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Determinants of Behavioral Intention to Adopt Mobile Payment in Egypt: The Mediating Role of Intention and Dominance of Cultural Factors

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Abstract

Mobile payment systems are widely viewed as a practical lever for sustainable financial inclusion in developing economies, with relevance to UN Sustainable Development Goals 1, 8, and 10. Yet in countries such as Egypt—where mobile penetration exceeds 95% but banking penetration remains below 35%—sustained engagement with these services lags policy expectations, suggesting that determinants beyond technology shape behavior. This study examines the determinants of behavioral intention and continued use of mobile payment among Egyptian users, and tests whether cultural factors dominate conventional technology-acceptance predictors in a collectivist, high-power-distance setting. A structured bilingual (Arabic–English) questionnaire measuring nine predictors across technology, psychological, and socio-cultural dimensions was administered to 200 active mobile-payment users in Egypt during January–February 2025. Hierarchical regression and mediation analysis (with Sobel/delta-method 95% confidence intervals as a robustness check) were used to examine direct effects on Behavioral Intention and continued use, and the mediating role of Behavioral Intention. Cultural Influence emerged as the strongest predictor of Behavioral Intention ($\beta = 0.421$, $p < 0.001$), followed by Facilitating Conditions ($\beta = 0.282$, $p < 0.001$); conventional TAM variables were not statistically significant. Cultural Influence retained a significant direct effect on continued use ($\beta = 0.253$, $p < 0.01$), indicating partial mediation. The findings support culture-sensitive approaches to technology adoption research and inform financial-inclusion policy in non-Western contexts. Limitations include the cross-sectional design and the convenience-based snowball sample of existing users.

Keywords: sustainable financial inclusion; mobile payment adoption; cultural influence; digital finance for development; SDG 1; SDG 10; technology acceptance model; Egypt; behavioral intention; UTAUT; collectivism; emerging markets; digital payments

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1. Introduction

1.1. Background and Motivation

Mobile payments have emerged as a critical enabler of sustainable financial inclusion in developing countries, with direct relevance to UN Sustainable Development Goals (SDGs) 1 (No Poverty), 8 (Decent Work and Economic Growth), and 10 (Reduced Inequalities). These technologies extend financial services to populations without access to traditional banking infrastructure [1,2], enabling users to transact, transfer funds, and access financial services

via mobile devices without requiring bank accounts or credit facilities. In countries where mobile phone penetration substantially exceeds banking penetration, mobile payments represent a practical bridge to financial participation for underbanked populations [3,4].

1.2. The Egyptian Context

Egypt presents a particularly relevant setting for studying mobile payment adoption. The country exemplifies the infrastructure–access paradox common across developing economies, with mobile penetration exceeding 95% while banking penetration remains below 35% [5,6]. Institutional efforts have been substantial: Egypt's National Payments Council has actively promoted digital payment infrastructure, and electronic payment has been mandated for government services [7,8]. Despite these structural facilitators and ongoing fintech integration [9,10], consumer adoption rates remain below policy expectations. Tawakol [11] attributes this to gaps between policy initiatives and grassroots implementation, while Hussein [12] points to persistent internet connectivity barriers. This disconnect between infrastructure availability and actual adoption suggests that factors beyond technology and policy shape adoption behavior [13,14].

1.3. Theoretical Background

Mobile payment adoption has predominantly been studied through Western theoretical frameworks. Davis's [15] Technology Acceptance Model (TAM) identifies perceived usefulness and ease of use as primary determinants of technology acceptance. The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. [16], incorporates social influence and facilitating conditions as additional predictors. The Theory of Planned Behavior (TPB) proposes that behavioral intention mediates the relationship between attitudes, subjective norms, and actual behavior [17]. While these models have been validated across diverse technological contexts [18,19], their explanatory power varies considerably across cultural settings [20,21].

A growing body of cross-cultural research suggests that technology adoption patterns reflect cultural values as much as rational utility assessments [22,23]. In Arab collectivist societies, adoption decisions are shaped by family expectations, communal norms, and social harmony rather than individual preferences alone [24,25]. Hassan and Wood [26] demonstrate that Egyptian and American consumers differ substantially in their perceptions of mobile banking, with cultural values mediating trust, risk assessment, and adoption intentions. In MENA technology adoption research, cultural compatibility has been found to supersede performance-based considerations [27,28].

Egyptian culture is specifically characterized by high collectivism, power distance, and uncertainty avoidance [22,29]. Said [30] finds that community endorsement and social network recommendations significantly influence mobile health technology adoption in Egypt, reflecting the primacy of collectivist values. The COVID-19 pandemic further underscored these dynamics, as social isolation complicated technology acceptance in collectivist contexts where social connectedness is a precondition for engagement. Recent evidence from the Arab region indicates that cultural factors may outweigh technological ones in predicting adoption outcomes [31,32].

Beyond cultural factors, several individual-level constructs warrant theoretical attention. Trust in mobile payment platforms is particularly important in financial technology contexts due to the exposure of personal and financial data [33,34], and Kumar et al. [35] demonstrate that cultural dimensions moderate trust effects on mobile banking adoption. Perceived security—users' assessments of technological protections for their transactions—further shapes adoption decisions [36,37]. Personal Innovativeness, defined as the willingness to experiment with new information technologies [38], has consistently predicted early

adoption intentions. Resistance to Change, rooted in status quo bias and loss aversion, may be especially pronounced in financial behavior domains where established routines provide comfort and predictability [39,40].

1.4. Research Gap

Despite growing interest in mobile payment adoption in the MENA region, important theoretical and empirical gaps remain. First, most existing studies rely on Western adoption models without adequately accounting for cultural context, potentially producing misleading conclusions when applied to non-Western settings [41,42]. Second, while cultural variables are sometimes included as moderators, few studies have directly tested whether they dominate over technological predictors in non-Western contexts [43,44]. Third, the mediation mechanisms through which various predictors influence adoption in emerging market contexts remain understudied, limiting theoretical understanding of how antecedents translate into behavior [45,46]. Fourth, despite being the Arab world's most populous country, Egypt remains underrepresented in theoretically grounded mobile payment research [47], with most studies employing exploratory methods or focusing on specific demographic segments rather than testing integrated theoretical frameworks.

1.5. Research Objectives

To address the identified gaps, this study develops and tests an integrated theoretical model combining TAM, UTAUT, TPB, and cultural influence factors to examine the determinants of mobile payment behavior in Egypt. The substantive purpose of the study is to clarify why infrastructure-led financial-inclusion policies in Egypt have not produced the levels of sustained mobile-payment use that institutional investments would predict, and to test whether socio-cultural factors—rather than technological perceptions alone—account for this gap among active users. Specifically, the study pursues three objectives:

To assess the direct effects of nine predictors—Perceived Ease of Use, Perceived Usefulness, Facilitating Conditions, Perceived Security, Personal Innovativeness, Trust, Resistance to Change, Social Influence, and Cultural Influence—on Behavioral Intention and Mobile Payment Adoption among Egyptian users.

To examine the mediating role of Behavioral Intention in the relationship between these predictors and actual Mobile Payment Adoption.

To determine whether cultural factors dominate over conventional technological predictors in a collectivist, high-power-distance context such as Egypt.

The theoretical justification for each predictor and the corresponding research hypotheses are developed in the following section.

1.6. Theoretical Contributions and Paper Structure

This study makes several contributions to the technology adoption literature. First, it empirically compares the relative predictive power of cultural and technological factors in a collectivist, high-power-distance society, directly testing the transportability of Western adoption models to non-Western contexts. Second, it examines the mediation mechanisms through which predictors shape adoption in an Egyptian context, distinguishing between deliberate intention-formation pathways and direct behavioral influences. Third, it advances culture-centered rather than merely culture-comparative approaches to technology adoption research in the Arab world [48,49], contributing to the broader argument that integrated acceptance frameworks are often more appropriate than single-model explanations in regional digital service contexts [50]. Practically, the study provides evidence-based guidance for mobile payment service providers and policymakers operating in markets where cultural values diverge substantially from Western norms.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature on Egyptian mobile payment systems, theoretical foundations of technology adoption, trust and security factors, individual difference variables, and cultural factors in technology acceptance, and derives the study hypotheses. Section 3 describes the research methodology, including research design, survey instrument development, ethical considerations, and analytical procedures. Section 4 presents the empirical results. Section 5 discusses the findings in relation to existing literature. Section 6 presents the conclusions, and Section 7 addresses the study's limitations and directions for future research.

2. Literature Review

2.1. Egyptian Mobile Payment Systems

Mobile payment systems enable financial inclusion in developing nations by allowing users to conduct transactions via mobile devices, bypassing the need for traditional banking infrastructure [1,2]. In regions where mobile usage is high but banking access remains limited, mobile payments can substantially boost economic engagement, particularly for underbanked populations [3,4]. Egypt exemplifies this dynamic: mobile penetration exceeds 95% while banking penetration remains below 35%, creating both challenges and opportunities for digital financial transformation [5,6].

Institutional efforts to drive adoption have been considerable. Under the National Payments Council, Egypt has actively promoted digital payments and mandated electronic payment for government services [7,8]. Despite these structural facilitators and ongoing fintech integration [9,10], consumer adoption rates remain low. Hussein [12] identifies poor internet connectivity as a persistent technological barrier, while Tawakol [11] highlights the gap between policy initiatives and grassroots implementation. This disconnect suggests that technological infrastructure alone is insufficient to drive behavioral change, and that comprehensive frameworks integrating social, cultural, and psychological factors are necessary [13,14].

More broadly, mobile payment adoption in the MENA region is constrained by limited digital literacy, weak institutional trust, and cultural resistance to financial technology [51,52]. Digital financial inclusion is widely recognized as a pillar of economic resilience [53], though adoption patterns in Egypt vary considerably by demographic group and geographic region [54].

2.2. Theoretical Foundations of Technology Adoption

2.2.1. Technology Acceptance Model (TAM)

Davis's [15] Technology Acceptance Model proposes that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the primary determinants of technology acceptance and use. Perceived Usefulness captures the degree to which users believe a technology will improve their performance or productivity, while Perceived Ease of Use reflects the effort expected in operating the system [55]. TAM has been empirically validated across a wide range of technologies and contexts [18,56] and demonstrates strong predictive validity with respect to technology adoption intentions.

However, comparative analyses indicate that TAM's explanatory power varies by cultural context [20,57]. Meta-analytic evidence shows that cultural values, demographic characteristics, and technology maturity all moderate the effects of PU and PEOU [21]. In mobile payment settings specifically, TAM constructs have been shown to influence perceptions and adoption intentions differently across nations due to underlying cultural differences [26,58]. Based on this theoretical grounding, the following hypotheses are proposed:

H1. *Perceived Usefulness has a significant positive effect on Behavioral Intention to adopt mobile payment.*

H2. *Perceived Ease of Use has a significant positive effect on Behavioral Intention to adopt mobile payment.*

2.2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. [16] synthesized eight technology acceptance theories into the Unified Theory of Acceptance and Use of Technology (UTAUT), identifying four core predictors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Social Influence refers to the degree to which an individual perceives that significant others expect them to use a technology, while Facilitating Conditions reflect the perceived availability of resources, infrastructure, and organizational support necessary for adoption.

UTAUT has proven particularly relevant in mobile payment contexts, where infrastructure access and normative social influences strongly shape adoption behavior [59,60]. Combining UTAUT with complementary frameworks enhances explanatory capacity, especially in mobile banking, e-government services, and digital payment systems [61]. The model's emphasis on contextual enablers addresses a recognized limitation of TAM by acknowledging that adoption depends on both individual perceptions and environmental conditions [62]. Based on UTAUT, the following hypotheses are proposed:

H3. *Facilitating Conditions have a significant positive effect on Behavioral Intention to adopt mobile payment.*

H4. *Social Influence has a significant positive effect on Behavioral Intention to adopt mobile payment.*

2.2.3. Theory of Planned Behavior (TPB) and the Mediating Role of Behavioral Intention

Ajzen's [17] Theory of Planned Behavior posits that Behavioral Intention is the most proximal predictor of actual behavior, mediating the effects of attitudes, subjective norms, and perceived behavioral control. Technology adoption research has consistently supported this mediation framework, demonstrating that cognitive evaluations solidify into intentions before translating into observable behavior [63,64]. The intention–behavior relationship provides a principled mechanism for understanding how diverse antecedents ultimately affect technology use [65].

Integrated frameworks combining TAM, UTAUT, and TPB have demonstrated superior explanatory power compared to single-theory applications [66,67]. Such integration reflects the complexity of adoption decisions, which simultaneously involve rational utility evaluations (TAM), social-contextual influences (UTAUT), and volitional control processes (TPB) [21,68]. Integrated models have successfully predicted mobile payment adoption intentions across diverse cultural contexts [69,70], and have been shown to be particularly appropriate in regional digital service contexts where no single model captures the full adoption dynamic [50]. Accordingly, the following hypothesis is proposed:

H5. *Behavioral Intention significantly mediates the relationship between the study's predictors and actual Mobile Payment Adoption.*

2.3. Trust, Security, and Individual Characteristics

2.3.1. Trust

Trust in mobile payment platforms is grounded in users' perceptions of provider competence, benevolence, and integrity—attributes that are especially consequential in financial technology given the inherent risks of financial transactions and exposure of personal data. Sleiman et al. [34] find that user trust levels significantly predict mobile payment adoption in China, while Kumar et al. [35] demonstrate that cultural dimensions—particularly collectivism and uncertainty avoidance—moderate the effect of trust on mobile banking adoption. Based on this evidence, the following hypothesis is proposed:

H6. *Trust has a significant positive effect on Behavioral Intention to adopt mobile payment.*

2.3.2. Perceived Security

Perceived Security refers to users' assessments of the technological measures in place to protect their financial data and transactions [71,72]. Security concerns have been identified as a significant barrier to contactless and mobile payment adoption, with the magnitude of this effect varying by demographic group and cultural context [36]. Building consumer confidence in mobile payment systems requires both robust technological security protocols and culturally sensitive trust-building strategies [37,73]. Accordingly, the following hypothesis is proposed:

H7. *Perceived Security has a significant positive effect on Behavioral Intention to adopt mobile payment.*

2.3.3. Personal Innovativeness

Personal Innovativeness in Information Technology—defined as the tendency to experiment with new information technologies [38]—captures individual variability in receptivity to technology. Highly innovative individuals tend to adopt earlier and serve as diffusion agents by modeling behavior and sharing information with their social networks [74,75]. Senali et al. [76] demonstrate that personal innovativeness moderates the relationship between perceived attributes and e-wallet adoption, with more innovative individuals better equipped to overcome initial adoption barriers. Personal innovativeness has consistently emerged as a reliable predictor of mobile payment adoption intentions, particularly in the early stages of diffusion when social proof is limited [77,78]. Accordingly:

H8. *Personal Innovativeness has a significant positive effect on Behavioral Intention to adopt mobile payment.*

2.3.4. Resistance to Change

Resistance to Change encompasses a range of psychological barriers, including status quo bias, loss aversion, and switching costs [39,79]. This resistance may be particularly pronounced in financial behavior domains, where established payment routines offer comfort, predictability, and perceived safety [80,81]. Cham et al. [40] found that technological anxiety and attachment to familiar payment methods represent significant obstacles to mobile payment adoption, especially among older users. Addressing these resistance mechanisms is therefore essential for effective technology diffusion, particularly when novel systems encounter well-established behavioral patterns [82,83]. Based on this, the following hypothesis is proposed:

H9. *Resistance to Change has a significant negative effect on Behavioral Intention to adopt mobile payment.*

2.4. Cultural Factors and Technology Adoption

2.4.1. Cultural Dimensions and Technology Acceptance

Cross-cultural research increasingly recognizes that technology adoption patterns reflect underlying cultural values as much as rational utility assessments [22,23]. The dimensions of individualism–collectivism, power distance, and uncertainty avoidance each shape how individuals perceive, evaluate, and respond to technological innovations [25,84]. In Arab collectivist societies, adoption decisions are driven by familial expectations, communal norms, and a preference for social harmony over individual cost–benefit analysis [24,85].

Power distance also influences technology implementation: high-power-distance cultures tend to be more receptive to top-down technology directives while demonstrating lower individual innovation [48,49]. Similarly, cultures with high uncertainty avoidance

place greater emphasis on reliability and security as preconditions for adoption, affecting risk tolerance and openness to innovation [86].

2.4.2. The Egyptian Cultural Context

Egyptian culture is distinctively characterized by high collectivism, elevated power distance, and strong uncertainty avoidance [22,29]. Hassan and Wood [26] demonstrate that Egyptian and American consumers differ substantially in their perceptions of mobile banking, with cultural values shaping trust, risk assessment, and adoption intentions. Egyptian decision-making is heavily influenced by family networks and social authority, with tradition playing a central role in behavioral choices [87,88].

Said [30] demonstrates that community endorsement and social network recommendations significantly influence mobile health technology adoption in Egypt, directly reflecting the primacy of collectivist values. The COVID-19 pandemic further accentuated these dynamics, as the social isolation experienced in collectivist societies complicated technology acceptance in contexts where social connectedness is a precondition for engagement. Islamic values of communal welfare, ethical business conduct, and trust-based relationships additionally shape Egyptian financial and technological behavior [89,90], with technologies that reinforce social bonds, respect hierarchical structures, and align with religious values attracting greater adoption regardless of utilitarian performance.

2.4.3. Cultural Dominance in Technology Adoption

Recent evidence from the MENA region suggests that cultural factors may outweigh technological ones in predicting adoption outcomes. Mattour and Kamoun-Chouk [31] demonstrate that collectivist orientations increase engagement with collaborative distance learning technologies across MENA countries. Cachia et al. [91] similarly show that collectivist values in Middle Eastern universities promote open education adoption when platforms enable knowledge sharing within trusted communities.

Cultural compatibility—the congruence between technological attributes and prevailing cultural values—has been shown to significantly influence Arab mobile payment adoption beyond what conventional TAM variables can explain [27,28]. Aldogiher et al. [32] further demonstrate that cultural, technological, and economic factors jointly moderate the adoption of digital technologies in Egyptian and Saudi university settings, underscoring the importance of cultural context in technology implementation. Based on the accumulated evidence, the following hypotheses are proposed:

H10. *Cultural Influence has a significant positive effect on Behavioral Intention to adopt mobile payment.*

H11. *Cultural Influence has a significant positive direct effect on Mobile Payment Adoption, beyond its indirect effect through Behavioral Intention.*

2.5. Mobile Payments and Sustainable Development

Mobile payment adoption is directly relevant to sustainable development, particularly in financially excluded and infrastructure-constrained contexts. The 2030 Agenda for Sustainable Development recognizes digital financial inclusion as a cross-cutting enabler across multiple SDGs, with mobile payments serving as a practical means of translating policy commitments into behavioral outcomes [92].

Mobile payment adoption carries three interconnected sustainability dimensions. First, extending financial access to underbanked populations advances social sustainability, directly supporting SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities). Suri and Jack [3] demonstrate that mobile money adoption in Kenya reduced household poverty by approximately 2% and enabled around 185,000 households—disproportionately women-

headed—to exit poverty. Mobile financial inclusion promotes economic participation, asset accumulation, and resilience to economic shocks. Second, mobile payment systems lower transaction costs, improve economic efficiency, and expand market participation, contributing to economic sustainability. By enabling micro-merchants to accept digital payments, these systems reduce barriers to entrepreneurship and integrate informal-sector participants into the formal economy, thereby supporting SDG 8 (Decent Work and Economic Growth) through job creation and inclusive economic development [93]. Third, digital financial services carry environmental sustainability benefits. The reduced reliance on physical bank branches, lower paper currency production, and decreased transportation requirements associated with digital transactions contribute—albeit secondarily—to resource efficiency and climate-relevant sustainable development goals.

In Egypt specifically, mobile payment adoption is aligned with the national Vision 2030 agenda, which identifies financial inclusion as a strategic pillar of sustainable economic development [94]. Mobile payments have the potential to reduce disparities in financial access across geographic, gender, and income dimensions [6]. Understanding the determinants of mobile payment adoption is therefore not only a theoretical concern but a practical imperative for designing effective sustainability interventions aligned with Egypt's development priorities and international commitments.

3. Materials and Methods

3.1. Research Design and Analytical Framework

This study employed a quantitative cross-sectional design to investigate the determinants of mobile payment adoption among Egyptian users. The theoretical framework integrates the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Theory of Planned Behavior (TPB), and cultural influence theory. This integration is theoretically motivated: TAM provides the cognitive evaluation framework through perceived usefulness and ease of use; UTAUT contributes contextual enablers through facilitating conditions and normative social influences; and TPB introduces the volitional intention–behavior pathway. Cultural influence is incorporated as an overarching construct that reshapes the relative weights of these theories in non-Western contexts. The analytical framework examined both the direct effects of nine independent variables on Behavioral Intention and Mobile Payment Adoption, and the mediating role of Behavioral Intention in the adoption pathway.

Data collection was carried out between January and February 2025. Respondents were recruited through convenience-based snowball sampling, in which an initial group of Egyptian mobile payment users was contacted via social media and university networks and subsequently invited to share the survey link with their networks. This approach was considered appropriate for the study's scope for two reasons. First, no formal sampling frame is available for active mobile-payment users in Egypt, and conventional probability sampling is therefore not feasible for this hard-to-reach population. Second, snowball recruitment via digital networks is well-suited to reaching users who are already engaged with mobile-payment platforms, which is the population of interest in a study of continued use rather than first-time adoption. The trade-off is that the resulting sample is likely to be biased toward younger, more digitally active users, and this should be borne in mind when interpreting the demographic profile and the generalisability of the findings (see Sections 4.1 and 7). While this approach facilitated access to active users within a limited timeframe, it carries known limitations regarding sample representativeness, which are acknowledged in Section 7. The survey was conducted entirely online, with no offline component, and participation was voluntary and anonymous. The geographic distribution of respondents was not restricted to a specific region; however, no formal population

register was available to serve as a sampling frame, and the study therefore does not claim to produce a statistically representative sample of Egyptian mobile payment users.

Prior to full deployment, a pilot study was conducted with 20 participants drawn from the target population. The pilot assessed questionnaire clarity, item comprehension, and response time. Minor wording adjustments were made to three items based on participant feedback before the final version was administered.

3.2. Survey Instrument

Data were collected using a structured bilingual questionnaire (Arabic–English) administered to Egyptian mobile payment users. The instrument comprised two sections. Section 1 captured demographic attributes including gender, age category, educational attainment, occupation, monthly income, residence location, prior mobile payment experience, and the specific mobile payment application used. Section 2 measured the study's theoretical constructs using items adapted from validated instruments in the technology adoption literature.

The questionnaire operationalized eleven constructs across three groups. Technology-related factors included Perceived Ease of Use (PEOU, 3 items), Perceived Usefulness (PU, 3 items), Facilitating Conditions (FC, 3 items), and Perceived Security (PS, 3 items). Psychological and personal factors included Personal Innovativeness (PI, 3 items), Trust (TR, 3 items), and Resistance to Change (RC, 3 items). Socio-cultural factors included Social Influence (SI, 3 items) and Cultural Influence (CI, 3 items). The mediating variable, Behavioral Intention (BI), was assessed using five items, and the dependent variable, Mobile Payment Adoption (ADOP), was measured with five items. All items were rated on a five-point Likert scale anchored at 1 (strongly disagree) and 5 (strongly agree).

To assess construct validity, Average Variance Extracted (AVE) and Composite Reliability (CR) were computed for all constructs. All AVE values exceeded the recommended threshold of 0.50, and all CR values surpassed the 0.70 benchmark, confirming convergent validity. Discriminant validity was established by confirming that the square root of each construct's AVE exceeded its correlations with all other constructs. These diagnostics confirm that the eleven constructs are empirically distinct and that the measurement instrument possesses adequate validity for subsequent analysis.

3.3. Ethical Considerations

The research protocol was approved by the Scientific Committee of the Department of Business Administration, College of Business, Jouf University, in meeting No. 9, dated 17 February 2025. All participants provided informed consent prior to completing the survey and were assured of full data confidentiality and anonymity. Participants were informed of their right to withdraw at any time without consequence. The introductory section of the questionnaire clearly communicated the research objectives and confidentiality assurances.

3.4. Data Analysis

The data analysis was conducted in six phases. In the first phase, descriptive statistics were computed to profile the sample and examine response distributions across all constructs. In the second phase, internal consistency reliability was assessed using Cronbach's alpha coefficients for all measurement scales, and construct validity was evaluated as described in Section 3.2. In the third phase, prior to inferential analyses, the dataset was examined for potential violations of regression assumptions. Outliers were identified using standardized residuals ($|z| > 3.29$), Mahalanobis distance, and Cook's distance; no influential outliers were detected. Normality of residuals was evaluated using Q-Q plots and the Shapiro–Wilk test, confirming approximate normality. Homoscedasticity was assessed using the Breusch–Pagan test, and no significant heteroscedasticity was found.

Variance Inflation Factors (VIFs) and tolerance values were computed for all predictors in both regression models to assess multicollinearity; all VIF values remained below 5.0 and all tolerance values exceeded 0.20, indicating that multicollinearity did not critically compromise the regression estimates. In the fourth phase, bivariate associations among all variables were examined using Pearson correlation analysis. In the fifth phase, two hierarchical multiple regression models were estimated: Model 1 examined the predictors of Behavioral Intention, and Model 2 investigated the predictors of Mobile Payment Adoption, incorporating Behavioral Intention as a mediating variable. Mediation effects were quantified by calculating the ratio of the indirect effect to the total effect for each predictor. In the sixth phase, and in response to reviewer feedback, a robustness check was performed on the indirect effects identified in the mediation model. Following Sobel [95] and the delta-method approach summarised by MacKinnon, Lockwood, and Williams [96], standard errors of the indirect effects (a $\times$ b) were derived analytically from the standardised regression coefficients and their associated t-statistics, and 95% confidence intervals were computed as the indirect effect $\pm$ 1.96 $\times$ SE_ab. This procedure provides interval estimates for each indirect effect and is reported alongside the original product-of-coefficients results to address the well-known limitation that the Baron and Kenny [97] approach does not, on its own, yield confidence intervals. All statistical analyses were conducted using SPSS software (IBM SPSS Statistics v.28, IBM Corp., Armonk, NY, USA), with statistical significance assessed at $\alpha = 0.05$. The overall research process across these seven sequential phases is summarised in Figure 1.

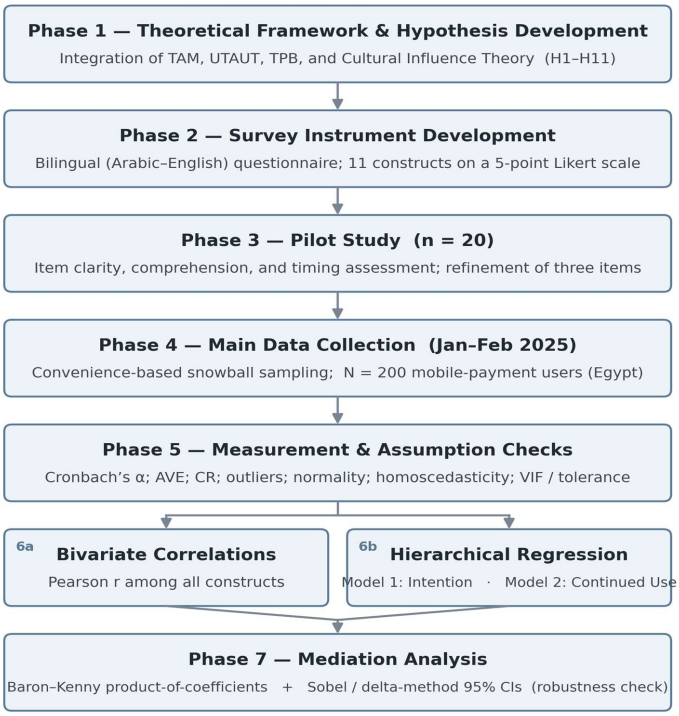


Figure 1. Research process flowchart. The study followed seven sequential phases: development of the integrated theoretical framework and hypotheses (Phase 1); construction of the bilingual survey instrument (Phase 2); piloting with 20 participants (Phase 3); main data collection from 200 active mobile-payment users via convenience-based snowball sampling between January and February 2025 (Phase 4); measurement and assumption checks including reliability, validity, outliers, normality, homoscedasticity, and multicollinearity (Phase 5); bivariate correlations and hierarchical regression for Behavioral Intention and continued use (Phase 6); and mediation analysis using the Baron–Kenny product-of-coefficients approach with Sobel/delta-method 95% confidence intervals as a robustness check (Phase 7).

4. Results

4.1. Demographic Profile of Respondents

The study surveyed 200 Egyptian mobile payment users. Full demographic characteristics are presented in Table 1. The sample skewed toward younger adults, with 37.5% aged 20–29 and 25.0% aged 30–39. Males comprised 60.5% of respondents, and 59.5% held secondary-level qualifications. The majority (65.5%) earned below 3000 EGP per month, and 49.0% were employed in the private sector. All 200 respondents reported prior mobile payment experience, confirming their suitability for the study's focus. Compared with national demographic data [98], the sample overrepresents young males with secondary education and lower incomes. This profile is consistent with documented mobile payment adoption patterns in Egypt [54] but limits generalizability to older age groups, females, and higher-educated segments. Additionally, because all respondents were existing users, the study captures continued usage behavior rather than initial adoption decisions. These characteristics should be considered when interpreting the results.

Table 1. Demographic characteristics (N = 200).

Characteristic	Category	Frequency	%
Gender	Male	121	60.5
	Female	79	39.5
Age	Under 20	30	15
	20–29	75	37.5
	30–39	50	25
	40–49	30	15
	50+	15	7.5
Education	Below Secondary	55	27.5
	Secondary	119	59.5
	University	26	13.0
Monthly Income	<3000 EGP	131	65.5
	3000–4999 EGP	28	14.0
	5000–6999 EGP	19	9.5
	7000–9999 EGP	14	7.0
	10,000+ EGP	8	4.0
Occupation	Student	12	6.0
	Government Employee	64	32.0
	Private Sector	98	49.0
	Self-employed	14	7.0
	Unemployed	12	6.0

4.2. Descriptive Statistics and Distribution Analysis

Table 2 presents descriptive statistics for all constructs. Mean scores ranged from 3.870 to 4.178, indicating generally favorable orientations toward mobile payment adoption across all measured dimensions. Perceived Ease of Use recorded the highest mean (M = 4.178, SD = 0.910), while Personal Innovativeness (M = 3.870, SD = 1.100) and Perceived Usefulness (M = 3.873, SD = 1.099) recorded the lowest, though both remained above the scale midpoint. Standard deviations ranged from 0.905 to 1.100, reflecting adequate response variability. Given the strong internal consistency of all scales (see Section 4.3), individual items were averaged to produce composite construct scores for subsequent analyses [99]. Figure 2 illustrates the distribution of responses across constructs, showing a generally positive skew, most pronounced for Perceived Ease of Use, Mobile Payment Adoption, and Social Influence.

Table 2. Descriptive statistics for measurement scales.

Construct	Items	Mean	SD	Min	Max
Perceived Ease of Use (PEOU)	3	4.178	0.910	1	5
Perceived Usefulness (PU)	3	3.873	1.099	1	5
Facilitating Conditions (FC)	3	3.992	0.999	1	5
Perceived Security (PS)	3	3.912	1.059	1	5
Personal Innovativeness (PI)	3	3.870	1.100	1	5
Trust (TR)	3	3.882	1.064	1	5
Resistance to Change (RC)	3	3.878	1.049	1	5
Social Influence (SI)	3	4.058	0.905	1	5
Cultural Influence (CI)	3	3.983	0.997	1	5
Behavioral Intention (BI)	5	3.975	1.003	1	5
Mobile Payment Adoption (ADOP)	5	4.089	0.960	1	5

Note: All measured on 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

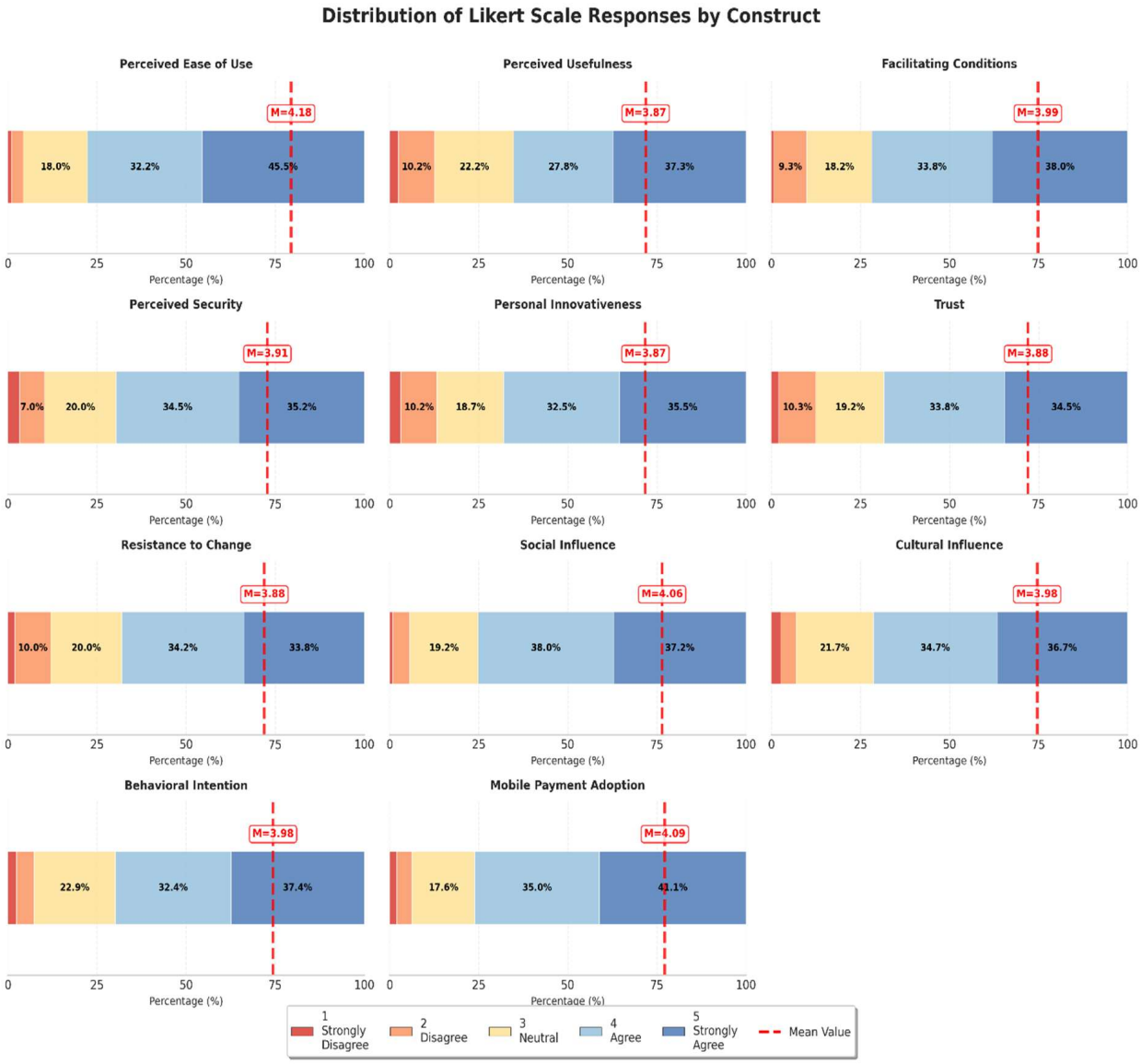


Figure 2. Distribution of Likert Scale Responses by Construct. Note. N = 200. Horizontal bars represent the percentage distribution of responses across the five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Red dashed lines indicate mean values for each construct.

Figure 2 shows how Likert scale responses are spread out across all constructs. The visual representation shows that most constructs had a positive skew, with most responses falling into the "agree" and "strongly agree" categories. This pattern was especially strong for Perceived Ease of Use, Mobile Payment Adoption, and Social Influence, which supports the high mean scores for these variables.

4.3. Reliability Analysis

Cronbach's alpha coefficients for all constructs are reported in Table 3. Values ranged from 0.808 to 0.944, all exceeding the recommended threshold of 0.70 [99]. Three constructs achieved excellent reliability ($\alpha \geq 0.90$): Trust ($\alpha = 0.944$), Behavioral Intention ($\alpha = 0.915$), and Facilitating Conditions ($\alpha = 0.903$). The remaining eight demonstrated good reliability ($0.80 \leq \alpha < 0.90$), with a mean alpha of 0.880 across all scales. These results, taken together with the convergent and discriminant validity diagnostics reported in Section 3.2, confirm adequate measurement quality for all subsequent analyses.

Table 3. Cronbach's alpha reliability coefficients for all measurement scales.

Construct	Items	α
Trust	3	0.944
Behavioral Intention	5	0.915
Facilitating Conditions	3	0.903
Perceived Security	3	0.898
Mobile Payment Adoption	5	0.893
Personal Innovativeness	3	0.891
Social Influence	3	0.889
Cultural Influence	3	0.887
Perceived Usefulness	3	0.839
Resistance to Change	3	0.816
Perceived Ease of Use	3	0.808
SUMMARY		
Range		0.808–0.944
Mean α		0.880
Excellent ($\geq$0.90)		3 (27.3%)
Good (0.80–0.89)		8 (72.7%)
Sample Size		N = 200

4.4. Bivariate Correlation Analysis

Pearson correlation was used to examine all research variables' bivariate relationships. Table 4 shows the independent variable—Behavioral Intention correlations—while Figure 3 shows the full correlation matrix for all constructs. All independent variables showed significant positive correlations with Behavioral Intention ($p < 0.001$). Cultural Influence had the highest correlation with Behavioral Intention ($r = 0.827$, $p < 0.001$), followed by Resistance to Change ($r = 0.801$, $p < 0.001$) and Facilitating Conditions ($r = 0.772$, $p < 0.001$). Behavioral Intention was correlated with Personal Innovativeness ($r = 0.760$, $p < 0.001$), Perceived Security ($r = 0.730$, $p < 0.001$), Social Influence ($r = 0.730$, $p < 0.001$), Trust ($r = 0.712$, $p < 0.001$), Perceived Usefulness ($r = 0.707$, $p < 0.001$), and Perceived Ease of Use ($r = 0.654$, $p < 0.001$).

Table 4. Correlations with behavioral intention.

Predictor	r	*p*	Sig.
Cultural Influence	0.827	<0.001	***
Resistance to Change	0.801	<0.001	***
Facilitating Conditions	0.772	<0.001	***
Personal Innovativeness	0.760	<0.001	***
Perceived Security	0.730	<0.001	***
Social Influence	0.730	<0.001	***
Trust	0.712	<0.001	***
Perceived Usefulness	0.707	<0.001	***
Perceived Ease of Use	0.654	<0.001	***
KEY CORRELATION			
BI → Adoption	0.825	<0.001	***
Sample Size: N = 200			

Note: r = Pearson correlation coefficient. *** $p < 0.001$. All correlations are positive and statistically significant. Predictors ranked by correlation strength.

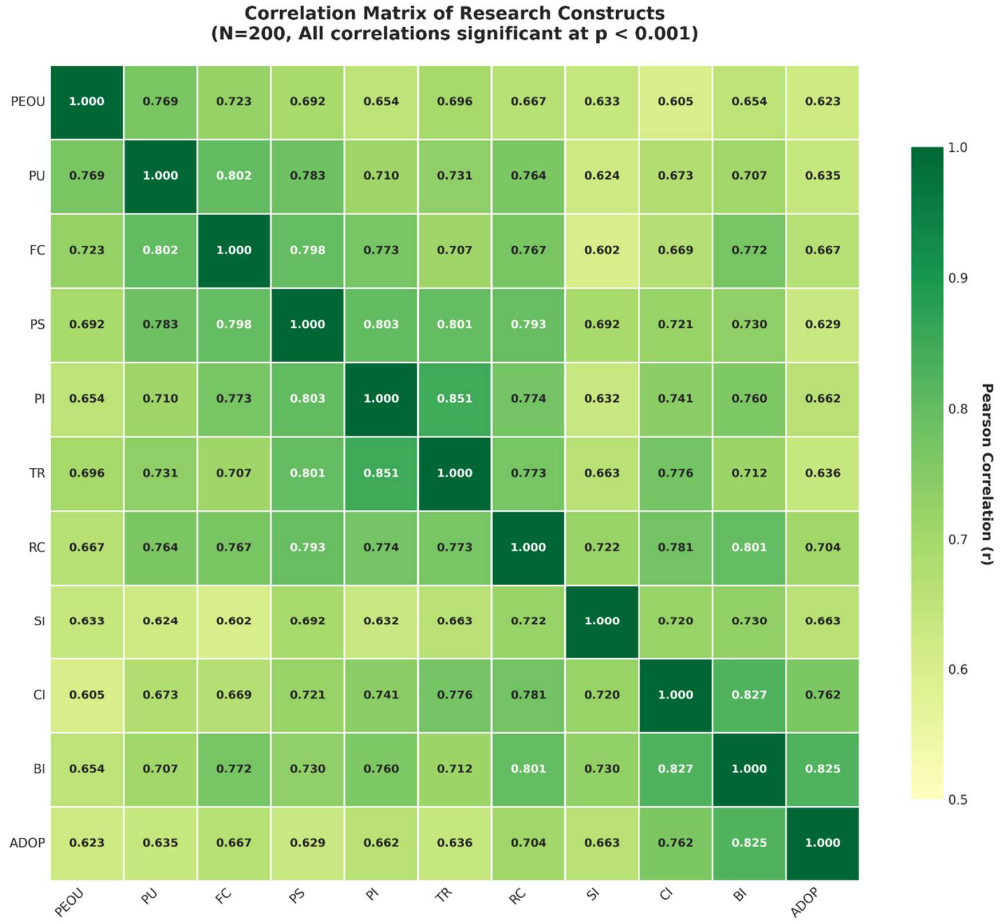


Figure 3. Correlation matrix of research constructs. Note. N = 200. The heatmap displays Pearson correlation coefficients among all study variables. Color intensity indicates correlation strength (darker green = stronger positive correlation). All correlations are statistically significant at $p < 0.001$. PEOU = Perceived Ease of Use; PU = Perceived Usefulness; FC = Facilitating Conditions; PS = Perceived Security; PI = Personal Innovativeness; TR = Trust; RC = Resistance to Change; SI = Social Influence; CI = Cultural Influence; BI = Behavioral Intention; ADOP = Mobile Payment Adoption.

The strong correlation between Behavioral Intention and Mobile Payment Adoption (r = 0.825, $p < 0.001$) supports the hypothesis that behavioral intention mediates the adoption

process. Figure 3 shows strong positive intercorrelations between all constructs, with correlation coefficients ranging from 0.602 to 0.851. Hair et al. [100] found no correlations above 0.90, suggesting multicollinearity is unlikely to affect regression analyses. These correlation patterns support potential theoretical relationships in the research model.

4.5. Predictors of Behavioral Intention and Mobile Payment Adoption

4.5.1. Predictors of Behavioral Intention

Model 1 regressed nine predictors on Behavioral Intention, yielding strong overall fit (R^2 = 0.802, Adjusted R^2 = 0.793, F(9, 190) = 85.526, $p < 0.001$), with the model accounting for 80.2% of the variance in Behavioral Intention. Results are presented in Table 5 and Figure 4A.

Table 5. Regression analysis—predictors of behavioral intention.

Hypothesis	Predictor	β	t	*p*	Sig.
H1	Perceived Usefulness	−0.011	−0.169	0.866	ns
H2	Perceived Ease of Use	0.034	0.606	0.546	ns
H3	Facilitating Conditions	0.282	4.212	<0.001	***
H4	Social Influence	0.169	3.208	0.002	**
H6	Trust	−0.162	−2.212	0.028	*
H7	Perceived Security	−0.075	−1.076	0.283	ns
H8	Personal Innovativeness	0.180	2.513	0.013	*
H9	Resistance to Change	0.165	2.433	0.016	*
H10	Cultural Influence	0.421	6.946	<0.001	***
R^2	0.802				(80.2% variance)
Adjusted R^2	0.793				
F-statistic	F(9, 190) = 85.526			$p < 0.001$	
Sample Size	N = 200				

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ns = not significant. β = standardized regression coefficient. Dependent variable: Behavioral Intention.

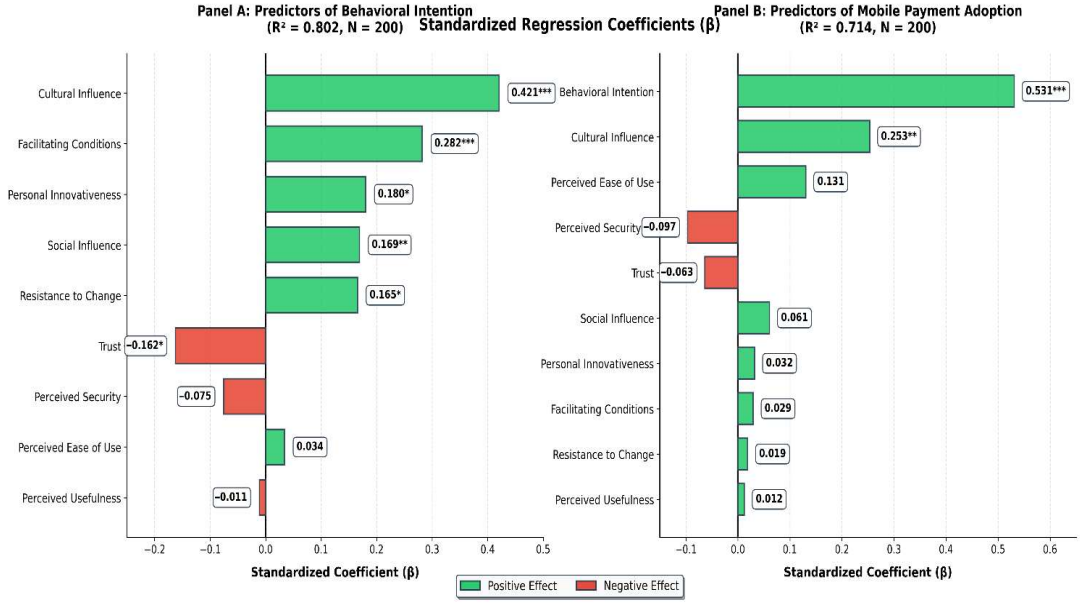


Figure 4. Standardized Regression Coefficients for Predictors of Behavioral Intention and Mobile Payment Adoption. Note. N = 200. Panel (**A**) displays standardized coefficients (β) for predictors of Behavioral Intention (R^2 = 0.802). Panel (**B**) displays standardized coefficients for predictors of Mobile Payment Adoption (R^2 = 0.714). Green bars indicate positive effects; red bars indicate negative effects. Asterisks denote significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Cultural Influence (H10) was the strongest significant predictor (β = 0.421, t = 6.946, $p < 0.001$), indicating that perceived alignment between mobile payment systems and prevailing cultural norms is the primary driver of adoption intentions within this sample, supporting H10. Facilitating Conditions (H3) were the second significant predictor (β = 0.282, t = 4.212, $p < 0.001$), indicating that infrastructure availability, resource access, and technical support shape adoption intentions, supporting H3. Personal Innovativeness (H8) (β = 0.180, t = 2.513, $p < 0.05$), Social Influence (H4) (β = 0.169, t = 3.208, $p < 0.01$), and Resistance to Change (H9) (β = 0.165, t = 2.433, $p < 0.05$) were also significant positive predictors, supporting H8 and H4, respectively. However, H9 was not supported in the expected direction: Resistance to Change showed a positive rather than a negative relationship with Behavioral Intention, a finding that warrants further investigation.

Trust (H6) yielded a significant negative coefficient (β = −0.162, t = −2.212, $p < 0.05$). Given its positive bivariate correlation with Behavioral Intention (r = 0.712), this sign reversal is consistent with a suppression effect arising from high intercorrelations among predictors, particularly between Trust and Cultural Influence (r = 0.779). This result should not be interpreted as indicating that trust reduces adoption intentions, leaving H6 unsupported in the expected direction. This pattern is discussed further in Section 5.4.

Perceived Usefulness (H1) (β = −0.011, $p = 0.866$), Perceived Ease of Use (H2) (β = 0.034, $p = 0.546$), and Perceived Security (H7) (β = −0.075, $p = 0.283$) were not statistically significant, leaving H1, H2, and H7 unsupported. Since all three were significantly correlated with Behavioral Intention at the bivariate level, their non-significance in the regression model is most plausibly attributable to shared variance with the stronger cultural and social predictors rather than a genuine absence of effect.

4.5.2. Predictors of Mobile Payment Adoption

Model 2 introduced Behavioral Intention alongside the nine independent variables as predictors of Mobile Payment Adoption ($R^2 = 0.714$, Adjusted $R^2 = 0.698$, F(10, 189) = 47.070, $p < 0.001$), explaining 71.4% of the variance in adoption. Results are presented in Table 6 and Figure 4B.

Table 6. Regression analysis—predictors of mobile payment adoption.

Hypothesis	Predictor	β	t	*p*	Sig.
H5	Behavioral Intention	0.531	6.068	<0.001	***
H11	Cultural Influence	0.253	3.095	0.002	**
—	Perceived Usefulness	0.012	0.155	0.877	ns
—	Perceived Ease of Use	0.131	1.937	0.054	ns
—	Facilitating Conditions	0.029	0.348	0.728	ns
—	Social Influence	0.061	0.931	0.353	ns
—	Trust	−0.063	−0.707	0.480	ns
—	Perceived Security	−0.097	−1.141	0.255	ns
—	Personal Innovativeness	0.032	0.365	0.716	ns
—	Resistance to Change	0.019	0.226	0.822	ns
R^2	0.714				(71.4% variance)
Adjusted R^2	0.698				
F-statistic	F(10, 189) = 47.070			$p < 0.001$	
Sample Size	N = 200				

Note: *** $p < 0.001$, ** $p < 0.01$, ns = not significant. β = standardized regression coefficient. Dependent variable: Mobile Payment Adoption. H5 tests the mediating role of Behavioral Intention; H11 tests the direct effect of Cultural Influence on adoption beyond its indirect pathway. Remaining predictors (marked —) are included as controls to assess mediation and carry no independent adoption hypotheses.

Behavioral Intention (H5) was the dominant predictor (β = 0.531, t = 6.068, $p < 0.001$), with a standardized coefficient substantially larger than any other variable in the model,

supporting H5 and confirming TPB's proposition that intention is the most proximal determinant of actual behavior [17]. Cultural Influence (H11) retained a significant direct effect on adoption ($\beta = 0.253$, $t = 3.095$, $p < 0.01$) after controlling for Behavioral Intention, supporting H11 and indicating partial rather than full mediation. This suggests that Cultural Influence operates through both an intention-mediated pathway and a more direct behavioral pathway.

All remaining predictors became non-significant when Behavioral Intention was introduced: Perceived Usefulness ($\beta = 0.012$, $p = 0.877$), Perceived Ease of Use ($\beta = 0.131$, $p = 0.054$), Facilitating Conditions ($\beta = 0.029$, $p = 0.728$), Social Influence ($\beta = 0.061$, $p = 0.353$), Trust ($\beta = -0.063$, $p = 0.480$), Perceived Security ($\beta = -0.097$, $p = 0.255$), Personal Innovativeness ($\beta = 0.032$, $p = 0.716$), and Resistance to Change ($\beta = 0.019$, $p = 0.822$). The attenuation of these previously significant predictors upon the introduction of Behavioral Intention is consistent with mediation, indicating that their effects on adoption operate primarily through intention formation rather than through direct behavioral pathways, providing support for H5.

4.6. Mediating Role of Behavioral Intention in Mobile Payment Adoption

Mediation was assessed using the product-of-coefficients approach following Baron and Kenny [97], whereby the indirect effect of each predictor on Mobile Payment Adoption was computed as the product of its effect on Behavioral Intention (path a) and Behavioral Intention's effect on Adoption (path b). The proportion of the total effect operating indirectly was calculated as the ratio of the indirect to the total effect. As a robustness check, and consistent with the recommendation that mediation tests be supplemented with interval estimates of the indirect effect, 95% confidence intervals were also derived analytically using the Sobel/delta-method approach [95,96]. For each indirect effect, the standard error was computed as $SE_ab = \sqrt{(b^2 \cdot SE_a^2 + a^2 \cdot SE_b^2)}$, with SE_a and SE_b derived from the standardised coefficients and t-statistics reported in Tables 5 and 6, and 95% CIs were obtained as $ab \pm 1.96 \cdot SE_ab$. The Sobel approach is a closed-form approximation that is widely used as a complement to bootstrap procedures and is appropriate where the analytical sample is sufficiently large for the normal-theory assumption to hold ($n = 200$). Future replications of this work using bias-corrected bootstrap procedures with the raw item-level data are encouraged to confirm these analytical estimates.

The results indicated mediation for most predictors, summarized in Table 7. Among the fully mediated predictors, Facilitating Conditions (H3) showed the largest indirect proportion (83.6%; indirect effect = 0.150), indicating that the influence of perceived infrastructure and resource availability on adoption operates predominantly through intention formation. Resistance to Change (H9) and Personal Innovativeness (H8) similarly showed high mediation proportions (82.4%, indirect effect = 0.088; 74.9%, indirect effect = 0.096, respectively), indicating that their effects on adoption are channeled almost entirely through Behavioral Intention. Social Influence (H4) demonstrated moderate mediation (59.6%; indirect effect = 0.090). Trust (H6) also showed a mediated proportion of 57.6% (indirect effect = −0.086).

Cultural Influence exhibited partial mediation: 46.9% of its total effect on adoption operated indirectly through Behavioral Intention (indirect effect = 0.223), supporting H10, while a significant direct effect on adoption was retained ($\beta = 0.253$, $p < 0.01$), supporting H11. Together, these two components account for the full effect of Cultural Influence on adoption, indicating that this construct operates through both intention-mediated and direct behavioral pathways.

Table 7. Summary of mediation analysis.

Hypothesis	Predictor	Path a	Path b	Indirect Effect	Direct Effect	Mediation %	Mediation Type
H1	Perceived Usefulness	−0.011	0.531	−0.006	0.012	−92.1%	—
H2	Perceived Ease of Use	0.034	0.531	0.018	0.131	12.1%	—
H3	Facilitating Conditions	0.282	0.531	0.150	0.029	83.6%	Full
H4	Social Influence	0.169	0.531	0.090	0.061	59.6%	Full
H6	Trust	−0.162	0.531	−0.086	−0.063	57.6%	Full *
H7	Perceived Security	ns	—	—	—	—	Not applicable
H8	Personal Innovativeness	0.180	0.531	0.096	0.032	74.9%	Full
H9	Resistance to Change	0.165	0.531	0.088	0.019	82.4%	Full
H10	Cultural Influence → BI (indirect)	0.421	0.531	0.223	—	46.9%	Partial
H11	Cultural Influence → Adoption (direct)	—	—	—	0.253	53.1%	Partial

Note: Path a = standardized coefficient of predictor on Behavioral Intention (from Model 1). Path b = standardized coefficient of Behavioral Intention on Adoption (from Model 2, β = 0.531). Indirect effect = path a × path b. Mediation % = indirect effect/total effect × 100. Full mediation indicated where the direct effect in Model 2 was non-significant. ns = not significant; — = not applicable. * Trust mediation should be interpreted with caution, given the suppression effect identified in Section 4.5.1. H7 was non-significant in Model 1; therefore, the mediation analysis is not applicable. H10 and H11 together represent the partial mediation of Cultural Influence: 46.9% of its total effect operates indirectly through Behavioral Intention (H10), and 53.1% represents a retained direct effect on Adoption (H11). Anomalous patterns for H1 and H2 are attributable to suppression effects and are not interpreted substantively.

H7 (Perceived Security) was non-significant in Model 1 and therefore yields no meaningful path coefficient; mediation analysis is not applicable for this predictor. The anomalous patterns observed for Perceived Usefulness (H1) (−92.1%; indirect effect = −0.006) and Perceived Ease of Use (H2) (12.1%; indirect effect = 0.018) are attributable to the suppression effects identified in Section 4.5.1 and are not interpreted substantively.

As a robustness check, 95% confidence intervals were computed for each indirect effect using the Sobel/delta method, as described in Section 3.4. The intervals exclude zero for all five significant predictors, supporting the original mediation conclusions, specifically Cultural Influence (H10), ab = 0.224, 95% CI [0.128, 0.319]; Facilitating Conditions (H3), ab = 0.150, 95% CI [0.065, 0.235]; Personal Innovativeness (H8), ab = 0.096, 95% CI [0.015, 0.176]; Social Influence (H4), ab = 0.090, 95% CI [0.028, 0.152]; and Resistance to Change (H9), ab = 0.088, 95% CI [0.012, 0.164]. The interval for Trust (H6), ab = −0.086, 95% CI [−0.167, −0.005], also excludes zero, but—as discussed in Section 4.5.1—this reflects the suppression effect arising from collinearity among predictors rather than a substantively negative indirect effect, and is not interpreted as a meaningful mediation finding. These intervals strengthen the original product-of-coefficients results by providing inferential evidence for each indirect effect rather than relying on the significance of paths a and b alone.

5. Discussion

This study examined the determinants of mobile payment adoption in Egypt through an integrated framework combining TAM, UTAUT, TPB, and cultural influence theory. The following discussion interprets the findings in relation to the existing literature. Given the cross-sectional design and convenience sample of existing users, all interpretations are bounded by this study's scope and should not be generalized beyond comparable contexts without further empirical support.

5.1. Dominance of Cultural Influence

Cultural Influence (H10) emerged as the strongest predictor of Behavioral Intention (β = 0.421, $p < 0.001$), consistent with evidence from MENA contexts suggesting that cultural compatibility may supersede purely utilitarian considerations in technology adop-

tion [27,28]. This finding aligns with Hassan and Wood's [26] demonstration that Egyptian consumers evaluate mobile banking through culturally specific rather than purely rational lenses, and with broader cross-cultural research linking collectivism, power distance, and uncertainty avoidance to modified adoption dynamics [22,23].

The partial mediation pattern—Cultural Influence (H10) retaining a significant direct effect on adoption ($\beta = 0.253$, $p < 0.01$) after controlling for Behavioral Intention, as specified in H11—suggests that cultural factors operate through two pathways: one mediated by deliberate intention formation, consistent with TPB [17], and one more direct, possibly reflecting habitual or normatively driven behavior in contexts where social conformity pressures are pronounced [91]. This pattern extends TPB by indicating that not all adoption behavior flows exclusively through conscious intention formation, though the mechanisms underlying the direct pathway warrant further investigation.

5.2. Facilitating Conditions

Facilitating Conditions (H3) were the second significant predictor of Behavioral Intention ($\beta = 0.282$, $p < 0.001$), consistent with UTAUT's emphasis on contextual enablers [16] and with evidence that infrastructure availability is a binding constraint on digital adoption in Egypt [12,47]. The high mediation proportion for H3 (83.6%) indicates that perceived resource availability primarily shapes adoption through its effect on intentions rather than through a direct behavioral pathway. This finding is particularly relevant in developing-country contexts where connectivity and device access cannot be assumed, and where facilitating conditions retain explanatory power that tends to attenuate in more developed markets [60].

5.3. Non-Significance of TAM Variables

Perceived Usefulness (H1) ($\beta = -0.011$, $p = 0.866$) and Perceived Ease of Use (H2) ($\beta = 0.034$, $p = 0.546$) were not significant in the regression model, leaving H1 and H2 unsupported. This finding appears to contradict TAM's foundational propositions [15] but is consistent with cross-cultural evidence documenting TAM's variable explanatory power across contexts [20,43]. Several interpretations merit consideration. First, in contexts where cultural and social factors capture substantial variance, TAM variables may contribute little unique explanatory power once those factors are controlled. Both constructs were significantly correlated with Behavioral Intention at the bivariate level ($r = 0.707$ and $r = 0.654$, respectively), suggesting their effects are largely subsumed by the stronger cultural and infrastructural predictors in the full model. Second, if mobile payment systems in Egypt have achieved sufficient standardization, variance in adoption may depend more on contextual than technological perceptions [45]. Third, measurement equivalence issues when applying Western-developed scales in non-Western contexts may attenuate observed relationships [25]. These findings do not establish the irrelevance of TAM variables in Egypt; rather, they suggest that within this model and sample, their incremental contribution was not statistically detectable.

5.4. Trust Suppression Effect

Trust (H6) yielded a significant negative coefficient in Model 1 ($\beta = -0.162$, $p < 0.05$), despite being positively correlated with Behavioral Intention at the bivariate level ($r = 0.712$). This sign reversal is consistent with a suppression effect arising from high intercorrelations between Trust and other predictors, particularly Cultural Influence ($r = 0.779$) and Perceived Security ($r = 0.758$). Under these conditions, regression coefficients reflect unique rather than total variance, and sign reversals do not imply a genuine negative relationship. Trust and Cultural Influence may also represent partially overlapping constructs in collectivist settings, where interpersonal trust and cultural conformity are closely intertwined [35,37]. This finding

underscores the need for analytical approaches better suited to highly intercorrelated predictors—such as structural equation modeling—in future research.

5.5. Mediation Through Behavioral Intention

Behavioral Intention (H5) was the dominant predictor of Mobile Payment Adoption ($\beta = 0.531$, $p < 0.001$), supporting TPB's proposition that intention is the most proximal determinant of actual behavior [17,63]. Substantial mediation was observed for most predictors, with proportions ranging from 59.6% to 83.6% for the key significant variables (H3, H4, H8, H9), indicating that antecedent effects on adoption are predominantly channeled through intention formation. The Trust (H6) mediation proportion (57.6%) should be interpreted with caution given the suppression effect identified in Section 5.4. The exception was Cultural Influence (H10), whose partial mediation (46.9%) alongside a retained direct effect (H11) is consistent with the dual-pathway interpretation discussed in Section 5.1. These mediation patterns collectively support the integrated framework's proposition that behavioral intentions serve as the primary mechanism through which diverse cognitive, social, and cultural antecedents translate into adoption behavior, consistent with integrated model evidence from comparable contexts [50,69].

5.6. Theoretical Implications

The results contribute to a growing body of evidence that Western technology adoption models require contextual adaptation when applied in collectivist, high-power-distance settings [42,58]. The relatively weak performance of TAM variables alongside the prominence of cultural and infrastructural predictors supports calls for culture-centered approaches that treat cultural factors as primary determinants rather than mere moderators [48,49]. This is broadly consistent with Mobarak et al.'s [28] finding that culturally grounded reasoning is a dominant driver of mobile payment adoption, and with Abdalla et al.'s [50] argument that integrated acceptance frameworks tend to outperform single-model explanations in regional digital service contexts. The partial mediation of Cultural Influence additionally extends TPB by suggesting that cultural norms may exert adoption effects through pathways that operate independently of deliberate intention formation, a possibility that warrants more systematic theoretical development.

5.7. Sustainability Implications

Mobile payment adoption has recognized relevance to financial inclusion and sustainable development, particularly in relation to SDGs 1, 8, and 10 [92]. The present findings suggest that the effectiveness of mobile payment-based financial inclusion interventions in Egypt may depend substantially on cultural alignment and infrastructure availability rather than on technological design alone. Strategies relying primarily on demonstrating utilitarian value may be less effective in collectivist contexts where adoption decisions are socially embedded. Interventions that engage community networks, incorporate cultural endorsement, and address infrastructure access are more likely to drive meaningful adoption among underserved populations. It should be noted, however, that this study examines adoption intentions and behavior among existing users and does not directly measure downstream sustainability outcomes such as poverty reduction, income resilience, or financial inclusion. The connection between adoption and these outcomes remains an empirical question for future research.

5.8. Practical Implications

For mobile payment providers operating in Egypt, the findings suggest that marketing strategies emphasizing cultural alignment, social endorsement, and community relevance may be more effective than messaging focused on technological features alone [26,28]. The

significance of Facilitating Conditions indicates that adoption is constrained by infrastructure and user knowledge; addressing connectivity, device access, and digital literacy may therefore yield more adoption gains than promotional efforts in underserved segments [8]. Given the significance of Social Influence, community-based diffusion strategies utilizing peer networks and trusted local figures may complement mass communication approaches [51]. For policymakers, these findings suggest that financial inclusion programs should incorporate cultural engagement alongside technology deployment, and that infrastructure investment should be accompanied by context-sensitive adoption support.

6. Conclusions

This study investigated the determinants of mobile payment adoption in Egypt through an integrated theoretical framework combining TAM, UTAUT, TPB, and cultural influence theory. Using hierarchical regression and mediation analysis applied to data from 200 Egyptian mobile payment users, the study tested eleven hypotheses concerning the direct and mediated effects of nine predictors on Behavioral Intention and Mobile Payment Adoption. The principal findings are as follows.

- Cultural Influence was the strongest predictor of Behavioral Intention ($\beta = 0.421$, $p < 0.001$), supporting H10, and retained a significant direct effect on Mobile Payment Adoption ($\beta = 0.253$, $p < 0.01$), supporting H11. This partial mediation pattern indicates that cultural factors operate through both deliberate intention-formation and more direct behavioral pathways.
- Facilitating Conditions significantly predicted Behavioral Intention ($\beta = 0.282$, $p < 0.001$), supporting H3, with 83.6% of its total effect on adoption mediated through Behavioral Intention.
- Personal Innovativeness ($\beta = 0.180$, $p < 0.05$) and Social Influence ($\beta = 0.169$, $p < 0.01$) were significant positive predictors of Behavioral Intention, supporting H8 and H4 respectively.
- Perceived Usefulness, Perceived Ease of Use, and Perceived Security did not reach significance in the regression model, leaving H1, H2, and H7 unsupported. Given their significant bivariate correlations with Behavioral Intention, this is most plausibly attributed to shared variance with the stronger cultural and social predictors rather than a genuine absence of effect.
- Resistance to Change showed a positive rather than negative relationship with Behavioral Intention, contrary to the direction specified in H9, a finding that warrants further investigation.
- Trust yielded a negative coefficient inconsistent with the direction specified in H6, attributable to a suppression effect arising from high intercorrelations with Cultural Influence and Perceived Security.
- Behavioral Intention was the dominant predictor of Mobile Payment Adoption ($\beta = 0.531$, $p < 0.001$), supporting H5, with mediation proportions ranging from 59.6% to 83.6% for the key significant predictors, consistent with TPB's proposition that intention is the most proximal determinant of behavior.

These findings contribute to existing evidence that the relative weights of cultural, social, and infrastructural factors in technology adoption may differ substantially from patterns observed in Western contexts. In this sample, conventional TAM variables did not independently predict adoption intentions after accounting for cultural and contextual predictors. The results support the value of integrating cultural constructs into adoption frameworks applied in collectivist settings, and suggest that financial inclusion strategies in comparable contexts may benefit from addressing cultural alignment and infrastructure access alongside technological communication.

7. Limitations and Directions for Future Research

7.1. Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design precludes causal inference; longitudinal designs would provide stronger grounds for causal conclusions. Second, the convenience-based snowball sample overrepresents young, male, lower-income respondents with secondary education, limiting generalizability to other demographic segments. Since all respondents were existing users, the study captures continued usage behavior rather than initial adoption decisions, and the perspectives of non-users are absent. Third, the sample size of 200 is insufficient for structural equation modeling or multi-group analysis. Fourth, although Sobel/delta-method 95% confidence intervals were computed alongside the Baron and Kenny [97] procedure as a robustness check, future replications using bias-corrected bootstrap procedures (e.g., the PROCESS macro) on the raw item-level data would provide additional inferential support for the indirect effects. Fifth, Cultural Influence was measured with only three items, and Egyptian culture was treated as homogeneous, which may limit construct validity. Sixth, the study does not measure downstream sustainability outcomes; whether adoption translates into financial inclusion or poverty reduction remains an empirical question beyond the current scope. Finally, the high intercorrelations among constructs suggest that structural equation modeling would be better suited to disentangling predictor relationships in future research.

7.2. Directions for Future Research

Subsequent research must tackle these limitations via multiple approaches. Longitudinal designs would clarify the temporal dynamics of adoption and test whether cultural factors diminish in importance as mobile payment systems mature. Comparative studies among Arab nations with diverse cultural characteristics would evaluate the regional applicability of the results. Studies incorporating non-adopters, alongside qualitative methods exploring family decision-making and community influence, would provide a more complete picture of adoption dynamics. Bootstrapped mediation analysis and confirmatory factor analysis would strengthen methodological rigor. Finally, research directly measuring sustainability outcomes—financial access, income resilience, and inequality indicators—would establish whether adoption translates into the development benefits central to Egypt's Vision 2030 and the 2030 Agenda for Sustainable Development.

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