African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Investigating Trust In M-Wallets: Developing An Assessment Tool

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Pour citer cet article : **BOUALOU .S & EL HARAOUI .I (2023) « Investigating Trust In M-Wallets: Developing An Assessment Tool », African Scientific Journal « Volume 03, Numéro 20 » pp: 417 – 435.**

Date de soumission : Septembre 2023

Date de publication : Octobre 2023

DOI : 10.5281/zenodo.10037078

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Abstract

This article delves into trust issues concerning m-wallet adoption in Morocco. Given the pivotal role of m-wallets during the COVID-19 pandemic, exacerbated by lockdowns and social distancing measures, our study seeks to create a bespoke instrument to assess trust among Moroccan m-wallet users. Drawing from a comprehensive review of literature on trust within financial technologies and the applied methodology, our research aims to pinpoint factors that drive Moroccan consumers' propensity to embrace m-wallets. Despite Morocco's notable mobile connectivity and widespread internet usage, hurdles to financial inclusivity persist, leaving a considerable segment of the adult populace without banking access. In our endeavor, a survey involving 181 respondents was conducted, leading to the formulation of an enhanced four-item measurement scale. This scale aids stakeholders in devising strategies to bolster user trust, ultimately catalyzing broader m-wallet uptake. For the integrity of our trust indicators, an Exploratory Factor Analysis was performed. The results resonated well with recognized standards, reinforcing the validity of our findings.

Keywords : *M-wallets, trust, measurement scale, COVID-19, client adoption ,mobile banking*

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Vol : 3, Numéro 20, Octobre 2023

INTRODUCTION:

The unprecedented upheavals spurred by the COVID-19 pandemic have drastically altered the nature of daily interactions and transaction methods worldwide. In Morocco, as in various other countries, these disruptions resulted in economic downturns, necessitating adaptations to new operating methods, facilitated significantly by advancements in technology during recent decades. The exigencies of the pandemic and the consequent implementation of national lockdowns and social distancing policies underscored the urgency of transitioning to online lifestyles and financial transactions, culminating in a noticeable surge in the adoption of banking applications, including m-wallets (Silanoi et al., 2023; Chang et al., 2020; Eikenberry et al., 2020; Sreelakshmi et al., 2020).

In this changing landscape, m-wallets emerged as innovative and essential tools, providing a convenient alternative to traditional payment methods and offering services such as secure transactions, bill settlements, and instant fund withdrawals through accounts managed by banking or payment institutions. These developments are particularly pivotal in the Moroccan context, where the potential risk of virus transmission through physical cash usage was recognized, prompting an increase in m-wallet adoption. However, despite the high mobile penetration rate and widespread internet access in Morocco, significant challenges persist in achieving financial inclusion, with a considerable segment of the adult population remaining unbanked and existing payment systems yet to fully realize the desired results.

A prevailing issue impacting the adoption of m-wallets, not only in Morocco but also in other emerging markets, is trust. Consumers exhibit marked hesitation, mainly attributable to distrust towards the security of online transactions and uncertainty regarding the protection of personal data (Kuisma et al., 2007; Littler et al., 2006). These trust issues pose significant obstacles to the widespread adoption of this technology, despite its obvious benefits such as convenience and speed of transactions.

Addressing this critical challenge, Morocco has implemented institutional communication strategies in collaboration with GP2M [1]and integrated dynamic QR codes into existing payment terminals, particularly in large-scale retail outlets, to promote m-wallet acceptance and educate the public about the benefits of this new electronic payment method. Moreover, inspired by successful experiences in other African countries like Kenya, Morocco is exploring the

[1] Groupement du paiement mobile Maroc « The Moroccan Mobile Payment Consortium »

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establishment of a unified mobile payment brand with the aim of enhancing the recognition of payment acceptance points and achieving widespread adoption.

This article examines trust issues related to m-wallets in Morocco. We aim to create a tool to measure consumer trust and identify key factors that influence their choice to use m-wallets. After reviewing current research on trust in fintech and explaining our methods, we focus on understanding trust factors specific to Morocco. Our goal is to figure out how to address these factors and encourage more people to use m-wallets.

In summary, this research aims to deepen our understanding of trust and the challenges associated with using m-wallets in Morocco. Through an Exploratory Factor Analysis of items identified from previous literature reviews, we seek to evaluate their reliability and validity in the Moroccan context. Our goal is to offer concrete recommendations to enhance m-wallet services and elucidate the factors that instill trust in consumers.

LITERATURE REVIEW : UNPACKING THE CONCEPT OF TRUST

Trust, a multifaceted and complex concept, is central to a multitude of disciplines including psychology, sociology, economics, information systems, and management science (El Haraoui, 2016; Mayer et al., 1995). While myriad definitions exist, a common thread is the understanding of trust as a state, belief, or positive expectation, often involving vulnerability and reliance on others (Paliszkiewicz, 2011; Mayer et al., 1995).

Sztompka (1999) encapsulates trust as an expectation of benevolent actions from others – be it individuals, groups, or institutions – leading to one's well-being. Mayer et al. (1995) offer a nuanced definition, describing trust as the willingness of a party to be vulnerable based on the expectation that another will perform an action important to the trustor, regardless of the ability to monitor or control that party. Trust comprises several dimensions, including integrity, competence, reliability, and benevolence (Mayer et al., 1995; Rousseau et al., 1998).

From a psychological standpoint, trust is interpreted as a state involving confident positive expectations about another's motives in situations entailing risk (Deutsch, 1958; Rotter, 1967). Interpersonal trust is foundational to social exchange and cooperation, shaped significantly by individuals' past experiences and socialization processes (Rotter, 1967).

In the sociological realm, scholars like Luhmann (1979) and Giddens (1990) perceive trust as a cornerstone in social systems. Luhmann (1979) postulates that trust mitigates complexity in social systems, fostering cooperative and risky behaviors, while Giddens (1990) envisions trust as an indispensable mechanism in modern societies, intertwined with abstract systems and expert knowledge.

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Economically, trust is deemed pivotal for facilitating transactions and minimizing transaction costs (Fukuyama, 1995; Knack & Keefer, 1997). Arrow (1972) and Arrow (1974) both consider trust as a lubricant for economic activities, enhancing efficiency and development by reducing frictions in exchanges.

1. Dimensions of trust

1.1 Organizational Trust:

Organizational trust equates to institutional or sociological trust. It mirrors a person's willingness to trust based on structural assurances such as legal frameworks, security measures, and established best practices (McKnight et al., 1998).

1.2 Personal Trust:

Focusing on the psychological dimension, personal trust recognizes the distinct traits, behaviors, and experiences that form an individual's trust levels (Sharif et al., 2014; Lui and Jameison, 2003).

1.3 Technological Trust:

Technological trust, central to our study, evaluates the relationship between the user and technology, considering the technology's attributes and effectiveness (McKnight et al., 2011; Koo & Wati, 2010).

In every instance of trust, there is a trustor and a trustee. This relationship presupposes benevolence from the trustee and involves a certain degree of uncontrol and dependency, extending beyond interpersonal to institutional relations (Whitener et al. 1998).

2. The Interplay and Implications of Trust

Trust operates in domains of uncertainty and risk. Various terms defining trust such as belief, expectation, willingness to trust, and confidence only skim the surface of the trustor's mindset and do not wholly encapsulate the concept. The notion of attitude, often attributed to trust by sociologists, is more a consequence than a definition.

Given its multidimensional nature, trust is classified into institutional, personal, and cognitive trust by McKnight et al. (1998), a classification echoed by Soderstrom (2009) and supported by numerous studies. This highlights the critical role of trust in influencing individuals' reliance on people, organizations, or technology.

3. Antecedents of Trust in Technology:

With the advent of the Internet and digital technologies, understanding trust in technology has gained significance. Researchers like McKnight et al. (2002) and Pavlou (2003) have explored trusting beliefs and the influence of trust on consumer intentions in online transactions,

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underlining its pivotal role in the adoption of digital services. Lee and Turban (2001) have identified perceived security, privacy, and credibility as key dimensions influencing user attitudes towards the safety and reliability of online platforms.

Several studies have delved into the interplay between trust and perceived risk, illustrating how trust mitigates perceived risk and influences technology adoption and user acceptance of services like Internet banking (Kim et al., 2009; Lu et al., 2010). Moreover, the role of social influence on trust in technology has been emphasized, exploring how subjective norms and social factors shape trusting beliefs and attitudes towards technology (Cheung and Lee, 2006). Identifying the right contributing factors is essential for understanding technological trust comprehensively, especially in areas like mobile banking services (McKnight et al., 2011). Seven specific antecedents—confidentiality, integrity, authentication, non-repudiation, access control, availability, and best business practices—have been recognized as fundamental to technological trust (Wang et al, 1996; Bhimani, 1996; Marcella et al., 1998; Parker, 1995; Ratnasingam et al., 2002; Hwang et al., 2007).

These antecedents address various aspects such as privacy protection, accuracy and legitimacy of transactions, ensuring non-denial of participation in transactions, infrastructural safeguards, institutional aspects, and consistent availability of services. Issues like weak signals, defective devices, and lack of services contribute to a decline in trust. These factors, when considered together, provide a holistic theoretical explanation of the concept of technological trust, elucidating its role in the adoption of digital services, particularly mobile banking.

4. The importance of technological trust for mobile banking

Given that mobile banking services are relatively new electronic delivery modes offered by banks, people might choose not to adopt mobile banking for reasons of security or privacy (Laforet et al, 2005; Lee et al, 2003). A lack of trust is one of the most frequently cited reasons explaining why customers do not use mobile banking services (Kim et al., 2009; Lee et al, 2009). Therefore, trust has become central to the use of innovative financial products and services. Yao et al (2013).

The reason why this factor is considered important in adopting mobile banking technologies is that mobile banking services create a mobile commerce structure different from the traditional one (Yousafzai et al, 2009). Aladwani (2001) argued that trust is a major challenge of online banking transactions, as these transactions lack the physical presence of a branch and direct interaction between the bank staff and the client. In the absence of these components, all fundamental to the traditional financial environment, users are supposed to adopt mobile

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banking services and forego traditional transaction methods in favor of conducting their financial activities through mobile devices and mobile communication networks. This creates a dependence on these mobile infrastructures and their providers to conduct activities reliably and safely (Lee et al, 2013). This dependence also creates vulnerability among users adopting this technology, and before a user can adopt the technology, they must be willing to expose themselves to this vulnerability with a minimum fear of repercussions (Rousseau, 1998). In the mobile banking services environment, users enjoy a wide range of benefits but are also exposed to risks such as security breaches or privacy issues (Lee et al, 2013). This is where trust in technology comes into play, as it allows users to put themselves in situations they cannot fully control with the hope of receiving benefits while also exposing themselves to the risk of disappointment and harm (Jarvenppa et al, 2000). Trust is therefore essential in implementing and adopting mobile banking technologies because, when trust in technology is established, users are more likely to allow themselves to benefit from it despite potential risks (Koo et al, 2010).

Trust in these technologies plays an important role in user adoption decisions, creating a relationship between trust, user adoption, and project success when trust in technologies leads to a willingness to adopt higher adoption rates and successful implementation. Conversely, a lack of trust will result in a lower willingness to adopt, lower adoption rates, and project failure (Lee et al, 2013) since it allows users to believe that mobile service providers have enough capacity and benevolence to provide them with useful services. Maroofi et al (2013).

5. Trust in mobile wallets

As the use of mobile wallets (m-wallets) proliferates, examining trust in this technology becomes paramount to understand user adoption and usage patterns. Several studies have delved into this subject, offering varied perspectives and findings that shape our understanding of trust in m-wallets.

One seminal study in this domain is by Kim et al. (2009), who explored the interplay between trust and perceived risk in online environments, establishing that trust mitigates perceived risk and influences user behavior and technology adoption. This finding is particularly pertinent to m-wallets, where transactional security is a common user concern.

Similarly, Pavlou (2003) conducted a pivotal investigation on how trust influences consumer intentions in online transactions, underlining trust's vital role in adopting digital services, including m-wallets. The study provided insights into user willingness to engage with m-wallet services based on the perceived trustworthiness of the technology.

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Building on these foundational studies, Lee and Turban (2001) identified key dimensions of trust in technology, including perceived security, privacy, and credibility. Their work has been instrumental in assessing user trust in m-wallets, focusing on how these dimensions influence user beliefs about the safety and reliability of m-wallet platforms.

Further, the work of McKnight et al. (2011) and Hwang et al. (2007) proved influential in identifying specific antecedents of technological trust, such as confidentiality, integrity, authentication, non-repudiation, access control, availability, and best business practices. These antecedents are critical in evaluating the factors that contribute to trust in m-wallets, with subsequent studies affirming their relevance (Ratnasingam et al, 2002; Maroofi et al, 2013).

In the realm of m-wallets, Ariff et al. (2013) explored confidentiality and established that customer trust is significantly influenced by the technology's ability to protect transactions and personal data from unauthorized access. This finding is echoed by other studies pointing to the necessity of robust security features in fostering trust in m-wallets.

Additionally, research by Cheung and Lee (2006) on the role of social influence on trust in technology highlighted the impact of subjective norms and social factors on individuals' trusting beliefs and attitudes towards m-wallets. This work underscores the importance of societal perspectives in shaping trust in emerging technologies.

A recent study by Koo et al. (2010) emphasized that once trust in m-wallet technology is established, users are likely to engage with the service despite potential risks, thereby underscoring the crucial role of trust in the adoption and continued use of m-wallets.

6. Development of a trust measurement instrument for mobile wallets

Defined earlier in the literature review, the concept of trust and its significant impact on the adoption of technologies have been identified as crucial in embracing new services or technologies, such as m-wallets (Laforet et al., 2005). Trust in the context of m-wallets has been explored by several authors, such as Akturan et al. (2012), Arif et al. (2016), Bagadia et al. (2016), Cruz et al. (2010), and a recent study by Makanyeza (2017) in Zimbabwe.

To gain a deeper understanding of the concept of trust in the adoption of m-wallet services by consumers, particularly in the Moroccan context, an in-depth study on the characteristics of trust was conducted. The concept was delineated into four facets deemed most important in terms of trust.

Ondrus and Pigneur (2007), Qin et al. (2017), Zhou (2012), and De Kerviler et al. (2016) contributed significant insights into the technological aspects and consumer behavior associated with m-wallets, emphasizing the pivotal role of trust in their adoption. Studies by Kim et al.

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(2016) and Shaikh and Karjaluoto (2015) addressed the security and privacy concerns and their influence on trust, underscoring the need for stringent security measures to establish consumer trust in m-wallets.

Moreover, the research conducted by Agur, Ari, and Dell'Ariccia (2021) and Mbiti and Weil (2016) shed light on the implications of m-wallets on monetary policy and financial inclusion, highlighting how trust in m-wallets can potentially foster financial inclusivity, especially in regions with scarce banking infrastructure.

Table 1 – Measurement scale developed for the concept of Trust

Code	Item	Author(s)
ITEM _TRUST _1	Your bank is trustworthy	Gu et al. (2009)
ITEM _TRUST _2	This bank has the skills to provide good mobile service through M-Wallet.	Li et Yeh., (2010)
ITEM _TRUST _3	You feel confident in this bank as it takes my interests into account through M-Wallet.	Pavlou, (2003)
ITEM _TRUST _4	The bank prioritizes me as a customer through M-Wallet.	Malaquias and Hwang (2016)

Source : Based on the literature review.

METHOD

The survey was administered and data were gathered through the internet, with a particular emphasis on utilizing social media platforms, throughout February 2023. This approach has been increasingly adopted and proven successful in academic research in recent years. According to Gavard-Perret et al. (2012), online surveys offer an opportunity for a polished and interactive visual presentation while maintaining the anonymity of respondents. We targeted a convenience sample, specifically focusing on individuals who have a bank account but do not utilize mobile banking services.

Thiétart (2014) emphasizes that different types of validity are relevant either to the research as a whole (internal and external validity) or to specific components of it (such as concepts or the instruments used for measurement). To ascertain the validity and reliability of items measuring trust among Moroccan consumers, all items were meticulously evaluated. These items will be measured using a five-point Likert scale, ranging from 1, denoting "Strongly Disagree," to 5, signifying "Strongly Agree."

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Carricano et al. (2009) propose that the sample size should depend on the number of items being analyzed, suggesting a minimum of five observations per item, with a ratio of 10 to 1 being preferable. Through a questionnaire distributed via Google Forms, we managed to gather 181 responses. Among these, ten were used as a pre-test sample, facilitating the clarification of ambiguous questions and the correction of various errors related to spelling, sequencing of questions, and types of responses for sociodemographic profiling. The first question was designed to determine the most frequently used channels by respondents for conducting banking transactions, followed by items relating to trust, and queries for demographic profiling.

We have opted for Exploratory Factor Analysis (EFA) as our analytical method, a decision motivated by EFA's ability to unveil the latent structure in a manner similar to principal component analysis. This reveals why certain variables within our study correlate, while others do not. EFA is prevalently utilized in quantitative research, a preference that might be partially due to its designation as the default extraction method in various analytical software, as noted by Bourque et al. (2006).

Applying factor analysis necessitates adherence to the criteria for data that can be factorized. As articulated by Evrard et al. (2009), this implies that "The dataset must form a coherent ensemble, thereby making it plausible to search for meaningful common dimensions rather than mere statistical artifacts." To achieve this, we align with the tests proposed by Bourque et al. (2006) to confirm the applicability conditions for EFA, which include:

• Pearson Correlation Matrix
• Barlett's Test of Sphericity
• Anti-image Matrix
• Kaiser's Measure of Sampling Adequacy (KMO)

Following this, to ascertain the internal validity of our measurement tool, we will ensure that the value of Cronbach's Alpha aligns with the threshold as recommended by Evrard et al. (2009).

RESULTS AND DISCUSSION

1. Demographics of participants

The composition of the acquired sample substantiates that the respondents' profiles aptly encapsulate the diversity inherent in the bank's clientele, spanning variations in gender, age, socio-professional classifications, and levels of education.

The ensuing data delineate a gender distribution where women constitute 57% of the respondents, juxtaposed with 43% men, exemplifying a harmonious gender representation

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within the sample. Furthermore, a noteworthy proportion of the participants demonstrate elevated educational attainments; 49% of the individuals surveyed possess qualifications that are Bachelor's degree or higher, juxtaposed against the 18.4% whose educational background is up to or below the high school level.

Additionally, the sample predominantly features a younger demographic, with 32% falling within the 26 to 35 age bracket and 26% below the age of 25. A significant segment of this diverse cohort is represented by individuals in upper-management roles, accounting for 25.5%, and students, comprising 39.8% of the sample. This demographic heterogeneity effectively mirrors the extensive and varied customer base associated with the bank in focus.

2. Results of Preliminary Tests Prior to EFA (Exploratory Factor Analysis)

Initially, a thorough verification of the Pearson correlation matrix was conducted. The corresponding table (Appendix 1) reveals that all selected items, notably those measuring "Trust", are significant and positive at the α=0.01 level. The inter-item correlations are neither excessive ($r > 0.80$) with a maximum observed at (r=0.779), thereby eliminating any potential risk of collinearity, nor insufficient ($r < 0.30$) with a minimum of (r=0.325). This preliminarily suggests that the variance of the items can be attributed to a common latent trait.

To confirm the adequacy of the correlations between the items for conducting a factor analysis, the Bartlett's test of sphericity was employed. The significant results ($P < 0.000$) support the factorability of the data and refute the null hypothesis. Additionally, the measure of sampling adequacy, indicated by a KMO = 0.808, denotes good data adequacy for exploratory factor analysis, surpassing the threshold of 0.7. Based on these results and the anti-image matrix, all items, with KMO-MSA values exceeding the 0.50 threshold, have been retained for the factor analysis. (Kaiser HF.,1974)

Table 2 : Results of the exploratory factor analysis

Items	Representation Quality	Factorial Contributions
ITEM _TRUST _1	0.844	0.919
ITEM _TRUST _2	0.797	0.893
ITEM _TRUST _3	0.767	0.876
ITEM _TRUST _4	0.585	0.765
Eigenvalue		2.993
Explained Variance		74.81%

Source: Data processed from Research Results

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The factor analysis, conducted using a principal component extraction method and a Varimax rotation, on the four items of the "Trust" construct, reveals a unidimensional structure. A single factor, accounting for 74.81% of the total variance with an eigenvalue of 2.993, has been extracted. The factorial contributions of the items, all substantially exceeding the 0.5 threshold, indicate quality representation and significant contribution to the extracted factor. Consequently, the calculated Cronbach's alpha for the scale is 0.883, demonstrating high internal reliability, thereby justifying the retention of all items in the measurement instrument.

3. Factor analysis results's

The exploratory factor analysis was conducted on the entire set of selected items, utilizing a principal axis factoring extraction method accompanied by a Varimax rotation.

Table 6 : Realibility Test

Items	α if item deleted	Scale α
CONFIA_PERCUE_1	0.819	0.883
CONFIA_PERCUE_2	0.832	
BA_CONFIA_PERCUE_3	0.845	
CONFIA_PERCUE_4	0.901	

Source: Data processed from Research Results

The exploratory factor analysis of the items, utilizing a Varimax type rotation, verifies that the measuring instrument is unidimensional. A singular factorial axis accounts for 74.81% of the variance, with an eigenvalue of 2.993. The results signify that the chosen items, BA_CONFIA_PERCUE_1, BA_CONFIA_PERCUE_2, BA_CONFIA_PERCUE_3, and BA_CONFIA_PERCUE_4, substantially contribute to the extracted factor, with factorial weights far exceeding the 0.5 threshold. These items have quality of representation values of 0.844, 0.797, 0.767, and 0.585 respectively, and factorial contributions of 0.919, 0.893, 0.876, and 0.765.

Additionally, the measure of sampling adequacy (KMO) has reached a value of 0.808, signifying good data adequacy for exploratory factor analysis. The Bartlett's test of sphericity is significant, supporting the factorability of the data and refuting the null hypothesis. The anti-image correlation (MSA) for the items are 0.746, 0.815, 0.813, and 0.909, respectively, while the Cronbach's alpha in case of item removal range between 0.819 and 0.901.

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We assessed the reliability of the measurement scale utilizing the calculation of Cronbach's alpha coefficient (α). Adhering to the α thresholds advocated by Evrard et al. (2009), which stipulate that a value exceeding 0.6 is deemed acceptable, we can conclusively assert that the scale exhibits assured internal validity, evidenced by a Cronbach's alpha of 0.925.

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CONCLUSION

In conclusion, this research delineates trust into four distinct facets, thereby enriching the understanding of these elements within the sphere of M-Wallet. The derived results enabled a refinement of the item list, narrowing it down to four reliable and valid items, thereby establishing an instrument apt for measuring the concept of trust as it is perceived by Moroccan consumers in relation to M-Wallet.

The conducted exploratory factorial analysis substantiates the unidimensional essence of this concept, with the selected items post-analysis showcasing an exemplary fit. Remarkably, this factorial solution elucidates a significant 74.81% of the total variance of perceived trust, a rate that aligns with the established norms in management sciences, typically ranging between 50% and 70% (Evrard, 2003; El Haraoui, 2016). The KMO test, registering at 0.808, further validates this factorial solution, underscoring its robustness.

Prior research has endeavored to develop measurement scales for the concept of trust, with noteworthy contributions from Featherman et al. (2003). However, studies specifically focusing on M-Wallet within the Moroccan context remain conspicuously scarce. This paper, therefore, seeks to bridge this research gap, providing theoretical insights while ensuring alignment with the consumer behavior characteristic of the Moroccan demographic. The insights gleaned from this research can serve as foundational for subsequent studies, assessing the scale's relevance in various contextual settings.

The implications of this study are manifold, offering valuable perspectives for the enhancement and widespread adoption of mobile applications, especially in the financial sector. The insights gleaned are pivotal for financial institutions and developers, underscoring the imperative to meticulously consider all dimensions of perceived trust and prioritize the mitigation of intrusion, fraud, and identity theft. The elements of our measurement instrument emerge as quintessential criteria for those assessing or developing M-Wallet services.

Moreover, this study is a reservoir of strategic insights for bank managers and researchers, aiding in the formulation of nuanced segmentation and positioning strategies, and fostering the development of efficacious communication strategies for diverse consumer segments. Such a focused approach not only fortifies the relationship with existing users by ensuring a gratifying user experience but also augments the confidence among potential adopters of M-Wallet.

Notwithstanding the contributions, this research is not impervious to limitations. The confinement to four dimensions of trust, while relevant, leaves room for further exploration of additional facets. The predominance of student participants in the questionnaire posits a

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potential skewness in perspectives, highlighting the need for a more diversified participant pool. Lastly, the temporal scope of data collection warrants expansion to facilitate a more comprehensive evaluation of such a pivotal concept, thereby enabling a more nuanced understanding of the adoption dynamics of online financial services.

In light of the aforementioned, this research serves as a springboard for further scholarly inquiry into the domain of M-Wallet, offering a nuanced lens through which trust is perceived by consumers, and laying the groundwork for future studies in varied cultural and contextual landscapes. The managerial implications derived are instrumental for institutions aiming to optimize their mobile services, ensuring the alignment with user expectations and fostering a secure and trusting digital environment.

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