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Integration of UTAUT2 and Information System Success Model: The Role of User Satisfaction and Financial Literacy Moderation in the Use of Digital Financial Services in Indonesia

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Abstract

The rapid development of digital financial services has driven the high adoption rate of financial applications in Indonesia. However, the increase in use is not always accompanied by an adequate level of financial literacy, raising questions about the main determinants of digital financial system usage behavior. This study aims to test the expanded technology acceptance model by integrating the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and information system success model, as well as evaluating the role of user satisfaction and financial literacy in driving the actual use of digital financial services.

This study uses a quantitative approach with a cross-sectional design. Data was collected through a survey of active users of digital financial services in Indonesia and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The research model examines the influence of UTAUT2 constructs on behavioral intention, the continued relationship between behavioral intention, user satisfaction, and system use, and the role of financial literacy moderation in the relationship between intention and system use.

The results of the analysis show that behavioral intention has a significant effect on user satisfaction and system use. Furthermore, user satisfaction has proven to be the most powerful determinant of the actual use of the system, beyond the direct influence of behavioral intention. In contrast, financial literacy has not been shown to moderate the relationship between behavioral intention and system use, suggesting that ease of use and user experience have a more dominant role than formal financial literacy levels in the context of modern digital financial services. The research model has a high ability to explain the variation in user satisfaction and system usage.

This research contributes to the development of the technology adoption literature by integrating pre-adoption and post-adoption perspectives in one comprehensive conceptual framework. In practical terms, these findings emphasize the importance of improving the quality of experience and user satisfaction as the main strategy to encourage the sustainability of the use of digital financial services in Indonesia.

INTRODUCTION

In the past decade, the acceleration of the digitalization of financial services has changed the way people interact with payment systems, fund management, and financial decision-making. According to a World Bank report (2023), more than 76% of the global adult population has used digital financial services, an increase of almost double compared to a decade earlier. Indonesia, as one of the countries with the fastest growth of the digital economy in Southeast Asia, has also witnessed a surge in the use of financial applications, both for daily transactions, investments, and credit services. Although the penetration of use is very high, various national surveys show a significant paradox of increasing adoption of the digital financial system, but people's financial

literacy is relatively stagnant, only reaching 49.68% based on the Financial Services Authority (OJK, 2022). This gap between usage and understanding raises the risk of wrong decision-making, low user satisfaction, and the potential for the sustainability of the digital system itself.

This phenomenon raises the fundamental question of whether psychological and technological factors alone determine the intentions and behaviors of using digital systems, or whether the level of financial literacy plays an important role in strengthening or weakening these relationships? More specifically, when behavioral theory models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) have long been the main reference in predicting technology acceptance, there is a need to understand whether these variables are still relevant in the context of increasingly complex digital financial services. In the midst of society's high dependence on application-based financial systems, the urgency of a comprehensive scientific understanding of user behavior is becoming increasingly important.

Research on the acceptance of technology has developed rapidly, especially since the introduction of UTAUT by Venkatesh et al. (2003) and its development into UTAUT2 (Venkatesh et al., 2012). This model emphasizes that performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit are the main determinants of behavioral intention and system use. Various recent studies prove the reliability of this model in explaining the adoption and behavior of using technology in various contexts, ranging from e-commerce (Tarhini et al., 2021), mobile banking (Rahi & Ghani, 2019), to digital education applications (Rimoldi et al., 2023).

In the context of digital financial services, research shows that performance expectancy and ease of use (effort expectancy) are strong predictors of intention to use financial applications. Social factors and habits have also proven to be significant drivers, especially in developing countries where community norms are still influenced by the acceptance of technology. On the other hand, recent developments also show that user satisfaction plays an important role in ensuring continued system use, as emphasized in studies on information system success models (DeLone & McLean, 2016).

In addition to psychological and technological factors, the issue of financial literacy is increasingly receiving attention in the latest literature. Financial literacy is not only the ability to understand financial concepts, but the skill of applying that knowledge in decision-making. Research by Lusardi and Mitchell (2014) confirms that financial literacy affects consumption behavior, investment, and the tendency to utilize financial technology. In digital finance studies, this variable began to be examined as a moderator that influences the relationship between technology perception and usage behavior (Kang & Hustvedt, 2014). However, empirical studies in Indonesia still show limited evidence, especially in their interaction with UTAUT components.

However, most of the research that exists is still focused on intention to use and has not evaluated much on how financial literacy moderates the relationship between user satisfaction and actual system use. With the increasing complexity of financial applications, from just digital wallets to investment and credit platforms, a comprehensive understanding of the determinants of user behavior is becoming increasingly relevant.

While research on the adoption of digital financial technology and systems continues to grow, there are some important gaps that have not been adequately addressed. First, most studies on UTAUT in Indonesia still focus on a single sector such as mobile banking, fintech payments, or e-wallets, while cross-variable interactions such as user satisfaction and actual use of the system have not been comprehensively analyzed. Many studies stop at behavioral intent without

continuing to test its effect on system use and user satisfaction, even though sustainability of use is an important indicator of the success of a digital system.

Second, the role of financial literacy as a moderation variable in the context of UTAUT is still underexplored, especially in the digital financial ecosystem in Indonesia. In fact, the global literature has shown that the level of financial literacy can moderate the influence of technology perception on usage behavior. This lack of moderation research leads to an incomplete understanding of how users make decisions in a risk-laden digital financial environment.

Third, some recent studies show inconsistent results regarding the influence of UTAUT factors on the intention to use the digital financial system. For example, some studies have found significant effects of effort expectancy and social influence, while other studies have shown weak or insignificant effects. These inconsistencies require further studies to retest the relationship between variables in different social and demographic contexts.

These gaps show the need for research that comprehensively tests the extended UTAUT model by including variables of financial literacy, user satisfaction, and actual use of the system. Filling this gap is important not only for theory development, but also for industries and policymakers who need an accurate understanding of user behavior in the digital ecosystem.

LITERATURE REVIEW

The conceptual framework of this research is based on key theories in technology adoption and user behavior. Among these theories, the Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2) is the strongest foundation, along with the theory of behavioral intentions and models of information system success. UTAUT was introduced by Venkatesh et al. (2003) as a synthesis of eight major theories, such as TAM, TRA, TPB, Innovation Diffusion Theory, and Social Cognitive Theory. This model formulates four core constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions that are empirically proven to influence behavioral intention and the use of technology in practice.

Over time, UTAUT developed into UTAUT2 (Venkatesh et al., 2012) with the addition of three new variables, namely hedonic motivation, price value, and habit. This expansion makes the model more relevant for understanding individual user behavior and consumer-based technologies. Interestingly, various studies in the past decade show that UTAUT2 consistently has strong predictive power for the adoption of digital technology, ranging from mobile banking, e-wallets, e-commerce, to fintech applications.

The relevance of these theories is evident in the context of this research. Users of digital financial systems are usually influenced by perceptions of the benefits of technology, ease of use, social encouragement, and the extent to which supporting facilities are available. In addition, emotional factors such as pleasure in using the app and habits formed from repeated use cannot be ignored. Therefore, this study not only uses the core variables of UTAUT2, but also expands it by including financial literacy as a moderation variable, as well as user satisfaction as a result variable that is between behavioral intention and system use.

The use of the user satisfaction variable refers to the theoretical tradition in the information system success model from DeLone and McLean (2016). The model emphasizes that the quality of systems, information, and services will shape user satisfaction, which further drives actual use and sustainability of interactions with the system. In digital financial services that require trust, clarity, and convenience, user satisfaction plays an even more central role. Therefore, combining technology acceptance theory and information systems success models allows this research to

present a more comprehensive understanding of how intentions are formed and manifested in practice.

Another important element in the conceptual framework of this research is financial literacy. According to Lusardi and Mitchell (2014), financial literacy includes understanding basic financial concepts such as compound interest, inflation, and risk diversification, as well as the ability to apply them in financial decision-making. In the digital era, the role of financial literacy is becoming more and more widespread. Users are not only required to understand financial services, but also how to assess the benefits, risks, and implications of using increasingly complex technology. Various studies show that the level of financial literacy affects a person's ability to understand the features of financial applications, assess security, and manage the risk of digital transactions, a dimension that is highly relevant in the rapidly growing fintech ecosystem.

In the consumer behavior literature, financial literacy is also often reported to influence how individuals evaluate technology. Kang and Hustvedt (2014), for example, show that individuals with higher financial literacy tend to be more sensitive to the benefits of financial technology and are more critical in examining the risks. Findings like these provide a convincing theoretical basis that financial literacy has the potential to strengthen or even weaken the relationship between behavioral intention and actual use. Practically, users with low literacy may have the intention to use financial apps, but have difficulty translating them into real actions. In contrast, those with high literacy are better able to utilize technology consistently and productively.

Compared to previous research, this study offers quite a different contribution. Studies that test UTAUT show a wide variety of findings regarding the factors that influence behavioral intentions. Alalwan (2020), for example, emphasized that performance expectancy is the strongest predictor of mobile banking adoption in the Middle East. Meanwhile, Tarhini et al. (2021) found that effort expectancy is more dominant in the context of e-commerce. This difference illustrates that the influence of each UTAUT variable is highly dependent on the social, economic, and technological context being studied.

Research in Indonesia is also not spared from these inconsistencies. Pratama and Setiawan (2022) show that social influence is not significant for the younger generation of mobile banking users. This is contrary to the findings of Atmaja and Nurhayati (2021) who found that social influence is actually the most dominant factor in the use of e-wallets. This striking difference shows that technology adoption is highly contextual. Therefore, the re-testing of UTAUT2 in the context of the broader digital financial system is very important and is one of the contributions of this research.

Another contribution lies in testing the relationship between behavioral intention, user satisfaction, and system use. Many studies stop at intent measurement and rarely include user satisfaction as a bridge to actual use. In fact, in voluntary technology, satisfaction is often the determining factor whether users will continue using it or even stop. The study of Rahi and Ghani (2019) does include satisfaction as mediation, but the context is limited to digital banking and does not integrate it with financial literacy.

The position of financial literacy is also an important differentiator. So far, most studies have placed it as an independent variable that influences intentions (Widyastuti & Haryanto, 2020). In fact, conceptually, literacy is more accurately understood as a factor that affects how intentions are translated into action. By positioning it as a moderator, this study expands the way we understand the interaction between technology perception and user behavior.

From a literature perspective, there are several evidence gaps that confirm the urgency of this research. First, research on financial literacy as a moderator in the UTAUT2 model is still very limited. In practice, financial literacy is often the distinguishing factor between users who only intend to use technology and users who actually use it effectively. Second, the findings regarding the determinants of behavioral intention continue to show inconsistencies. This indicates that the relationship between UTAUT variables needs to be retested in the context of financial technology that continues to evolve. Third, the integration of behavioral intention, user satisfaction, and system use in one model is still rare, although all three are important elements in understanding end-to-end technology adoption.

In addition, research using a comprehensive model in the context of digital finance in Indonesia is still limited. Most studies focus on one sector, such as mobile banking or e-wallets only, even though user behavior in the digital world is often cross-platform. Therefore, this research approach is expected to provide a more complete picture of user behavior patterns.
Filling this research gap is important, both for the development of theory and practice. Theoretically, this study enriches the literature by expanding UTAUT2 through the integration of financial literacy and user satisfaction. In practical terms, the results of the research can help application developers, financial institutions, and policymakers design systems that are not only easy to use, but also support financial literacy and improve the quality of user experience. Ultimately, people also benefit through a better understanding of how financial literacy affects the security and effectiveness of using digital financial services.

METHODS

This study uses a quantitative research design with a cross-sectional approach. This design was chosen because the study aims to test the causal relationship between variables derived from the UTAUT2 theoretical model, financial literacy, behavioral intention, user satisfaction, and system use. The quantitative approach allows for objective measurement of variables through standardized instruments as well as analysis of relationships between variables using inferential statistical techniques. Creswell (2014) explained that quantitative design is very suitable for research that aims to test theories, identify relationship patterns, and generate generalizations based on representative samples.

The population in this study is all individuals who use digital financial services in Indonesia, including mobile banking, digital wallets, investment applications, and digital credit services. This population is relevant because the research focuses on the mechanisms of user behavior in the context of financial technology. Active users are selected because they have real experience in interacting with the application and can provide valid assessments regarding behavioral intention, satisfaction, and actual use of the system.

The sampling technique uses non-probability purposive sampling, which is the selection of respondents based on certain characteristics that are relevant to the research objectives. This

technique is commonly used in technology adoption research because not all members of the population have the necessary experience to provide valid answers (Sekaran & Bougie, 2019).

The determination of the number of samples refers to the structural equation modeling (SEM-PLS) guidelines. According to Hair et al. (2021), the minimum number of samples is determined based on the "10-times rule", which is ten times the largest number of paths leading to a construct in the model. Taking into account the complexity of the model, the minimum sample count is in the range of 100–150. Statistical power analysis for medium effect sizes (Cohen, 1992) also showed that a minimum of 150–200 respondents were required for the study to reach a power of 0.80 at a significance level of 0.05. Based on these considerations, this study set a target sample of around 300 respondents, allowing for a more stable structural analysis and allowing for further discussions such as moderator analysis.

Data collection was carried out using a structured questionnaire, which was developed through the adaptation of instruments from previous research. The instrument includes the measurement of UTAUT2 constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habit) based on Venkatesh et al. (2012). The variables of behavioral intention and system use were adapted from the literature on technology acceptance, while the variable of user satisfaction used indicators from the DeLone and McLean (2016) model. The financial literacy variable uses objective knowledge-based items according to the standards of Lusardi and Mitchell (2014).

Each construct was measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), except for the financial literacy item in the form of multiple-choice questions to assess respondents' level of understanding. The use of standardized indicators increases the validity of the content and allows for comparison of results with previous studies.

The reliability and validity of the construct were tested through Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). The thresholds used were Cronbach's alpha > 0.70, CR > 0.70, and AVE > 0.50, as per the guidelines of Hair et al. (2021). The validity of the discriminant was tested using the Fornell-Larcker criteria as well as the Heterotrait-Monotrait Ratio (HTMT) value

RESULTS AND DISCUSSION

This section presents the results of the research based on the analysis of Partial Least Squares Structural Equation Modeling (PLS-SEM) conducted using SmartPLS software. This study aims to analyze the influence of several antecedent constructs on Behavioral Intention, as

well as the continued relationship between Behavioral Intention, User Satisfaction, System Use, and Financial Literacy moderation in the context of using digital financial system services.

Table 1. Outer Loadings Construct Research

Construct	Loading Range
Performance Expectancy	0.876–0.881
Price Value	0.890–0.911
Effort Expectancy	0.877–0.892
Hedonic Motivation	0.894–0.899
Social Influence	0.900–0.901
Habit	0.881–0.900
Facilitating Conditions	0.874–0.882
User Satisfaction	0.886–0.893
System Use	0.935–0.950
Financial Literacy	0.847–0.869

As shown in Table 1, all indicators have loads above the minimum limit of 0.70, thus passing the convergent validity criteria. The System Use indicator reaches the highest value (up to 0.950), signaling the indicator's very strong contribution in explaining latent variables.

Table 2. Composite Reliability (CR)

Construct	CR
Performance Expectancy	0.805
Price Value	0.785
Effort Expectancy	0.785
Hedonic Motivation	0.773
Social Influence	0.783
Habit	0.772
Facilitating Conditions	0.793
User Satisfaction	0.844
System Use	0.869
Financial Literacy	0.014

Table 2 shows that all core constructs (except Financial Literacy) meet the composite reliability criteria (> 0.70). The highest reliability value is found in System Use (0.869), which indicates the internal stability of the indicator.

Table 3. Path Coefficients

Intervariable Relationships	Coeficin
Behavioral Intention → User Satisfaction	0.460
User Satisfaction → System Use	0.484
Behavioral Intention → System Use	0.317
Moderasi Financial Literacy	–0.027

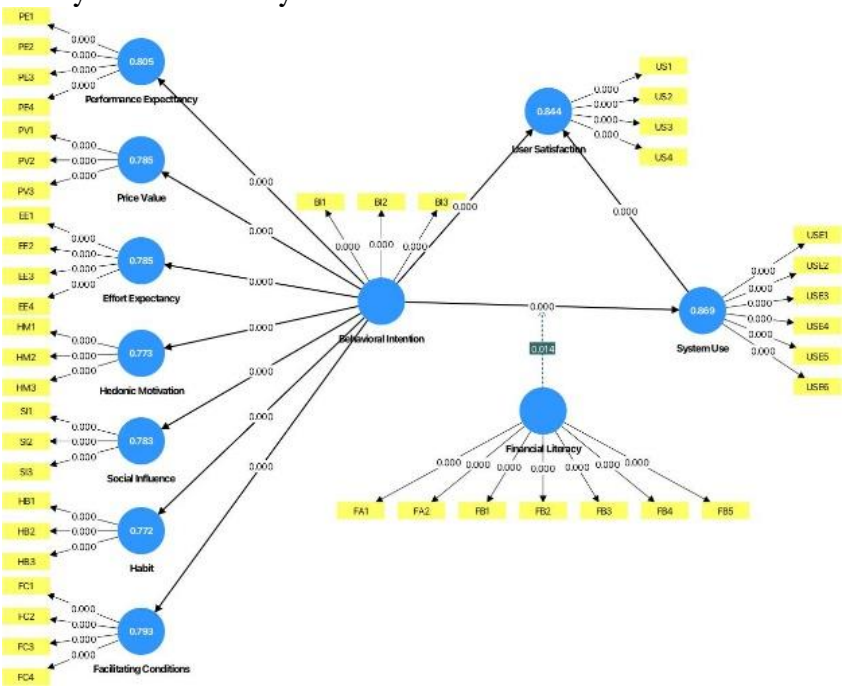
The path coefficients shown in Table 3 illustrate the strength of the relationship between latent variables. The highest coefficient value is found in the User Satisfaction → System Use path, indicating a strong contribution of user satisfaction to the intensity of system use.

Table 4. R^2 Value

Endogenous Variables	R^2
User Satisfaction	0.844
System Use	0.869

The value of R^2 falls into the category of "excellent" (Chin, 1998). As seen in Table 4, the model is able to account for 84.4% of User Satisfaction variability and 86.9% of System Use variability.

Instrument Validity and Reliability



The results of the measurement model test showed that all indicators met the criteria of outer loading > 0.70, Composite Reliability > 0.70, and Average Variance Extracted (AVE) > 0.50. Thus, the instrument is declared reliable and valid in measuring latent constructs. All constructs also passed the discriminant test through the HTMT criterion (< 0.90), so it can be concluded that each variable has a strong conceptual separation.

The structural model shows that Behavioral Intention has a strong contribution to User Satisfaction (β = 0.460). Furthermore, User Satisfaction had a greater effect on System Use (β = 0.484), than the direct effect of Behavioral Intention on System Use (β = 0.317). This shows that user satisfaction plays an important role in facilitating the actual use of the system.

The effect of Financial Literacy moderation on the relationship between Behavioral Intention and System Use showed a small negative coefficient value (–0.027). This value is very close to zero and does not show any meaningful contribution to the model. Thus, Financial Literacy does not strengthen or weaken the relationship between intentions and system usage.

DISCUSSION

The results show that behavioral intention has a strong influence on user satisfaction and system use, while user satisfaction is the most significant determinant of the actual use of digital financial services. These findings reinforce the UTAUT2 theory and the DeLone–McLean model, which places user intent and satisfaction as the two main foundations in the utilization of digital systems. Thus, this research contributes to the development of technology adoption theory by combining pre-adoption and post-adoption perspectives in one coherent framework.

In terms of policy and practice, these results indicate that increasing the use of digital financial services is not enough just to build user intent through promotion or education.

Furthermore, the quality of the user experience ranging from ease of use, comfort, security, to overall satisfaction is an aspect that determines whether users will continue to use the service. Financial institutions and fintech service providers need to prioritize intuitive interface design, improved service speed, and responsive problem solving to maintain a positive user experience.

Interesting findings emerged on the financial literacy variable, which has not been shown to moderate the relationship between intention and use of the system. These results differ from some previous studies that showed that financial literacy plays an important role in the adoption of financial technology. This difference can be due to the increasingly user-friendly nature of digital financial applications so that they no longer require a high level of financial literacy to operate. This shows that the adoption of digital technologies is not always determined by formal analytical capabilities, but rather by the ease of technology and the everyday user experience.

In terms of methodology, this study has the strength of high reliability and validity of the instrument, as well as strong model prediction ability. However, this study also has limitations such as cross-sectional design and low reliability on financial literacy variables. These limitations need to be corrected in future research by using more comprehensive literacy instruments or longitudinal approaches to observe behavioral changes over a period of time.

Overall, this study provides a new understanding that the behavior of using digital financial services is more determined by user experience and satisfaction than formal financial literacy. This perspective emphasizes the importance of user-oriented service innovation as a key strategy in increasing the inclusion and sustainability of digital service use. In closing, the findings of this research are expected to be the basis for the development of theories, policies, and practices in building a digital financial ecosystem that is more effective and responsive to people's needs.

CONCLUSION

This research confirms that the success of using digital financial services is not only determined by the user's initial intention, but more fundamentally by the quality of their experience in interacting with the system. Behavioral intention has proven to be an important foundation for creating user satisfaction, while satisfaction is the most powerful factor in encouraging sustainable use of the system. On the other hand, financial literacy does not play a significant moderation role, suggesting that the use of modern digital technologies tends to be more influenced by convenience and ease of access than formal financial analytical skills. These findings provide a clear picture that digital user behavior is the result of a combination of initial perception, actual experience, and the quality of service they receive.

In a practical context, the implications of this study are particularly relevant for policymakers and industry players. The Financial Services Authority, Bank Indonesia, and other regulators can leverage these findings to develop policies that not only focus on improving financial literacy, but also encourage improving the quality of people's digital experiences. For example, policies that ensure data security, transaction convenience, and minimum service standards for all digital service providers can increase the chances of successful digital transformation in the financial sector. For the fintech and digital banking industries, the results of this study draw attention to the importance of intuitive interface design, responsive customer service, and enjoyable post-adoption experiences. By improving these elements, service providers can strengthen user satisfaction and ultimately encourage more consistent use of the system. For the general public, this study shows that the adoption of digital financial technology does not necessarily require high financial literacy, as long as the system is made easy to understand, secure, and reliable.

Although this research has uncovered important patterns in the behavior of using digital financial services, there is still room for further development. Future research may consider longitudinal design to analyze changes in user behavior over a longer period of time. In addition, financial literacy measurement instruments need to be improved in order to be able to capture

variations in financial knowledge and skills more accurately. Practitioners can also use these findings to develop more innovative user experience improvement strategies, for example through service personalization or the integration of educational features that are micro and easily accessible. At the policy level, advanced research can support the formulation of regulations that are more adaptive to technological developments and the needs of digital users.

Finally, this research makes an important contribution to the development of theory and practice in the fields of technology adoption, digital services, and user behavior. By affirming the central role of user satisfaction and experience, the study broadens the understanding of what really drives the sustainable use of technology. This conclusion is expected to serve as the basis for further strategic steps, both in research and policy implementation, to build a more inclusive, secure, and user-oriented digital ecosystem.

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