2019). Assessing respondents' educational levels was critical for capturing demographic factors that may shape perceptions of e-business adoption (Życzyńska-Ciołek & Kołczyńska, 2021). A sample size of 241 was inflated by 15% to cover non-response rate, missing values and any other anomalies resulting in the total sample size of 277 drawn from a population of 886. Only 253 were fielded and returned but 229 responses were included in the final analysis which is 83% response rate.

The key constructs namely; AT, SN, PBC, DL, and EBS were operationalized as latent variables measured using questionnaire items adapted from established scales in the technology diffusion and behavioural literature (Davis, Bagozzi, & Warshaw, 1989). All items were assessed using a Likert-type scale to capture respondents' perceptions and intentions. AT was measured through items reflecting

favourable or unfavourable evaluations of using EBS, SN captured perceived social influence from important others, and PBC assessed perceived ease of use, skills, and control over using digital banking systems for EBS use, all adopted from Buhmann et al. (2024). DL was measured through self-reported ability to use digital tools and online financial services from Bogdanov (2022), while EBS was adopted from Isa, Ahmad, Sai'd, Ibrahim, and Muhammad (2025) and operationalized as users' intention to use electronic banking platforms.

Data Analysis and Results

The research model consisted of three independent behavioral drivers (individual AT, PBC and SN) an outcome variable (EBS), and a moderator (digital literacy). All were measured using reflective indicators. To analyze the data, Smart Partial Least Squares (Smart-PLS3), a component-based structural equation modeling (SEM) technique, was employed, as it is well suited for handling complex models with multiple constructs and does not address multicollinearity issues often found in marketing survey data (Becker, Cheah, Gholamzade, Ringle, & Sarstedt, 2023).

Descriptive and Demographic Statistics

The study sample consisted of owners and managers of MFIs responsible for implementing new operational strategies, ensuring they possessed substantial knowledge of EBS, DL, and digital transformation within their institutions. Participants' experience with e-business activities varied: 10% had 3–5 years, 25% had 6–10 years, 41% had 11–15 years, and 24% had more than 16 years of engagement. Similarly, regarding e-business operations, 9% reported 3–5 years, 42% 6–10 years, 29% 11–15 years, and 20% over 16 years of experience. This extensive exposure enabled participants to develop an understanding of the strategic value of e-business initiatives arising from digital transformation, allowing them to provide informed responses that accurately reflect the perceived impact of the behavior drivers toward EBS and the role of DL in this context. In terms of educational level, 72% of participants had completed post-secondary education, while 28% had attained advanced secondary education. This level of education enhanced their ability to comprehend the questionnaire and provide reliable responses (Anderson & Rivera Vargas, 2020; Fintan & Mbura, 2025).

Table 3.1 descriptively, responses generally agreed that behavioral drivers positively influence intention towards EBS. Data accuracy was ensured by examining the distribution using skewness and kurtosis, with all skewness values within ±1 and kurtosis values between ±3, indicating data normality. Measures of central tendency had a mean of 4.94 and a median of 5, both exceeding the recommended benchmark of 4.44 for a 7-point Likert scale (Pimentel & Pimentel, 2019). Additionally, the highest standard deviation is 1.28, below the threshold of 3, such results indicate minimal variability in responses, suggesting a high degree of consensus among participants regarding the causal nature of the predicted relationships, thereby reinforcing the reliability of the collected data (Życzyńska-Ciołek & Kołczyńska, 2021).

Table 3.1: Responses Descriptive Statistics

Items	Mean	Median	Standard Deviation	Kurtosis	Skewness
SN1	4.941	5	1.245	0.465	-0.804
SN2	4.662	5	1.146	0.643	-0.629
SN3	4.869	5	1.232	0.762	-0.825
SN4	4.964	5	1.308	0.598	-0.651
SN5	4.887	5	1.231	0.938	-0.718
DL1	4.712	5	1.500	0.402	-0.853
DL2	4.640	5	1.384	0.781	-0.760
DL3	4.514	5	1.146	0.966	-0.413
DL4	4.667	5	1.317	0.165	-0.461
DL5	4.694	5	1.261	0.139	-0.396
DL6	4.743	5	1.224	-0.415	-0.330
DL7	4.712	5	1.297	-0.379	-0.448
PBC1	4.414	4	1.382	-0.041	-0.414
PBC2	4.694	5	1.354	0.473	-0.941
PBC3	4.586	5	1.255	0.485	-0.553
PBC4	4.554	5	1.396	0.078	-0.667
PBC5	4.802	5	1.251	0.374	-0.760
AT1	5.194	5	1.136	-0.429	-0.220
AT2	5.378	5	1.119	0.194	-0.788
AT3	5.261	5	1.210	-0.042	-0.529
AT4	5.117	5	1.228	0.632	-0.651
EBS1	5.649	6	1.320	2.179	-0.332
EBS2	5.338	6	1.204	0.817	-0.112
EBS3	5.149	5	1.238	0.439	-0.759
EBS4	5.613	6	1.239	0.614	-0.062
EBS5	4.734	5	1.192	-0.017	-0.454

Note: Mean > 4.44; SD < 3; kurtosis within ±3; skewness within ±1: all descriptive statictics are met

Measurement Model Results

The study's measurement model was assessed using Confirmatory Composite Analysis (CCA), a method that evaluates both the constructs and their corresponding indicators to ensure the proposed theoretical

framework accurately reflects the relationships among them (Hair, 2022; Napitu, Simanjuntak, & Amal, 2021). After rigorously testing validity and reliability, CCA confirmed that the study's data align with the underlying theories. This validation process was a critical step in ensuring the robustness of the study's Smart-PLS3 analysis, as it strengthened the credibility and generalizability of the findings.

To ensure the quality and rigor of the measurement model, factor loadings above 0.70 demonstrated strong correlations between observed variables and their underlying measurement factors, indicating that the items adequately represent the theoretical concepts. Composite reliability values exceeding 0.70 suggested good internal consistency among the items within each construct, reflecting stable and coherent measurement. Similarly, Cronbach's Alpha values above 0.70 further confirmed the reliability of the constructs, demonstrating that the items consistently measure the intended latent variables. Additionally, Average Variance Extracted (AVE) values greater than 0.50 indicated that each construct accounted for more variance than could be attributed to measurement error, confirming that the constructs were well represented by their indicators. Collectively, these results provide strong evidence for the convergent validity of the measurement model, ensuring that the constructs capture the phenomena they are intended to measure. The values indicating reliability and validity of the data are demonstrated in Table 3.2.

Table 3.2: Constructs Reliability and Validity

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
AT	0.715	0.823	0.538
DL	0.819	0.869	0.525
EBS	0.874	0.905	0.615
PBC	0.844	0.889	0.617
SN	0.808	0.866	0.564

Source: Survey Data (2026)

Discriminant validity was examined using the heterotrait-monotrait ratio of correlations (HTMT), where values below 0.85 (See Table 3.3) suggest that the constructs are sufficiently distinct from one another. According to Hair Jr, Howard, and Nitzl (2020), discriminant validity is established when the HTMT values are below the conservative threshold of 0.85, indicating that the constructs are empirically distinct from one another. In the present study, all HTMT values are below 0.85, with the highest value being 0.675 (see Table 3.3, which is comfortably below the recommended threshold. Therefore, discriminant validity is established among the constructs, indicating that the constructs do not overlap and are empirically separable. This evidence confirms that each construct measures a unique aspect of the underlying theoretical framework. Overall, these results demonstrate that the measurement model meets the necessary standards for reliability, convergent validity, and discriminant validity. This rigorous evaluation ensures the robustness of the model and establishes a solid foundation for subsequent structural model analysis, enhancing the credibility and generalizability of the study's findings.

Table 3.3. Discriminant Validity on Heterotrai-Monotrait Ratio (HTMT)

Variables	AT	DL	EBS	PBC	SN
AT					
DL	0.336				
EBS	0.476	0.672			
PBC	0.413	0.533	0.602		
SN	0.437	0.675	0.608	0.582	

Note: HTMT indices are below 0.85, indicating that discriminant validity has been established.

Examining collinearity was essential because its presence can distort the relationships between concepts and affect the accuracy of path coefficients Kock (2015), potentially leading to erroneous interpretations of the data (Macha, Chalu, & Mzenzi, 2025; Teunis, Jayakumar, & Ring, 2021). The full-collinearity Variance Inflation Factor (VIF) assessment was conducted following Kock (2015), with the maximum VIF among the constructs being 1.33, well below the recommended threshold of 3.0, indicating that multicollinearity was not a concern. Importantly, the full-collinearity VIF results also confirm that common method bias is not a concern in the study, as all VIF values were substantially below the threshold of 3.3 as recommended by Anwar, Irwan, Zaini, and Budi (2025). This result confirms that the independent variables are clearly differentiated, allowing subsequent analysis to proceed with confidence. The low VIF-values reinforce the reliability of the measures and support the robustness of the model, ensuring that the findings are not compromised by overlapping constructs or common method bias (Hair, 2022).

Hypotheses Test Results

As shown in Table 3.4, six hypothesized relationships were found to be statistically significant, validating the study's propositions. The results demonstrate that DL exerts the most substantial effect on IB drivers toward the intention to embrace EBS among MFIs. In particular, it shows the strongest influence on SN (path coefficient = 0.557), followed by PBC (0.449) and AT (0.262). In addition, SN emerge as the most influential factor in the intention to embrace EBS (0.294), followed by PBC (0.291) and AT (0.174). Collectively, the model explains 35.1% of the variance in the intention to embrace EBS. According to Rodríguez Sánchez, Salmerón Gómez, and García (2022), R^2 values of 0.67, 0.33, and 0.19 can be

described as substantial, moderate, and weak, respectively. Therefore, an R^2 of 0.351 reflects a moderate explanatory power of the study model based on Rodríguez Sánchez et al. (2022).

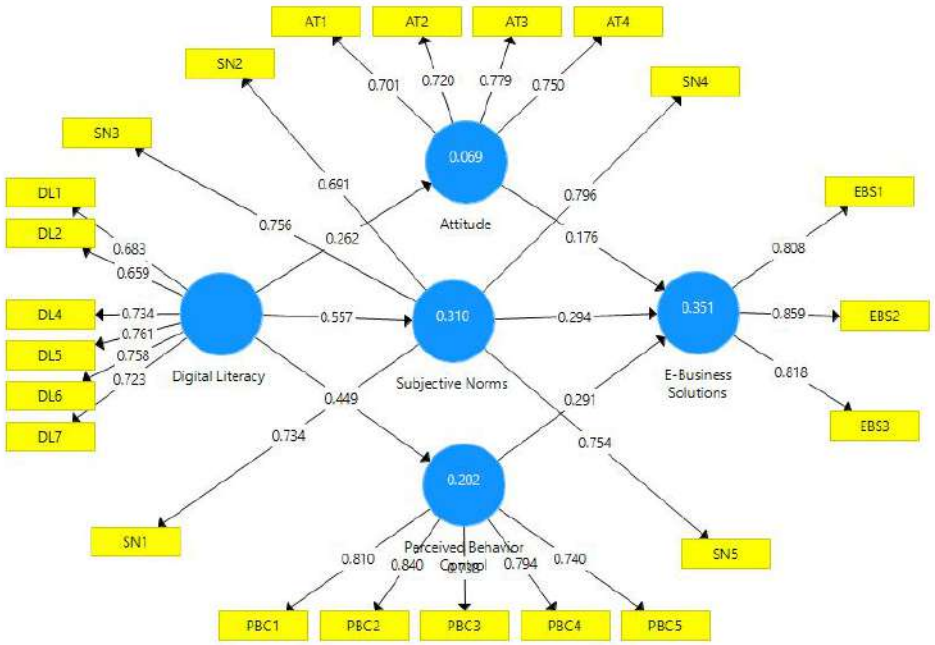
Table 3.4: Structural Model and Hypothesis Testing Indices

Relationships	H	PI	VIF	TV	PV	Q^2	f2	95%CIBCa	Decision
DL -> AT	H1a	0.262	1.000	3.1030	0.001	0.012	0.450	[0.068, 0.286]	Accepted
AT -> EBS	H1b	0.176	1.165	2.6860	0.004	0.214	0.041	[0.122, 0.387]	Accepted
DL -> SN	H2a	0.557	1.000	10.117	0.000	0.021	0.253	[0.326, 0.543]	Accepted
SN -> EBS	H2b	0.291	1.372	3.6760	0.000	0.412	0.097	[0.430, 0.625]	Accepted
DL -> PBC	H3a	0.449	1.000	6.9050	0.000	0.057	0.074	[0.170, 0.425]	Accepted
PBC -> EBS	H3b	0.291	1.356	3.7940	0.000	0.291	0.096	[0.165, 0.413]	Accepted

Notes: Effect size (f2)> the threshold of small effect 0.02, PV (p-values < 0.05),TV (t-values > 1.65), H (Hypothesis), PI (path indices) > 0, 95CIBCa *(Confidence Interval Bias-Corrected) lower to upper limits does not cross one, indicating model predictive relevance.*

The effect size (f^2) values exceed minimum threshold of 0.02, which confirms the significance of the hypothesized relationships in explaining the role of DL and IB toward the intention to adopt EBS. The smallest effect size is 0.041 for AT on intention to EBS, followed by 0.074 for DL on PBC, 0.096 for PBC on EBS, and 0.097 for SN on EBS. Notably, DL exerts a much stronger effect on SN and AT (0.450). Furthermore, the Q^2 values for the paths between DL and IB constructs, as well as from these constructs to intention to adopt EBS, are all greater than zero, which confirms the predictive relevance of the model. In addition, the 95% bias-corrected and accelerated (BCa) confidence intervals are positive and do not cross zero, further validating the statistical significance of the hypothesized relationships. Collectively, these results highlight the explanatory power and emphasize the central role of DL in positively and significantly shaping IB toward the intention to adopt EBS as demonstrated in Table 3.4 and Figure 1.

Figure 1. The Finalized Research Model



Source: Extracted from field data (2025).

Discussion of the findings

The findings indicate that DL, as conceptualized by DOI Theory (Rogers et al., 2014), positively influences IB, which is consistent with TPB (Ajzen, 1991). As shown in Figure 1 and Table 3.4, the study empirically validates the proposed research model, demonstrating that DL strengthens IB constructs (AT, SN, and PBC), thereby enhancing the intention to adopt EBS among MFIs. The hypothesized relationships, derived from prior literature, were rigorously tested for validity and reliability using SmartPLS3 to ensure the stability of the measurement model. Overall, the results reveal that all hypothesized relationships are positive and significant, highlighting the pivotal role of DL in shaping IB and driving intentions to adopt EBS.

Although most prior studies assessed IB and its concepts in isolation, or examined DL and individual intention separately, the current findings provide a meaningful theoretical framework for explaining the interplay among these constructs. Building on this, H1a and H1b were designed to assess DL's role in amplifying individual AT toward the intention to adopt EBS. The results indicate that DL positively influences AT, which in turn exhibits a positive relationship with EBS. In addition, Kuek and Hakkennes (2020) demonstrate a positive relationship between DL and technological acceptance in hospitals. Mohamad, Osman, Mohamad, Ismail, and Din (2023) showed a positive relationship between AT and the intention to adopt digital banking in Malaysia, while Mndeme and Mihale (2025) share a positive impact between DL and mobile banking usage among graduates in Tanzania. Together, these studies support the

hypothesized relationships in the present study, reinforcing the notion that DL strengthens AT, which subsequently drives the intention to adopt EBS. Moreover, these prior findings validate the current results by providing empirical evidence that the observed relationships between DL, AT, and intention to EBS are consistent with established patterns in different organizational and technological contexts.

H2a and H2b were designed to examine the role of DL in amplifying SN toward intention to adopt EBS by MFIs. The analyzed data reveal that DL is a critical factor in enhancing SN, with positive and significant relationships observed both between DL and SN and between SN and EBS. This highlights the importance of DL in shaping the social influences that drive intention to adopt EBS. This finding is supported by several studies: Massawe, Mbura, Elly, and Masanja (2023) argued that DL has a greater influence on SN towards continuous intention on social media. In the same vein, Inegbedion et al. (2020), examined the relationship between DL and customer AT toward the intention to use e-banking in commercial banks in Nigeria; Patria, Alam, Mulyadi, and Setyarko (2023) reported that DL positively affected managers' AT toward digital marketing in Bekasi, and consistent evidence was also documented by Bruce et al. (2023) in the insurance sector in Ghana. These cross-sectoral findings reinforce the present results by demonstrating that the influence of DL on SN and the intention to adopt EBS remains consistent across different service sectors, thereby underscoring their relevance for MFIs.

The last two hypotheses examined in this study, H3a and H3b, were designed to assess the role of DL in enhancing PBC toward intention to adopt EBS. The findings reveal that DL is a critical factor influencing PBC, thereby strengthening the intention to adopt EBS. This result is supported by Lampo (2025) and Mushi and Kagoya (2025), who demonstrated the positive impact of DL on PBC in the services sector (specifically the aviation industry in Macao), and by a study by Gathumbi (2015) on Matatu owner SACCO in Nairobi, which highlights how DL enhances PBC and adoption behavior in financial cooperative settings. These prior studies support the current findings by providing empirical evidence that DL consistently strengthens PBC across different sectoral contexts, thereby validating the importance of DL in shaping individuals' PBC to adopt EBS among MFIs.

Conclusions and Recommendations

The positive impact of DL on IB, as shown by the results supporting hypotheses H1a and H1b, highlights the need for MFIs to integrate DL as a key factor in strengthening their AT toward embracing EBS. This integration should involve proactive strategies, such as providing employees with training to develop the skills and knowledge necessary for the effective use of digital systems in financial operations. As demonstrated by previous studies, recognizing DL as a critical determinant of positive user AT can generate multiple benefits for MFIs. Such benefits include, among others, expanding business reach, engaging customers more effectively, receiving timely feedback, improving service delivery, enhancing customer satisfaction, and maintaining competitiveness in the digital era.

An integrated model incorporating DL, SN and EBS as postulated by H2a and H2b can provide a robust framework for understanding how DL enhances users' SN. This model demonstrates that improved digital knowledge and competencies heighten individuals' sensitivity to social expectations, normative pressures, and peer influences, which in turn positively shape their intention to embrace EBS. Given that DL has been empirically shown to be a significant antecedent of SN in relation to the intention to embrace EBS, MFIs are advised to implement DL initiatives. These initiatives should include targeted training programs, digital workshops, and continuous support for both employees and customers. Strategically enhancing DL not only strengthens SN but also promotes greater user engagement, facilitates faster and more effective embracing and adopting EBS, and improving operational efficiency. Furthermore, customers benefit from expanded access to financial services and from more responsive service delivery, while the broader financial sector experiences increased digital integration, enhanced financial inclusion, and growth in digital transactions, thereby contributing to a more resilient, efficient, and competitive financial ecosystem.

Based on H3a and H3b, the concept of DL plays a pivotal role in enhancing PBC by equipping users with the knowledge, skills, and confidence required to effectively navigate EBS, thereby increasing their perceived ability to manage digital financial activities. Strengthening PBC through DL reduces perceived barriers and uncertainties, fostering greater self-efficacy and intentional adoption of EBS. Therefore, MFIs are encouraged to implement structured DL initiatives, including practical training sessions, digital simulations, and continuous support, to empower both employees and customers to utilize digital platforms. Enhancing PBC in this manner not only promotes higher adoption rates and operational efficiency but also benefits customers through increased autonomy, faster transactions, and more responsive service. At the institutional and sectoral level, reinforcing PBC via DL contributes to wider digital adoption, improved financial inclusion, and a more resilient and competitive financial ecosystem (Fintan & Mbura, 2025; Pittri, Godawatte, Esangbedo, Antwi-Afari, & Bao, 2025).

These findings extend the TPB by demonstrating that DL acts as a foundational enabler that strengthens all three core determinants that are AT, SN, and PBC, thereby enhancing their collective influence on behavioral intention towards actual usage of EBS. At the same time, the results advance the DOI by positioning DL as a critical capability that facilitates the adoption process, reducing complexity, increasing perceived ease of use, and accelerating the diffusion of digital financial innovations within MFIs. Together, this integration provides a more comprehensive explanation of how individual competencies interact with social and behavioral factors to drive technology adoption in developing

financial contexts.

Limitations and Areas for Further Research

Future research could employ longitudinal designs to examine changes over time and provide stronger evidence of causality. Second, the study relied on self-reported Likert-scale measures, which may be affected by response and social desirability bias. Future studies could complement these measures with objective indicators, such as transaction records or system-usage data, where accessible. Third, collecting data through a single questionnaire may introduce common method variance and potentially inflate the observed relationships among the constructs. This limitation could be addressed through multiple data sources, different measurement methods, or data collected at different time points.

Finally, the study is contextually limited to the MFI subsector, which may constrain the generalizability of the findings to other types of financial institutions. Differences in financial service development, investment in digital literacy (DL), and levels of digital technology adoption may produce different outcomes across institutional settings. Future research should therefore compare MFIs with other financial institutions, such as commercial banks, insurance companies, and savings and credit cooperative societies (SACCOs), to assess the transferability of the findings. Such comparative research could also examine how institutional, cultural, and technological differences shape digital technology adoption and identify context-specific best practices for DL implementation.

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