Effect of Perceived Risk on Behavioural Intention of Using Digital Financial Services: Exploring the Theoretical Gap

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Abstract

This research aims to address the gap in the existing literature by examining the influence of perceived risk on the behavioral intention to use digital financial services. It reviews the literature on the effect of perceived risk on behavioural intention related to synthesizing technology acceptance theories and models and the applicability of those with perceived risk in digital financial services. The review focuses on twelve technology acceptance theories and models that can be used to determine behavioural intentions towards digital financial services. Through this review, 31 variables are identified as key determinants of behavioral intention, highlighting the omission of perceived risk in the existing theories and models.

Keywords: Behavioural intention, digital financial services, perceived risk, technology acceptance

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Introduction

The rapid evolution of digital financial services has transformed the landscape of financial transactions (Museba et al., 2021). According to Ozili (2018), "digital transactional platforms, retail agents, and customers" are key components of DFS (p. 330). It has the potential to lower costs, expand products and service portfolios, and improve the speed of service delivery, thereby reducing waiting time queues and enhancing economies of scale (Huang & Wang, 2017; Liao et al., 2020). Additionally, it provides an opportunity to reach out to customers who have been excluded from conventional financial services.

It emphasizes that the use of financial technologies by the users of financial services is essential to operate, improve, and sustain the digital financial system. Therefore, the behavioral intention to use digital financial services plays a crucial part in the financial system. "A behavioural intention is a measure of the strength of one's intention to perform a specified behaviour" (Fishbein & Ajzen, 1975 as cited in Davis et al., 1989, p. 984). In theory, researchers argue that behavioural intention is determined by various factors. Among these factors, performance expectancy, effort expectancy, social influence, and facilitating conditions have been discussed by many studies (Dajani, 2016; Sarfaraz, 2017; Venkatesh et al., 2003; Venkatesh et al., 2012; Yohanes et al., 2020). Further, Gu et al. (2009) argue that three major factors, namely perceived usefulness, perceived ease of use, and trust, are major predictors of behavioural intention. These contemporary studies prove that behavioural intention is central to understanding consumer behaviour in relation to adopting and using digital financial services. Therefore, it is crucial to comprehend the variables that affect user behaviour and the adoption of digital financial services. Moreover, behavioural intention, which is crucial for the adoption and spread of novel technologies, serves as a determinant of actual behaviour (Ajzen, 1991). Behavioural intention in the context of digital financial services can be defined as an individual's desire, readiness, and plan to use digital financial services for financial transactions.

The safety and security of digital transactions is a crucial managerial issue faced by both service providers and users (Balogh & Mészáros, 2020; Kim et al., 2008). Despite their growing popularity, there is a significant gap in the literature regarding the impact of perceived risk on individuals' behavioral intentions to use these services. This gap is highlighted by AI Kailani and Kumar (2011), who emphasize the complexities faced by financial providers in delivering safe and secure digital platforms that empower customers to fully use DFS. Furthermore, users of DFS face potential risks such as fraud, data breaches, and unauthorized access to sensitive financial information (Ozili, 2018). These risks can significantly impact their willingness to adopt and use DFS for their financial needs. Although researchers did not explicitly investigate the influence of perceived risk on behavioural intention to use DFS, they emphasise the importance of perceived risk in the broader context of technology adoption and usage (Balogh & Mészáros, 2020; AI Kailani & Kumar, 2011; Lafraxo et al., 2018; Tang et al., 2020). Perceived risk includes individuals' subjective assessments of potential negative outcomes or uncertainties associated with a particular action, such as using DFS (Kaur & Arora, 2020). Based on theoretical evidence, this study seeks to bridge this theoretical gap by synthesizing existing technology acceptance theories and models to assess their relevance to perceived risk in the context of digital financial services.

Methodology

Despite the availability of literature on technology acceptance and behavioural intention, an exhaustive literature review was conducted to synthesise the drivers of behavioural intention from an integrated perspective. The review was conducted on the basis of the order in which theories and models of technology acceptance and behavioural intention were developed. As such, this review examined seven empirically tested theories, including the innovation diffusion theory, the theory of reasoned actions, the social cognitive theory, the theory of planned behaviour, the Decomposed theory of planned behaviour, the unified theory of acceptance and use of technology, and unified theory of acceptance and use of technology 2, together with five models, such as motivational models, technology acceptance model, model of PC utilization, technology acceptance model 2, and technology acceptance model 3.

The theories from innovation diffusion theory to the unified theory of acceptance and use of technology2 and models from motivational models to technology acceptance model3 that already exist were reviewed on a rational and logical basis to reach a conclusion. Researchers use current explicit knowledge, which is widely available in Web of Science, SCOPUS, Elsevier, Taylor & Francis, Emerald, Google Scholar, and other peer-reviewed journals to gather information on arguments that were developed on behavioural intention. In addition, a few textbooks and conference papers were also studied due to the fascinating nature of the phenomena discussed. As such, this paper is an outcome of a review of twelve major theories and models that were relevant to technology acceptance in determining the behavioural intention to use DFS.

Technology Acceptance Theories

A theory can be conceptualized as a statement outlining a testable relationship that potentially exists among a set of variables associated with a specific phenomenon (Gelso, 2006). Theories and models play fundamental roles in advancing knowledge and understanding in various fields. They help researchers develop a deeper understanding of complex phenomena, guide the formulation of research questions, and provide a basis for designing experiments and studies. In the following section, researchers discuss seven foundational theories, explaining their core concepts and how they contribute to the comprehension of behavioural intention. These theories serve as a solid theoretical foundation for understanding the multidimensional nature of behavioural intention.

Innovation Diffusion Theory

Since 1960, the innovation diffusion theory (IDT) has been used to investigate a wide range of innovations (Rogers, 1995; Venkatesh et al., 2003). "Diffusion of innovation is the process by which an innovation is communicated through certain channels over time among the members of a social system"(Rogers, 1995, p.5). This theory examines the determinants of the adoption and usage of technology, such as individual characteristics and innovation characteristics. Individual characteristics refer to the personal features that describe a potential innovation adopter, whereas innovation characteristics refer to the characteristics that individuals use to evaluate an innovation (Arts et al., 2011). Rogers (1983) identifies five attributes of innovations that consistently influence adoption. Relative advantage, compatibility, complexity, trialability, and observability are the five attributes of innovation (Scott et al.,

2008). According to Moore and Benbasat (1991), the relative advantage is "the degree to which an innovation is perceived as being better than its precursor" (p.195). They also define compatibility as "the degree to which innovation is perceived as being consistent with the existing values, needs, and the past experience of potential adopters". Additionally, complexity is described as "the degree to which an innovation is perceived as being difficult to use", observability as "the degree to which the results of an innovation are observable to others", and trialability as "the degree to which an innovation may be experienced with before adoption" (Moore & Benbasat, 1991, p.195). Figure 1 demonstrates the constructs and relationships of the IDT. In summary, it has been a base theory for investigating the adoption of innovations across various fields since the 1960s. By examining individual and innovation characteristics, IDT offers valuable insights into why and how individuals choose to adopt or resist new technologies.
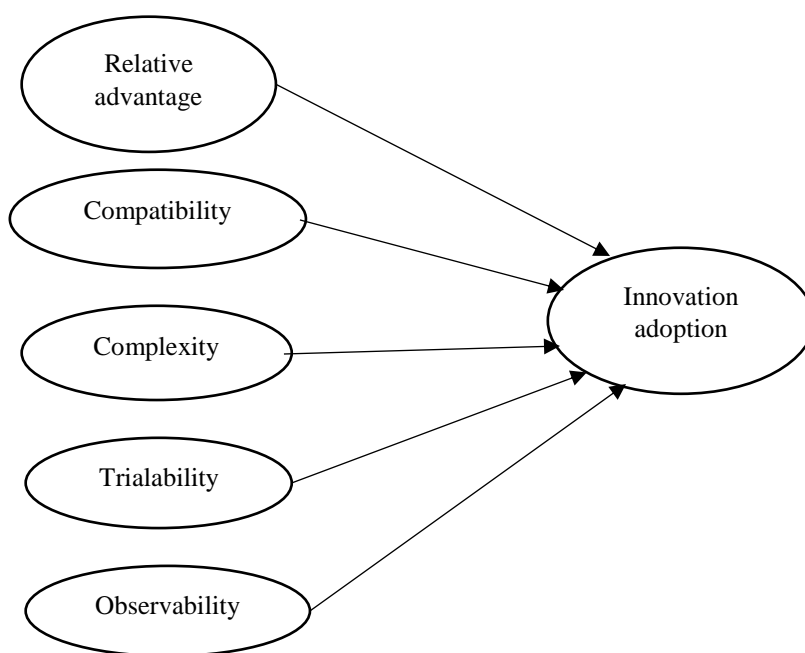

Figure 1: Determinants of innovation adoption
Source: Rogers (1983)

Theory of Reasoned Action

The theory was developed by Fishbein and Ajzen in 1975 and was based on well-established theoretical models from psychology developed by Fishbein in 1967. Theory of reasoned action (TRA) assumes that human behaviour is sensible, and people gather the existing information and examine the results of the actions implicitly or explicitly (Fishbein & Ajzen, 1975). Moreover, TRA is "designed to predict volitional behavior and to understand their psychological determinants" (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975 as cited in

Ajzen, 1985, p.12). Thus, according to the theory, the intention to perform of an action influences behaviour. Thereby, TRA describes that people are supposed to act according to their intentions for unforeseen events, and intentions can alter over the time when it takes longer time intervals. Hence, "the accuracy of prediction will usually be an inverse function of the time interval between measurement of intention and observation of behaviour" (Ajzen, 1985, p.12). Hence, to understand human behaviour, it is necessary to identify the determinants of intention. There are two basic elements in the function that explains person intention in TRA: personal in nature and social influence. Figure 2 further demonstrates these two variables and their relationships with behavioural intention. The personal in nature describes as individuals' positive or negative feelings of his or her behaviour and it is referred to as attitude toward the behaviour. Therefore, TRA is concerned with the attitude toward behaviour but not with the attitude toward objects, individuals, or organizations. Social influence deals with the perception of how other people expect that person to act in target behaviour and is referred to as a subjective norm (Fishbein & Ajzen, 1975). Consequently, this model describes that the key determinants influencing the intention to performing behaviour are the attitude toward behaviour and the subjective norm.
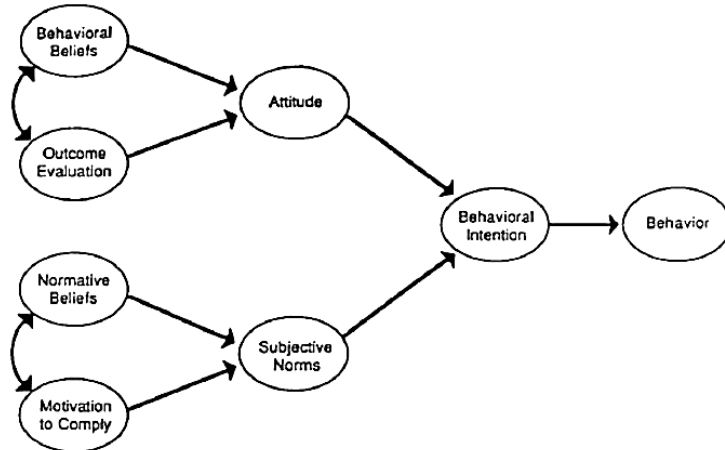

Figure 2: Determinants of behavioural intention
Source: Fishbein & Ajzen (1975)

Social Cognitive Theory

Social cognition theory (Bandura, 1986) explains how environmental, personal, and behavioural elements interact with one another. According to this theory, behaviour and possible interventions to change behaviour are based on the dynamic and reciprocal interactions between these three parts (Bandura, 1977, 1986, 2001). This theory gives prominence to the concept of self-efficacy. Also, it considers outcome expectation of performance, outcome expectations on personal, anxiety, and affects are major constructs of this model (Venkatesh et al., 2003). The outcome expectations on performance are directly linked to the consequences of one's actions, particularly in terms of job-related outcomes. In addition, outcome expectations for behaviour pertain to behaviour, specifically personal

expectations that relate to an individual's self-esteem and sense of achievement (Compeau & Higgins, 1995). Self-efficacy pertains to an individual's confidence in their capacity to effectively execute a particular behaviour or task (Compeau & Higgins, 1995). It represents the belief one possesses in their ability to successfully perform a specific task or attain a specific objective. Additionally, as noted by Venkatesh et al. (2003), self-efficacy extends to a person's opinion or confidence in their own capacity to use technology to carry out a certain task or job. It involves the personal belief that one possesses the skills and capability to navigate and leverage technology successfully for a particular purpose. Anxiety, according to Venkatesh et al. (2003), refers to the experience of feeling anxious or emotional when individuals are confronted with the possibility of engaging in a particular behaviour. In other words, it refers to the emotional responses or anxieties that may arise in anticipation of engaging in a particular task. Conversely, as per the same source, affect refers to an individual's preference for a particular behavior. In the context of technology adoption, affect can influence the overall inclination and enthusiasm individuals have for engaging in specific activities. This comprehensive theory provides valuable insights into the multifaceted determinants of technology adoption and behavioural intention.

Theory of Planned Behaviour

Based on social psychology, theory of planned behaviour (TPB) has been developed to predict and explain a particular behaviour in a specified context. The theory of reasoned action has been expanded to develop TPB, which specifies three major constructs of behavioural intentions, namely "-attitude toward the behaviour, subjective norms, and perceived behavioural control-" (Ajzen, 1991, p.206). TPB suggests that behavioural intention along with perceived behavioural control, explains the actual behaviour of individuals. Moreover, Ajzen argues that social, attitude, and personality traits are important for predicting and describing human behaviour. Furthermore, it emphasizes that the cognitive self-regulation as a crucial characteristic of human behaviour. In this theory, it is evident that an individual's willingness to perform a specific behaviour plays a crucial role in theory of planned behaviour. Intentions are motivational aspects that show how much effort people are willing to put in to perform the behaviour and how hard they are willing to attempt. There the person's actual behavior is shaped by their intention to behave in a certain way, and this intention is collectively shaped by their attitude, the influence of societal expectations, and their perception of how much control they have over the behavior (Ajzen, 1991). Moreover, the person's favourable or unfavourable assessment of the behaviour in question is referred to as their attitude toward the behaviour. Fishbein and Ajzen (1975), define attitude as a learned and organized positive or negative mental state that influences how a person responds to people, objects, and situations based on their past experiences. This attitude, as a crucial factor, plays a pivotal role in influencing behaviour (Churchill & Lacobucci, 2002). According to the TPB, individuals who hold a favourable attitude toward performing a certain behaviour make a positive behavioural intention, while individuals who hold a negative attitude toward a certain behaviour make a negative intention on target behaviour. It also highlights the influence of family situation, peer group behaviour, and their social networks on determining the subjective norm as a predictor of behavioural intention (Ajzen, 1991; Sauer & Zilberman, 2009).

In theory of planned behaviour, people's perceptions of the ease or difficulty of completing the behaviour of interest are referred to as perceived behavioural control (PBC). According to

Taylor and Todd (1995), perceived behavioural control is a reflection of an individual's perceptions regarding the internal and external constraints that may affect their ability to engage in a specific behaviour. In essence, it represents how people perceive the factors, both within and outside themselves, that might hinder or facilitate their ability to perform a particular action. Performance of a behaviour is a joint function of perceived behavioural control and intention (Ajzen, 1991). Furthermore, it argues that intentions and perceptions of controls should be assessed in relation to the behaviour of interest. As TPB suggests, when individuals perceive that barriers such as lack of knowledge, skills, or resources exist, they are more likely to perform negative behavioural intention toward target behaviour. This reveals that TPB has been used in different fields of studies, such as consumer behaviour, organizational behaviour, technology innovations, investment decisions, and financial behaviour to predict and understand human behaviour (Al-Majali & Mat, 2010; Ayinde & Echchabi, 2012; Folorunso et al., 2010; Hunsinger & Smith, 2005; Jasper & Waldhart, 2013; Karjaluoto et al., 2010; Tan & Teo, 2000; Teo & Pok, 2003; Xiao, 2008). Figure 3 illustrates the relationships among variables in theory of planned behaviour.
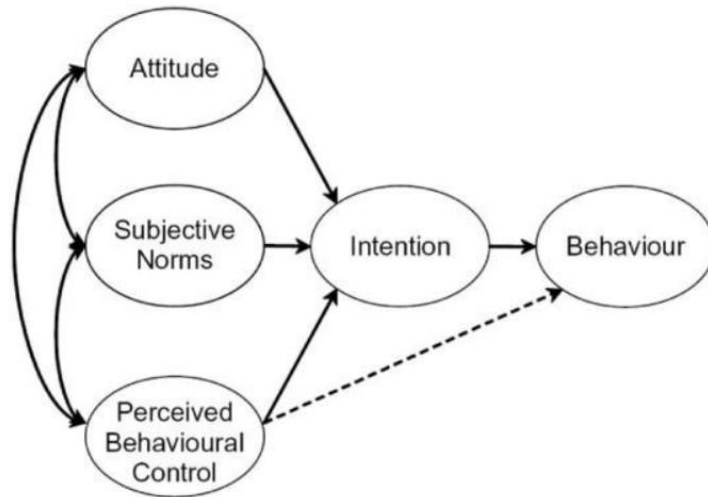

Figure 3: Dimensions of planned behaviour
Source: Ajzen (1991)

Decomposed Theory of Planned Behaviour

Decomposed theory of planned behaviour (DTPB) was developed by Taylor and Todd in 1995 to understand the usage of information technology by combining the technology acceptance model and theory of planned behaviour models. It draws upon the constructs from the literature on innovation characteristics to decompose subjective norms and perceived behavioural control into particular belief dimensions. Attitudinal, normative, and control belief are further deconstructed into multi-dimensional belief constructs in this model (Taylor & Todd, 1995). The decomposition provides clear and more understandable relationships among those constructs and a consistent set of beliefs that can be utilized in several situations. Further,

the predictors of DTPB are attitude toward behaviour, subjective norm, perceived behavioural control, and perceived usefulness (Venkatesh et al., 2003). Furthermore, according to this model, behaviour is influenced by behavioural intention, which is influenced by attitude, subjective norm, perceived behavioural control, and perceived usefulness. Figure 4 describes the variables and their relationships with decomposed theory of planned behaviour.
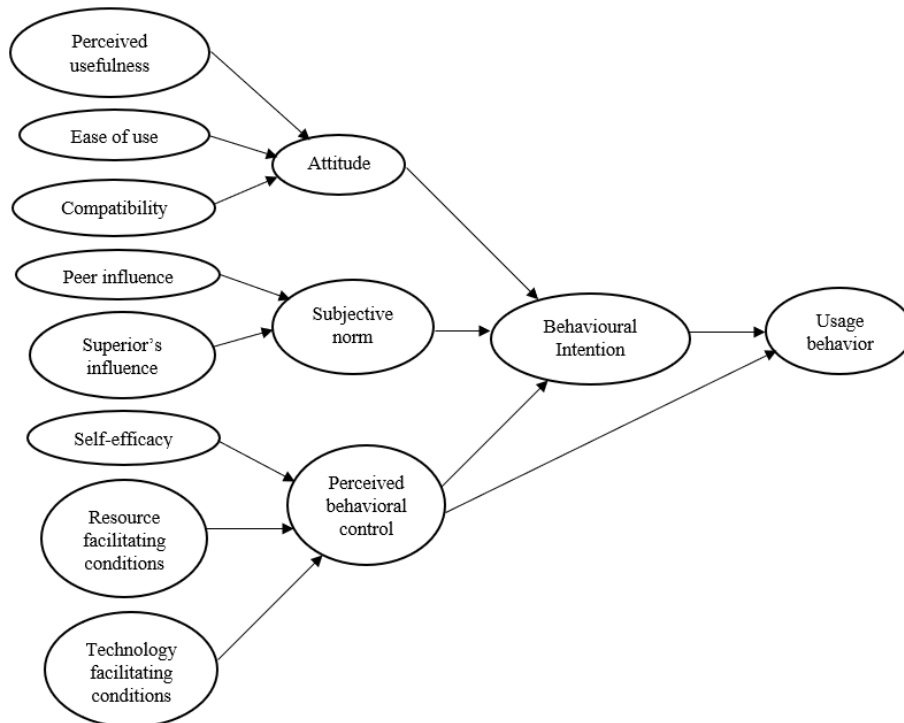

Figure 4: Framework of decomposed theory of planned behaviour
Source: Taylor & Todd (1995)

Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) developed the unified theory of acceptance and use of technology (UTAUT), which summarizes the individual adoption of information technology into a cohesive theoretical model based on the fundamental parts of eight models. Accordingly, the theory describes that the behavioural intention of individuals is affected by three major constructs namely performance expectancy, effort expectancy, and social influences (Venkatesh et al., 2003). Furthermore, moderating effects of experience; voluntariness, gender, and age are validated as essential aspects of the theory. Performance expectancy is the extent to which a person thinks that utilizing a system will enable him or her to improve job performance, while effort expectancy is defined as "the degree of ease associated with the use of the system". In addition, social influence pertains to the extent to which a person believes

that significant others think they should utilize the new system (Venkatesh et al., 2003, p.450). Figure 5 illustrates the constructs, their relationships, and the moderating effects of the variables of unified theory of acceptance and use of technology.
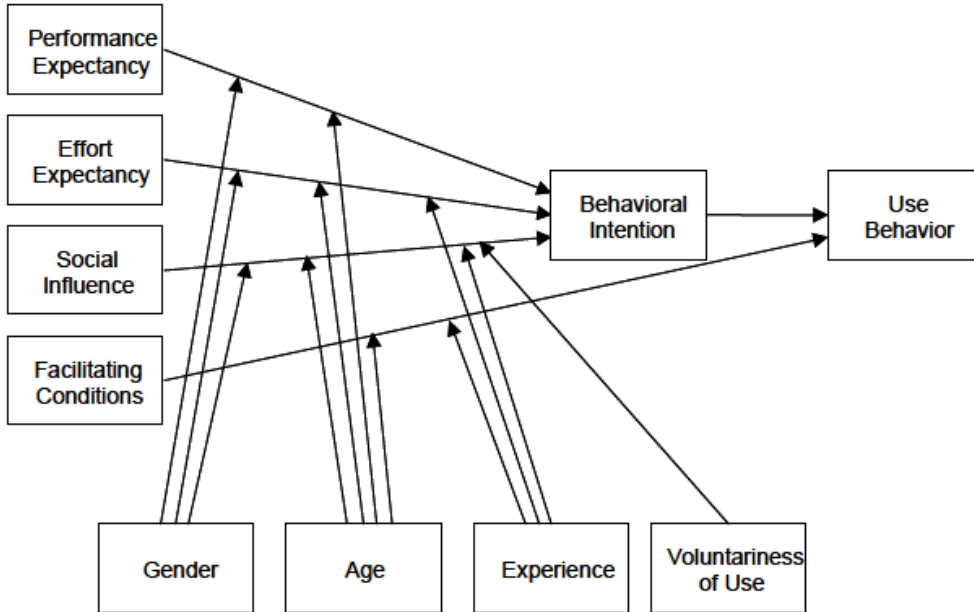
Figure 5: Unified theory of acceptance and use of technology research model
Source: Venkatesh et al. (2003)

Unified Theory of Acceptance and Use of Technology 2

Venkatesh et al. (2012) developed another model called unified theory of acceptance and use of technology 2 (UTAUT2), by incorporating facilitating condition, hedonic motivation, price value, and habit as determinants that affect behavioural intention. The facilitating conditions are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p.453), and hedonic motivation involves the pleasure derived from technology use. It has been demonstrated that hedonic motivation plays a crucial role in shaping individuals' decisions to accept and use technology (Brown & Venkatesh, 2005 as cited in Venkatesh et al., 2012). The price value is the cognitive trade-off between perceived benefits and monetary cost of the application (Dodds et al., 1991 as cited in Venkatesh et al., 2012). Habit is the automatic performance of behaviours due to learning. (Limayem et al., 2007). Figure 6 illustrates those variables such as; performance expectations, effort expectations, social influence, and facilitating conditions are all clear predictors of behavioural intention and its relationships with unified theory of acceptance and use of technology 2.
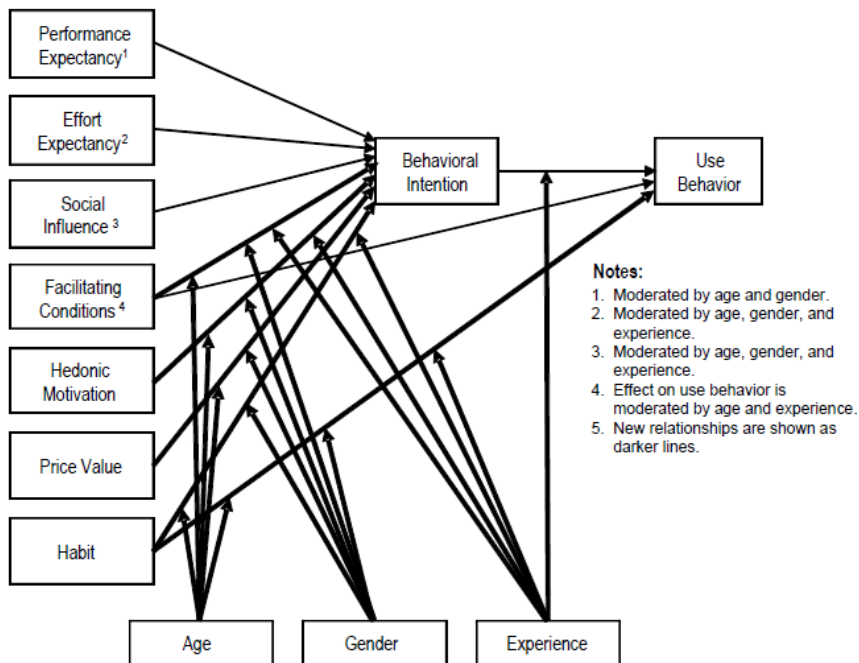
Figure 6: Unified theory of acceptance and use of technology 2 research model
Source: Venkatesh et al. (2012)

Behavioural Intention Models

After exploring the foundational theories that support the understanding of technology adoption and behavioural intention, the specific models that have been developed provide structured frameworks for assessing complex factors influencing individuals' decisions to adopt technology. Any abstract representation of a specific aspect of reality that is created for the purposes of comprehending, explaining, forecasting, or managing a phenomenon under investigation is referred to as a model (Burch, 2003). In the following section, researchers examine these models in detail to gain deeper insights into their key constructs and how they contribute to the comprehension of behavioural intention.

Motivational Models

As cited by Davis et al. (1992), extrinsic and intrinsic motivation are the two main categories of motivation that motivation theorists frequently distinguish between when discussing why someone should execute an activity (Calder & Staw, 1975; Deci, 1971). According to motivational models (MM), extrinsic motivation using a particular technology in the workplace has been theorized and operationalized by Davis et al. (1992) by connecting it to completing job-related tasks more effectively. Extrinsic motivation is the behaviour that is driven by external factors such as improvement of job performance, compensation, or promotions (Vroom, 1964, as cited in Davis et al., 1992). In addition, intrinsic motivation is the act of doing something without any obvious external reward (White, 1959, as cited in

Davis et al., 1992). There they describe perceived usefulness as extrinsic motivation, whereas enjoyment as intrinsic motivation (Davis et al., 1992). Finally, they concluded that perceived usefulness strongly and positively affects behavioural intention while enjoyment partially influences behavioural intention.

Technology Acceptance Model

The technology acceptance model (TAM) was built on the basis of a well-established theoretical model of human behaviour from psychology (Fishbein, 1967; Fishbein & Ajzen, 1975). It provides a generic explanation of the factors influencing computer adoption (Davis et al., 1989). The model focuses on the impact of external factors on internal beliefs, attitudes, and intentions. Perceived usefulness and perceived ease of use are two primary factors discussed in the model (Venkatesh & Davis, 1996). Figure 7 illustrates the model and the relationships between these two variables and behavioural intention. Further, it shows a direct relationship between perceived usefulness and behavioural intention. Perceived usefulness refers to a potential user's subjective likelihood that utilising a particular application system will improve their job performance in an organisational setting or how much people believe that using a certain technology would improve their job performance (Davis et al., 1989). Users' beliefs and expectations to use inventions are strongly influenced by perceived usefulness. Perceived ease of use, according to Davis, is the extent to which a potential user anticipates the target system is free of effort. These two beliefs on behavioral intention may be influenced by other factors such as system characteristics, training, user participation in design, and the nature of the execution process. These factors are referred to as external variables in technology acceptance model.
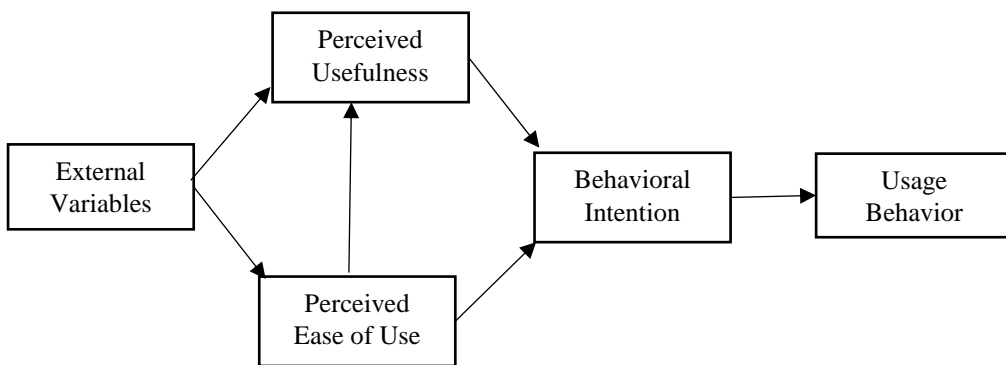

Figure 7: Technology acceptance model
Source: Davis et al. (1989)

Model of Personal Computer Utilization

Thomson et al. (1991) created a model of personal computer utilization (MPCU) based on Z' 1977 theory. It describes different components of expected consequences of personal computer utilization as well as relative influence of social factors, affect toward use, complexity, job fit, long term consequences, and facilitating conditions on personal computer utilization. Job fit, as

defined by Thomson et al. (1991), refers to the degree to which an individual perceives that utilising technology can improve their job performance. The level of perceived difficulty in understanding and utilising an innovation is known as its complexity. Additionally, long-term consequences involve outcomes that yield benefits in the future.

A crucial aspect of the model is an individual's affect toward use, which encompasses feelings of joy, exaltation, or pleasure, or melancholy, or anger, displeasure, or hatred associated with a specific act. Social factors, according to the model, include individuals' internalization of the reference group subculture and unique interpersonal agreements established with others in specific social contexts. The individual's sense of the system's resources and assistance are referred to as facilitating conditions. (Venkatesh et al., 2003). Figure 8 illustrates the factors affecting personal computer utilization and how they collectively influence the use of personal computers.
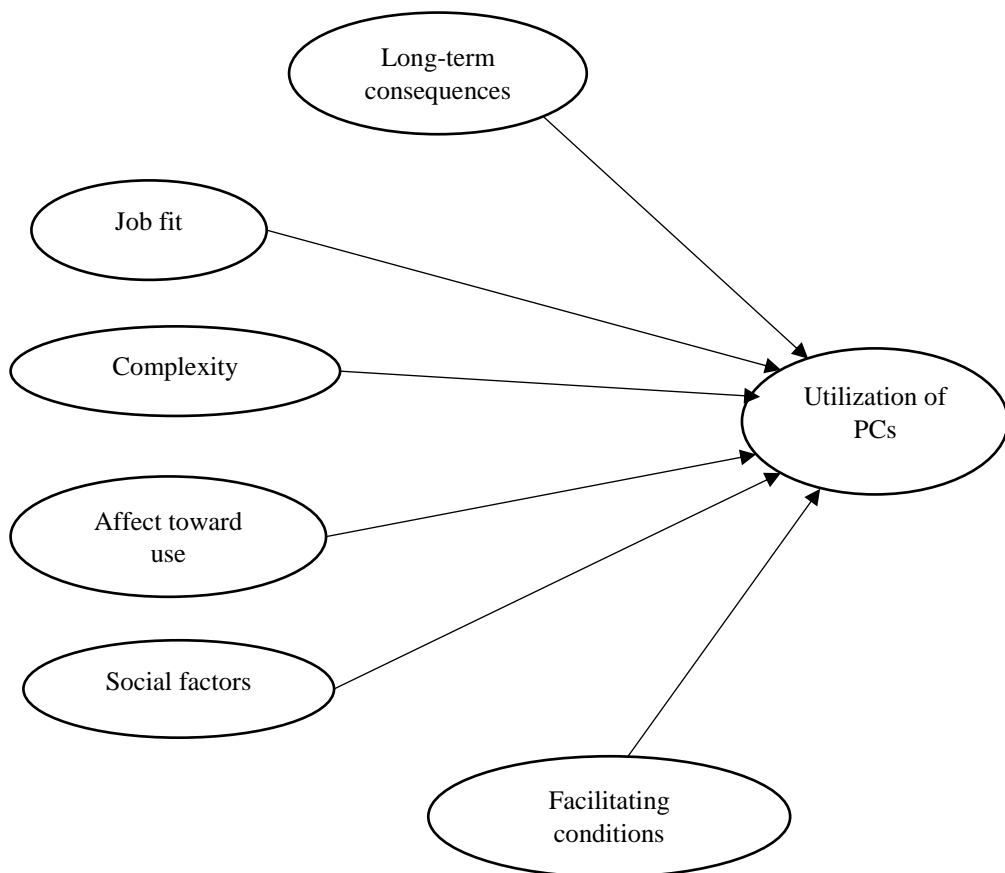
Figure 8: Model of personal computer utilization
Source: Thompson et al. (1991)

Technology Acceptance Model 2

Technology Acceptance Model 2 (TAM2) was developed to extend technology acceptance model by incorporating additional determinants for perceived usefulness and use intention constructs to comprehend how the effects of these variables alter as the target system's users gain more experience. Furthermore, the model incorporates additional theoretical constructs, namely social influence processing factors and cognitive instrumental processing factors (Venkatesh & Davis, 2000).

In the model, researchers incorporate subjective norms, voluntariness, and images to cover the social influence processes, while job relevance, output quality, result demonstrability, and perceived ease of use cover the cognitive instrumental process. Social influence processes describe how individuals are confronted with the choice of adopting or rejecting a new system. The subjective norm is referred to as "the person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein & Ajzen, 1975, p. 302). Voluntariness of use is "the extent to which potential adopters perceive the adoption decision to be non-mandatory" (Agarwal & Prasad 1997, p.564; Moore & Benbasat, 1991, p.195). Image is defined as "the degree to which the use of an innovation is perceived to enhance one's status in one's social system" (Moore & Benbasat, 1991, p.195).

In addition to the social influence process, the cognitive instrumental process was discussed in the model as individuals' general cognitive processes that impact their decisions to accept new innovations or technologies using external criteria such as job relevance, output quality, results demonstrability, and perceived ease of use (Venkatesh & Davis, 2000). According to the model, people should rely on how well their jobs and the performance results of using the system align. Based on their job relevance, this will impact their perception of the system's usefulness. Job relevance was defined as "an individual's perception regarding the degree to which the target system is applicable to his or her job" (Vekatesh & Davis, 2000, p.191). Output quality is defined as how well a system executes the established standards of activities or the quality of the final product that the system delivers to the person. Therefore, the user acceptance rate is assumed to decline if the system fails to generate any suitable output that will improve user performance. Moreover, Moore and Benbasat (1991) define result demonstrability as the "tangibility of the results of using the innovation," will directly influence perceived usefulness (p. 203).

Further, TAM2 and its variables' relationship with user behaviour is demonstrated in Figure 9. Where, a subjective norm will directly influence a person's intention to engage in a particular activity, even if that person is not in favour of that behaviour. Further, intention can be indirectly affected by subjective norms through perceived usefulness. The model uses voluntariness as a moderator to differentiate between mandatory and voluntary behaviour. According to the model, subjective norms will have a direct compliance-based effect on intention over perceived usefulness and perceived ease of use in contexts where system usage is mandatory but involuntary.
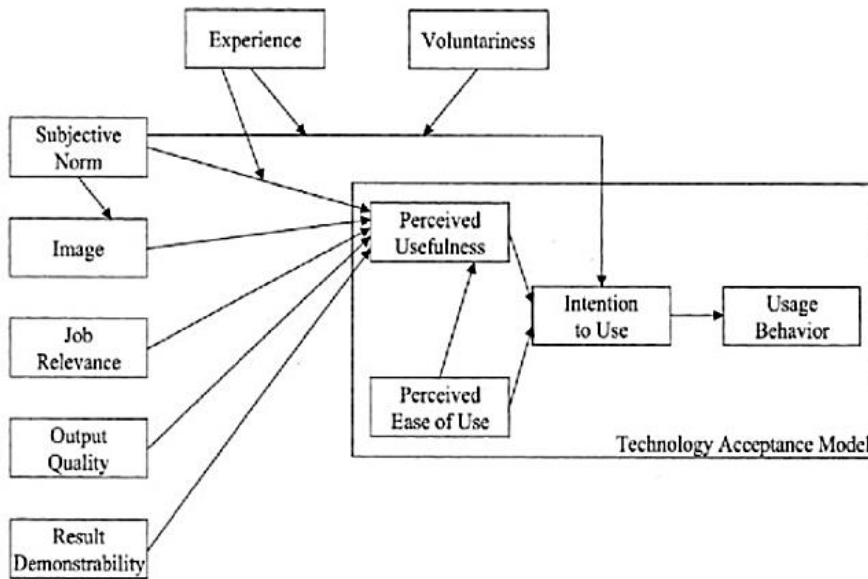
Figure 9: Technology acceptance model 2
Source: Venkatesh & Davis (2000)

Technology Acceptance Model 3

Technology Acceptance Model 3 (TAM3) is an extension of the well-established Technology acceptance model to provide a more comprehensive understanding of technology acceptance, adoption, and usage in organizational contexts (Venkatesh & Bala, 2008). It incorporates additional constructs and relationships to address the complexities of modern technology adoption. By extending Technology Acceptance model 2, TAM3 includes new constructs as determinants of perceived ease of use, such as computer self-efficacy, computer playfulness, computer anxiety, objective usability, perceptions of external control, and perceived enjoyment. Computer self-efficacy refers to the users' confidence in using the system effectively. Computer playfulness assesses users' playfulness and creativity when using computers. Computer anxiety measures users' anxiety and discomfort when working with computers. According to Venkatesh (2000), objective usability refers to the evaluation of systems based on the actual effort required to execute tasks. Venkatesh et al. (2003) define "perception of external control" as a person's belief that the necessary organizational and technological support is available to help them easily adopt and use a specific system. Perceived enjoyment evaluates users' overall enjoyment of using the system. TAM3 provides a comprehensive understanding of the factors influencing users' intentions, such as perceived usefulness, ease of use, self-efficacy, and enjoyment, which are particularly pertinent in the context of digital financial services (DFS) adoption. The detailed Technology Acceptance Model 3 framework, which illustrates the complex interactions between numerous factors that affect behavioural intention, is graphically shown in Figure 10.
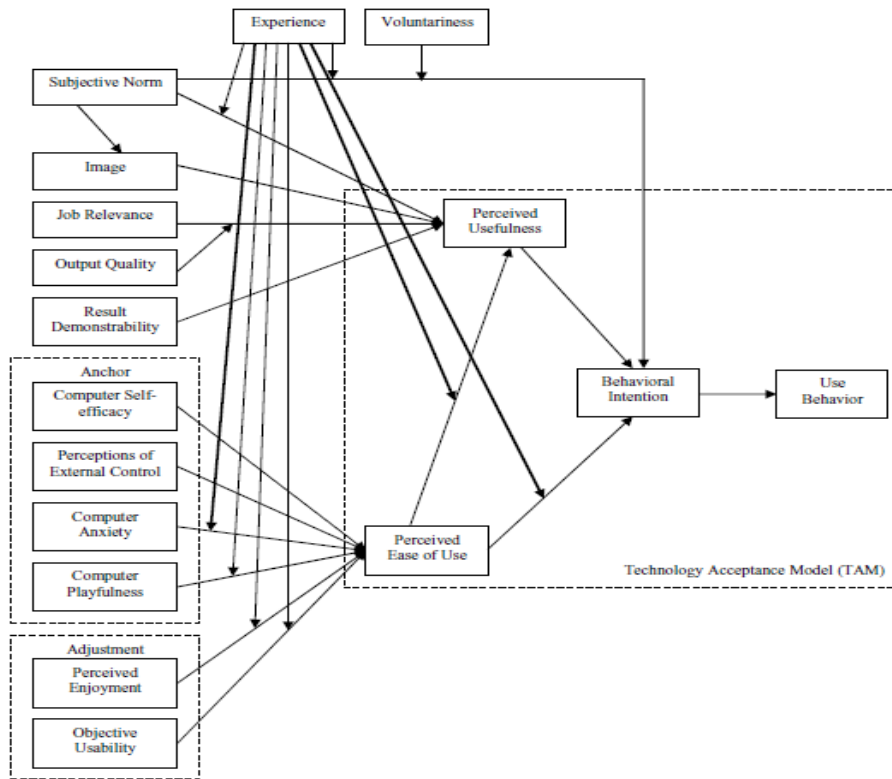
Figure 10: Technology acceptance model 3
Source: Venkatesh & Bala (2008)

Each of the theories and models examined in this study offers a unique viewpoint on the complex elements that impact behavioural intentions. These frameworks possess flexibility that allows their application to understand the behavioural intention to use digital financial services.

Perceived Risk

Researchers extensively explore the perceived risk, which is a key factor in the consumer's decision-making process (Florea, 2015). Bauer's (1960) seminal work defines perceived risk as the unfavourable outcome that a consumer's beliefs might result from his current behaviour. Perceived risk has a negative effect on the adoption of information technology or information system services (Ryu, 2018). The financial service industry has gone through a digital transformation process during the past 50 years (Buckley et al., 2019). However, this shift toward digital finance transactions is vulnerable to cybersecurity and data privacy (Buckley et al., 2019). Thus, digital finance users must be mindful of their privacy, as their personal and financial information can be vulnerable to unauthorized access. Digital finance platforms rely on technology, and any disruptions or failures in this technology can lead to operational risks (Tang et al., 2020), including system downtime, transaction failures, and processing errors

(Tănase, & Şerbu, 2010). In this context, perceived risk serves as an obstacle that limits individuals from using financial technology platforms (Chopdar et al., 2018; Kahneman & Tversky, 2013).

It is noteworthy that the available technology acceptance models and theories do not fully capture the nuanced behavioral intentions of this rapidly evolving field of digital finance. Consequently, perceived risk, a key component in the field of finance, emerges as a determinant of behavioral intention in digital financial services. As users navigate the diverse landscape of digital financial services offerings, understanding how perceived risk influences their intentions to adopt and use these services becomes crucial for both research and industry practitioners.

Exploring the Theoretical Gap on the Determinants of Behavioural Intention towards Digital Financial Services

This study implemented a thorough analysis of theories and models to explore the theoretical gap around the factors that influence behavioural intention in the context of digital financial services. Table 1 summarizes the above theories and models of technology acceptance and the core constructs considered in these theories. Additionally, Table 2 highlights how several behavioural intention theories and models share common constructs, that reflect key factors influencing individuals' intentions and behaviours regarding technology adoption and usage.

Table 1: The summary of theories and models

Models and Theories	Key Constructs	Moderating Variables	R^2
Innovation Diffusion Theory, 1960	Relative advantage Compatibility, Complexity Trialability, Observability	None	0.40
Theory of Reasoned Actions, 1975	Attitude toward behaviour Subjective norm	None	0.36
Social Cognitive Theory, 1986	Outcome expectation on performance Outcome expectation on personal Self-efficacy, Affect, Anxiety	None	0.36
Theory of Planned Behaviour, 1991	Attitude toward behaviour Subjective norm Perceived behavioural control	None	0.47

Decomposed Theory of Planned Behaviour ,1995	Attitude toward behaviour Perceived usefulness Ease of use Compatibility Subjective norm Peer influence Superior's influence Perceived behavioural control Self-efficacy Resource facilitating conditions Technology facilitating conditions	None	0.47
Unified Theory of Acceptance and Use of Technology, 2003	Performance expectancy Effort expectancy Social influence	Gender Age Experience Voluntariness of use	0.70
Unified Theory of Acceptance and Use of Technology 2, 2012	Performance expectancy Effort expectancy Social influence Facilitating conditions Hedonic motivation Price value, Habit	Gender Age Experience	0.73
Motivational Models, 1975	Extrinsic motivation Intrinsic motivation	None	0.38
Technology Acceptance Model, 1989	Perceived usefulness Perceived ease of use	None	0.52
Model of PC Utilization, 1991	Job fit, Complexity Long term consequences Affect towards use Social factors Facilitating conditions	None	0.47
Technology Acceptance Model 2, 2000	Perceived usefulness Subjective norm Image, Job relevance Output quality Results demonstrability Perceived ease of use	Experience Voluntariness	0.52

Technology Acceptance Model 3, 2008	Perceived usefulness Subjective norm Image, Job relevance Output quality Results demonstrability Perceived ease of use Computer self-efficacy Computer playfulness Computer anxiety Objective usability Perceptions of external control Perceived enjoyment	Experience Voluntariness	0.53

Note: *R^2 values from Venkatesh et al., (2003, 2012), Venkatesh and Davis, (2010), Venkatesh and Bala, (2008)

These theories and models explain human behaviour and the behavioural intention of technology acceptance. Digital financial services (DFS) emphasize the financial activities through financial technologies and digital transactional platforms. Thereby, these technology acceptance theories are appropriate to investigate the determinants of the behavioural intention to use DFS. Accordingly, Table 1 summarizes key major determinants of behavioural intention of technology acceptance as per the all theories and models discussed above. The review reveals that none of these theories explicitly consider perceived risk as a determinant of behavioral intention in the context of digital financial services.

Table 2: Common constructs across the behavioural intention theories and models

Variable/Construct	Models / Theories
Attitude toward behaviour	TRA, TPB, DTPB
Subjective norm	TRA, TAM, TAM 2, TAM 3, DTPB,
Social influence	UTAUT, UTAUT2
Social factors	MPCU
Perceived usefulness	TAM, TAM 2, TAM 3, DTPB
Performance expectancy	UTAUT, UTAUT2
Extrinsic motivation	MM
Job fit	MPCU, TAM 2, TAM 3
Relative advantage	IDT
Outcome expectations	SCT
Perceived ease of use	
Effort expectancy	TAM, TAM 2, TAM 3, IDT
Complexity	UTAUT, UTAUT2
	MPCU
Image	TAM 2, TAM 3, IDT
Output quality	TAM 2, TAM 3

Results demonstrability	TAM 2, TAM 3
Computer self-efficacy	TAM 3
Computer anxiety	TAM 3
Perceptions of external control	TAM3
Facilitating conditions	UTAUT, UTAUT 2, MPCU, DTPB
Compatibility	IDT, DTPB
Perceived enjoyment	TAM 3
Intrinsic motivation	MM
Perceived behavioural control	TPB, DTPB
Self-efficacy	TAM 3, DTPB, SCT
Price value	UTAUT2
Habit	UTAUT2
Anxiety	TAM 3, SCT
Affect	SCT, MPCU
Hedonic motivation	UTAUT 2
Playfulness	TAM 3

Conclusion

The effectiveness of a theory or model in predicting and explaining behaviour is determined by how well its predictors account for the variance in behaviour, without considering the unique strengths of each theory or model (Taylor & Todd, 1995). Consequently, it becomes essential to compare these theories and models to identify the most suitable ones for predicting and explaining how individuals behave when it comes to accepting and using technology. Table 1 illustrates that among the various theories and models, the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) stand out for its superior explanatory power in explaining behavioural intention. Consequently, these two theories offer a deeper understanding of the factors influencing the acceptance and use of new technologies compared with other similar theories and models. The R^2 value, or the variance explained, is a crucial metric in assessing the goodness of fit of a model. It tells us how well the model explains the variation in the dependent variable. Notably, UTAUT, and UTAUT2 have the highest R^2 values of 0.70 and 0.73, respectively. This indicates that these models explain a larger proportion of the variance in the phenomenon they are designed to explore compared with the other theories and models. In the context of digital financial services, this implies that these models have a better fit with the data and can provide more accurate predictions or explanations for why individuals or organizations adopt or use DFS.

The constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions, as defined in the UTAUT and UTAUT2 models, are highly pertinent and advantageous for studying the behavioral intention to use digital financial services. Performance expectancy enables the exploration of users' perceptions regarding the utility and benefits of DFS in achieving financial goals. Effort expectancy assesses the ease of using DFS platforms, a critical factor given the diverse user interfaces and processes in the digital

financial landscape. Social influence provides insights into how peer, family, or societal factors impact DFS adoption, by acknowledging the role of social networks. Lastly, facilitating conditions highlight whether users have access to the necessary resources and support for using DFS, addressing infrastructural and environmental barriers. Focusing on these constructs, it offers a comprehensive understanding of the drivers and challenges surrounding digital financial services adoption. On the other hand, hedonic motivation, price value, and habit should be given careful consideration for inclusion within this DFS adoption model.

Hedonic motivation, which pertains to the pleasure or enjoyment derived from using a technology, may have limited relevance in the DFS context, where users primarily seek practical financial solutions rather than entertainment value. For many DFS users, the primary motivation is to conduct financial transactions efficiently and securely. Therefore, the inclusion of hedonic motivation may not significantly contribute to understanding DFS adoption factors.

Price value, which assesses users' perceptions of the cost-effectiveness of a technology, may overlap with the construct of performance expectancy, which focuses on the perceived benefits. In the context of DFS, users are likely to evaluate the cost-effectiveness of digital financial services based on their perceived benefits. Therefore, price value might be redundant and can be assessed indirectly through performance expectancy.

The construct of habit pertains to the automatic and repetitive use of a technology. The relevance of habit in DFS adoption depends on the nature of the financial tasks. DFS users may not form strong habits for all financial activities, as the frequency and complexity of transactions can vary widely. Including habit as a construct may not be universally applicable across all DFS contexts.

Today, the safety and security of digital transactions are crucial managerial issues faced by both financial providers and users of those services. Thereby, the perceived risk is a key challenge in providing a safe and secure digital platform to empower customers to make full use of digital financial services. However, UTAUT and UTAUT2 do not focus on this vital factor, even though these two theories are more suitable for understanding and explaining behavioural intention. As a result, the researchers discovered that perceived risk, which defines the possibility of loss in the pursuit of a desired objective of employing technology, influences behavioural intention (Featherman & Pavlou, 2003). Hence, researchers concluded that there is a theoretical gap in current theories and models. Further researchers propose the following theoretical model illustrated in Figure 11 to address this gap and better understand the influence of perceived risk on the behavioural intention to use digital financial services.

The proposed model integrates the established UTAUT, and UTAUT2 frameworks with perceived risk as a central construct. It recognizes that the perceived risk associated with digital transactions, such as concerns about data security, privacy, and financial loss, significantly affects users' behavioural intentions. By introducing perceived risk into the existing frameworks, this extended model aims to provide a more comprehensive understanding of the dynamics of user adoption and usage of digital financial services.
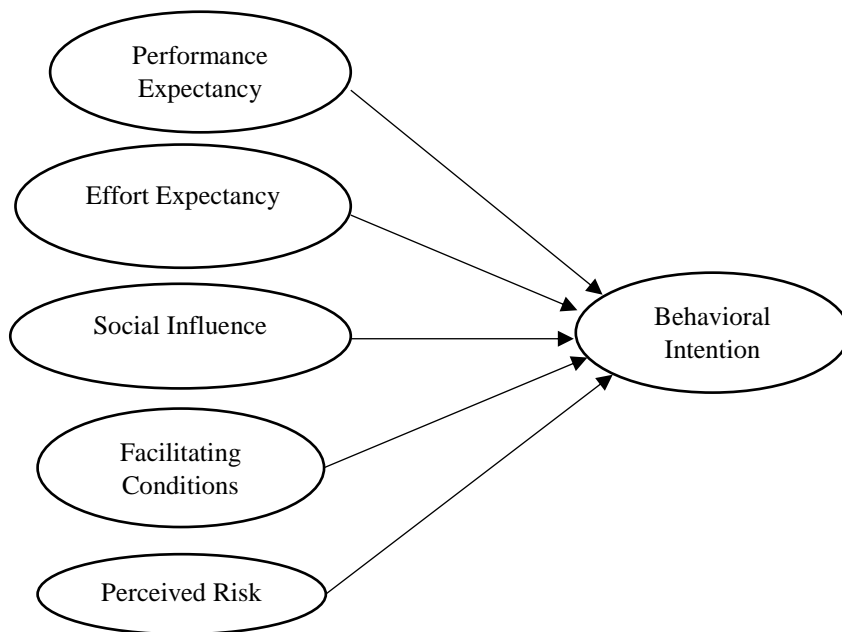
Figure 11: Proposed model of behavioural intention to use digital financial services.

In conclusion, our analysis highlights the critical role of perceived risk in the adoption and usage of digital financial services. While the UTAUT and UTAUT2 models are effective in explaining behavioural intentions, however, they do not fully account for the vital factor of perceived risk, which is vital in the context of DFS. The inclusion of perceived risk as a central construct in an extended theoretical model offers a more comprehensive understanding of the dynamics of digital financial services adoption.

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