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INNOVATING PAYMENTS SUSTAINABLY: A JOURNEY THROUGH RISKS, REWARDS, AND REGULATORY READINESS

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ABSTRACT

Despite its potential, FinTech payments are not yet mainstream, with traditional cards and cash still preferred globally, including in Malaysia. This study investigates factors influencing FinTech payment usage in Malaysia using Unified Theory of Acceptance and Use of Technology (UTAUT), meta-UTAUT, and Value-based Adoption Model (VAM), encompassing system properties, individual characteristics, and external environment. A total of 546 responses were collected across 13 Malaysian states via stratified random sampling and analysed using PLS-SEM. Results show that effort expectancy, social benefit, openness to change, and attitude significantly influence intention. Attitude also mediates the effects of performance and effort expectancy, economic and social benefit, regulatory support, and openness to change on intention. In contrast, social influence, and perceived security and privacy risks had no significant effect on attitude or intention. To our knowledge, this is the first study to integrate UTAUT, meta-UTAUT, and VAM into a unified model for FinTech payment adoption. The combined framework offers valuable insights to guide strategies aimed at increasing adoption of these technologies.

Keywords: *FinTech Payment; Benefits; Risks, UTAUT, meta-UTAUT, VAM*

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1. INTRODUCTION

FinTech payments hold strong potential to drive socioeconomic development by expanding access to financial services, particularly for women and low-income groups. Since COVID-19, digital payments have become the largest FinTech segment by transaction value (CCAF, World Bank & World Economic Forum, 2022).In ASEAN, digital payment value is projected to grow by 14%, from USD 806 billion in 2022 to USD 1.2 trillion in 2025 (World Economic Forum, 2023).

In Malaysia, similar trends were observed from 2019 to 2023, with 73.7% growth in electronic money and mobile banking transactions volume and 428% in value (Bank Negara Malaysia, 2024). Nevertheless, cash remains dominant. Globally, currency in circulation rose 18.74% between 2019 and 2021 (Bank for International Settlements, 2023). In ASEAN and Malaysia, cash is still preferred (PayNet, 2022; Seraj, 2024; United Overseas Bank et al., 2022). Digital payment use has declined post-pandemic, despite government efforts.

Hence, this calls for more research into factors influencing FinTech payment adoption. Most prior studies focus on developed countries, while frequently used models like the Technology Acceptance Model (TAM) and UTAUT have limitations. TAM often requires extensions (Flavian, Guinaliu & Lu, 2020; Leong et al., 2021), and UTAUT overlooks perceived risks (Cao & Niu, 2019; Sharma, Singh & Sharma, 2020b). Since FinTech payment adoption involves benefit-risk trade-offs, a more integrated model is needed (Suzianti et al., 2021).

This study adopts a combined UTAUT, VAM, and meta-UTAUT framework with the following research objectives:

RO1: Assess effects of performance/effort expectancy, social influence, economic/social benefit, privacy/security risk, regulatory support, and openness to change on intention.
RO2: Examine attitude's impact on intention.
RO3: Study the above factors' impact on attitude.

This study offers several key contributions to the literature. This is the first study to integrate these models in the FinTech context. It broadens the scope by including benefits, risks, system properties, individual characteristics, and external environment. It also offers insights from Malaysia, an emerging market.

2. LITERATURE REVIEW

2.1 Theoretical Background

UTAUT and meta-UTAUT

UTAUT, introduced by Venkatesh et al. (2003), synthesised constructs from eight models-including the Theory of Reasoned Action, TAM, and Theory of Planned Behavior, to predict user intentions (IT). UTAUT identifies four core constructs: performance expectancy (PE), effort

expectancy (EE), social influence (SI), and Facilitating Conditions (FC), moderated by Gender, Age, Experience, and Voluntariness of use.

UTAUT has been widely applied beyond its original organisational settings, including in healthcare, mobile tech, education systems, taxation, mobile government, commerce, mobile banking, payments, and blockchain.

A meta-analysis by Jadil et al.(2021) based on 127 studies on mobile banking adoption confirms all UTAUT relationships. PE is the strongest predictor of IT, and IT best predicts usage. Sarker et al.(2020) further support UTAUT's relevance in FinTech research, reinforcing its applicability.

The UTAUT2 framework by Venkatesh, Thong & Xu(2012) with Hedonic Motivation, Price Value, and Habit added, improved explained variance for IT but still shows inconsistency in predicting IT (Tamilmani, Rana & Dwivedi, 2020).

Attitude (AT) (the known predictor of IT) is excluded from both UTAUT and UTAUT2. Venkatesh et al.(2003, 2012) argue that AT matters only when PE and EE are absent. However, Dwivedi et al.(2019) dispute this that the inclusion of attitude raises the model's explanatory power from 38% to 45%. The resulting meta-UTAUT model has since been adopted across domains, from mobile banking (Jadil et al.2021) to language learning (Hoi, 2020).

VAM

The VAM developed by Kim, Chan & Gupta (2007), addresses TAM's limitations in explaining ICT adoption, where TAM's constructs-ease of use and usefulness are insufficient to capture perceived value. VAM views perceived value as a trade-off between benefits (usefulness and enjoyment) and sacrifices (technicality and cost). Numerous studies have extended VAM with additional constructs, confirming its robustness across contexts such as IoT (Jayashankar et al.,2018), AI solutions (Sohn & Kwon, 2020), and virtual reality (Vishwakarma, Mukherjee & Datta,2020). Despite its wide application, VAM often requires extensions, suggesting a lack of comprehensiveness. Moreover, its application in FinTech research remains limited. Importantly, while perceived value (the balance of benefits and risks) is central to consumer decision-making, UTAUT and meta-UTAUT do not account for risks.

UTAUT focuses on IT and usage with a wide application across technologies. Meta-UTAUT builds on this by incorporating AT as a mediator of UTAUT constructs. VAM, in contrast, offers a consumer-oriented, value-driven view with the trade-off between benefits and sacrifices. These models are complementary, with overlapping constructs like PE. VAM's value lens enhances UTAUT, especially in contexts where cost-benefit evaluations are key. Thus, combining these models expands coverage beyond their limitations.

2.2 Hypothesis Development

2.2.1 PE on Intention to Use FinTech Payments (IT)

PE is the degree to which consumers believe that using a technology will benefit them in performing certain activities (Venkatesh et al., 2012). Initially defined by Venkatesh et al.(2003) as the belief that using the system will boost job performance, it later expanded to include consumer benefits in non-organisational settings.

The significance prediction of PE on IT is confirmed in various contexts: contactless payment in Finland (Karjaluoto et al.,2020), mobile wallets in India (Singh et al.,2020), Islamic FinTech in Malaysia (Shaikh et al.,2020), and mobile banking in Vietnam (Nguyen, Tapanainen & Nguyen, 2022). In contrast, Xia et al. (2023) and Hassan et al. (2023) did not find this for Robo-advisors and insurance technology. Given the support of the majority of past literature, the following hypothesis is formed:

H1a: PE significantly affects users' IT.

2.2.2 EE on IT

EE refers to the extent of ease associated with using a technology (Venkatesh et al., 2012). Users are generally more inclined to adopt user-friendly technologies, as not everyone is tech-savvy (Baishya & Samalia, 2020).

The role of EE in predicting intention to use digital finance is well-supported across different regions. Al-Saedi et al.(2020), Hussain et al.(2019), Singh et al.(2020), and Srivastava, Mohta & Shunmugasundaram (2023) found that it positively influences the adoption of mobile payment services in African, Middle Eastern, and South Asian countries. However, there are discrepancies, such as Merhi, Hone & Tarhini (2019) finding significant influence in the UK but not in Lebanon, and Mohd Thas Thaker et al.(2019) reporting no significant relationship in Malaysia. Given that most of the studies suggest the significance of EE, the following hypothesis is developed:

H1b: EE significantly affects users' IT.

2.2.3 SI on IT

SI refers to the extent to which others' opinions affect a user's decision to adopt a new system (Venkatesh et al., 2003, 2012). It is examined from two angles: subjective norm (perception that others believe one should adopt the technology) and perceived herd behavior (tendency to follow others' actions). While Farzin et al.(2021) and Oladapo et al.(2022) define SI in terms of subjective norm, their interpretations align more with herd behavior. Thus, this study considers SI as encompassing both.

Evidence from FinTech research generally supports a positive effect of SI on INT. Studies by Cao & Niu (2019) in China, Widyanto, Kusumawardani& Yohanes (2021)in Indonesia, and Farzin et

al.(2021) confirm this link for mobile payments, while Oladapo et al. (2022) validate it for FinTech services in Malaysia.

However, contrasting evidence also exists. Gupta & Arora(2020) in India and Senyo & Osabutey(2020) in Ghana found no significant SI effect in mobile banking. Oladapo et al.(2022) observed significance in Malaysia but not in Saudi Arabia, highlighting regional differences.

Based on prior literature, the following hypothesis is proposed:

H1c: SI significantly affects users' IT.

2.2.4 Economic Benefit (EB) on IT

EB refers to the cognitive trade-off between cost savings and financial gains (Gerlach & Lutz, 2019), and has been investigated primarily from the perspectives of cost or the trade-off between price value. Regardless of cost or price value perspectives, this relationship with intention is not always consistent.

Al-Saedi et al.(2020) and Humbani & Wiese (2019) found a significant relationship between cost and mobile payment adoption intention. On the other hand, Alalwan et al.(2017) and Al-Okaily et al.(2020) establish the significant impact of price value on the intention to use mobile banking and digital payments. Nonetheless, contradicting evidence is equally compelling as well with Jünger & Mietzner(2019), Singh & Sinha(2020), Loh et al.(2021), and Senyo & Osabutey (2020) finding an insignificant relationship between cost/price value and adoption intention in FinTech and mobile payments.

Arising from this, the fourth hypothesis is posited:

H1d: EB significantly affects users' IT.

2.2.5 Social Benefit (SB) on IT

SB, which can be viewed from both egoistic and altruistic perspectives, refers to the positive impact on others and society through the use of a system. This study emphasises altruistic motivations following the definition of Li et al. (2021), which not only benefit society but also enhance the sustainability of FinTech platforms.

To the best of our knowledge, the research covering altruistic social benefit is rare, especially in the context of FinTech payments. However, past research focusing on altruism in the Islamic finance context sheds light that this is one of the significant determinants affecting the customers' adoption intentions. Sayuti & Amin(2022), Amin(2021), Amin & Hassan (2022), and Juisin et al.(2023) unveiled the significance of Islamic altruism on adopting and accepting Islamic home financing, Murabahah vehicle financing, Tawarruq-based ar-rahnu, and Shari'ah gold investment in Malaysia. Hence, the following hypothesis is developed.

H1e: SB significantly affects users' IT.

2.2.6 Perceived Privacy Risk (PR) on IT

PR, defined as users' concerns about the potential compromise of their personal information (Johnson et al., 2018) has garnered growing research interest in the adoption of digital systems.

Studies by Alalwan et al.(2023), Hazarika, Shrivastava & Rea (2023), Kala Kamdjoug et al.(2021), Aw, Rana& Tan(2023), and Seiler & Fanenbruck(2021) indicate that privacy concerns significantly affect the adoption of digital payment and Robo-advisors. Nevertheless, studies by Bajunaied, Hussin & Kamarudin (2023) and Nelloh et al.(2019) report that privacy concerns exert an insignificant impact on adoption and continuance intentions in FinTech and mobile payments. The sixth hypothesis is proposed based on the majority of the findings:

H1f: PR significantly affects users' IT.

2.2.7 Perceived Security Risk (SR) on IT

Security concerns are triggered by incidents threatening the safety of consumers' financial transactions (Lee & Kim, 2020; Lin, Wang & Huang (2020). Consumers are less likely to use FinTech services if they perceive a high probability of data or monetary loss.

Albastaki et al.(2022), Saha & Kiran(2022), Pal et al.(2021), and Widyanto et al.(2021) show that security protection significantly impacts the adoption of mobile payment and banking. Notwithstanding that, Gerlach & Lutz(2019) and Oktavendi & Mu'ammal(2022) failed to confirm the role of SR and privacy and security concerns on intention to use FinTech payments. As most prior studies support the significance of SR on IT, the following hypothesis is proposed:

H1g: SR significantly affects users' IT.

2.2.8 Regulatory Support (RS) on IT

RS is defined as users' belief in the protection provided by the current regulatory framework in case of future disputes(Madan & Yadav, 2018). Although frequently tested in institutional contexts, RS remains underexplored in individual FinTech usage. It plays a dual role: while it facilitates adoption through supportive infrastructure and policies, the rise of cryptocurrency challenges regulatory control. Nevertheless, government actions still significantly influence the market, justifying RS's inclusion in studying low FinTech payment adoption.

The significant role of RS is confirmed by Ezeh & Nkamnebe(2020), Das & Das(2023), and Nugraha et al.(2022) in the context of Islamic banking and FinTech services. Hence, the following hypothesis is developed:

H1h: RS significantly affects users' IT.

2.2.9 Openness to Change (OC) on IT

OC is defined as a combination of willingness to support the change and positive feelings about the change outcome(Miller, Johnson & Grau, 1994). While commonly examined in organisational change contexts, research on individual OC in FinTech payments remains scarce.

Innovative individuals are more willing to accept and try new ideas. The findings from Flavián et al.(2022), Oktavendi & Mu'ammal(2022), and Shaikh & Amin(2023) validate the significant role of OC in the IT to use Robo Advisor in North America, digital payments in Indonesia, and FinTech in Pakistan. In line with the past literature, the following hypothesis is formulated:

H1i: OC significantly affects users' IT.

2.2.10 AT on IT

AT is defined as a person's "feelings about performing the target behavior"(Davis, 1989; Fishbein & Ajzen, 1975; Taylor & Todd, 1995). Past research consistently shows that attitude plays a significant role in predicting intention, both before and after adopting a new technology.

Studies by Flavian et al.(2020), Patil et al.(2020), and Singh et al.(2020) confirm that a positive attitude strongly affects the intention to use mobile payment systems in the United States, Spain, and India, respectively. The positive influence of attitude also extends beyond payment technologies. Arli & Bakpayev(2023), Cristofaro et al.(2023), Himel et al.(2021), and Maryam et al.(2021) found similar outcomes in the positive role of attitude on intention to use digital financial services. Hence, the following hypothesis is proposed:

H2: AT significantly affects users' IT

2.2.11 Mediating Effect of AT

The mediating role of AT in the relationship between PE, EE, and IT has been widely confirmed across contexts like cryptocurrency, mobile payments, and FinTech (Albayati, Kim & Rho, 2020; Wong et al., 2021), though some studies found only partial mediation (Dwivedi et al., 2019; Flavian et al., 2020).

AT's mediation between SI and IT is less studied but shows both full (Charag et al., 2019; Yeh et al., 2023) and partial mediation(Flavian et al., 2020; Maryam et al., 2021).

For EB and SB, evidence is limited. Maryam et al.(2021) and Park et al.(2019) support AT's mediation for EB-INT, but not for SB, possibly due to egoistic framing. Tewari et al.(2022) suggest altruism influences AT and IT.

Findings on PR and SR mediation are mixed. Mostafa(2020) supports PR mediation, while Zhu et al. (2021) do not. For SR, mediation is partially supported (Khalilzadeh, Ozturk & Bilgihan, 2017) but Park et al.(2019) found no effect.

AT fully mediates RS and IT in some studies (Hu et al.,2019) but only partially in others(Charag et al., 2019).

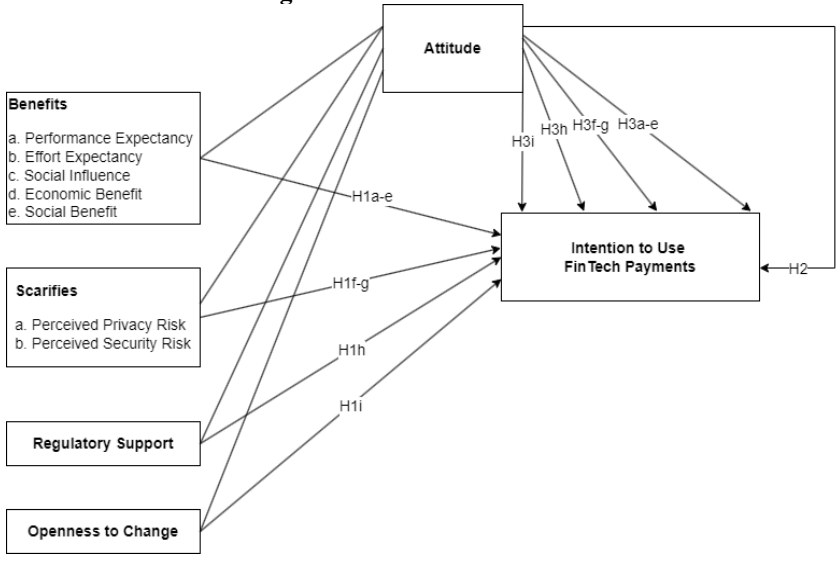
For OC, results vary: some find full mediation (Gupta & Arora, 2017b), others partial (Schaupp et al.,2022), or none (Sivathanu,2018).

Given that most prior studies support the mediating role of attitude, the following hypotheses are proposed:

H3a-i: AT mediates the relationship between PE, EE, SI, EB, SB, PR, SR, RS, OC, and IT.

The following diagram shows the research framework.

Figure 1: Research Framework



3. METHODOLOGY

A field survey was conducted using a self-administered questionnaire with constructs measured on a 7-point Likert scale, based on prior studies. The questionnaire had two sections: demographics (Section A) and items for independent and dependent variables (Section B). To support non-English speakers, it was developed in English and translated into Malay.

A pilot test with 30 randomly selected respondents confirmed reliability and validity with minor suggestions to add definitions and examples.

The final questionnaire was distributed from December 2022 to March 2023, both face-to-face and via Google Forms, targeting Malaysians aged 15 and above, the national working age (Department

of Statistics Malaysia, 2024). A stratified random sampling method was used to ensure representativeness of key population segments, aligning with the research objectives. Stratification creates homogeneous groups while ensuring heterogeneity between them (Sekaran & Bougie, 2016). Responses were collected from 13 strata (Malaysia's 13 states), based on population estimates from the Department of Statistics Malaysia(2022). A total of 547 responses were collected, with one removed due to significant missing data.

Descriptive analysis was performed using IBM SPSS Statistics 26. Hypotheses were tested using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4. SEM consists of covariance-based (CB-SEM) and variance-based (PLS-SEM) approaches (Oliveira et al., 2016). CB-SEM is ideal for theory testing with large, normally distributed data. PLS-SEM was selected due to its suitability for exploratory research, small samples, complex models, and theory extension.

4. RESULTS

4.1 Descriptive Analysis

Of the 546 respondents, 56.8% are female, with most aged 26–35 (41.9%). The ethnic breakdown is predominantly Malay (48.9%), followed by Chinese (31.3%), Indian (6.6%), and others, including Thai, Punjabi, and ethnic groups from Sabah and Sarawak (12.8%). Most are well-educated, with 46.7% holding a Bachelor's and 10.4% a Master's degree. The majority are employed (82.6%), mainly in the private sector (59.2%). About 75.4% earn below RM 4,849, indicating they fall within the B40 income group. Table 1 presents the descriptive statistics.

Table 1: Descriptive Statistics

Variables	Frequencies	Percentages (%)
Gender		
Male	234	42.9
Female	310	56.8
Missing Values	2	0.4
Age		
15-25	104	19.0
26-35	229	41.9
36-45	130	23.8
46-55	61	11.2
56-64	15	2.7
65 and above	4	0.7
Missing Values	3	0.5
Ethnicity		
Malay	267	48.9
Chinese	171	31.3
Indian	36	6.6
Others	70	12.8
Missing Values	2	0.4
Education		

Variables	Frequencies	Percentages (%)
SPM/O Level	57	10.4
STPM/A Level	44	8.1
Diploma	116	21.2
Bachelor's Degree	255	46.7
Master's Degree	57	10.4
PhD's Degree	6	1.1
Professional Certificate	10	1.8
Missing Values	1	0.2
Employment Status		
Working	451	82.6
Unemployed	84	15.4
Retired	7	1.3
Missing Values	4	0.7
Employment Sector		
Public	137	25.1
Private	323	59.2
Not applicable	82	15.0
Missing Values	4	0.7
Income		
Less than RM 2,500	199	36.4
RM 2,500 - RM 4,849	213	39.0
RM 4,850- RM 7,199	82	15.0
RM 7,199- RM 10,969	24	4.4
RM10,970 and above	22	4.0
Missing Values	6	1.1
State of Residence		
Perlis	5	0.9
Kedah	40	7.3
Penang	26	4.8
Perak	47	8.6
KL/Selangor	138	25.3
Pahang	25	4.6
Kelantan	28	5.1
Terengganu	27	4.9
Melaka	20	3.7
N. Sembilan	21	3.8
Johor	68	12.5
Sabah/Labuan	54	9.9
Sarawak	47	8.6

24 responses were subsequently removed due to the outlier effect as their p-value of the Mahalanobis, D^2 is less than 0.001. Hence, the final responses subjected to the final PLS-SEM testing are 522.

4.2 Measurement Model Assessment

The research model was first examined for the reliability and validity of the measurement model before the structural assessment was tested based on the recommendation of Hair et al.(2022).

For internal consistency, a composite reliability (CR) value above 0.70 is required (Ramayah et al., 2018). For indicator reliability and convergent validity, Hair et al.(2017) suggest that the loadings must exceed 0.708 and the average variance extracted (AVE) must be above 0.50. As indicated in Table 2, all variables demonstrate CR values and loadings above 0.70, with AVE values exceeding 0.50, confirming that internal consistency, indicator reliability, and convergent validity are achieved. There is no discriminant validity issue since all Heterotrait-Monotriat ratio of correlations (HTMT) ratios are lower than the 0.90 threshold recommended by Hair et al.(2017).

Table 2: Measurement Model Assessment

Constructs/Items	**Composite Reliability (CR)**	**Loadings**	**AVE**
PE (PE)			
PE1	0.897	0.853	0.686
PE2		0.864	
PE3		0.831	
PE4		0.761	
EE (EE)			
EE1	0.918	0.858	0.736
EE2		0.873	
EE3		0.866	
EE4		0.833	
SI(SI)			
SI1	0.929	0.842	0.722
SI2		0.865	
SI3		0.854	
SI4		0.847	
SI5		0.841	
Economic Benefit (EB)			
EB1	0.880	0.817	0.648
EB2		0.821	
EB3		0.839	
EB4		0.739	
Social Benefit (SB)			
SB1	0.901	0.789	0.695
SB2		0.819	
SB3		0.850	
SB4		0.875	
Privacy Risk (PR)			
PR1	0.920	0.850	0.742
PR2		0.885	

Constructs/Items	Composite Reliability (CR)	Loadings	AVE
PR3		0.869	
PR4		0.841	
Security Risk (SR)			
SR1	0.923	0.854	0.706
SR2		0.742	
SR3		0.869	
SR4		0.862	
SR5		0.867	
Regulatory Support (RS)			
RS1	0.908	0.861	0.712
RS2		0.844	
RS3		0.860	
RS4		0.809	
Openness to Change (OC)			
OC1	0.904	0.808	0.701
OC2		0.869	
OC3		0.881	
OC4		0.788	
Intention (IT)			
IT1	0.932	0.885	0.774
IT2		0.894	
IT3		0.839	
IT4		0.900	

4.3 Structural Model Assessment

The structural model was examined for hypothesis testing using 10,000 re-sample bootstrapping.

Firstly, RO1, the direct effect of the 9 independent variables, and RO2, the direct effect of the mediating variable, AT, on the dependent variable, IT was assessed. The R^2 value of 0.55 indicates that the 10 predictors account for 55% of the variance in IT. EE (β=0.139, $p<0.01$), SB (β=0.094, $p<0.05$), OC (β=0.14, $p<0.05$), and AT (β=0.444, $p<0.01$) are all found to have a significant relationship with IT, accepting H1b, H1e, H1i, and H2. However, PE, SI, EB, PR, SR, and RS exert no influence on IT, rejecting H1a, H1c, H1d, H1f, H1g, and H1h.

For RO3, the mediation impact of AT on the relationship between IT and the following variables is confirmed: PE ($\beta = 0.086$, $p < 0.01$), EE ($\beta = 0.083$, $p < 0.01$), EB ($\beta = 0.072$, $p < 0.01$), SB ($\beta = 0.039$, $p < 0.05$), RS ($\beta = 0.049$, $p < 0.01$), and OC ($\beta = 0.122$, $p < 0.01$), supporting H3a, H3b, H3d, H3e, H3h, and H3i. Consistent with RO1 (impact on IT), SI, PR, and SR do not affect AT as well, rejecting H3c, H3f, and H3g. Table 4 shows the findings of direct effects and indirect effects.

Table 3: Hypothesis Testing Direct and Indirect Effects

RO	Hypothesis	Relationship	Theory	Contexts	Std Beta	p-value	f^2	Decision
RO1	H1a	PE-IT	UTAUT	System	0.066	0.164	0.004	Rejected
	H1b	EE-IT	UTAUT	System	0.139	0.004	0.015	Accepted
	H1c	SI-IT	UTAUT	External Environment	-0.009	0.798	0.000	Rejected
	H1d	EB-IT	VAM	System	-0.022	0.579	0.001	Rejected
	H1e	SB-IT	VAM	External Environment	0.094	0.029	0.009	Accepted
	H1f	PR-IT	VAM	System	0.039	0.455	0.002	Rejected
	H1g	SR-IT	VAM	System	-0.013	0.787	0.000	Rejected
	H1h	RS-IT	Contextual Variable	External Environment	0.019	0.637	0.001	Rejected
	H1i	OC-IT	Contextual Variable	User	0.140	0.040	0.024	Accepted
RO2	H2	AT-IT	Meta-UTAUT	User	0.444	0.000	0.180	Accepted
RO3	H3a	PE-AT-IT	Meta-UTAUT	System	0.086	0.000	-	Accepted
	H3b	EE-AT-IT	Meta-UTAUT	System	0.083	0.000	-	Accepted
	H3c	SI-AT-IT	Meta-UTAUT	External Environment	0.008	0.676	-	Rejected
	H3d	EB-AT-IT	Meta-UTAUT /VAM	System	0.072	0.001	-	Accepted
	H3e	SB-AT-IT	Meta-UTAUT /VAM	External Environment	0.039	0.038	-	Accepted
	H3f	PR-AT-IT	Meta-UTAUT /VAM	System	-0.006	0.765	-	Rejected
	H3g	SR-AT-IT	Meta-UTAUT /VAM	System	-0.01	0.582	-	Rejected
	H3h	RS-AT-IT	Meta-UTAUT/ Contextual	System	0.049	0.007	-	Accepted
	H3i	OC-AT-IT	Meta-UTAUT/ Contextual	User	0.122	0.000	-	Accepted

To validate the model's predictive relevance, the PLS-Predict technique proposed by Shmueli et al.(2019) was applied. The Mean Absolute Error (MAE) values of both the PLS-SEM and LM models were compared since the prediction errors are not symmetrically distributed. As illustrated

in Table 5, all MAE values for PLS-SEM are lower than LM, confirming the model's strong predictive power.

Table 4: MAE Values Comparison

	Q^2predict	PLS-SEM_MAE	LM_MAE
AT1	0.361	0.629	0.642
AT2	0.395	0.574	0.584
AT3	0.361	0.612	0.631
AT4	0.393	0.610	0.634
AT5	0.398	0.588	0.617
IT1	0.368	0.633	0.640
IT2	0.342	0.660	0.691
IT3	0.270	0.694	0.743
IT4	0.318	0.647	0.661

4.4 Discussion

EE, SB, OC, and AT influence both AT and IT. This suggests that more innovative individuals are likely to form positive evaluations of FinTech payments when these offer user-friendly features and societal value. The significant EE-IT relationship aligns with Al-Saedi et al.(2020), Singh et al.(2020), and Srivastava et al.(2023), while AT's partial mediation confirms Dwivedi et al.(2019). The significant SB-IT path and AT's mediating role offer new insight, as prior studies often focused on egoistic (personal) rather than altruistic (societal) benefits. These findings align with Sayuti & Amin(2022), Amin & Hassan (2022), and Juisin et al.(2023). OC-IT and OC-AT-IT relationships also support earlier works (Flavián et al., 2022; Pillai & Sivathanu, 2018; Shaikh & Amin, 2023). The strong effect of AT on IT is consistent with Flavian et al.(2020) and Patil et al.(2020), confirming that positive attitudes enhance IT.

Notably, PE, EB, and RS influence IT only through AT, indicating full mediation. Functional and monetary benefits, and regulatory assurance, contribute to positive evaluations, which in turn drive intention. These mediations support findings from Alhassan et al.(2020), Irimia-di et al.(2023), Khan et al.(2023), and Upadhyay et al.(2022) for PE-IT; Park et al.(2019) for EB-IT; and Hu et al.(2019), Maryam et al.(2021) for RS-IT.

Finally, respondents place little emphasis on others' opinions, privacy, or security concerns, as SI, PR, and SR have no significant impact on AT or IT. The SI result contradicts Yeh et al.(2023) and Elhajjar & Ouaida (2020), possibly due to FinTech's financial nature, where personal needs outweigh SI (Senyo & Osabutey, 2020). For PR, the privacy paradox may explain the lack of effect-users value privacy but behave inconsistently (Chakraborty, 2022). The lack of SR impact is surprising given frequent security breaches, but may reflect the tech-savviness of Gen Z users(Oktavendi & Mu'ammal, 2022); 60.9% of respondents are under 35, representing Generations Y and Z.

5. CONCLUSION

Digitalisation is the main pillar of the future provision of financial services. Therefore, understanding the factors that influence consumers' use of FinTech payments is crucial to sustain consumers' demand.

5.1 Theoretical Implications

This study contributes to theory in several ways. First, it is the first to integrate UTAUT, meta-UTAUT, and VAM to examine low FinTech payment usage. Following Dwivedi et al.(2019), AT is added to UTAUT to form meta-UTAUT, which shows greater predictive power, 66% vs. 33% with 6 of 9 hypotheses supported in RO3, compared to 3 in RO1. Combining VAM with meta-UTAUT also increases explanatory power from 25% to 50%.

Second, the model reflects real-world trade-offs by incorporating both benefits and risks across system properties, individual characteristics, and the external environment.

Third, the study enhances meta-UTAUT by adding contextual variables. Attitude mediates the effects of RS and OC on IT, highlighting key but underexplored relationships. The influence of SB indicates a shift from egoistic to altruistic motives post-pandemic, contributing to sustainability literature.

Finally, by focusing on Malaysia, a diverse developing country, the study adds value to technology acceptance research, where variations in literacy, tech use, and infrastructure shape FinTech adoption.

5.2 Managerial Implications

The findings offer valuable insights for both industry professionals and regulators.

FinTech companies can gain a competitive edge by focusing on system design and user-friendly features. Personalisation through technologies like AR/VR and functions such as bill reminders and exchange rate alerts can enhance user experience.

Marketing strategies should include monetary incentives (cash-back, vouchers, discounts) and emphasise ESG benefits, which influence both attitude and intention. Apps can feature ESG tools like round-up donations and carbon tracking. Behavioural analytics can help target innovative users. For policymakers, BNM could also refine the 2024 Regulatory Sandbox Framework by prioritising system functionality and user-friendliness. Enhancing cross-border payment infrastructure and continuing digital aid disbursement would further encourage adoption.

5.3 Limitations and Future Research

The study's cross-sectional design limits its ability to capture behavioural changes over time. External factors like market shifts may alter variables such as EE's impact on IT as users gain experience. Longitudinal studies are recommended to track these changes. The model's scope is limited, with convenience only included under PE, and other risks like operational failure are excluded. Although AT and IT are strong predictors, they may not reflect actual behaviour. Future research should use real usage data (e.g., app downloads) for better accuracy. Lastly, focusing only on Malaysia limits generalisability. Broader studies across countries with varying socioeconomic and cultural contexts are needed to understand global FinTech payment adoption.

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