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Unraveling Digital Payment Adoption in Emerging Economies: A Unified Theory of Acceptance and Use of Technology 2-Driven Cross Country Analysis of Egypt and India

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ABSTRACT

This research investigates the implementation of digital payments in Egypt and India, two developing economies, utilizing the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) paradigm. Utilizing performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and perceived risk (PR), we examine their effects on behavioral intention (BI) through structural equation modeling based on survey data from 130 Egyptian and 307 Indian students. Findings indicate that FC and EE serve as universal motivators in both contexts, although PE has a more pronounced impact in Egypt, which is at an early-adoption phase. SI substantially influences Indian users, mirroring cultural standards, although it does not impact Egyptians. Public relations have an adverse impact on adoption in Egypt, although it has a negligible impact in India, suggesting a lack of trust. The findings highlight the importance of addressing contextual elements in digital maturity and policy, offering valuable insights for regulators and fintech companies to enhance infrastructure, usability, and risk mitigation for financial inclusion in emerging nations.

1. INTRODUCTION

In the financial services industry, Information technology revolution has been encouraged by the emergence of internet, which eventually changed how banking services are provided [1]. Digital finance such as mobile banking, internet banking, and Unified Payment Interface (UPI) use witnessed significant improvements with the help of online financial services [2]. Digital finance presents new opportunities to offer financial services to populations that were previously not aware of this. The growing number of smartphone subscriptions-over six billion globally-is driving demand for digital banking services [3]. Financial institutions now enable customers to perform transactions remotely via mobile devices [4].

Adoption of electronic funds is not just found in advanced nations. For example, During the COVID-19 outbreak, 33% of Indians said they used digital payments more frequently [5]. Mobile wallets have gained attention for their potential to simplify payments and offer new income streams for service providers such as financial institutions, telecom operators, and e-commerce platforms. Key factors influencing their adoption include perceived usefulness, facilitating conditions, security, ease of use, social influence, and regulatory support. The rapid evolution of smartphones, in tandem with information technology, has transformed them into essential tools of daily life [6].

Mobile wallets offer services such as instant payment through QR codes, digital receipt storage, reduced waiting time, promotional discounts, and increased customer satisfaction. Their popularity surged during COVID-19, which altered consumer habits and heightened interest in contactless payments to minimize virus transmission [7, 8]. The design of mobile payments supported social distancing and facilitated transactions without physical contact.

Despite their advantages, mobile wallets are not yet universally adopted. Studies report skepticism and resistance to new technologies as barriers [9, 10]. Inadequate government support and regulatory challenges further hinder progress toward cashless societies. Scholars have highlighted the need to comprehend customer behavior in order to promote adoption [11]. These observations are appropriate, for developing countries like Egypt and India. This kind of research can provide suggestions to policy makers in creating policies to promote digital payment, as well as support service providers in developing effective marketing campaigns.

Despite significant efforts to boost financial inclusion, many people in developing countries still struggle to access digital payments and transaction accounts. As of 2021, only 71% of youngsters in these regions had maintained a bank account, compared to 76% globally. Also, just 57% of adults

in developing countries engaged in online payments, whereas the worldwide average reported 64% [12]. Some of the hurdles to adoption include informality [13], tax benefit [14], and poor internet or mobile connectivity [15].

Payment digitization has boosted financial inclusion and identified to boost financial development [16], reduce poverty [17], and close the disparities in education [18] and gender [19]. Mobile financial applications have made it possible for consumers to send money over long distances, which has increased household financial stability and enhanced tax collection [20, 21]. Yet, mobile money adoption remains uneven. In contrast, bank-based digital transfers have grown rapidly, requiring a closer examination of cross-country differences and drivers.

It was identified that acceptance of fast payment systems (FPS) is higher when central banks operate them, when non-bank entities are allowed to participate, and when there are diverse use cases and cross-border linkages [22]. Instant payments-real-time credit transfers processed 24/7 represent a shift from traditional payment methods that take hours or days to settle [23]. Drivers include enhanced digital infrastructure, supportive regulation, and growing consumer demand for speed and convenience [24].

Unlike batch-processed credit transfers, instant payments eliminate the float period during which funds are locked in the system. This allows immediate access to money for both consumption and business use and reduces risks for merchants who would otherwise rely on delayed payment guarantees [25]. By providing instant confirmation and settlement, instant payments function similarly to cash but in digital form.

This study uses Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) as a theoretical framework to examine the factors that influence intention to adopt digital payment differ between Egypt and India. The present work analyzes user behavior, policy environments, and system-level factors to discuss their implications for financial institutions, digital service providers, and policy regulators. The findings affirmed that marketing strategies and regulatory policies aimed at promoting digital transaction in Egypt and India.

This study not only provides cross country evidence but also extends the UTAUT2 framework by extending its perspective in two nations with different levels of digital payment ecosystem maturity. This study compares Egypt (where the digital payment ecosystem is still evolving) with India (where it is more mature) to investigate determinants of digital adoption. The study goes beyond applying the UTAUT2 model by refining its relevance for emerging market contexts.

2. LITERATURE REVIEW

Mobile wallets and digital payment platforms have appeared as transformative tools, particularly in emerging markets. The first online transaction using electronic payment occurred in 1994 [26]. Last decade has witnessed accelerated innovation through platforms such as PayPal (1998), Google Wallet (2011), Apple Pay (2014), and Samsung Pay (2015). More recently, financial ecosystems have expanded to include Buy Now Pay Later (BNPL) services and pilot implementations of Central Bank Digital Currencies (CBDCs). Mobile payment service providers now include banks, telecom operators, fintech firms, and e-commerce companies [27]. These platforms enable transactions anytime and anywhere, making them a vital component of modern financial ecosystems [28].

Mobile payment is especially beneficial in emerging economies, where smartphones are ubiquitous and financial inclusion is a policy priority. According to Statista (2022a), there are over six billion smartphone subscriptions worldwide [6]. The rise in smartphone penetration and internet usage has contributed to the popularity of digital payment apps and mobile banking [3]. Financial institutions now facilitate remote transactions via mobile devices, enhancing convenience [4].

The mobile payment adoption has been significantly increased at the time of COVID – 19 pandemics. With the World Health Organization [8] advocating contactless payments to reduce virus transmission, mobile wallets gained prominence due to their touch-free transaction capabilities [29]. The pandemic shifted consumer behavior globally, prompting increased reliance on digital payments in both developed and emerging economies [30]. Studies have identified that 33% of Indian users confirmed that the usage of digital payment was increased at the time of COVID-19 [31]. Despite these advantages, adoption is still unequal, and user resistance is fueled by perceived complexity, lack of awareness, and trust difficulties [10].

In the field of marketing literature, the emergence of technology adoption has extensively been conferred. Technology adoption is a important area of study for both academics and practitioners. However, conceptual difficulties have arisen due to the lack of clarity in defining "adoption," limiting operational definitions necessary for scale development [32]. Scholars describe consumer adoption as the process by which individuals decide to accept or reject an innovation [33, 34]. This was further explained by [35], who described adoption as a multi-phase process that starts with awareness and ends with the decision to adopt. Important groups within this adoption spectrum include the factors of diffusion of innovation theory. Technology adoption is consumer's interest to engage with new technological innovation [36]. Recent studies have also explored the adoption of AI-powered tools and intelligent platforms among university students, highlighting the role of configurational and behavioral factors in technology acceptance.

Researchers had developed various models over the years to study technology acceptance. Among the models, Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and UTAUT's later extensions are widely adopted by the academicians [37]. These models had postulated to find out the factors that affect the customer to accept new technology particularly in digital transaction. Based on behavioural theories, TAM was developed by [38]. Before that Ajzen and Fishbein [39] introduced the Theory of Reasoned Action (TRA) to study the individual behavioural intentions. Despite, its popularity and wide application, TAM has been criticized for its narrow focus [40] and has ignored social, personal, and institutional factors [41]. Various extensions TAM had been introduced to overcome the limitations. Nevertheless, UTAUT [41] has become extensively employed model for technology acceptance research. UTAUT integrates eight previous theories: diffusion of innovation, TRA, TAM, social cognitive theory, model of PC utilization, motivation theory, TPB, and combined TAM-TPB [41]. Recent empirical studies have extended these models into emerging domains such as ERP systems in higher education, demonstrating both enabling and inhibiting factors influencing adoption decisions. Venkatesh et

al. [42] further expanded the UTAUT framework by adding price value, hedonic motivation, and habit and named UTAUT2. This modification is said to improve the model's descriptive power.

Trust was not a construction of UTAUT or UTAUT2. But researchers have integrated trust in the existing UTAUT and UTAUT2 model. Literature suggested that trust had significantly influenced the adoption of digital technology in banking industry [43, 44]. It has also been affirmed that trust help mitigate perceived risks while using digital financial services [45]. Additional constructs such as security and privacy had been included in digital payment studies in developing nation [46].

Prior studies have confirmed that UTAUT and UTAUT2 have been widely used with integrating various factors in accordance with research context. It offers a widely employed framework for analysing cross-national comparisons where diverse socioeconomic factors play a significant role on digital payment adoption. Table 1 details the previous digital payment adoption studies with variables used and model employed in that study.

Table 1. Summary of digital payment adoption studies

Author(s) (Year)	Study Context	Variables Examined	Model Used
Davis [47]	Technology Acceptance Model (TAM)	PU, PEU, A, BI	TAM
Venkatesh et al. [41]	Unified Theory of Acceptance and Use of Technology (UTAUT)	PE, EE, SI, FC, BI, UB	UTAUT
Lin [48]	Mobile Banking Adoption	Ease of use, Perceived relative advantage, Compatibility	DOI
Venkatesh et al. [42]	UTAUT2: Extended UTAUT Model	PE, EE, SI, FC, HM, PV, H	UTAUT2
Slade et al. [49]	Mobile Payment adoption in UK	PE, EE, SI, FC, PR, T	UTAUT
Oliveira et al. [50]	Mobile payment, Portugal	Compatibility, Security, Innovativeness, PE, SI	UTAUT2 & DOI
Alalwan et al. [51]	Mobile Banking, Jordan	T, HM, PV, H	Meta UTAUT2
Kumar et al [52]	Mobile Wallet Usage	PU, PEU, A, T	TAM
Chhonker et al. [53]	m-commerce technology adoption	PE, EE, SI, FC	TAM, TAM2, TAM3, UTAUT2, TRA & TPB
Sivathanu [54]	Digital Payment Adoption in India	PU, PEU, T, Awareness	UTAUT 2 & Innovation resistance theory
Patil et al. [55]	Mobile payment, India	PE, EE, T, Personal innovativeness, Anxiety, Grievance Redressal	Meta UTAUT
Zhong & Moon [56]	Mobile QR-Code Payment in China	PE, PU, PR	TAM, UTAUT
Sahi et al. [57]	Digital Payment Adoption: A Review	PE, PU, PR, T	TAM, UTAUT, DOI
Kapoor et al. [58]	Mobile wallet adoption	Perceived critical mass, Perceived values, Promotional benefits	SOR
Razi-ur-Rahim and Uddin [59]	Adoption of UPI among Indian users	PE, SI, EE, FC, T, A, Personal innovations, Anxiety	Meta UTAUT
Kar [60]	Mobile payment satisfaction	PV, PU, T, SI, Credibility, Information privacy, Responsiveness	Digital Service Usage Satisfaction Model
Haritha [61]	Mobile payment adoption	PU, PEU, A	TAM
Saha & Kiran [62]	UPI payment adoption by baby boomers	PE, SI, EE, PR Ubiquity, Perceived security	Meta UTAUT
Banerji & Singh [63]	Mobile wallet adoption in India	PU, PEU, Compatibility, Observability, Trialability	TAM & DOI
Lee & Chen [64]	Acceptance of Mobile-Banking Applications	PE, EE, SI, FC	UTAUT
Shahid [65]	UPI adoption in India	Relative advantage, Complexity, Trialability Observability	DOI
Kirmani et al. [66]	Intentions to continue UPI in India	Perceived value, PU, PR	TAM
Thakkar & Thakkar [67]	UPI usage among women in India	PE, EE, SI, FC	UTAUT
Al-Sabaawi et al. [68]	Electronic Payment Adoption in developing nations	PE, EE, SI, FC, T, PR	Meta UTAUT
Guhan & Nigma [69]	UPI usage during COVID-19	PE, EE, SI, FC	UTAUT
Jegerson & Hussain [70]	Mobile payment adoption	PE, EE, SI, FC	UTAUT
Wu & Liu [71]	Mobile payment: Cross country adoption	PE, SI, FC, EE, HM, PV, and H.	UTAUT2
Soormo et al. [72]	Adoption of QR payments	PE, EE, SI, FC	UTAUT
Alam et al. [73]	QR code payment methods	PE, EE, SI, FC Perceived values, Perceived critical mass, Promotional benefits	UTAUT & SOR
Razi-ur-Rahim et al. [59]	UPI adoption in India	PE, EE, SI, FC, A, UB	Meta-UTAUT
Tang & Tsai [74]	Mobile payment after COVID-19	PE, HM, PV, EE, SI, FC, H.	UTAUT2
Usman et al. [75]	Digital Payment usage	Subjective Norms, Attitude, Financial	TPB

		Literacy, Perceived Behavioral Control	
Davis [47]	Technology Acceptance Model (TAM)	PU, PEU, A, BI	TAM
Venkatesh et al. [41]	Unified Theory of Acceptance and Use of Technology (UTAUT)	PE, EE, SI, FC, BI, UB	UTAUT
Lin [48]	Mobile Banking Adoption	Ease of use, Perceived relative advantage, Compatibility	DOI
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Kar [60]	Mobile payment satisfaction	PV, PU, T, SI, Credibility, Information privacy, Responsiveness	Digital Service Usage Satisfaction Model

Notes: A - Attitude; PEU - Perceived Ease of Use; PU - Perceived Usefulness; PE - Performance Expectancy; SI - Social Influence; EE - Effort Expectancy; FC - Facilitating Conditions; BI - Behavioral Intention; UB - Usage Behavior; HM - Hedonic Motivation; PV - Price Value; H - Habit; T - Trust; PR - Perceived Risk

A critical review of the studies summarized in Table 1 highlights several important trends and research gaps. Most of the studies employed TAM, UTAUT, and UTAUT2 models, showing performance expectancy, effort expectancy, social influence, and facilitating conditions are the important factors of behavioral intention. But perceived risk, trust, and habit were found to be inconsistent across nations. Prior studies focused on single country perspective and emphasized mobile wallet and UPI related with limited consideration of broader ecosystem-level differences. Cross country comparison remains dearth. These gaps indicate the need for a comparative study examining relationships among UTAUT2 framework across countries having different regulatory environments, infrastructure readiness, and levels of digital maturity.

3. THEORETICAL FRAMEWORK & HYPOTHESES DEVELOPMENT

UTAUT2 serves as a widely employed adoption framework of online payment adoption. The UTAUT2 model, integrated with important factors to the first UTAUT model [42], was employed in a plethora of studies in the field of financial technology. This study finds that performance expectancy, social influence, effort expectancy, facilitating conditions, and perceived risk demonstrates significant negative impact on customers intention to use digital payment. Digital payment refers to an economic environment where transaction is relying on electronic transfer [76]. According to reviewed literature and conceptual foundations of UTAUT2, the study hypotheses are framed".

3.1 Performance expectancy

The degree to which the utilizing technology assists to accomplish the task is deemed as performance expectancy [77]. Users will adopt or ready to accept new technology once they think it would support to complete their task [41]. This construct identified to be a substantial influencer on digital adoption [44, 78-81]. Thus, the hypothesis below is framed.
H1: Performance expectancy is having positive influence on digital payment adoption.

3.2 Effort expectancy

The ease of handling technology is known as effort expectancy [42]. When people consider the process is simple to learn, they would consider adopting. Effort expectancy ascertained to be an imperative construct of digital payment [2, 79]. Thus, the hypothesis below is framed.
H2: Effort expectancy is having positive influence on digital payment adoption.

3.3 Social influence

Individuals' behaviour is being influenced by family, friends, and co-workers [80]. Social influence is the extent to which anyone thinks that family, friends, and colleagues impact on an individual's behaviour [81]. Studies have confirmed the positive association between social influence and intention in the situation of digital payment [50]. Social influence affirmed to have a substantial influence on UPI adoption in India [82]. Thus, the hypothesis below is framed
H3: Social influence is having positive influence on digital payment adoption.

3.4 Facilitating conditions

The degree to which the utilizing technology assists to accomplish the task is deemed as performance expectancy [77]. Users will adopt or ready to accept new technology once they think it would support to complete their task [41]. This

construct identified to be a substantial influencer on digital adoption [44, 78, 81]. Thus, the hypothesis below is framed
H1: Performance expectancy is having positive influence on digital payment adoption.

3.5 Performance expectancy

The infrastructure support given to an individual to assess the new technology is referred to as facilitation condition [41]. It is pertained to have required resources to access any technology [83]. Researchers have reported that facilitating conditions have predominantly influence individual to adopt digital payment, particularly in India [54, 83]. Thus, the hypothesis below is framed.
H4: Facilitating conditions is having positive influence on digital payment adoption.

3.6 Perceived risk

Risk is deemed to have an imperative explanatory power on digital payment adoption [84, 85], particularly in emerging fintech and Sharia-compliant financial contexts [84]. This is deemed to have negative influence on digital adoption [86]. In accordance with digital transactions, loss of money while transaction, data breach, account of fraud, payment delay are the possibility of risk [87]. Thus, the hypothesis below is framed.
H5: Perceived risk is having negative influence on digital payment adoption.

4. RESEARCH METHODOLOGY

4.1 Measurement scales

Measurement instruments are developed from the scales of previous studies. It comprised six latent factors and 18 observed variables. To confirm the face validity of the instrument, an English form of the questionnaire was initially presented to three experts, one was engaged in digital marketing and two were from fintech research. These experts included one digital marketing practitioner with industry experience in digital payment systems and two academic researchers specializing in fintech and digital finance. Their review focused on face validity, clarity, and contextual relevance of the measurement items. The questionnaire was translated into Arabic for collecting data from Egypt and Hindi for collecting data from India by a bilingualist. The translator was proficient in both English and the target language and familiar with survey-based research terminology to ensure conceptual equivalence rather than literal translation. After the translation both versions were reviewed further to confirm the accuracy. Although a formal back-translation procedure was not employed, the translated versions were independently reviewed by experts to verify semantic consistency, readability, and the absence of ambiguity across language versions. Experts were requested to examine the readability and ambiguity of the measurement instrument. The suggested modifications primarily involved simplifying sentence structure and adjusting terminology related to perceived risk and facilitating conditions to improve respondent comprehension. Results of this process are highly consistent with Dillman's [88] recommendations. A pilot study was led with 30 samples to verify the instrument's validity and reliability. The pilot respondents confirmed that the questionnaire items were clear and easy to understand across both language versions. The responses were analysed to authenticate the items' reliability. Cronbach's alpha was used to assess internal consistency reliability, and all constructs exceeded the recommended threshold value.

4.2 Sampling and data collection

Cochran's [89] method was used to measure the sample size. Thus, 385 was decided as a minimum required sample. Consequently, 425 sample size was adequate. The survey was conducted online with students in Egypt and India, who have been using any form of digital transaction for buying goods or services. The participants were considered for data collection after confirming that they have been using digital payment for sales transactions.

Higher education students were selected as the study population. Students apparently have high smartphone usage with digital literacy and high engagement with financial services. Which make them likely early adopters of emerging new technologies. In addition to that, their high digital social interactions make them suitable for this research context. As young consumers are believed to shape the future of digital payment ecosystems in emerging economies, their behavioral intentions give valuable insight into evolving adoption patterns.

There was no easily accessible sampling frame that could be used to count the population of digital payment users, so convenience sampling method employed for data collection. Convenience sampling is the process of selecting respondents according to their approachability, closeness, availability at given point of time, and willingness to participate [90]. While this approach facilitated data collection from digitally active respondents, it may limit the generalizability of findings beyond the sampled population. Previous studies in related fields have effectively employed this technique under similar constraints [91, 92].

We used a Google Forms-created web-administrated questionnaire to conduct an online survey. Under these conditions, online questionnaires were simple to use. We properly detailed the objective and ensured that their data would remain confidential and that it was being done solely for scholarly purposes. Following Hair et al. [93], 437 valid responses remained in the final analysis after 39 responses with insufficient or missing data were eliminated. Of the 437 completed surveys that were distributed, 307 came from India and 130 from Egypt. This suggests a response rate of about 79% and is higher than the typical regional average of 51% in similar survey-based studies. Responses displaying significant missing values or discrepancies were removed, and data screening procedures were conducted in compliance with Hair et al. [93] recommendations. The final sample, which was deemed suitable for additional statistical analysis, consisted of 437 valid responses after these instances were eliminated.

5. DATA ANALYSIS AND FINDINGS

5.1 Demographic details

Table 2 presents the demographic profile of respondents from India (N = 307) and Egypt (N = 130). In India, the sample consisted of 52% males and 48% females, with the majority aged between 18-21 years (55%), followed by 22-25 years

(42%). All Indian respondents reported daily usage of digital payment applications. In contrast, the Egyptian sample comprised 62% males and 38% females, with most respondents aged between 18-21 years (58%) and 22-25 years (42%). Digital payment usage frequency in Egypt varied across daily (29%), weekly (29%), monthly (24%), and rarely (18%) categories. The uniformly high daily usage observed in the Indian sample reflects the characteristics of the surveyed population, which primarily consisted of urban university students highly engaged with mobile-based payment platforms.

Table 2. Participants information

	Egypt		India	
Construct	**Characteristics**	**Percentage**	**Characteristics**	**Percentage**
Gender	Male	62	Male	160
	Female	38	Female	147
Age	<18	0	<18	0
	18-21	58	18-21	170
	22-25	42	22-25	130
	26-30	0	26-30	0
Educational Qualification	High School	31	High School	0
	Graduate	35	Graduate	169
	Postgraduate	33	Postgraduate	138
	PhD	1	PhD	0
Frequency of Usage	Daily	29	Daily	307
	Weekly	29	Weekly	0
	Monthly	24	Monthly	0
	Rarely	18	Rarely	0
Preferred App	InstaPay		Google Pay	209
	Vodafone Cash	15	PhonePe	98
	Meeza	20	Paytm	0
	PayPal	11	BHIM	0
	Apple Pay	1		
	Google Pay	39		

Note: *Percentages are calculated separately for each country sample (Egypt N = 130; India N = 307).

5.2 Exploratory results and measurement model (Egypt)

To investigate the framed hypotheses, structural equation modelling was employed. First step was to perform confirmatory factor analysis to analyse the measurement model, as shown in Figure 1. Null model and the empirical model were compared to ascertain the model fit. Literature recommended that it is necessary to attain CMIN/DF less than 3. In our model it is reported that 1.908. The Tucker-Lewis Index (TLI), Incremental Fit Index (IFI), and Comparative Fit Index (CFI) reported as 0.904, 0.926, and 0.925 respectively and greater than the suggested range of 0.90. Root Mean Square Error of Approximation (RMSEA) is found to be 0.08, as suggested. Fit measures were satisfied with the recommended limit of Hair et al. (2018). All factors confirmed acceptable Composite Reliability (CR) values ranging from 0.767 to 0.932, which is greater than level of 0.70 as suggested [93]. The Average Variance Extracted (AVE) of the factors are listed in Table 2 and reported above the suggested range of 0.50 [93].

The AVE was measured to assess the convergent validity. The factors AVE scores surpassed the 0.5 threshold; thus, CFA convergent validity has been confirmed. Discriminant validity was also verified by determining whether the AVEs of the factors surpass the corresponding inter-construct correlations. The results show in Table 3, confirm that the AVE as square root of all factors is greater than intercorrelation. Thus, discriminate validity of the factors has been confirmed. As per the standards suggested by Fornell and Larcker [94], these findings validate the construct validity of the measurement model. All these results support the measurement model's validity in the Egyptian context.

5.3 Structural model (Egypt)

The structural model was examined to assess the proposed hypotheses between the latent variables, as shown in Figure 2. According to Hair et al. [93], the model fit indices showed an adequate level of fit: $\chi^2 = 228.958$, df = 120, resulting in a CMIN/df = 1.908, well under the suggested criterion of <3.0 for a satisfactory fit. With a 90% confidence range between 0.067 and 0.100 (PCLOSE = 0.001), the RMSEA was 0.084, indicating a manageable error of approximation for large-sample social science research.

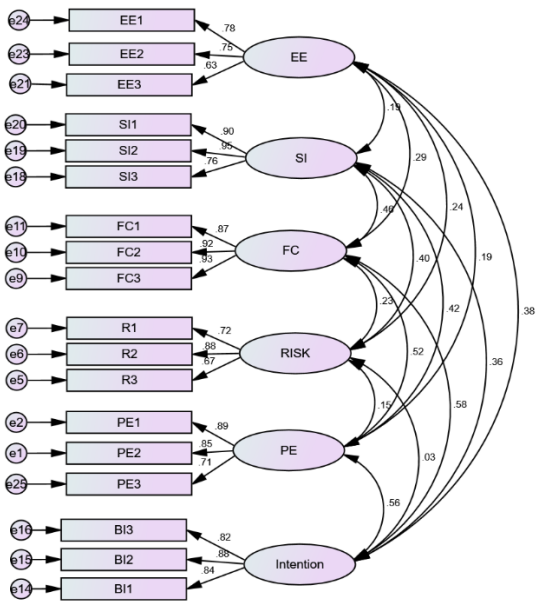

Figure 1. Measurement model Egypt

Table 3. CR and AVE (Egypt)

Construct	CR	AVE
Performance Expectancy (PE)	0.860	0.674
Effort Expectancy (EE)	0.767	0.525
Facilitating Condition (FC)	0.932	0.821
Social Influence (SI)	0.906	0.764
Perceived Risk (PR)	0.804	0.580
Behavioural Intention (BI)	0.882	0.715

Model adequacy is further supported by several fit indices: TLI = 0.904, IFI = 0.926, and CFI = 0.925 all surpassed the minimal suggested cut-off of 0.90. Both AGFI and GFI were within acceptable limits, albeit marginally below optimal, at 0.760 and 0.832, respectively. An acceptable fit in the Egyptian setting was further supported by NFI = 0.857 and RFI = 0.818. According to Henseler and Fassott [95], the model has moderate explanatory power, accounting for 40.2% of the variance in digital payment adoption (R2 = 0.402).

Most of the proposed hypotheses of the conceptual model were strongly supported statistically as results shown in Table 4. In particular, it was discovered that intention to adopt was considerably and favorably influenced by Performance Expectancy (PE) (β = 0.325, p = 0.001), Effort Expectancy (EE) (β = 0.243, p = 0.010), and Facilitating Conditions (FC) (β = 0.341, p < 0.001). The results are consistent with prior studies [42, 51], confirming that individuals are persuaded to accept digital payments when they consider the system is practical, user-friendly, and has sufficient technical support.

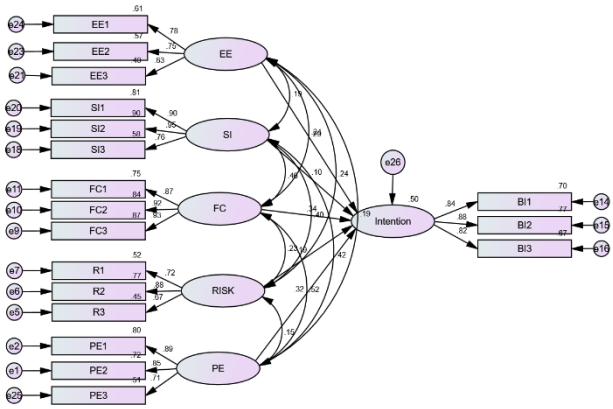

Figure 2. Structural model Egypt

Table 4. Discriminant validity (Egypt)

	R	BI	EE	SI	FC	PE
R	**0.762**					
BI	0.034	**0.845**				
EE	0.240	0.377	**0.725**			
SI	0.402	0.358	0.194	**0.874**		
FC	0.226	0.581	0.293	0.457	**0.906**	
PE	0.152	0.558	0.188	0.416	0.517	**0.821**

On the contrary, behavioral intention has been significantly impacted by perceived risk but negatively (β = –0.189, p = 0.041), indicating that psychological hurdles to adoption are still present due to worries about financial loss, data breaches, or transaction failure. Studies like Zhou [96] and Featherman and Pavlou [97] emphasize the importance of risk perceptions in influencing technology-related behavioral outcomes, particularly in financial contexts, are supported by this conclusion.

Nevertheless, no substantial impact of Social Influence (SI) on behavioral intention (β = 0.096, p = 0.320). The widely accepted view in UTAUT-based research that societal norms and peer suggestion significantly impact adoption behavior, mainly in collectivist societies like Egypt and India is called into question by this non-significant finding. One possible explanation is the increasing normalcy and personalization of digital payment use, especially among student populations that use technology frequently. As digital payments become more common, especially in India's advanced UPI ecosystem, users may no longer rely heavily on social approval or peer influence when adopting them. This result is same as Venkatesh et al. [42] research and the recent research of Al-Qudah et al. [98]. Both the studies have ascertained the marginal influence of social impact on customers' technological adoption behaviour. But this interpretation is inferential and not directly tested within the present study; therefore, future research employing qualitative or mixed-method approaches is needed to further validate this explanation.

5.4 Exploratory results and measurement model (India)

A model fit between hypothetical model and the empirical model of Indian respondents affirms the good model fit, as shown in Figure 3. Literature recommended that it is necessary to have CMIN/DF less than 3. In our model it is reported that it is 2.912. TLI, IFI, and CFI reported as 0.938, 0.954, and 0.954 respectively and greater than the threshold range of 0.90. RMSEA is exactly as a recommended level of 0.08. For this study, fit measures were within the recommended limit of Hair et al. [93]. All factors confirmed acceptable Composite Reliability values ranging from 0.774 to 0.990, which is higher than suggested level of 0.70 [93]. AVE of the factors are listed in Table 5 and reported over the suggested value of 0.50 [93].

Table 5. Path coefficient and hypothesis test result (Egypt)

Hypotheses	Path	Estimate	S. E	P Value	Remarks
H_{1e}	PE →BI	0.325	0.098	0.001	Supported
H_{2e}	EE →BI	0.243	0.114	0.010	Supported
H_{3e}	FC →BI	0.341	0.085	0.000	Supported
H_{4e}	SI →BI	0.096	0.106	0.320	Not Supported
H_{5e}	PR →BI	-0.189	0.148	0.041	Supported

Table 6. CR and AVE (India)

Construct	CR	AVE
Performance Expectancy (PE)	0.860	0.674
Effort Expectancy (EE)	0.767	0.525
Facilitating Condition (FC)	0.932	0.821
Social Influence (SI)	0.906	0.764
Perceived Risk (PR)	0.804	0.580
Behavioural Intention (BI)	0.882	0.715

The AVE scores (Table 6) for all constructs surpassed 0.5, thus affirming convergent validity. Discriminant validity was also verified by determining whether the AVEs of the factors surpass the corresponding inter-construct correlations. The results shown in Table 7, confirms AVE as square root of all

factors is greater than intercorrelation. Thus, discriminate validity of the factors has been confirmed. As the standards suggested by Fornell and Larcker [94], these findings validate the construct validity of the measurement model. All these results support the measurement model's validity in the Indian context.

Table 7. Discriminant validity (India)

	R	BI	EE	SI	FC	PE
R	**0.753**					
BI	0.030	**0.849**				
EE	0.093	0.274	**0.646**			
SI	0.143	0.650	0.155	**0.834**		
FC	0.172	0.512	0.213	0.600	**0.985**	
PE	0.084	0.648	0.179	0.728	0.426	**0.969**

5.5 Structural model (India)

To examine the postulated relationship between the factors, path analysis has been performed, as shown in Figure 4. The structural model was considered to be fit as the CMIN/df = 2.633, less than the suggested value of 3 [93]. GFI = 0.900 and AGFI = 0.858, although the AGFI value (0.858) is slightly below the conventional 0.90 threshold, it exceeds the minimum recommended level of 0.80 for complex models as suggested by Hair et al. [93]. Parsimony indices like the Parsimony Comparative Fit Index (PCFI = 0.756) and the Parsimony Normed Fit Index (PNFI = 0.739) demonstrated the model's balance between fit and simplicity. Acceptable generalizability was suggested by the Expected Cross-Validation Index (ECVI = 1.366), which was near to that of the saturated model (1.118). Besides, the sample size was adequate to produce stable model estimates, as evidenced by the Hoelter's Critical N values of 142 at the 0.05 significance level and 154 at 0.01. The RMSEA was 0.074, which is less than the threshold level of 0.08. Based on the abovementioned fit indices, the structural model for the Indian sample ascertained to be appropriate for further analysis.

Structed path analysis revealed that UTAUT2 factors influenced adoption intention in different ways for the Indian sample, as shown in Table 8. Facilitating Conditions (FC) was the important predictor ($\beta = 0.360$, $p < 0.001$), emphasizing the significance of infrastructure support of adoption. Behavioral intention and SI also showed a strong positive connection ($\beta = 0.280$, $p = 0.001$), showing the significance of social and peer impact in influencing user attitudes toward digital payments. The modest and significant effect of Effort Expectancy (EE) ($\beta = 0.184$, $p = 0.002$) confirmed that EE is a crucial facilitator of adoption.

Table 8. Path coefficient and hypothesis test result (India)

Hypotheses	Path	Estimate	S. E	P Value	Remarks
H_{1i}	PE →BI	0.179	0.079	0.023	Supported
H_{2i}	EE →BI	0.133	0.043	0.002	Supported
H_{3i}	FC →BI	0.290	0.059	0.000	Supported
H_{4i}	SI →BI	0.257	0.079	0.001	Supported
H_{5i}	PR →BI	-0.072	0.040	0.072	Not Supported

PE had a significant but lesser influence on intention ($\beta = 0.115$, $p = 0.036$), indicating that ease, support, or social norms had a greater influence in this situation than perceived usefulness, despite PE's relevance. Interestingly, the path coefficient for the relationship between intention and perceived risk in the Indian sample was statistically non-significant ($p = 0.072$) and negative ($\beta = -0.072$).

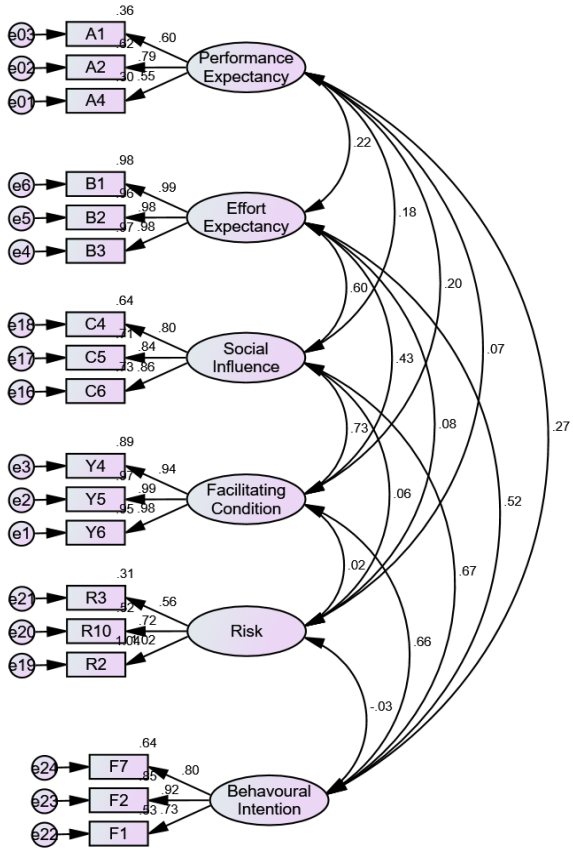

Figure 3. Measurement model India

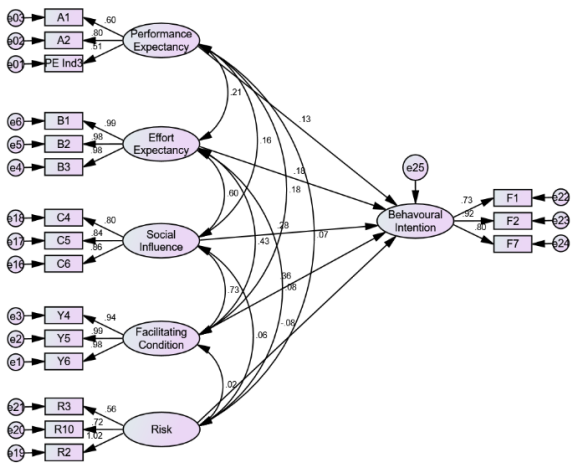

Figure 4. Structural model India

The Indian sample validated each of the hypotheses (H1 through H5) that were put out. To increase user trust and acceptance, the results confirm that UTAUT2 structures are applicable to the acceptance of digital payments in emerging areas, with a emphasis on reducing perceived risks.

6. DISCUSSION AND IMPLICATIONS

This research employed UTAUT2 to examine the uptake of digital payments in two rising economies: Egypt and India. In both countries, facilitating conditions are ascertained to be a significant factor of behavioral intention. This affirms the most significant predictor of behavioral intention was Facilitating Conditions. This shows the importance of technical infrastructure, compatibility of the devices used, customer support from the provider and availability of internet to influence digital payment adoption. These results are consistent with prior studies that ascertained the influence of supporting infrastructure on technology adoption in different nations [37, 98-100]. Although facilitating conditions were found to have high influence on adoption in both the countries. Digital payment adoption in Egypt is still growing. Enabling reliable internet access, secure transactions, and merchant acceptance are significant for promoting digital adoption. In contrast, India's digital ecosystem is deemed to be mature. Transaction time, reliable system and proper customer services are the influencing factors of digital financial transactions. While facilitating conditions are common across Egypt and India, their operational priorities are different based on the digital market maturity. Effort expectancy is another factor which shows constant results in both nations. Digital payment users in Egypt and India were apparently having a same perspective about digital transactions. They prefer to use digital payment applications if they are user friendly. Prior studies also witnessed a significant impact on digital adoption of user-friendly applications in low-income and middle-income countries [51, 98]. Another factor which was found to have influence on digital payment adoption was performance expectancy. But the influence of performance expectancy was higher in Egypt than India. Snice Egypt population are in early adoption stage in digital payment; users continuously evaluate the performance. On other hand, in India government has taken initiatives Digital India, UPI, and Jan Dhan Yojana. These initiatives made digital payment as a new normal, so performance expectation has considered as a standard factor rather than differentiator. Previous studies have supported this finding, social or psychological facilitators are the possible reason to adopt digital eco system [54, 101].

The impact of Social Influence on the digital adoption reported differently in both the countries. In India, it was ascertained to have significant influence on adoption. However, it was found insignificant in Egypt. Importance of peer group is a part of Indian culture, thus, social influence considered as an important factor of adoption intention. Scholars have witnessed the impact of family members and friends on digital adoption [102, 103]. Egyptian population is more independent as compared to Indian population; thus, social influence did not identify to be a important predictor of digital adoption. Digital maturity and cultural context could be the reasons for the difference between India and Egypt. This variation can also be interpreted through Hofstede's cultural dimensions framework, which suggests that collectivist orientations tend to amplify the role of peer norms and social approval in shaping behavioral intentions. In more collectivist contexts, individuals may rely more heavily on social networks when evaluating new technologies, whereas in relatively autonomy-oriented settings, adoption decisions may be more individually driven. Thus, cultural value orientations may function as contextual boundary conditions influencing the strength of social influence within the UTAUT2 model.

Risk is another factor which is found to have different impact on digital adoption in both countries. It was ascertained to be influencing negatively in Egypt. However, in India it was not fount be significant predictor of digital adoption. It indicates that data privacy, cybersecurity, and financial theft were predominant factors of perceived risk in Egypt. Zhou [96] and Alalwan et al. [51] have found that trust factor significantly influences the customers adoption in financial innovations in Arab countries. In accordance with Indian respondents, the path coefficient is statistically insignificant. India has witnessed increasing usage of digital transactions as government encouraged people to adopt Digital India mission. Regulatory measures such as real time alert and two factor authentication have increased the user confidence in accordance with digital transactions.

In the Indian sample, the path coefficients for perceived risk and behavioral intention were negative and statistically insignificant. This result indicates that digital fraud, transaction failure, and data privacy do not have any influence on their digital payment adoption. Growth of digital payment in India due to government supported UPI applications, two factor authentication, and real-time transaction alerts are the reasons for the abovementioned results. Prior studies have also ascertained the results [54, 104], this indicated that perceived benefits and ease of use apparently outweigh apprehensions about potential. As a result, risk is certainly no longer a factor that prevent to adopt digital payments among the respondents. In mature digital ecosystem, convenience, usability, and social norms are the influencing factors of adoption as compared to perceived risk. This is consistent with technology adoption life cycle, where user priorities shift from safety to convenience as technology adoption moves from early adopters to late majority stage. These findings affirm the imperative role contextual factors in users' digital adoption behavior. Infrastructure facilities and usability are found to be common across nations. Factors such as perceived risk and social impact are highly varied and influenced by cultural norms.

6.1 Theoretical contributions

This study contributes to technology adoption literature by providing cross-country comparison by examining digital payment adoption in emerging economies. It give empirical evidence for the framework's evolution and integration by exhibiting difference across nations [42], highlighting the significance of culturally sensitive models [105, 106]. The result indicates that perceived risk was found to have less impact on digital payment adoption in India. This affirms that trust in digital adoption grows over time, as users are less concerned about adoption barriers.

6.2 Practical and policy implications

6.2.1 Implications for regulators

Policymakers in emerging economies should recognize that infrastructural readiness and institutional trust as they certainly influence digital adoption.

(a) Addressing perceived risk in Egypt is crucial. It can be done by strengthening privacy regulation, secure transactions, and encouraging public endorsements. Fintech companies should give importance to build trust among customers.

(b) Improving facilitating conditions requires adequate digital infrastructure and wide merchant network in Egypt.

Whereas India should focus on platform interoperability, integration and effective customer services.

(c) Digital payment must be promoted by governments and payment companies. This can be used as a tool for financial empowerment, particularly for women, rural communities, and the unorganized sector workers.

6.2.2 Implications for fintech providers

Service providers should focus on enhancing interface, value added services, and customer support to sustain behavioral intention.

(a) Marketing strategies in India must focus on community-based awareness programs, peer influence, and word-of-mouth communication, particularly in Tier II and III cities.

(b) Simple and intuitive onboarding process are significant in Egypt where digital fluency is comparatively low.

(c) Well-designed user interface can significantly enhance perceived ease of use.

This finding suggests that digital payment adoption intention in emerging economies such as Egypt and India appears to be influenced by contextual factors. Which emphasizes different strategies and regulatory policies to be implemented rather than uniform policies and strategies.

7. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although the required sample size was determined by William G. Cochran's (1953) formula, the participants were selected through convenience sampling. Higher education students in India and Egypt were the population of this study. Therefore, the findings reflect digitally active students' population and may not fully represent the population in emerging economies. As higher education students are digitally literate, technology-oriented, this finding may overestimate behavioral intention. This may differ with less literate and older population, and the non-probability sampling also restricts external validity.

This study considered behavioral intention not actual usage behavior. The findings give insights into the intention to adopt digital payment and may not completely assess usage patterns. Future research may include usage behavior in the postulated model.

Structured questionnaire was used to collect responses with a five-point Likert scale. In-spite of statistical rigor, this method may not reflect subjective experiences. Future studies could employe qualitative interviews, especially conducting cross-country research.

This research conducted in Egypt and India, both the countries are deemed as emerging economies. Low-income countries also need to be included in the future studies to extend the comparative framework. This could give thorough view of digital payment adoption perspective.

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DECLARATION OF COMPETING INTEREST

The authors declare that present study was independently carried out without institutional or commercial sponsorship that might have influenced its interpretation or result.

REFERENCES

[1] Hanafizadeh, P., Keating, B.W., Khedmatgozar, H.R. (2014). A systematic review of Internet banking adoption. Telematics and Informatics, 31(3): 492-510. https://doi.org/10.1016/j.tele.2013.04.003

[2] Shaikh, A.A., Hanafizadeh, P., Karjaluoto, H. (2017). Mobile banking and payment system: A conceptual standpoint. International Journal of E-Business Research, 13(2): 14-27. https://doi.org/10.4018/IJEBR.2017040102

[3] Choudrie, J., Junior, C.O., McKenna, B., Richter S. (2018). Understanding and conceptualising the adoption, use and diffusion of mobile banking in older adults: A research agenda and conceptual framework. Journal of Business Research, 88: 449-465. https://doi.org/10.1016/j.jbusres.2017.11.029

[4] Baabdullah, A.M., Alalwan, A.A., Rana, N.P., Kizgin, H., Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. International Journal of Information Management, 44: 38-52. https://doi.org/10.1016/j.ijinfomgt.2018.09.002

[5] Raman, P., Aashish, K. (2022). Influence of COVID-19 pandemic on the intention to adopt mobile payment systems in India. Qualitative Market Research: An International Journal, 26(2): 368-394, https://doi.org/10.1108/QMR-01-2022-0008

[6] Jaiswal, D., Kaushal, V., Mohan, A., Thaichon, P. (2022). Mobile wallets adoption: Pre-and post-adoption dynamics of mobile wallets usage. Marketing Intelligence & Planning, 40(5): 573-588. https://doi.org/10.1108/MIP-12-2021-0466

[7] Gursoy, D., Chi, C.G. (2020). Effects of COVID-19 pandemic on hospitality industry: Review of the current situations and a research agenda. Journal of Hospitality Marketing & Management, 29(5): 527-529. https://doi.org/10.1080/19368623.2020.1788231

[8] Expanding our understanding of post COVID-19 condition: Report of a WHO webinar, 9 February 2021. Geneva: World Health Organization. ISBN: 9789240025035

[9] Jahanmir, S.F., Lages, L.F. (2016). The late-adopter scale: A measure of late adopters of technological innovations. Journal of Business Research, 69(5): 1701-1706. https://doi.org/10.1016/j.jbusres.2015.10.041

[10] Heidenreich, S., Talke, K. (2020). Consequences of mandated usage of innovations in organizations: Developing an innovation decision model of symbolic and forced adoption. AMS Review, 10: 279-298. https://doi.org/10.1007/s13162-020-00164-x

[11] Ambika, A., Shin, H., Jain, V. (2025). Immersive technologies and consumer behavior: A systematic review of two decades of research. Australian Journal of Management, 50(1): 55-79. https://doi.org/10.1177/03128962231181429

[12] Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., Hess, J. (2018). The Global Findex Database 2017:

Measuring Financial Inclusion and the Fintech Revolution. World Bank Publications, 1: 126033 http://documents.worldbank.org/curated/en/332881525873182837.
[13] Aurazo, J., Vega, M. (2021). Why people use digital payments: Evidence from micro data in Peru. Latin American Journal of Central Banking. 2(4): 100044. https://doi.org/10.1016/j.latcb.2021.100044
[14] Aurazo, J., Vasquez, J. (2019). Merchant card acceptance: An extension of the tourist test for developing countries. Review of Network Economics, 18(2): 109–139. https://doi.org/: 10.1515/rne-2019-0030
[15] Mothobi, O., Kebotsamang, K. (2024). The impact of network coverage on adoption of Fintech and financial inclusion in sub-Saharan Africa. Journal of Economic Structures,13: 5. https://doi.org/10.1186/s40008-023-00326-7
[16] Fabregas, R., Yokossi, T. (2022). Mobile money and economic activity: Evidence from Kenya. World Bank Econ Rev , 36(3): 734-756. https://doi.org/: 10.1093/wber/lhac007
[17] Aker, J.C., Boumnijel, R., McClelland, A., Tierney, N. (2016). Payment mechanisms and antipoverty programs: Evidence from a mobile money cash transfer experiment in Niger. Economic Development and Cultural Change, 65(1): 1-37. https://doi.org/10.1086/687578
[18] Grohmann, A., Klühs, T., Menkhoff, L. (2018). Does financial literacy improve financial inclusion? Cross country evidence. World Development, 111: 84-96. https://doi.org/10.1016/j.worlddev.2018.06.020
[19] Suri, T., Jack, W. (2016). The long-run poverty and gender impacts of mobile money. Science, 354: 1288-1292. https://doi.org/10.1126/science.aah5309
[20] Suri, T., Bharadwaj, P., Jack, W. (2012). Fintech and household resilience to shocks: Evidence from digital loans in Kenya. Journal of Development Economic, 153: 102697. https://doi.org/10.1016/j.jdeveco.2021.102697
[21] Apeti, A.E. (2023). Household welfare in the digital age: Assessing the effect of mobile money on household consumption volatility in developing countrie. World Development,161: 106110. https://doi.org/10.1016/j.worlddev.2022.106110
[22] Frost, J., Wilkens, P.K., Kosse, A., Shreeti, V., Velasquez, C. (2024). Fast payments: Design and adoption. BIS Quarterly Review.
[23] Bech, M.L., Shimizu, Y., Wong, P. (2017). The quest for speed in payments. BIS Quarterly Review.
[24] Arango-Arango, C.A., Betancourt-García, Y.R., Restrepo-Bernal, M., Zuluaga-Giraldo, G. (2021). Pagos electrónicos y uso del efectivo en los comercios colombianos 2020 [Electronic payments and cash usage in the Colombian retail sector 2020] (Borradores de Economía No. 1180). Banco de la República.
[25] Zamora-Pérez, A. (2022). Guaranteeing freedom of payment choice: Access to cash in the euro area. Economic Bulletin Articles, European Central Ban, 5.
[26] Yang, Y., Liu, Y., Lv, X., Ai, J., Li, Y. (2022). Anthropomorphism and customers' willingness to use artificial intelligence service agents. Journal of Hospitality Marketing & Management, 31(1): 1-23. https://doi.org/10.1080/19368623.2021.1926037
[27] Dahlberg, T., Mallat, N., Ondrus, J., Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. Electronic Commerce Research and Applications,7(2): 165-18. https://doi.org/10.1016/j.elerap.2007.02.001
[28] Mallet, P., Vignoli, E. (2007). Intensity seeking and novelty seeking: Their relationship to adolescent risk behavior and occupational interests. Personality and Individual Differences, 43(8): 2011-2021. https://doi.org/10.1016/j.paid.2007.06.018
[29] Celum, C. L. et al. (2020). Incentives conditioned on tenofovir levels to support PrEP adherence among young South African women: A randomized tria. Journal of the International AIDS Society, 23(11): e25636. https://doi.org/10.1002/jia2.25636
[30] Mew, J., Millan, E. (2021). Mobile wallets: Key drivers and deterrents of consumers' intention to adopt. The International Review of Retail, Distribution and Consumer Research, 31(2): 182-210. https://doi.org/10.1080/09593969.2021.1879208
[31] Mate, R., Kapdi, A. (2021). Impact of Covid-19 on digital payment usage in India. UGC care Group, 1.
[32] Pandey, P., Rai, A.K. (2023). Consumer adoption of AI-powered virtual assistants (AIVA): An integrated model based on the SEM–ANN approach. FIIB Business Review, 0(0). https://doi.org/10.1177/23197145231196066
[33] Saaksjarvi, M. (2003). Consumer adoption of technological innovations. European Journal of Innovation Management, 6(2): 90-100, 2003. https://doi.org/10.1108/14601060310475246
[34] Rogers, E.M., Singhal, A., Quinlan, M.M. (2014). Diffusion of innovations. In An integrated approach to communication theory and research. Routledge. 432-448.
[35] Outcault, S., Sanguinetti, A., Nelson, L. (2022). Technology characteristics that influence adoption of residential distributed energy resources: Adapting Rogers' framework. Energy Policy, 168: 113153. https://doi.org/10.1016/j.enpol.2022.113153
[36] Warkentin, M., Gefen, D., Pavlou, P.A., Rose, G.M. (2002). Encouraging citizen adoption of e-government by building trust. Electronic markets, 12(3): 157-162. https://doi.org/10.1080/101967802320245929
[37] Sankar, J.G., David, A. (2024). A comprehensive examination of mobile augmented reality in tourism (MART) adoption: using the UTAUT2 framework. In Contemporary trends in innovative marketing strategies pp. 241-262. IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-1231-5.ch012
[38] Davis, F.D., Bagozzi, R.P., Warshaw, P.R. (1989). Technology acceptance model. J Manag Sci, 35(8): 982-1003.
[39] Ajzen, I., Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. Psychological Bulletin, 84(5): 888-918. https://doi.org/10.1037/0033-2909.84.5.888
[40] Ajibade, P. (2018). Technology acceptance model limitations and criticisms: Exploring the practical applications and use in technology-related studies, mixed-method, and qualitative researches.
[41] Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D. (2003). User acceptance of information technology: Toward a unified view1. MIS Quarterly, 27(3): 425-478. https://doi.org/10.2307/30036540
[42] Venkatesh, V., Thong, J.Y., Xu, X. (2012). Consumer acceptance and use of information technology:

Extending the unified theory of acceptance and use of technology. MIS Quarterly, 36(1): 157-178. https://doi.org/10.2307/41410412

[43] Gharaibeh, M.K., Arshad, M.R.M., Gharaibh, N.K. (2018). Using the UTAUT2 model to determine factors affecting adoption of mobile banking services: A qualitative approach. International Journal of Interactive Mobile Technologies, 12(4). https://doi.org/10.3991/ijim.v12i4.8525

[44] Merhi, M., Hone, K., Tarhini, A. (2019). A cross-cultural study of the intention to use mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. Technology in Society, 59: 101151. https://doi.org/10.1016/j.techsoc.2019.101151

[45] Yousafzai, S., Pallister, J., Foxall, G. (2009). Multi-dimensional role of trust in Internet banking adoption. The Service Industries Journal, 29(5): 591-605. https://doi.org/10.1080/02642060902719958

[46] Soodan, V., Rana, A. (2020). Modeling customers' intention to use e-wallet in a developing nation: Extending UTAUT2 with security, privacy and savings. Journal of Electronic Commerce in Organizations (JECO), 18(1): 89-114. https://doi.org/10.4018/JECO.2020010105

[47] Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3): 319-340. https://doi.org/10.2307/249008

[48] Lin, H.F. (2011). An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust. International Journal of Information Management, 31(3): 252-260. https://doi.org/10.1016/j.ijinfomgt.2010.07.006

[49] Slade, E.L., Dwivedi, Y.K., Piercy, N.C., Williams, M. D. (2015). Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: extending UTAUT with innovativeness, risk, and trust. Psychology & Marketing, 32(8): 860-873. https://doi.org/10.1002/mar.20823

[50] Oliveira, T., Thomas, M., Baptista, G., Campos, F. (2016). Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology. Computers in Human Behavior, 61: 404-414. https://doi.org/10.1016/j.chb.2016.03.030

[51] Alalwan, A.A., Dwivedi, Y.K., Rana, N.P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. International Journal of Information Management, 37(3): 99-110. https://doi.org/10.1016/j.ijinfomgt.2017.01.002

[52] Kumar, A., Adlakaha, A., Mukherjee, K. (2018). The effect of perceived security and grievance redressal on continuance intention to use M-wallets in a developing country. International Journal of Bank Marketing, 36(7): 1170-1189. https://doi.org/10.1108/IJBM-04-2017-0077

[53] Chhonker, M.S., Verma, D., Kar, A.K., Grover, P. (2018). m-commerce technology adoption: Thematic and citation analysis of scholarly research during (2008-2017). The Bottom Line, 31(3-4): 208-233. https://doi.org/10.1108/BL-04-2018-0020

[54] Sivathanu, B. (2019). Adoption of digital payment systems in the era of demonetization in India: An empirical study. Journal of Science and Technology Policy Management, 10(1): 143-171. https://doi.org/10.1108/JSTPM-07-2017-0033

[55] Patil, P., Tamilmani, K., Rana, N.P., Raghavan, V. (2020). Understanding consumer adoption of mobile payment in India: Extending Meta-UTAUT model with personal innovativeness, anxiety, trust, and grievance redressal. International Journal of Information Management, 54: 102144. https://doi.org/10.1016/j.ijinfomgt.2020.102144

[56] Zhong, Y., Moon, H.C. (2022). Investigating customer behavior of using contactless payment in China: A comparative study of facial recognition payment and mobile QR-code payment. Sustainability, 14(12): 7150. https://doi.org/10.3390/su14127150

[57] Sahi, A. M., Khalid, H., & Abbas, A. F. (2021). Digital payment adoption: A review (2015-2020). Journal of Management Information & Decision Sciences, 24(7).

[58] Kapoor, A., Sindwani, R., Goel, M., Shankar, A. (2022). Mobile wallet adoption intention amid COVID-19 pandemic outbreak: A novel conceptual framework. Computers & Industrial Engineering, 172: 108646. https://doi.org/10.1016/j.cie.2022.108646

[59] Razi-ur-Rahim, M., Rabbani, M.R., Uddin, F., Shaikh, Z.H. (2024). Adoption of UPI among Indian users: Using extended meta-UTAUT model. Digital Business, 4(2): 100093. https://doi.org/10.1016/j.digbus.2024.100093

[60] Kar, A.K. (2021). What affects usage satisfaction in mobile payments? Modelling user generated content to develop the "digital service usage satisfaction model". Information Systems Frontiers, 23(5): 1341-1361. https://doi.org/10.1007/s10796-020-10045-0

[61] PH, H. (2023). Mobile payment service adoption: Understanding customers for an application of emerging financial technology. Information & Computer Security, 31(2): 145-171. https://doi.org/10.1108/ICS-04-2022-0058

[62] Saha, P., Kiran, K.B. (2022). What insisted baby boomers adopt unified payment interface as a payment mechanism?: An exploration of drivers of behavioral intention. Journal of Advances in Management Research, 19(5): 792-809. https://doi.org/10.1108/JAMR-01-2022-0022

[63] Banerji, R., Singh, A. (2022). An empirical study on consumer attitude and behavioural intention to adopt mobile wallet in India. International Journal of Electronic Banking, 3(2): 83-99. https://doi.org/10.1504/IJEBANK.2022.122219

[64] Lee, J.C., Chen, X. (2022). Exploring users' adoption intentions in the evolution of artificial intelligence mobile banking applications: The intelligent and anthropomorphic perspectives. International Journal of Bank Marketing, 40(4): 631-658. https://doi.org/10.1108/IJBM-08-2021-0394

[65] Fahad, M.S. (2022). Exploring the determinants of adoption of Unified Payment Interface (UPI) in India: A study based on diffusion of innovation theory. Digital Business, 2 (2): 100040. https://doi.org/10.1016/j.digbus.2022.100040

[66] Kirmani, M.D., Haque, M.A., Sadiq, M.A., Hasan, F. (2023). Cashless preferences during the COVID-19 pandemic: Investigating user intentions to continue UPI-based payment systems in India. Journal of Science and Technology Policy Management, 14(4): 758-779.

https://doi.org/10.1108/JSTPM-08-2021-0127
[67] Thakkar, J., Thakkar, P. (2023). Digital payments revolution: A study of awareness, acceptance, and usage of unified payments interface technology among selected women in India. In 2022 OPJU International Technology Conference on Emerging Technologies for Sustainable Development (OTCON), pp. 1-6. https://doi.org/10.1109/OTCON56053.2023.10114004
[68] Al-Sabaawi, M.Y.M., Alshaher, A.A., Alsalem, M.A. (2023). User trends of electronic payment systems adoption in developing countries: An empirical analysis. Journal of Science and Technology Policy Management, 14(2), 246-270. https://doi.org/10.1108/JSTPM-11-2020-0162
[69] Guhan, R., Nigama, K. (2023). Behavioural intention of Unified Payments Interface (UPI) usage in the pandemic: Evidence from Tamil Nadu. In Interdisciplinary Research in Technology and Management, pp. 119-128.
[70] Jegerson, D., Hussain, M. (2023). A framework for measuring the adoption factors in digital mobile payments in the COVID-19 era. International Journal of Pervasive Computing and Communications, 19(4): 596-623. https://doi.org/10.1108/IJPCC-12-2021-0307
[71] Wu, Z., Liu, Y. (2023). Exploring country differences in the adoption of mobile payment service: The surprising robustness of the UTAUT2 model. International Journal of Bank Marketing, 41(2): 237-268. https://doi.org/10.1108/IJBM-02-2022-0052
[72] Soormo, R.B., Al-Rahmi, W.M., Dahri, N.A., Alblehai, F., Alshimai, A., Aldaijy, A., Salameh, A.A. (2024). Evaluating the influence of UTAUT factors on the adoption of QR codes in MSMEs: An application of SEM and ANN Methodologies. IEEE Access, 12: 191304-191322. https://doi.org/10.1109/ACCESS.2024.3510375
[73] Alam, S.S., Ahmed, S., Kokash, H.A., Mahmud, M.S., Sharnali, S.Z. (2024). Utility and hedonic perception-Customers' intention towards using of QR codes in mobile payment of Generation Y and Generation Z. Electronic Commerce Research and Applications, 65: 101389. https://doi.org/10.1016/j.elerap.2024.101389
[74] Tang, J.W., Tsai, P.H. (2024). Exploring critical determinants influencing businesses' continuous usage of mobile payment in post-pandemic era: Based on the UTAUT2 perspective. Technology in Society, 77: 102554. https://doi.org/10.1016/j.techsoc.2024.102554
[75] Usman, B., Rianto, H., Aujirapongpan, S. (2025). Digital payment adoption: A revisit on the theory of planned behavior among the young generation. International Journal of Information Management Data Insights, 5(1): 100319. https://doi.org/10.1016/j.jjimei.2025.100319
[76] Oyelami, L.O., Adebiyi, S.O., Adekunle, B.S. (2020). Electronic payment adoption and consumers' spending growth: Empirical evidence from Nigeria. Future Business Journal, 6(1): 14 https://doi.org/10.1186/s43093-020-00022-z
[77] Chua, P.Y., Rezaei, S., Gu, M.L., Oh, Y., Jambulingam, M. (2018). Elucidating social networking apps decisions: Performance expectancy, effort expectancy and social influence. Nankai Business Review International, 9(2): 118-142. https://doi.org/10.1108/NBRI-01-2017-0003
[78] Soliman, M., Noorliza, K. (2022). Adopting enterprise resource planning (ERP) in higher education: A SWOT analysis. International Journal of Management in Education, 16(1): 20-39. https://doi.org/10.1504/IJMIE.2022.119681
[79] Soliman, M., Ali, R.A., Khalid, J., Mahmud, I., Assalihee, M. (2023). Modeling the continuous intention to use the metaverse as a learning platform: PLS-SEM and FsQCA approach. In Current and future trends on intelligent technology adoption: Volume 1 (pp. 41-62). https://doi.org/10.1007/978-3-031-48397-4-3
[80] Soliman, M., Ali, R.A., Mahmud, I., Noipom, T. (2025). Unlocking AI-powered tools adoption among university students: A fuzzy-set approach. Journal of Information and Communication Technology, 24(1): 1-28. https://doi.org/10.32890/jict2025.24.1.1
[81] Soliman, M., Assalihee, M., Mahmud, I., Ali, R. (2024). Predicting continuous intention to use e-learning platforms among university students: An integrated model. International Journal of Information and Education Technology, 14(12): 1724-1733. https://doi.org/10.18178/ijiet.2024.14.12.2203
[82] Soliman, M., Hayeemad, M., Nuh, R., Phetkaew, C. (2025). Investigating factors affecting purchase intention of halal cosmetics products among Millennial consumers: findings from PLS-SEM approach. Journal of Islamic Marketing, 17(4): 1310-1339. https://doi.org/10.1108/JIMA-06-2024-0264
[83] Soliman, M., Karia, N. (2025). Investigating ERP readiness enablers and inhibitors among Egyptian higher education institutions. Global Business Review, 26(1): 221-239. https://doi.org/10.1177/0972150920988652
[84] Hassama, A., Soliman, M., Noipom, T. (2024). Antecedents of Individuals' Switching Intention to Adopt Sharia Compliance in Fintech Transactions among Generation Y: A Case of Thai Southern Borders Provinces. In 2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS) (pp. 796-800). https://doi.org/10.1109/ICETSIS61505.2024.10459354
[85] Lara-Rubio, J., Villarejo-Ramos, A.F., Liébana-Cabanillas, F. (2021). Explanatory and predictive model of the adoption of P2P payment systems. Behaviour & Information Technology, 40(6): 528-541. https://doi.org/10.1080/0144929X.2019.1706637
[86] Almaiah, M.A., Alhumaid, K., Aldhuhoori, A., Alnazzawi, N., Aburayya, A., Alfaisal, R., Salloum, S. A., Lutfi, A., Al Mulhem, A., Alkhdour, T., Awad, A.B., Shehab, R. (2022). Factors Affecting the Adoption of Digital Information Technologies in Higher Education: An Empirical Study. Electronics, 11(21): 3572. https://doi.org/10.3390/electronics11213572
[87] Namahoot, K.S., Jantasri, V. (2023). Integration of UTAUT model in Thailand cashless payment system adoption: The mediating role of perceived risk and trust. Journal of Science and Technology Policy Management, 14(4): 634-658. https://doi.org/10.1108/JSTPM-07-2020-0102
[88] Dillman, D.A. (2011). Mail and Internet surveys: The tailored design method--2007 Update with new Internet, visual, and mixed-mode guide. John Wiley & Sons.
[89] Cochran, W.G. (1954). The combination of estimates from different experiments. Biometrics, 10(1): 101-129. https://doi.org/10.2307/3001666
[90] Hair, J.F., Hult, G.T. M., Ringle, C.M., Sarstedt, M., Danks, N.P., Ray, S. (2021). Partial least squares structural equation modeling (PLS-SEM) using R: A

workbook. Springer International Publishing.
[91] Dhar, R.L. (2016). Ethical leadership and its impact on service innovative behavior: The role of LMX and job autonomy. Tourism Management, 57:139-148. https://doi.org/10.1016/j.tourman.2016.05.011
[92] Saunders, H., Gallagher‐Ford, L., Kvist, T., Vehviläinen‐Julkunen, K. (2019). Practicing healthcare professionals' evidence‐based practice competencies: An overview of systematic reviews. Worldviews on Evidence‐Based Nursing, 16(3): 176-185. https://doi.org/10.1111/wvn.12363
[93] Hair, J.F., Harrison, D.E., Risher, J.J. (2018). Marketing research in the 21st century: Opportunities and challenges. Revista Brasileira de Marketing, 17(5): 666-699. https://doi.org/10.5585/bjm.v17i5.4173
[94] Fornell, C., Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1): 39-50.
[95] Henseler, J., Fassott, G. (2009). Testing moderating effects in PLS path models: An illustration of available procedures. In Handbook of partial least squares: Concepts, methods and applications, pp. 713-735. https://doi.org/10.1007/978-3-540-32827-8_31
[96] Zhou, T. (2011). An empirical examination of initial trust in mobile banking. Internet Research, 21(5): 527-540. https://doi.org/10.1108/10662241111176353
[97] Featherman, M.S., Pavlou, P.A. (2003). Predicting e-services adoption: A perceived risk facets perspective. International Journal of Human-Computer Studies, 59(4): 451-474. https://doi.org/10.1016/S1071-5819(03)00111-3
[98] Al-Qudah, A.A., Al-Okaily, M., Shiyyab, F.S., Taha, A.A., Almajali, D.A., Masa'deh, R.E., Warrad, L.H. (2024). Determinants of digital payment adoption among Generation Z: An empirical study. Journal of Risk and Financial Management, 17(11): 521. https://doi.org/10.3390/jrfm17110521
[99] Lu, J., Yu, C.S., Liu, C., Yao, J.E. (2003). Technology acceptance model for wireless Internet. Internet research, 13(3): 206-222. https://doi.org/10.1108/10662240310478222
[100] Aggelidis, V.P., Chatzoglou, P.D. (2009). Using a modified technology acceptance model in hospitals. International Journal of Medical Informatics, 78(2): 115-126. https://doi.org/10.1016/j.ijmedinf.2008.06.006
[101] Patil, P.P., Dwivedi, Y.K., Rana, N.P. (2017). Digital payments adoption: An analysis of literature. In Conference on e-Business, e-Services and e-Society, pp. 61-70. https://doi.org/10.1007/978-3-319-68557-1_7
[102] Gupta, A., Arora, N. (2017). Understanding determinants and barriers of mobile shopping adoption using behavioral reasoning theory. Journal of Retailing and Consumer Services, 36: 1-7. https://doi.org/10.1016/j.jretconser.2016.12.012
[103] Chopdar, P.K., Korfiatis, N., Sivakumar, V.J., Lytras, M.D. (2018). Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. Computers in Human Behavior, 86: 109-128. https://doi.org/10.1016/j.chb.2018.04.017
[104] Arfi, W.B., Nasr, I.B., Khvatova, T., Zaied, Y.B. (2021). Understanding acceptance of eHealthcare by IoT natives and IoT immigrants: An integrated model of UTAUT, perceived risk, and financial cost. Technological Forecasting and Social Change, 163, 120437. https://doi.org/10.1016/j.techfore.2020.120437
[105] Dwivedi, Y.K., Rana, N.P., Jeyaraj, A., Clement, M., Williams, M.D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. Information Systems Frontiers, 21(3): 719-734. https://doi.org/10.1007/s10796-017-9774-y
[106] Tamilmani, K., Rana, N.P., Wamba, S.F., Dwivedi, R. (2021). The extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A systematic literature review and theory evaluation. International Journal of Information Management, 57: 102269. https://doi.org/10.1016/j.ijinfomgt.2020.102269