

# A Conceptual Framework for a Cross-National Study on Fintech Adoption and Financial Literacy among Students in Malaysia and Indonesia

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## ABSTRACT

The rapid expansion of financial technology (FinTech) across Southeast Asia is transforming how young consumers interact with financial services. Malaysia and Indonesia, as leading digital economies, present a unique context for examining how youth adopt FinTech platforms such as e-wallets, digital banking, Buy-Now-Pay-Later (BNPL), and investment applications. This conceptual paper develops a theoretical framework grounded in the Technology Adoption Model (TAM), extended with Trust, Perceived Risk, and Financial Literacy as a moderating construct. The framework proposes that Perceived Usefulness, Perceived Ease of Use, Trust, and Perceived Risk influence students' Behavioural Intention to adopt FinTech services, while Financial Literacy strengthens or weakens these relationships. By comparing two culturally and economically interconnected nations, the model provides a basis for understanding how differences in financial literacy and regulatory environments may shape FinTech adoption among students. The paper contributes theoretically by integrating financial literacy into TAM as a contextual moderator and practically by offering guidance for policymakers, educators, and FinTech providers to enhance financial literacy and responsible digital finance usage among youth. Future research directions are outlined to empirically validate the proposed framework through cross-national comparative analysis.

**Keywords:** Financial Technology (FinTech), Technology Adoption Model (TAM), Financial Literacy, Behavioural Intention, Conceptual Framework, Malaysia, Indonesia

## INTRODUCTION (REVISED)

The rapid growth of financial technology (FinTech) in Southeast Asia, particularly in Malaysia and Indonesia, is significantly reshaping consumer interactions with financial services, especially among the youth. This demographic, characterised by high smartphone penetration and a familiarity with digital platforms, increasingly adopts FinTech solutions such as e-wallets, digital banking, and Buy-Now-Pay-Later (BNPL) services, which enhance convenience and accessibility (Aloumi et al., 2024; Lestari et al., 2024). However, challenges persist, including low financial literacy, which can lead to poor financial management and increased debt risks (Lestari et al., 2024). Additionally, trust and cybersecurity concerns remain critical barriers to broader adoption, as consumers seek assurance regarding the safety of their personal data and transactions (Aloumi et al., 2024; Rozali et al., 2024). To address these issues, enhancing financial literacy and strengthening regulatory frameworks are essential for fostering a more robust FinTech ecosystem in these emerging markets (Shi & Wang, 2023; Rozali et al., 2024).

University students in Malaysia and Indonesia, as early adopters of FinTech, face significant challenges regarding financial literacy and risk awareness, which are crucial for responsible FinTech usage. Research indicates that while students exhibit advanced financial knowledge, they often lack digital financial literacy (DFL) and an understanding of associated risks. This leads to poor financial management behaviours and increased bankruptcy rates among youths (Adnan et al., 2023; Rahim et al., 2022). Comparative studies reveal

that financial literacy significantly influences FinTech adoption, with factors such as financial knowledge, trust, and perceived advantages playing pivotal roles in shaping students' adoption behaviours (Khan et al., 2023; Hosen et al., 2023). Moreover, the integration of digital literacy into financial education is essential, as it enhances students' financial management practices and strengthens the relationship between financial technology and literacy (Fadiyah & Widodo, 2024). This highlights the need for targeted educational interventions to improve financial literacy and promote responsible FinTech adoption among students in these culturally interconnected nations.

To address this gap, this paper conceptually explores the adoption of financial technology among university students by drawing on the Technology Adoption Model (TAM) and extending it with Trust, Perceived Risk, and Financial Literacy. The model investigates both direct effects (PU, PEOU, Trust, Risk → Behavioural Intention) and the moderating role of financial literacy. By doing so, the study provides a comprehensive theoretical understanding of FinTech adoption behaviour among students in these two national contexts. Rather than presenting empirical findings, this paper develops a conceptual framework intended to guide future cross-national research examining FinTech adoption among youth in Malaysia and Indonesia.

Accordingly, the study sets out two key objectives:

1. **RO1:** To examine the effects of Perceived Usefulness, Perceived Ease of Use, Trust, and Perceived Risk on students' Behavioural Intention to Adopt FinTech.
2. **RO2:** To assess the moderating role of Financial Literacy on the relationships between FinTech adoption factors (PU, PEOU, Trust, Risk) and students' Behavioural Intention to Adopt FinTech.

These objectives are translated into research questions and hypotheses that guide the conceptual framework. The paper contributes both theoretically by extending TAM with financial literacy as a moderator and practically, by providing insights for educators, policymakers, and FinTech providers seeking to enhance responsible adoption among youth.

## LITERATURE REVIEW

### FinTech Adoption and Youth in Emerging Economies

FinTech adoption among youth in emerging economies, particularly in Malaysia and Indonesia, is influenced by various factors, including digital familiarity, lifestyle preferences, and regulatory environments. Young consumers, especially university students, are often early adopters of FinTech innovations such as e-wallets and digital banking, driven by their comfort with technology and the convenience these services offer (Kouam, 2024; Gulamhuseinwala et al., 2015). However, challenges persist, notably financial literacy deficits that can lead to overspending and debt accumulation (Bermeo-Giraldo et al., 2023).

In both Malaysia and Indonesia, students' financial decision-making is shaped by differences in educational systems, digital financial literacy, and national regulatory frameworks. Comparative findings reveal that, although both countries demonstrate rapid FinTech growth, Malaysian students tend to show higher adoption readiness due to better integration of digital literacy in education, while Indonesian students exhibit higher engagement but lower financial risk awareness (Yunoh et al., 2023; Guo, 2024). These contrasts suggest that contextual factors such as financial education, trust in financial institutions, and regulatory protection play crucial roles in shaping FinTech adoption behaviour. Strengthening financial literacy and consumer protection policies therefore remains essential for sustainable FinTech growth among young users in the region (Kouam, 2024; Guo, 2024).

### Technology Adoption Model (TAM) and FinTech

The Technology Adoption Model (TAM) serves as a critical framework for understanding FinTech adoption, particularly among millennials. Central to TAM are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which significantly influence behavioural intentions towards adopting FinTech solutions. Research

indicates that PU reflects users' beliefs that digital finance enhances efficiency in money management, while PEOU pertains to the perceived simplicity of using financial applications (Durai & Lallawmawmi, 2023; Vidyanata, 2022). PU refers to the extent to which users believe that FinTech enhances their financial efficiency, while PEOU reflects the perceived simplicity and effortlessness of using such technologies (Eltin, 2019; Dhingra & Mudgal, 2019).

However, scholars argue that TAM alone may be insufficient to explain adoption in high-risk financial environments, as FinTech involves trust-sensitive and security-critical transactions (Rahman, 2018; Eltin, 2019). Therefore, researchers increasingly integrate external variables such as trust and **perceived risk** to capture behavioural complexities in digital financial adoption. These extensions acknowledge that psychological factors and knowledge-based attributes — such as literacy and security awareness — substantially shape adoption decisions in emerging markets.

### Trust and Perceived Risk in FinTech Adoption

Trust and perceived risk are critical factors influencing FinTech adoption, particularly among students in emerging economies. Research indicates that higher trust levels significantly enhance the likelihood of adopting mobile payments and digital banking services, as users feel more secure sharing sensitive financial information (Durai & Lallawmawmi, 2023). Conversely, perceived risks, including concerns about fraud, privacy breaches, and financial loss, can deter potential users from engaging with these technologies (Wijaya et al., 2024; Jagetia, 2023).

In Malaysia and Indonesia, both trust and perceived risk are shaped by prior digital experiences and government regulation. Studies indicate that improving trust mechanisms, such as transparent data protection policies and user education, can significantly mitigate perceived risks and enhance FinTech adoption (Elsaman et al., 2024; Silva et al., 2023). Therefore, integrating these constructs into TAM offers a more context-sensitive approach for explaining technology adoption in financial settings.

### Financial Literacy as a Moderating Construct

Financial literacy is increasingly recognised as a pivotal variable in understanding FinTech adoption, especially in emerging economies. It moderates the relationships between technological perceptions (PU, PEOU) and behavioural intention by enhancing individuals' ability to assess benefits and manage risks (Wardani et al., 2024; Hidayanti et al., 2023). Students with higher financial literacy are better equipped to evaluate FinTech services and make informed decisions, while those with limited financial knowledge are more vulnerable to impulsive spending and financial mismanagement (Fadiyah & Widodo, 2024; Hidayati & Nugroho, 2023).

However, cross-national evidence remains limited. Few comparative studies have examined how financial literacy moderates FinTech adoption in Malaysia versus Indonesia, despite both nations' shared regional and cultural characteristics (Anam & Anwar, 2023). This theoretical gap highlights the need to conceptualise how literacy differences interact with trust and perceived risk across varying educational and regulatory environments.

### Research Gap and Conceptual Rationale

A synthesis of the literature reveals several key gaps:

**Limited Cross-National Comparative Studies**, where most FinTech research in Southeast Asia focuses on single-country contexts. Cross-national comparisons between Malaysia and Indonesia, both digital leaders in ASEAN, remain underexplored.

**Underexamined Moderating Role of Financial Literacy**, although financial literacy is often treated as an independent variable, few studies conceptualise it as a *moderator* influencing the strength and direction of TAM constructs.

Due to the Insufficient Integration of Risk and Trust into TAM, the interplay between trust, risk, and literacy within a single framework remains theoretically fragmented.

Need for Contextual Theorisation, Cultural, regulatory, and educational distinctions between Malaysia and Indonesia necessitate a model that accounts for these contextual influences on students' digital finance behaviour.

Therefore, this paper develops a conceptual framework that extends the Technology Adoption Model by incorporating Trust, Perceived Risk, and Financial Literacy as a moderating construct. The model provides a theoretical foundation for future empirical studies to explore FinTech adoption behaviour among students across different national contexts, offering valuable implications for policymakers and educators.

## Conceptual Framework

Conceptual Framework Building upon the reviewed literature, this paper proposes an extended Technology Adoption Model (TAM) to conceptually explain FinTech adoption among university students in Malaysia and Indonesia. The model integrates Trust, Perceived Risk, and Financial Literacy as key constructs that broaden the TAM's explanatory power in a digital finance context.

The original TAM (Davis, 1989) posits that technology adoption is driven primarily by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which influence users' Behavioural Intention (BI) to adopt technology. However, FinTech services differ from general technologies due to their financial risk exposure and reliance on user trust. Thus, the extended framework incorporates trust as a positive determinant and perceived risk as a negative determinant of intention to adopt.

Furthermore, Financial Literacy is introduced as a moderating variable that strengthens or weakens the relationships between the core TAM constructs (PU, PEOU, Trust, and Risk) and Behavioural Intention. The inclusion of financial literacy recognises that users' knowledge, confidence, and awareness of financial principles play a crucial role in shaping responsible adoption behaviour. Students with higher financial literacy are expected to perceive FinTech applications as more useful, easier to use, and less risky, thereby displaying a stronger behavioural intention to adopt such technologies. Conversely, limited financial literacy may amplify risk perceptions and diminish trust, reducing adoption likelihood.

The framework also acknowledges the importance of contextual differences between Malaysia and Indonesia. While both nations share cultural proximity and a rapidly expanding digital ecosystem, variations in financial education systems, regulatory enforcement, and FinTech infrastructure may influence how these relationships manifest. This conceptualisation positions financial literacy not only as a psychological attribute but also as a contextual moderator reflecting national and institutional differences in financial awareness and digital readiness.

Based on the above reasoning, this conceptual framework proposes the following theoretical relationships:

- **P1:** Perceived Usefulness (PU) positively influences students' Behavioural Intention (BI) to adopt FinTech.
- **P2:** Perceived Ease of Use (PEOU) positively influences Behavioural Intention.
- **P3:** Trust in FinTech services positively influences Behavioural Intention.
- **P4:** Perceived Risk negatively influences Behavioural Intention.
- **P5a:** Financial Literacy positively moderates the relationship between PU and BI.
- **P5b:** Financial Literacy positively moderates the relationship between PEOU and BI.
- **P5c:** Financial Literacy positively moderates the relationship between Trust and BI.

- **P5d:** Financial Literacy negatively moderates the relationship between Perceived Risk and BI.

These propositions collectively present a comprehensive theoretical model that can guide future empirical research on FinTech adoption in cross-national contexts.

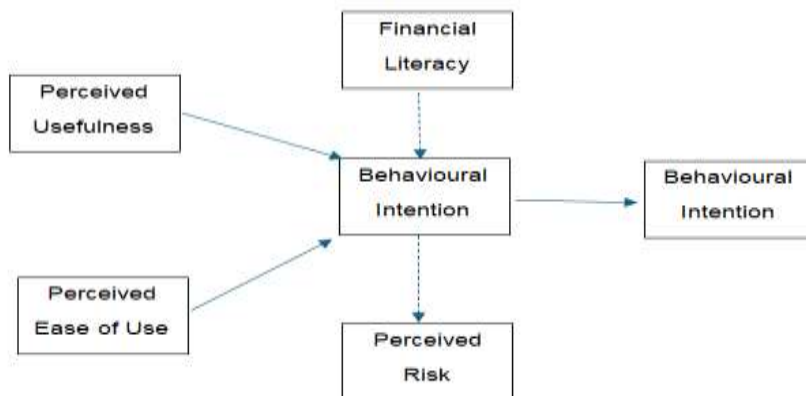


Figure 1. Conceptual framework of FinTech adoption among students in Malaysia and Indonesia, integrating Trust, Perceived Risk, and Financial Literacy into the Technology Adoption Model (TAM).

### Theoretical Contribution of the Framework

This conceptual model contributes to theory by extending the Technology Acceptance Model (TAM) to incorporate elements such as trust, perceived risk, and financial literacy, thereby capturing essential behavioural and contextual factors within digital financial ecosystems. Additionally, it conceptualises financial literacy as a moderator that accounts for behavioural variations in different cross-national and cultural contexts. By applying the model to Malaysia and Indonesia, it offers valuable comparative insights and establishes a conceptual foundation for understanding how educational and regulatory environments influence FinTech adoption among youth in emerging economies.

## METHODOLOGY

### Research Design

This paper adopts a conceptual research design grounded in the Technology Adoption Model (TAM) and extended with Trust, Perceived Risk, and Financial Literacy as a moderating construct. The purpose of this design is to develop a theoretically sound framework that explains how students in Malaysia and Indonesia form behavioural intentions toward FinTech adoption.

Rather than implementing empirical procedures, this conceptual design outlines how future research may operationalise the proposed model. It specifies theoretical constructs, directional relationships, and moderating effects that can later be empirically validated through quantitative cross-national studies.

### Conceptual Derivation of Objectives, Research Questions, and Propositions

The proposed framework is guided by two overarching research objectives (ROs), supported by corresponding research questions (RQs) and theoretical propositions (P). These are not empirical hypotheses but **conceptually derived statements** that define how constructs are expected to relate within the model.

Table 1: Research Objectives, Research Questions, and Hypotheses

Research Objective (RO)	Research Question (RQ)	Conceptual Proposition (P)
RO1: To conceptually examine the effects of	RQ1: How do Perceived Usefulness (PU) and Perceived	P1: PU positively influences Behavioural Intention. P2: PEOU positively influences

Perceived Usefulness, Perceived Ease of Use, Trust, and Perceived Risk on students' Behavioural Intention to adopt FinTech.	Ease of Use (PEOU) shape students' behavioural intention to adopt FinTech? RQ2: How do Trust and Perceived Risk influence students' behavioural intention to adopt FinTech?	Behavioural Intention. P3: Trust positively influences Behavioural Intention. P4: Perceived Risk negatively influences Behavioural Intention.
RO2: To conceptualise the moderating role of Financial Literacy in the relationships between FinTech adoption factors (PU, PEOU, Trust, Risk) and Behavioural Intention.	RQ3: How does Financial Literacy strengthen or weaken the relationships between adoption factors and behavioural intention?	P5a: Financial Literacy positively moderates the relationship between PU and Behavioural Intention. P5b: Financial Literacy positively moderates the relationship between PEOU and Behavioural Intention. P5c: Financial Literacy positively moderates the relationship between Trust and Behavioural Intention. P5d: Financial Literacy negatively moderates the relationship between Perceived Risk and Behavioural Intention.

### Proposed Approach for Future Empirical Validation

Future research inspired by this conceptual model could utilize a cross-national quantitative survey to test the proposed theoretical relationships, focusing on university students aged 18–30 in Malaysia and Indonesia, who are digital natives and early adopters of FinTech. The study will establish Technology Acceptance Model (TAM)-based scales for Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), alongside scales for Trust, Perceived Risk, and Financial Literacy, utilizing established frameworks from prior research. Analytical methods like Partial Least Squares Structural Equation Modelling (PLS-SEM) will be appropriate for managing complex and predictive models, enabling effective assessment of measurement validity, structural relationships, and cross-national differences. Additionally, a Multi-Group Analysis (MGA) could be employed to explore variances between Malaysian and Indonesian samples, offering valuable insights into contextual influences.

### Ethical and Theoretical Considerations

Although the current paper does not involve human participants, future empirical extensions of this conceptual design should comply with research ethics, including informed consent, data confidentiality, and institutional approval. The conceptual framework itself adheres to scholarly standards of theoretical transparency, ensuring that constructs are logically defined, relationships are justified by literature, and the model contributes meaningfully to the advancement of FinTech adoption theory.

### Conceptual Contributions

#### Theoretical Contributions

This paper contributes to the FinTech adoption literature by developing an extended conceptual framework of the Technology Adoption Model (TAM) that integrates Trust, Perceived Risk, and Financial Literacy as additional explanatory variables. While previous TAM-based studies have primarily focused on technological and usability aspects, this conceptual model advances theory in three significant ways:

Integration of Behavioural and Knowledge-Based Factors, the framework enriches TAM by incorporating trust and risk as behavioural antecedents, acknowledging that FinTech adoption involves not only technological perceptions but also psychological confidence and security concerns. By positioning Financial Literacy as a moderating construct, the model highlights how individuals' financial knowledge and awareness influence the strength and direction of adoption behaviour.

Cross-National Conceptualisation, this paper extends TAM beyond a single national context, offering a comparative conceptual lens for understanding FinTech adoption among university students in Malaysia and

Indonesia. It recognises that variations in educational systems, regulatory structures, and cultural attitudes toward technology and finance can meaningfully shape adoption patterns.

Framework for Future Empirical Validation, the proposed framework provides a blueprint for future research to empirically test and refine FinTech adoption theory using cross-national comparative methods. It offers a structured theoretical model that can be validated through quantitative analysis, multi-group comparisons, and the inclusion of other moderating factors such as digital readiness or socio-economic background.

### Practical Contributions

Beyond theoretical advancements, this conceptual paper provides strategic implications for policymakers, educators, and FinTech practitioners:

For policymakers, the model underscores the importance of integrating financial literacy initiatives with national FinTech strategies. Enhancing citizens' understanding of digital finance reduces risk exposure and promotes sustainable inclusion.

For Educational Institutions, Universities can embed digital financial literacy modules into business and accounting curricula, preparing students to make responsible financial decisions and safely engage with emerging financial technologies.

For FinTech Providers, the insights from this framework can guide product developers to design transparent, secure, and user-friendly platforms that build consumer trust and reduce perceived risk, particularly among young users.

For Regional Collaboration, the comparative perspective encourages ASEAN policymakers to pursue harmonised approaches to financial literacy education, consumer protection, and FinTech regulation across member nations.

### CONCLUSION

The accelerating digital transformation of financial services across Southeast Asia presents both opportunities and challenges for youth engagement. Malaysia and Indonesia, as rapidly digitalising economies with strong youth demographics, offer fertile ground for understanding how technological perceptions, trust, and literacy interact in shaping FinTech adoption behaviour.

This conceptual paper has developed an extended TAM framework that integrates Trust, Perceived Risk, and Financial Literacy to explain students' Behavioural Intention to adopt FinTech. The model proposes that Perceived Usefulness, Perceived Ease of Use, Trust, and Perceived Risk directly influence adoption behaviour, while Financial Literacy moderates these relationships by enhancing or weakening their effects. By positioning financial literacy as a central construct, the paper acknowledges that effective adoption of FinTech requires not only technological acceptance but also informed financial decision-making.

Theoretically, this paper advances TAM into a more context-sensitive model suited for digital finance environments. Practically, it provides a conceptual basis for designing policies and educational programs that foster responsible and inclusive FinTech adoption among students. Future research should empirically test this model using cross-national survey data, comparing behavioural patterns between Malaysia and Indonesia. Such studies will further validate the proposed relationships, quantify the moderating influence of financial literacy, and deepen our understanding of FinTech adoption in the broader ASEAN context.

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