

## Research Article

# The Mediation Role of Perceived Risk, Trust, and Perceived Security Toward Intention to Use in the Model of Fintech Application Adoption: An Extension of TAM

Indra Dharma Wijaya\*, Endang Siti Astuti, Edy Yulianto, Yusri Abdillah

Faculty of Administrative Science, Brawijaya University, Malang, Indonesia

**Abstract.**

The advancement of information technology fosters business transaction activities that necessitate its continued development in terms of both usefulness and intentions, including the use of information technology-based financial services, commonly referred to as financial technology (fintech). This article aims to examine conceptual studies on the desire to utilize financial technology as it is mediated by perceived security, trust, and risk. This conceptual article aims to discuss the perceptions of users/potential users of fintech applications, discuss previous research on fintech, and propose a conceptual framework regarding intention to use fintech applications. The research results are expected to be taken into consideration for users/prospective users who adopt fintech applications by mediating perceived risk, trust, and perceived security.

Corresponding Author: Indra  
Dharma Wijaya; email:  
indrardharma@student.ub.ac.id

**Published:** 5 April 2024

Publishing services provided by  
Knowledge E

© Indra Dharma Wijaya et  
al. This article is distributed  
under the terms of the [Creative  
Commons Attribution License](#),  
which permits unrestricted use  
and redistribution provided that  
the original author and source  
are credited.

Selection and Peer-review under  
the responsibility of the BICBATT  
2023 Conference Committee.

**Keywords:** fintech, intention to use, perceived risk, perceived security, trust

## 1. Introduction

Financial technology, commonly named as fintech, is a combination of technology and financial systems, which is an innovation in the developing financial services sector, including in Indonesia [1]. Research on the adoption of information technology, especially regarding financial technology, has been developing in the world since the 2000s [2] and continues to develop, especially since Bitcoin began to appear in 2008 [3]. Fintech developments in Indonesia emerged around 2016 [4] so that the adaptation of TAM theory is still developing in relation to the adoption of financial technology.

The significance of comprehending an individual's behavior in embracing technology has motivated several specialists to carry out more comprehensive and extensive research. The Technology acceptability Model (TAM), derived from the Theory of Reasoned Action (TRA) [5], is one method for assessing a technology's acceptability. Perceived usefulness and perceived ease of use are two important characteristics that TAM presents that are relevant for predicting IT acceptance.

**OPEN ACCESS**

To achieve better predictive results, several studies have expanded the TAM model by introducing more antecedent variables. TAM expansion is generally adapted to the different environmental and cultural contexts in each country. However, the development of TAM related to the adoption of financial technology still does not involve much perceived risk, trust and perceived security. Although these three factors have a significant role in moderating the impact of perceived utility on the intention to use fintech in the adoption of fintech [6]. To close the conceptual gap, a conceptual framework will be put forward in this essay.

It is suspected that the perceived risk variable plays an important role in the adoption of information technology so that the perceived risk variable can be an antecedent of intention to use fintech [7]. This variable cannot be separated from its use to the perceived usefulness variable [8]. Meanwhile, trust is also very important to add considering that the use of payment systems/financial transactions via the internet or with digital technology is still considered risky and requires high trust given the many frauds and others[9]. Seeing the development of the adoption of information technology at the present time which is very risky to the risk of data loss either due to theft or misuse of personal data by unauthorized persons/parties, the perceived security variable greatly influences users towards the adoption of financial technology [10] , [11], [12] and [13].

From the urgency of involving the three variables above (perceived risk, trust and perceived security) in a TAM adoption model, a conceptual model will be developed to answer the development needs of fintech adoption. The conceptual model is derived based on the appropriate arrangement of grand theory, middle theory and applied theory.

## 2. Literature Review

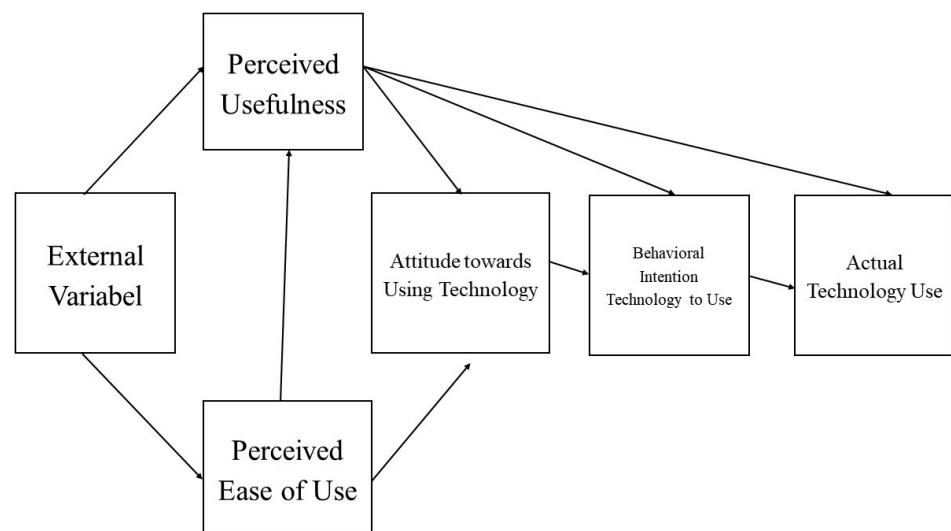
### 2.1. Development of Technology Acceptance Model (TAM) Theory

Technology Acceptance Model (TAM) is a theory from Davis [5] which is commonly used to analyze and explain individual acceptance of the use of a technology. Davis [5] demonstrated that a user's attitude about utilizing technology is influenced by the convenience and advantages they experience. Attitude shapes behavioral motivation, which in turn shapes real-world usage patterns. This theory makes the variables perceived usefulness and perceived ease of use as measuring tools to analyze individual acceptance of the use of a technology. TAM is currently a commonly used model in investigating factors that influence user acceptance of technology [14].

Over time, TAM has evolved and expanded into various more complex versions, and there are ongoing efforts to update this model to remain relevant to developments in technology and understanding of user behavior. Among these developments are:

### 2.1.1. Technology Acceptance Model (TAM) 1

First presented by Davis [5], the Technology adoption Model (TAM) is a model designed to evaluate and comprehend the elements that impact the adoption of the usage of information technology. In order to provide a basis for understanding the influence of external factors on psychological foundations, TAM aims to explain the factors that determine acceptance of information-based technology in general as well as the behavior of end users of information technology with fairly wide variations and user populations. To accomplish this, TAM was developed by employing TRA as a theoretical framework to study the interactions between variables and by selecting a limited number of key variables from earlier studies on the theories and factors influencing technology adoption. The TRA model served as the basis for the TAM model. Two key constructs—perceived utility and perceived ease of use—are added by TAM to the TRA model. The behavioral intention is directly impacted by these two characteristics. Figure 1 depicts the TAM 1 model.



**Figure 1:** Technology Acceptance Model (TAM) 1 by Davis [5].

The link between the constructs in TAM [5] is illustrated in the graphic above. The external variable construct is evaluated to have an impact on the perceived usefulness and ease of use constructs.

### 2.1.2. Technology Acceptance Model (TAM) 2

Another theory resulting from the development of TAM with a more comprehensive model is TAM 2 developed by Venkatesh and Davis [32], as can be seen in Figure 2 as follows:

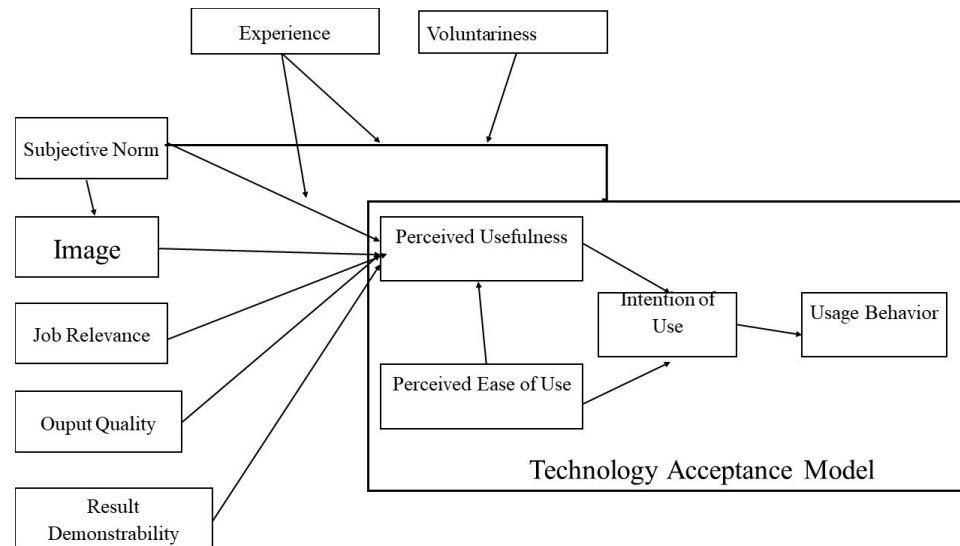


Figure 2: 2 TAM 2 [32].

In the TAM 2 model, A number of external factors are directly introduced, including cognitive instrumental processes like Job Relevance, Output Quality, and Result Demonstrability, and social influence processes like Subjective Norm and Image with the moderating variables Voluntariness and Experience.

### 2.1.3. Technology Acceptance Model (TAM) 3

Venkatesh and Bala [31] combined the TAM 2 theory developed by Venkatesh and Davis in 2000 with the variable determinants model of perceived ease of use which was also developed by Venkatesh in 2000, into the TAM 3 theory by adding one of the Computer Self-Efficacy variables as external variables that influence Perceived Ease of Use. TAM 3 is a research model that can be used to predict the adoption of information technology which was introduced by Davis in 1989 [5]. The purpose of TAM is to assess and explain user acceptability of an information system. TAM offers a theoretical foundation for understanding the elements that affect a technology’s adoption rate inside an organization. The Theory of Acceptance Model (TAM) elucidates the causal link between users’ actual usage of an information system, behavior, objectives, and requirements, and views about the ease of use and advantages of the system

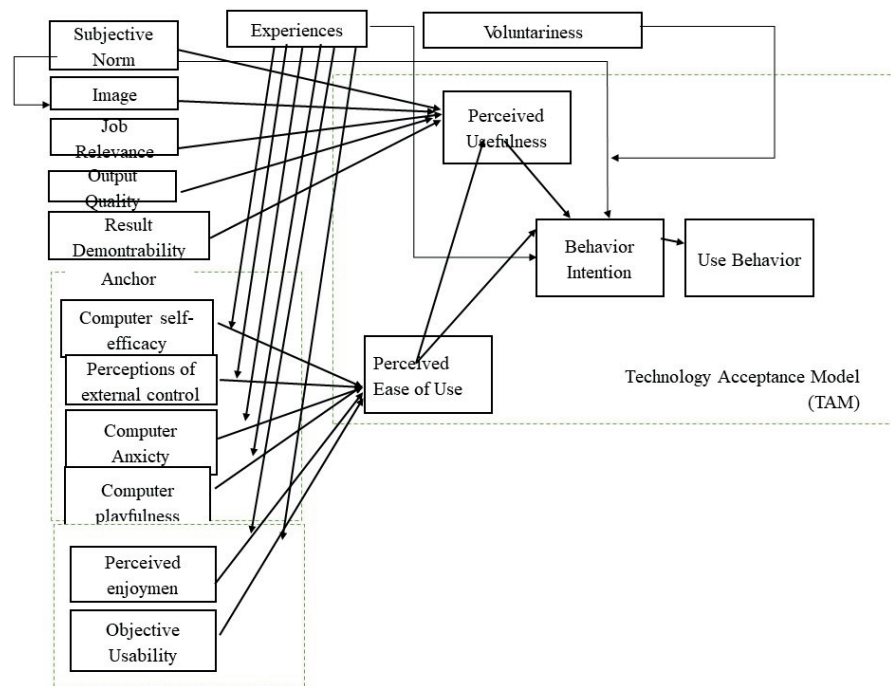


Figure 3: TAM 3 [31].

## 2.2. Perceived usefulness

Perceived usefulness is the potential for a user’s subjective belief that utilizing a certain application system would enhance its performance, according to Davis [5]. Gefen [15] explained that perceived usefulness results from users’ assessment of the external characteristics of information technology, including task orientation, outcomes (how information technology helps users achieve their task objectives, such as efficiency and effectiveness of task performance).

## 2.3. Perceived risk

According to research by [8] m-payment security is the biggest concern of Chinese mobile internet users. Users are afraid that their personal information and bank accounts in smartphone accounts and their money will be lost. Also, compared to Alipay Wallet, WeChat payments is still under development and still untested at this time.

According to research [7] perceived risk refers to negative thoughts or volatility that customers have/experience when buying an item. These are negative emotional feelings, which can change behavioral intentions [16]. Perceived risk is an unexpected consequence that users/potential users want to avoid when using fintech application services

## 2.4. Trust

Rotter (in [17]) defines trust as the general hope held by an individual that the words of another person can be relied upon. Yousafzai [18] defines trust as the customer's willingness to carry out online transactions and hope that the seller will fulfill obligations, regardless of the monitoring or controlling actions of the seller.

Trust in electronic financial transaction systems is defined as consumer confidence that electronic financial transactions will be processed according to consumer expectations [19]. As a result, the use of this variable will greatly affect interest in using fintech. So, trust is an important variable to describe user trust in electronic services and electronic transactions [20].

## 2.5. Perceived Security

Perceived security is defined as the extent to which users believe that using online payments is safe[20]. Security has been proven to be a major determinant of online shopping intentions, and various research studies have found its positive influence on online intention to use[21]. Gefen [15] also found that business security on the internet influences consumers not to buy online. Therefore, perceived security greatly influences the intention to use by consumers. Ensuring the security of personal data during transactions is an important thing that consumers pay attention to.

## 2.6. Intention To use

A user's intention to utilize a technology is their desire to use or repurpose it [22]. One component of human psychology called interest makes people more likely to focus on or enjoy an object, which might motivate them to accomplish their objectives[23]. Intention to use in the context of fintech users is the user's tendency to use fintech applications, including willingness to accept financial transaction services from fintech applications.

## 3. Methodology

The goal of this article is to construct a conceptual model that follows a hierarchical framework of applied theory, intermediate theory, and grand theory. A conceptual model

that can respond to research inquiries has been developed by expanding on a number of earlier investigations.

## 4. Results and Discussion

### 4.1. The mediating role of perceived risk, trust and perceived security in the fintech application adoption model.

Trust is very important in the adoption of new information technology, including fintech transactions [24]. Concerns about the security of personal and financial data often discourage users from using fintech services. In addition, uncertainty related to the reputation and integrity of fintech companies can also affect the level of user trust.

Perceived risk can also be a factor that influences the intention to use fintech. Users may feel uncertain about the risk of losing their money or personal information due to technological failure or security breaches. One of the main obstacles to technology adoption is seen to be the perceived dangers connected to using FinTech[25]. “A user’s perception of the uncertainty and possible negative consequences associated with the use of FinTech” is the definition of perceived risk in the context of fintech.

Perceived security is also an important factor in using fintech[20]. Users want to feel confident that their information is safe and protected from fraud or cybercrime[26]. Therefore, fintech companies must provide sufficient trust, security and convenience to their users. This can be achieved through the use of reliable security technologies, robust data protection, transparency in business practices and responsive customer support. The degree to which one believes that the technology used to transmit sensitive information, such as customer and financial transaction data, is guaranteed to be secure is known as perceived security, according to Arpacı [27]. As a result, there will be more fulfillment of the factors of trust, perceived risk, and perceived security, which may raise the inclination to utilize fintech.

### 4.2. Research Conceptual Framework

Martin Fishbein and Icek Ajzen initially presented the Theory of Reasoned Action (TRA) in 1975 [28]. According to TRA, a person’s desire to engage in a behavior is determined by their subjective norms and attitudes, which then predicts their actual conduct.

As an extension of TRA, Theory of Planned activity (TPB) [28] adds a concept called perceived behavioral control, which relates to an individual's perceptions about their capacity to carry out the activity. Other components of TRA are also included in TPB.

According to Davis [5], individual desire to use technology is mostly determined by TAM perceived utility and perceived simplicity of use, which in turn predicts real technology usage. Meanwhile, TAM 3 [31] adds two additional variables, namely prior experience and perceptions of influences originating from cultural factors (cultural influence). Perception of previous experience refers to the extent to which a user has had previous experience with similar technology. Meanwhile, perceptions about influences originating from cultural factors include influences originating from values and norms in the culture in which the user is located.

The following are several developments in the TAM-based conceptual model by adding important variables in order to explain fintech application adaptation. Gefen [15] developed the TAM 3 model by including the trust variable in order to build an integrated model in his research entitled "Trust and TAM in online shopping: an integrated model. Subsequently, the variable perceived risk was incorporated into the model in a study by Lee [29] titled "Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit." Additionally, research by Kumar et al., [30] titled "The effect of grievance redressal and perceived security on continued intention to use M-wallets in a developing country" emphasizes the significance of perceived security in information technology acceptance, leading to the inclusion of this variable in the model. This is related to perceptions of data and transaction security in the adoption of application-based financial services

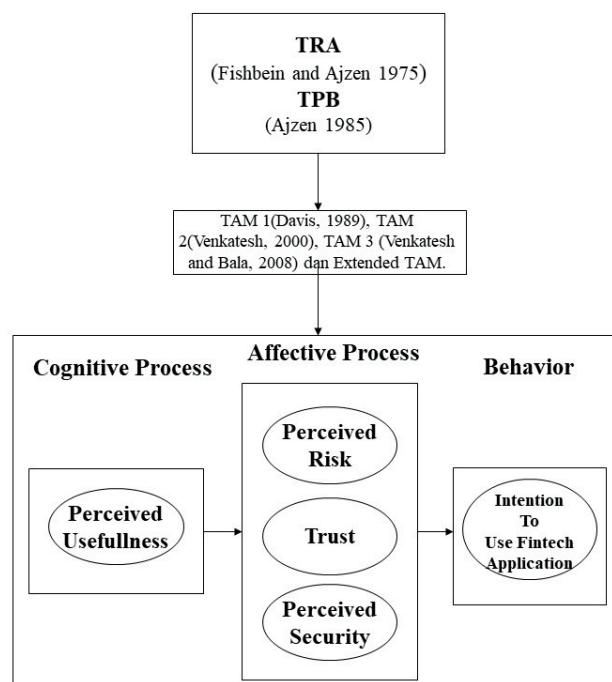
From existing theoretical developments and empirical gaps in further research, a conceptual framework will be produced in this section in an effort to explain intention to use financial technology applications through a model involving the variables of perceived usefulness, perceived risk, trust, and perceived security. The theory of planned behavior (TPB), the technological acceptance model (TAM), and the theory of reasoned action (TRA) form the foundation of this study plan's conceptual framework. Empirical studies of previous researchers were also carried out to strengthen the proposed model. This conceptual framework aims to build novelty and expand the development of a conceptual model that explains intention to use financial technology applications.

The variable perceived usefulness is a variable that expresses the perceived usefulness of fintech users and the Intention to use variable, which in TAM theory is a determining factor in encouraging someone to actually use the new/latest technology [5]. The intention to use variable describes interest in using fintech. Next, perceived



risk, trust, and perceived security are proposed in the conceptual framework. All three have an important role in the use of fintech applications so they need to be used simultaneously and as a mediating variable for perceived usefulness to the intention to use fintech applications.

From this development, a frame of mind can be made according to TAM theory referring to the TAM theoretical model which was modified for the first time by Davis [5] to TAM Theory 3 [31] and Extended TAM. The proposed research concept framework can be seen in Figure 4.



**Figure 4:** Conceptual Framework as well as a Conceptual Model that explains Intention to Use Fintech Applications.

## 5. Conclusion

### 5.1. Future research development

The research agenda related to fintech acceptance/adoption must include several important variables including: perceived risk, trust and perceived security simultaneously as variables mediating intention to use fintech.

The conceptual model of this research is different from previous research by using the development of TAM theory where: the variables perceived risk, trust and perceived security as mediating variables perceived usefulness to the intention to use fintech applications as a development of TAM theory.

Providing empirical evidence that there is no need for the perceived ease of use variable because potential fintech users are already accustomed to using information technology devices/smartphones in carrying out business transactions/utilizing fintech-based financial transaction services.

## 5.2. Implications for Research Practice

The use of the variables perceived risk, trust, perceived security simultaneously is considered important in this research hypothesis model because these three variables are studies that need to be discussed in relation to the context of information technology adoption in the financial/fintech sector which requires an understanding of perceived risk, trust and perceived security of prospective fintech users. The importance of carefully identifying respondents in their intention to use fintech applications is to determine the interest of potential users/users in using fintech applications.

In the context of Management Information Systems, developing TAM 3 with perceived risk, perceived security, and trust in mind can offer greater insight into the psychological and social variables that impact technology adoption. With a better understanding of how users respond to risk, trust, and security, MIS science can produce more effective guidelines and

strategies for designing, managing, and using information systems that are reliable and secure for individuals and within organizations.

## Acknowledgment

The author wishes to express their appreciation to all those who took part in the research projects that made this study possible.

## References

- [1] Verma S, Shome S, Hassan MK. FinTech in small and medium enterprises ( SMEs ): A review and future research agenda. *Eur Manag J.* 2023.
- [2] Wulan VR. Financial Technology (fintech) a New Transaction in Future. *JEECS J Electr Eng Comput Sci.* 2017;2:177–82.
- [3] Martinelli I. Menilik Financial Technology dalam Bidang Perbankan. *J Sos Hum Komun.* 2021;2:32–43.

- [4] Rahadiyan I. Perkembangan Financial Technology Di Indonesia Dan Tantangan Pengaturan Yang Dihadapi. *Artif Intell Law*. 2020;31–48.
- [5] Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q Manag Inf Syst*. 1989;13:319–39.
- [6] Almaiah MA, Al-Rahmi A, Alturise F, Hassan L, Lutfi A, Alrawad M, et al. Investigating the effect of perceived security, perceived trust, and information quality on mobile payment usage through near-field communication (NFC) in Saudi Arabia. *Electron Switz*. 2022;11:1–22.
- [7] Jangir K, Sharma V, Taneja S, Rupeika-Apoga R. The moderating effect of perceived risk on users' continuance intention for FinTech services. *J Risk Financ Manag*. 2023;16.
- [8] Wu J, Liu L, Huang L. Consumer acceptance of mobile payment across time Antecedents and moderating role of diffusion stages. *Ind Manag Data Syst*. 2017;117:1761–76.
- [9] Tsiakis T, Sthephanides G. The concept of security and trust in electronic payments. *Comput Secur*. 2005;24:10–5.
- [10] Stewart H, Jürjens J. Data security and consumer trust in FinTech innovation in Germany. *Inf Comput Secur*. 2018;26:109–28.
- [11] Lee W-J. Understanding consumer acceptance of fintech service: An extension of the TAM Model to understand Bitcoin. *J Bus Manag*. 2018;20:34–7.
- [12] Sudono FS, Adiwijaya M, Siagian H. The influence of perceived security and perceived enjoyment on intention to use with attitude towards use as intervening variable on mobile payment customer in Surabaya. *Petra Int J Bus Stud*. 2020;3:37–46.
- [13] Natakusumah K, Maulina E, Muftiadi A, Purnomo M. Integrating religiosity into a technology acceptance model for the adoption of mobile payment technology. *Int J Data Netw Sci*. 2023;7:305–12.
- [14] Marangunić N, Granić A. Technology acceptance model: a literature review from 1986 to 2013. *Univers Access Inf Soc*. 2015;14:81–95.
- [15] Gefen. Trust and TAM in online shopping: An Integrated Model By: *MIS Q Manag Inf Syst*. 2003;1:51–90.
- [16] Udo GJ, Bagchi KK, Kirs PJ. An assessment of customers' e-service quality perception, satisfaction and intention. *Int J Inf Manag*. 2010;30:481–92.
- [17] McKnight DH, Chervany NL. What trust means in e-commerce customer relationships: An interdisciplinary conceptual typology. *Int J Electron Commer*. 2001;6:35–59.

- [18] Yousafzai SY, Pallister JG, Foxall GR. Strategies for building and communicating trust in electronic banking: A field experiment. *Psychol Mark.* 2005;22:181–201.
- [19] Kim C, Tao W, Shin N, Kim KS. An empirical study of customers' perceptions of security and trust in e-payment systems. *Electron Commer Res Appl.* 2010;9:84–95.
- [20] Chawla D, Joshi H. Consumer attitude and intention to adopt mobile wallet in India – An empirical study. *Int J Bank Mark.* 2019;37:1590–618.
- [21] Yousafzai SY, Pallister JG, Foxall GR. A proposed model of e-trust for electronic banking. *Technovation.* 2003;23:847–60.
- [22] Putri GA, Widagdo AK, Setiawan D. Analysis of financial technology acceptance of peer to peer lending (P2P lending) using extended technology acceptance model (TAM). *J Open Innov Technol Mark Complex.* 2023;9:100027.
- [23] Murdiyanto T, Mahatama Y. Pengembangan Alat Peraga Matematika Untuk Meningkatkan Minat Dan Motivasi Belajar Matematika Siswa Sekolah Dasar. *Sarwahita.* 2014;11:38.
- [24] Najib M, Fahma F. Investigating the adoption of digital payment system through an extended technology acceptance model: An insight from the Indonesian small and medium enterprises. *Int J Adv Sci Eng Inf Technol.* 2020;10:1702–8.
- [25] Al Nawayseh MK. Fintech in COVID-19 and beyond: What factors are affecting customers' choice of fintech applications? *J Open Innov Technol Mark Complex.* 2020;6:1–15.
- [26] Atikah I. Consumer protection and fintech companies in Indonesia: Innovations and challenges of the financial services authority. *J Huk Dan Peradil.* 2020;9:132.
- [27] Arpaci I, Kilicer K, Bardakci S. Effects of security and privacy concerns on educational use of cloud services. *Comput Hum Behav.* 2015;45:93–8.
- [28] Madden TJ, Ellen PS, Ajzen I. A comparison of the theory of planned behavior and the theory of reasoned action. *Pers Soc Psychol Bull.* 1992;18:3–9.
- [29] Lee MC. Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electron Commer Res Appl.* 2009;8:130–41.
- [30] Kumar A, Adlakaha A, Mukherjee K. The effect of perceived security and grievance redressal on continuance intention to use M-wallets in a developing country. *Int J Bank Mark.* 2018;36:1170–89.
- [31] Venkatesh V, Bala H. Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences* 2008;39:2.
- [32] Venkatesh V, Davis FD. A theoretical extension of the technology acceptance model: Four Longitudinal Field Studies. *Management Science* 2000;46:186-204.