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“Determinants of mobile payment and mobile wallet adoption in Morocco”

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Determinants of mobile payment and mobile wallet adoption in Morocco

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Abstract: The Moroccan National Financial Inclusion Strategy, launched in 2018, defines the deployment of mobile payment as one of its first pillars. However, five years after its launch, the adoption of mobile payment and mobile wallet remains very low. This paper investigates the determinants of mobile payment and mobile wallet adoption from the point of view of the various stakeholders: 351 clients and users of mobile payment and mobile wallets; 100 grocery retailers; and managers of the Moroccan Central Bank, HPSS, banks and payment companies. Our results identify drivers, opportunities and barriers of mobile payment and mobile wallet adoption in Morocco and present several practical implications and recommandations for public authorities, banks, payment and finance companies, mobile payment service providers and end-users.

1. Introduction

Technological innovations such as mobile phones and the Internet have a significant impact on both social and professional aspects of life (de Sena Abrahão *et al.*, 2016). They offer numerous advantages to users, including increased flexibility, mobility, and efficiency (Rao and Troshani, 2007). Mobile payment, also known as m-payment, refers to purchasing, bill payments, acquisitions, or transferring values through mobile devices (such as cell phones or smartphones), without the necessity of involving traditional banking institutions (Bitner, 2001; Rao & Troshani, 2007; Chen & Nath, 2008; Dahlberg *et al.*, 2008; Diniz *et al.*, 2011; Patil *et al.*, 2020; Alkhowaiter, 2020). Regarding mobile wallet, it is defined as an application on mobile phones or a virtual wallet that provides the possibility to perform several financial transactions, including storing and transfering money (Zhao and Muftic, 2011, Patel, 2016a, Patel, 2016b). This application can also store personal and sensitive data such as passports, insurance policies and credit card information (Shin, 2009).

In Morocco, the use of mobile payment and mobile wallets presents several challenges: the penetration rate of mobile telephony is 137.5%, with 400 billion cash transactions and an annual sales value of grocery retailers reaching around 290 billion dirhams (27 billion euros). However, despite the initiatives and incentives taken by the Moroccan Central Bank, the Ministry of Economy and Finance, and the Ministry of Commerce and Industry (including fiscal and equipment incentives such as tax reductions for merchants accepting mobile payments, reduced VAT for customers using m-wallets as a payment method, providing assistance to small merchants in terms of technological equipment and offering training, as well as reducing the operating costs of mobile payments to ensure wider adoption, particularly

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among merchants), the adoption of mobile payment and mobile wallets in Morocco remains very low.

This paper aims to investigate the determinants of mobile payment and mobile wallet adoption from the perspective of various stakeholders: end-users (consumers and grocery retailers) and institutional entities (the Moroccan Central Bank - Bank Al-Maghrib, HPSS, banks, and payment companies). Therefore, we seek to address the following four questions: What factors determine user adoption of mobile payment? Why do Moroccan users adopt m-wallets? What are the drivers and barriers of mobile payment adoption among grocery retailers? And what is the point of view of professionals?
The main contribution of this study lies in addressing the existing gap, as far as we are aware, in the research landscape by examining mobile payment and mobile wallet adoption from the viewpoints of both end-users (consumers and grocery retailers) and institutional entities (the Moroccan Central Bank - Bank Al-Maghrib, HPSS, banks, and payment companies). Our findings hold practical implications for various stakeholders. This study is motivated by the significance that mobile payment adoption holds for the Moroccan authorities. In this paper, we use first-hand data, collected through:

- Online questionnaires administered to a sample of 351 clients and users of mobile payment and mobile wallets;
- Interview guides conducted with a sample of 100 grocery retailers from the five main Moroccan cities: Rabat, Casablanca, Tangier, Fes, and Marrakech;
- Interview guides carried out with managers from the Moroccan Central Bank - Bank Al-Maghrib, HPSS, banks, and payment companies.

Sections 2 and 3 aim to investigate factors influencing the adoption and the intention of adoption of mobile payment and mobile wallet in Morocco. Section 4 studies grocery retailers' acceptance of mobile payment in Morocco. Finally, section 5 presents professionals' point of view.

2. What determines users adoption of mobile payment?

This section aims at investigating the factors influencing the adoption and the intention of adoption of mobile payment in Morocco. We used a quantitative survey using a questionnaire that was prepared based on the constructs of the extended Meta-UTAUT model and was refined based on the theoretical and literature reviews. We collected 351 valid questionnaires, and 12 hypotheses were defined. Our results show the positive influence of performance expectancy, effort expectancy, personal innovativeness, anxiety and trust on attitude toward using mobile payment. Moreover, results demonstrate that facilitating conditions and attitude influence behavioral intention and that performance expectancy and behavioral intention influence users behavior. However, we find that the impact of social influence on behavioral intention and the influence of grievance redressal on user behavior are not significant.

a. Theoretical background

Several theories and models explained individuals' adoption and intention of use of information systems and information technology. The Theory of Reasoned Action (Fishbein and Ajzen 1975; Ajzen and Fishbein, 1980) was the first theory to explain the individual behavior to adopt technology (Venkatesh *et al.,* 2003) using its own behavioral intention, the attitude toward behavior and the subjective norm. This theory was extended to the Theory of Planned Behavior TPB (Azjen, 1991) according to which individuals' actions are influenced by their intentions

and perceptions of control (Ajzen 1991, 2001). Still another theory is the Technology Acceptance Model (TAM) (Davis, 1989) which includes three variables: perceived usefulness, perceived ease and subjective norm. The Decomposed Theory of Planned Behaviour (DTPB) (Taylor and Todd 1995a, 1995b) is a combination of TAM and TPB and explains attitude toward behavior using subjective norm, percieved behavioral control and perceived usefulness. The Model of PC utilization *(*Thompson *et al.*, 1991*)* predicts individual's use of IS/IT using job-fit, complexity, long-term consequences, affect towards use, social factors and facilitations conditions while the Social Cognitive Theory (Compeau and Higgins, 1995a), derived from the Model of PC utilization, explains the use of technology (Compeau and Higgins, 1995a; 1995b) using outcome expectations – performance, outcome expectations – personal, self-efficacy, affect and anxiety. The motivational model (Davis *et al.*, 1992) explains the use and adoption of IT using extrinsic motivation and intrinsic motivation and the Innovation Diffusion Theory (IDT) (Rogers, 1995) explains the individual technology acceptance by relative advantage, ease of use, image, visibility, compatibility, results demonstrability and voluntariness of use.

In 2003, Venkatesh *et al.* (2003) proposed the Unified Theory of Acceptance and Use of Technology UTAUT by combining the eight models and theories presented above. The UTAUT is considered as the most inclusive model (Tai and Ku, 2013) as it integrates both psychological and behavioral theories (Wong and Huang, 2011) to explain the intention to adopt and use new technologies (Celik, 2016). Venkatesh *et al.* (2003) define four factors that influence behavioral intention and use behavior, namely: performance expectancy, effort expectancy, social influence, and facilitating conditions. However, the UTAUT presents three main limitations (Dwivedi *et al.*, 2019): (1) only few studies apply the complete UTAUT model and generally moderators are dropped; (2) relationships proposed in the original UTAUT model may be reconsidered for completeness; (3) and the original UTAUT model may be reconsidered. Also, as the UTAUT was developed within an organizational context to explain employee technology acceptance. Venkatesh *et al.* (2012) extended the UTAUT and proposed the UTAUT2 that allows understanding consumer technology acceptance (Patil *et al.*, 2020). The UTAUT2 includes three more variables to the initial UTAUT model: hedonic motivation, price value/price sensitivity and habit. The moderating variables are individual differences (age, gender and experience). The UTAUT2 is considered as more accurate and stronger since it explains individual's intention to adopt technology using environmental, individual and technological constructs (Nwagwu and Akeem, 2013). However, one of the limitations of UTAUT/UTAUT2 is that they were developed in an organizational context and do not take into consideration individuals attributes. Based on a re-examined UTAUT model proposed by Diwivedi *et al.* (2019), Patil *et al*. (2020) presented the Meta-UTAUT model, a combination of meta-analysis of UTAUT studies and Structural Equation Modelling and includes four independants constructs: Personal innovativeness, Anxiety, Trust and Grievance redressal (figure 1). Dwivedi *et al.* (2019) model includes performance expectancy, effort expectancy, social influence and facilitating conditions as explicative constructs, use behavior as dependent construct; attitude and behavioral intention as mediating variables. The meta-UTAUT model is more comprehensive and less complicated than UTAUT (Patil *et al.*, 2020).

b. Literature review

While literature review of the factors influencing the adoption of mobile payment is rich, these factors differ according to the different models used and according to the contexts of the studies. Thus, in the US, Khalilzadeh *et al.* (2017) investigate the determinants of the intention of use of NFC mobile payment in the restaurant industry using a combined UTAUT and TAM model. Results show evidence of positive effect of social influence on behavioral intention, of effort expectancy on attitude, of social influence on security, of security on trust, of trust on effort

expectancy and on behavioral intention. Results show also evidence of negative effect of risk on security and on trust whereas there is no effect of facilitating conditions on behavioral intention. Another study on the motivations and obstacles of accepting mobile payment services in the US was conducted by Jung *et al.* (2020), using the UTAUT model. Results show evidence of positive effect of performance expectancy, knowledge, trust, compatibility, and social influence on intention to use mobile payment services while there is no evidence of influence of effort expectancy, relative advantage and perceived risk on intention to use mobile payment. In Germany, Schierz *et al.* (2010) investigate consumer acceptance of mobile payment based on TAM model. Results show that perceived compatibility, perceived security, perceived usefulness, perceived ease of use, individual mobility and subjective norm explain consumers acceptance of mobile payment whereas the intention to use mobile payment is explained by perceived compatibility, attitude towards use and individual mobility. In the UK, Slade *et al.* (2015) implement an extended UTAUT model and find evidence of positive effect of performance expectancy, effort expectations, social influence, innovativeness and trust on behavioral intention. However, the effect of perceived risk and trust on behavioral intention is negative. In Taiwan, Lin *et al.* (2020) investigate the factors that impact the behavioral intention to adopt mobile payment using UTAUT2 model. According to the authors, there is a significant and positive influence of social influence, facilitating conditions, hedonic motivation, price value, compatibility, innovation, relative advantage, and observability on behavioral intention. The effect of performance expectancy, effort expectations and complexity on behavioral intention is not significant. In India, studies were conducted, among others, by Shakar and Datta (2018), Sobti (2019) and Sivathanu (2019) using respectively TAM, the UTAUT and a combination of the UTAUT2 and Innovation Resistance Theory. Thus, Shakar and Datta (2018) find that mobile payment adoption is influenced by perceived ease of use, self-efficacy, perceived usefulness, and trust. The impact of subject norm and personal innovativeness on mobile payment adoption is non-significant. Sobti (2019) find that facilitating conditions have significant effect on the adoption of mobile payment services whereas Sivathanu (2019) results show that behavioral intention is influenced using digital payment systems. In Pakistan, Raza *et al.* (2018) find positive impact of Performance expectancy, facilitating conditions, Effort expectancy on intention of use of mobile banking in islamic banks using a modified UTAUT model while the effect of social influence is found insignificant. Farah *et al.* (2018) investigate mobile banking adoption in Pakistan using UTAUT2 model. Results show that whereas performance expectancy, effort expectancy, social influence, hedonic motivation and perceived value influence positively behavioral intention, habit has a negative influence on behavioral intention. The effect of the constructs facilitating conditions, trust and perceived risk is non-significant while behavioral intention has a positive influence on use behavior. In China, Hongxia *et al.* (2011) find evidence of positive influence of performance expectancy and social influence on users acceptance of mobile payment. However, while Wang and Yi (2012) confirm the positive impact of performance expectancy on user behavior, the authors found no evidence of influence of social influence on behavioral intention. In Malaysia, Tang *et al.* (2014) investigate the determinants that affect Gen Y's behavior intention on mobile wallet adoption using UTAUT 2 model. Results show that performance expectancy, effort expectancy, facilitating conditions, hedonic motivation and habit influence positively the intention to use mobile wallet while the effect of social influence and price value was insignificant. In Cambodia, Do *et al.* (2019) find positive influence of performance expectancy and effort expectancy on behavior intention. In Qatar, Musa *et al.* (2015) use UTAUT model to investigate the factors that influence payment devices adoption. Results show that effort expectancy influences positively performance expectancy and the variables performance expectancy, social influence, perceived information and security influence positively behavioral intention. De Sena Abrahão et al. (2016) evaluate the determinants of behavioral intention of adoption of

mobile payment in Brazil, based on UTAUT. Results show that, while behavioral intention is explained by performance expectancy, effort expectation, social influence and perceived risk, there is no evidence of relationship between behavioral intention and perceived cost. Upadhyay et al. (2022) investigate the determinants of consumer adoption of mobile payment during COVID-19 using an extended Meta-UTAUT model. Results show that performance expectancy, effort expectancy and perceived severity have a significant positive impact on consumers' attitude; facilitating conditions has a significant positive impact on effort expectancy; attitude has a significant positive impact on behavioral intention and the latter has a significant positive impact on use behavior. Pal *et al.* (2019) presented an extended literature review on the factors that influence mobile payment adoption.

c. Proposed variables

Several variables have been used in the proposed models that investigate determinants of mobile payment and mobile wallet adoption. These variables are :

- *Performance expectancy* is the degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh *et al.*, 2003). It measures the degree to which individual believes that a system (*e.g.* mobile payment) is useful in carrying out its daily tasks (De Sena Abrahão *et al*., 2016).
- *Effort expectancy* is the degree of ease associated with the use of the system of technology (Venkatesh, 2003; Venkatesh, 2012). Prior studies proposed concepts that capture effort expectancy such as Perceived ease of use (Davis 1989; Davis *et al.,* 1989), Complexity (Thompson *et al.*, 1991) and the Ease of use (Moore and Benbasat, 1991). The influence of Effort expectancy is moderated by gender (stronger for women), age (stronger for younger women) and experience (at early stages of experience).
- Social influence is the degree to which an individual perceives that important others believe he or she should use a specific technology (Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012; Baishya & Samalia, 2020). It measures the degree of influence of others' opinions of the adoption of a system, e.g. mobile payment (De Sena Abrahão *et al*., 2016). The constructs retained for social influence are Subjective norm (Ajzen 1991; Davis *et al.*, 1989; Farah, 2017; Fishbeina and Azjen, 1975; Mathieson, 1991; Taylor and Todd 1995a, 1995b), Social factors (Thompson *et al.,* 1991) and Image (Moore and Benbasat 1991; Lu *et al.*, 2011a). The influence of social influence is moderated by gender, age, and experience (in both UTAUT and UTAUT2).
- *Facilitating conditions* refers to the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Facilitating conditions are represented in former studies as Perceived behavioral control (Ajzen 1991; Taylor and Todd 1995a, 1995b), Facilitating conditions (Thompson *et al.* 1991) and Compatibility (Moore and Benbasat, 1991).
- *Personal innovativeness* is the degree of willingness that users may have to accept technology (Agarwal and Prasad, 1998; Akour *et al.*, 2022). Agarwal and Prasad (1998) define two implications of personal innovativeness. The first, a practical implication, as it helps to identify individuals who are likely to adopt information technology innovations earlier than others; these individuals can operate as an opinion leader to simplify diffusion of a new technology. The second, a theoretical implication, as the use of personal innovativeness in different models can explain the role of individuals' traits in technology adoption.
- *Perceived innovativeness* is defined as "the degree to which consumers believe that the product possesses important attributes of innovation such as newness and uniqueness"

(Watchravesringkan *et al.*, 2010). There is an evidence of a positive impact of perceived innovativeness on the attitude (Patil *et al.*, 2020; Salamah, 2022).

- Anxiety is the fear felt by a consumer when using a new system or technology and may be caused by the fear of losing data or making errors (Simonson *et al.*, 1987; Venkatesh & Davis, 2000; Patil *et al.*, 2020).
- *Trust* is a subjective belief that a party (provider) will fulfil their obligations toward its client, in an environment characterized by risk, uncertainty and loss of control (Lu *et al.*, 2011b; Zhou, 2013a, Patil *et al.*, 2020). Qasim and Abu-Shanab (2016) define trust as the willingness of one party (purchaser) to be vulnerable to the second party (virtual establishment) and allow it to conduct important actions on their behalf. The lack or absence of trust cannot guarantee to consumers a convincing experience (Zhou, 2013a).
- *Grievance redressal* is a mechanism/system established by legal authority to address the disputes between a consumer and a service provider (Kumar *et al.*, 2018; Khurshid *et al.*, 2019).
- *Attitude towards the use of mobile payment system* is the sentiment of consumers regarding the adoption and use of mobile payment. Attitude is used as an explicative variable (e.g. TAM), as a dependent variable (e.g. DTPB) or as a mediating variable (e.g. Meta UTAUT).
- *Behavioral intention* determines consumer's future behavior (Oliver and Swan, 1989). The UTAUT defines three direct determinants of behavioral intention, namely: performance expectancy, effort expectancy and social influence (Venkatesh *et al.*, 2003) whereas the UTAUT2 adds four other determinants: facilitating conditions, hedonic motivation, price value and habit (Venkatesh *et al.*, 2012).

d. Hypotheses development

Based on the above literature review and on the extended Meta-UTAUT model proposed by Patil *et al.* (2020), we suggest the following hypotheses:

- *Performance expectancy:* From the previous studies, we remark that different constructs refers to performance expectancy such as Perceived usefulness (Davis 1989; Davis *et al*, 1989), Extrinsic motivation (Davis *et al.,* 1992), Job-fit (Thompson *et al.*, 1991), Relative advantage (Moore and Benbasat, 1991) and Outcome expectations (Compeau and Higgins, 1995; Compeau *et al.,* 1999). Performance expectancy is the main determinant of behavioral intention to use the technology (Fakhoury and Baker, 2016; Luo *et al.*, 2010; Hongxia *et al.*, 2011; Wang and Yi, 2012; Yu, 2012; Oliveira *et al.*, 2014). Venkatesh *et al.* (2003) suppose that the influence of performance expectancy is moderated by gender (stronger for men) and age (stronger for younger men). Patil *et al.* (2020) was the first to analyze the influence of performance expectancy on the use behavior of the mobile payment system. The lack of such studies, according to the authors, is due to the lack of data and the diversity of the measures of use behavior. Prior studies confirmed the impact of performance expectancy on mobile banking adoption (Farah *et al.*, 2018) and on mobile wallet adoption (Megadewandanu, 2016). Several studies confirm the influence of performance expectancy on attitude toward using mobile payment (e.g. Hongxia, 2011; Tang *et al.*, 2014; Musa *et al.*, 2015; Raza *et al.*, 2018; Farah *et al.*, 2018 ; Jung *et al.*, 2020). In this paper, we propose the following hypothesis :

H1: Performance expectancy positively influences the attitude toward using mobile payment

Following Musa *et al.* (2015) and Patil *et al.* (2020), there is a direct influence of Performance expectancy on the intention of use of mobile payment. Indeed, we propose the following hypothesis:

H2: Performance expectancy positively influences the use of mobile payment

- *Effort expectancy*: Prior studies confirm the impact of effort expectancy on mobile payment and mobile wallet adoption (Farah *et al.*, 2018; Megadewandanu, 2016). While Jung *et al.* (2020) found no influence of effort expectancy on attitude, the majority of papers found positive and significant relationship between effort expectancy and attitude (Tang *et al.*, 2014; Musa *et al.*, 2015 ; Khalilzadeh *et al.* ; 2017 ; Raza *et al.*, 2018 ; Farah *et al.*, 2018 ; Do *et al.*, 2019 ; Upadhyay *et al.*, 2022). In this study, we believe that effort expectancy positively influences the attitude toward using mobile payment:

H3: Effort expectancy positively and significantly influences the attitude toward using mobile payment

- Social influence: However, Dwivedi *et al.* (2019) used meta-UTAUT without any moderating variables. Raza *et al.* (2018), Tang *et al.* (2014) and Upadhyay *et al.* (2022) found insignifiant influence of social influence on consumers intention to use mobile payment wherease other studies confirmed the impact of effort expectancy on mobile payment (Hongxia, 2011 ; Musa *et al.*, 2015 ; Slade *et al.*, 2015 ; De Sena Abrahão *et al.*, 2016 ; Megadewandanu, 2016 ; Khalilzadeh *et al.*, 2017 ; Farah *et al.*, 2018 ; Jung *et al.*, 2020). We propose the following hypothesis :

H4: Social influence positively and significantly influences the behavioral intention to use mobile payment

- *Facilitating conditions*: Prior studies confirmed the impact of effort expectancy on mobile payment (Tang *et al.*, 2014 ; Raza *et al.*, 2018 ; Sobti, 2019 ; Lin *et al.,* 2020). We propose the following hypothesis :

H5: Facilitating conditions positively and significantly influences the behavioral intention to use mobile payment

Prior studies show that facilitating conditions influence effort expectancy (Stefi, 2015; Venkatesh & Bala, 2008; Patil *et al.,* 2020; Upadhyay *et al.*, 2022). Thus, we formulate the following hypothesis:

H6: Facilitating conditions positively and significantly influences effort expectancy

- *Personal innovativeness*: Patil *et al.* (2020) found evidence of significant and positive impact of personal innovativeness on attitude. Thus, we formulate the following hypothesis :

H7: Personal innovativeness positively and significantly influences the attitude toward using mobile payment

- Anxiety: Several studies show that anxiety influences negatively attitude (*e.g.* Park *et al.,* 2019 ; Patil, 2020 ; Wei *et al.,* 2021). In this study, we formulate the following hypothesis :

H8: Anxiety negatively and significantly influences the attitude of using mobile payment

- *Trust*: Thus, prior studies found that trust impacts positively consumer attitude (Slade *et al.*, 2015; Khalilzadeh *et al.*, 2017, Patil *et al.*, 2020; Widyanto *et al.*, 2021). Thus, we propose the following hypothesis :

H9: Trust in mobile payment system positively and significantly influences consumer attitude

- Grievance redressal : Kumar *et al.* (2018) found evidence of positive influence of perceived secutiry on intention to use m-wallet with grievance redressal as a mediating construct, while Patil *et al.* (2020) found that grievance redressal has a significant and positive impact on behavioral use of mobile payment. Thus, we formulate the following hypothesis :

H10: Grievance redressal positively and significantly influences behavioral use of mobile payment

- Attitude The effect of the attitude on consumers' intention to adopt mobile payment is positive (Schierz *et al.*, 2010, Patil *et al.*, 2020).

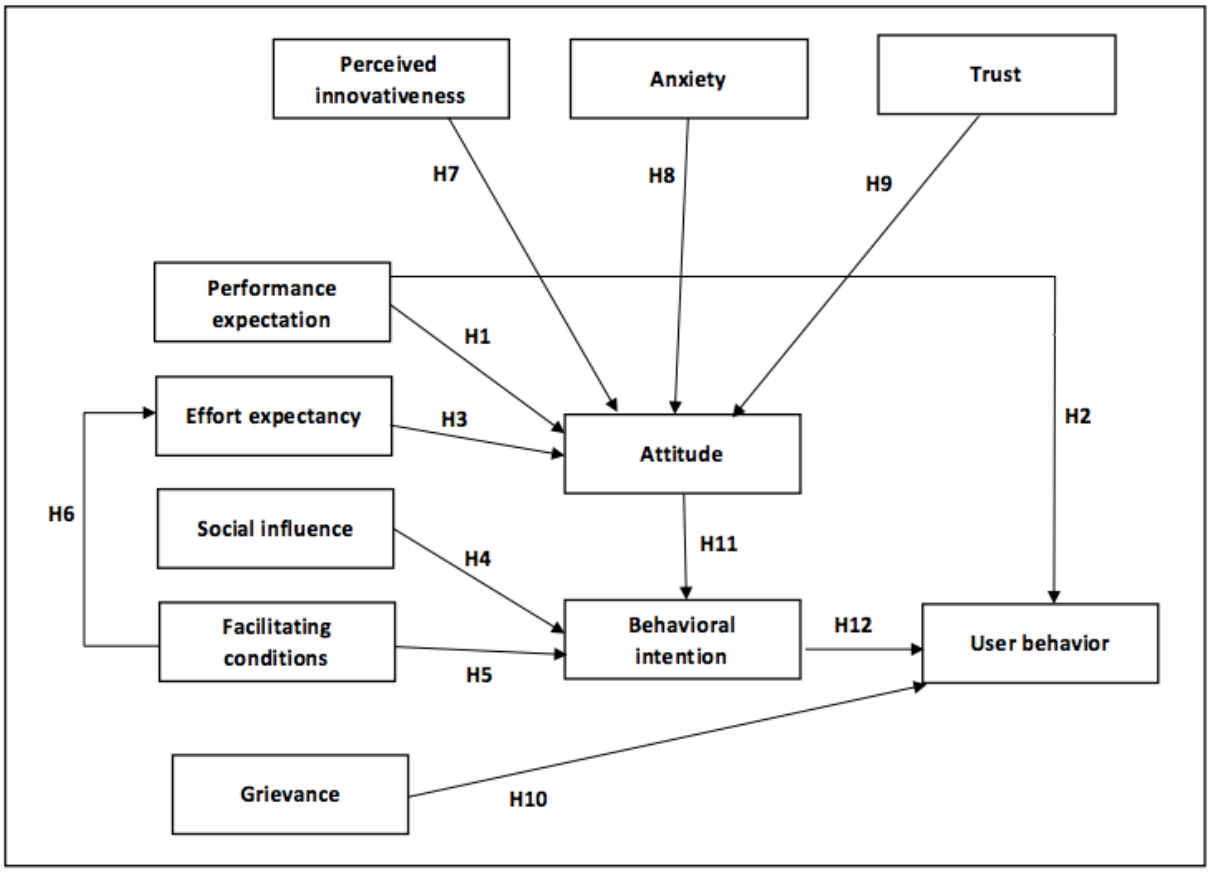
H11: Attitude towards the use of mobile payment influences positively and significantly consumers behavioral intention

- Behavioral intention: According to the proposed Meta-UTAUT model, behavioral intention is influenced by two variables: social influence and facilitating conditions (Patil *et al.*, 2020). Behavioral intention is supposed to positively influence use behavior. Thus, we propose the following hypothesis:

H12: Consumer behavioral intention to use mobile payment influences positively and significantly its use behavior

Figure 1 presents the meta-UTAUT model proposed in this study.

Figure 1: Meta-UTAUT model



Source : Adapted from Patil *et al.*, 2020

e. Methodology and data

In the present and the next sections (respectively section 3 and 4), we use a quantitative survey using a questionnaire to measure the impact of different factors on the adoption of mobile payment and mobile wallet in Morocco, respectively. The questionnaire was prepared based on the constructs of the extended Meta-UTAUT model (Patil *et al.*, 2020) and was refined on the theoretical and literature review's basis. The questionnaire was prepared in French (as French is the first foreign language used in Morocco; Arabic is the mother tongue and Amazigh is used in different parts of Morocco). French is also the language of instruction in Morocco and all financial and banking applications offer their services in French (in addition to Arabic and other languages such as English or Spanish). The questionnaire was then validated in two stages:

- Following Sanders *et al.* (2007) recommendations, the questionnaire was first sent to four experts, all professors of economics and management, to validate the content of the questionnaire;
- We then conducted a pilot survey among 20 persons to ensure that the questionnaire is readable and easily understandable. We made some changes to the questionnaire based on the pilot respondents remarks. According to our pilot respondents, the time required to complete the questionnaire is 10-15 minutes.

The questionnaire is divided into three parts:

- The first part is related to mobile payment and it aims to define the determinants of its adoption. It begins with a presentation of mobile payment and it is composed of 41 questions;
- The second part is related to mobile wallet and it aims to define the determinants of the intention to adopt it. This part begins with a presentation of mobile wallet and is composed of 38 questions;

- The second part is dedicated to demographical aspects of the respondents (gender, age, revenue, occupation and optionally emails). (5 questions).

The questions represent the factors of our models using 5-point Likert scales from 1 to 5, where 1 represents « strongly disagree » and 5 represents « strongly agree ». Multi-item scales was used to measure the used variables and were adapted from validated scales from literature (Patil *et al.*, 2020; Shakar and Datta, 2018; De Sena Abrahão *et al.* (2016), Venkatesh *et al.*, (2012), Farah *et al.,* 2018; Zhou, 2013b; Zhou and Lu, 2011; Lu *et al.,* 2011b ; Kumar *et al.*, 2018). Lists of references of each item are presented in Appendixes 1 and 2. Our sample is based on a convenience non-probabilistic approach, widely used in similar studies (Farah *et al.*, 2018). The advantages of this approach are that it minimizes selection biases and maximize the number of respondents (Evans and Mathur, 2005).

The questionnaire was prepared using Google forms and data was collected online using social networks (Gmail, Facebook Messenger, Linkedin and Whatsapp). Six reasons justify this choice. First, this approach allows targeting directly smartphone users, considered as potential users of mobile payments. Second, we believe that this approach is adaptable to the Moroccan context where equipment rate for individuals aged 15 and over equipped with a mobile phone is 94.10% and where Internet access in 2019 is 74.4% nationally (ANRT[4], 2019). Third, the online survey guarantees that the respondents complete the questionnaire (Creswell, 2014). Also, this approach is the fastest and least expensive to data collection. Finally, due to the actual pandemic situation, we avoided any physical contact with the respondents. Data was collected during the period of October 2021-December 2021. Finally, 351 validated questionnaires were collected.

The sample is represented equally by male (51%) and female (49%). The respondents are relatively young with 31% are less than 25 years and 69,80% are less than 35 years. 34,19% of the respondents have a salary less than 3000 MAD[5] and 29,63% have a salary more than 12001 MAD. A first tier of our sample is represented by students (34,76%), a second tier is composed of public sector employees (33,62%). The third tier is represented by private sector employees (22,22%), self-employed (5,13%), unemployed (2,56%) and retired people (1,71%). We note that our sample is heterogeneous and representative of the various potential users of mobile payment (Table 1).

Table 1 : Descriptive statistics of respondents

Variable	Group	Frequency	Percentage	Cumulative percent

[4] Agence Nationale de Réglementation de Télécommunications - National Agency for the Legalization of Communications

[5] MAD is the Moroccan Dirham, the official currency of Morocco (1 USD ≈ 10 MAD)

Gender	Male	179	51%	51%
	Female	172	49%	100%
Age	18-25	109	31,05%	31,05%
	25-35	136	38,75%	69,80%
	36-45	66	18,80%	88,60%
	46-55	31	8,83%	97,43%
	Above 56	9	2,56%	100,00%
Salary	Less than 3000 MAD	120	34,19%	34,19%
	3001 MAD - 6000 MAD	52	14,81%	49,00%
	6001 MAD et 9000 MAD	43	12,25%	61,25%
	9001 MAD et 12000 MAD	32	9,12%	70,37%
	Above 12001 MAD	104	29,63%	100,00%
Occupation	Student	122	34,76%	34,76%
	Employee-Public Sector	118	33,62%	68,38%
	Employee-Private Sector	78	22,22%	90,60%
	Self-employed	18	5,13%	95,73%
	Unemployed	9	2,56%	98,29%
	Retired people	6	1,71%	100,00%
Have you ever heard of the m-wallet?	Yes	152	43,30%	43,30%
	No	199	56,69%	100%
If yes, do you have an m-wallet?	Yes	41	26,97%	26,97%
	No	111	73,03%	100%

f. Results

Results of measurement model show that:

- The standardized factor loading values vary between 0,740 and 0,919 for all the items except MPAX2, MPFC3, MPPE4 and MPSI1 (standardized factor loading values should be higher than the required limit of 0.5 (Gefen *et al.*, 2000; Slabbert and Du Preez, 2021)). Thus, MPAX2, MPFC3, MPPE4 and MPSI1 have been removed ;
- The Composite Reliability (CR) values are higher than the accepted limit of 0,7 for all the factors (Hair *et al.*, 1992; Alarcón *et al.*, 2015) which show the consistency of our constructs;
- The Average Variance Extracted AVE values exceed 0.5 of all the constructs (Fornell & Larcker, 1981). Indeed, AVE values vary between 0.617 and 0.808.

To test the discriminant validity, the square roots of average variance extracted AVE should be higher than correlation coefficients between other constructs, *e.g.* the correlation between Anxiety and Attitude (0.446) is less than square root of average variance extracted AVE values of Anxiety (0.792) and Attitude (0.883). Table 2 presents results of discriminant validity. We remark that there is no multicollinearity between retained constructs as correlations are less than 0.70 (Hair *et al.* 2010; Singh and Sinha, 2020).

Table 2: Results of confirmatory factor analysis

Construct	Items	FL	CR	AVE
Anxiety	MPAX1	0.790	0.834	0.627

	MPAX3	0.778		
	MPAX4	0.807		
Attitude	MPAT1	0.888	0.914	0.780
	MPAT2	0.854		
	MPAT3	0.906		
Behavioral intention	MPBI1	0.855	0.895	0.739
	MPBI2	0.872		
	MPBI3	0.852		
Effort expectancy	MPEE1	0.836	0.904	0.759
	MPEE2	0.873		
	MPEE3	0.904		
Facilitating conditions	MPFC1	0.868	0.868	0.689
	MPFC2	0.875		
	MPFC4	0.740		
Grievance	MPGR1	0.878	0.927	0.808
	MPGR2	0.899		
	MPGR3	0.919		
Percieved innovativeness	MPPI1	0.789	0.828	0.617
	MPPI2	0.741		
	MPPI3	0.824		
Performance expectancy	MPPE1	0.875	0.894	0.738
	MPPE2	0.883		
	MPPE3	0.818		
Social influence	MPSI2	0.836	0.792	0.656
	MPSI3	0.784		
Trust	MPTR1	0.882	0.915	0.781
	MPTR2	0.902		
	MPTR3	0.867		
User behavior	MPUB1	0.879	0.865	0.682
	MPUB2	0.839		
	MPUB3	0.754		

Table 3 : Discriminant validity of constructs

	Anxiety	Attitude	Behavioral intention	Effort expectancy	Facilitating conditions	Grievance	Performance expectancy	Trust	User behavior
Anxiety	**0.792**								

Attitude	0.446	**0.883**							
Behaviroal intention	0.363	0.567	**0.860**						
Effort expectancy	0.293	0.477	0.481	**0.871**					
Facilitating conditions	0.327	0.477	0.530	0.513	**0.830**				
Grievance redressal	0.282	0.321	0.325	0.217	0.377	**0.899**			
Performanc e expectancy	0.290	0.440	0.442	0.424	0.394	0.353	**0.859**		
Trust	0.439	0.459	0.365	0.347	0.386	0.240	0.269	**0.884**	
User behavior	0.235	0.291	0.375	0.302	0.284	0.139	0.394	0.232	**0.826**

We used SmartPLS software to conduct Structural Equation Modeling analysis. Model fit was determined through five measures: x2/df, AGFI (Adjusted Goodness of Fit Index), NFI (Normed Fit Index), CFI (Comparative Fit Index) and RMSEA (Root Lean Square Error of Approximation). These indices should respectively be < 5 ; > 0.90 ; > 0.80 ; > 0.90 ; > 0.90 ; < 0.06. Results obtained show that: x2/df = 2.9422; AGFI = 0.934; NFI = 0.910 ; CFI = 0.933 and RMSEA = 0.072.

The Meta-UTAUT model defines seven independent variables (Performance expectancy, Effort expectancy, social influence, Facilitating conditions, Personal innovativeness, Anxiety and Trust) and four dependent variables (Effort expectancy, Attitude, Behavioral intention and Use behavior). Results (**Table 4**) show that Trust, Performance expectancy, Personal innovativeness, Effort expectancy and Anxiety influence significantly and positively consumer attitude (R^2 value of 0. 542). The influence is almost the same for the five explicative constructs (path coefficients are respectively 0.153, 0.194, 0.229, 0.180 and 0.182). We accept hypotheses H1, H3, H7, H8 and H9. Results also show evidence of positive relationship between the predictors Facilitating conditions and Attitude with the dependent construct Behavioral intention (R^2 value of 0. 609). Path coefficients are respectively 0.335 and 0.406. We confirm hypotheses H5 and H11. However, we find no evidence of relationship between Social influence and Behavioral influence (p value 0.871). Thus, we reject hypothesis H4. Evidence of positive relationship exists between Facilitating conditions and Effort expectancy (as mediating construct). Indeed, R^2 is 0.263 which confirms H6. Finally, we find evidence of positive relationship between Behavioral intention Performance expectancy and the ultimate variable Use behavior (R^2 is 0.508), while there is no evidence of relationship between Grievance redressal and User behavior (p value equal to 0.373. We accept hypotheses H2 and H12 and reject H10. Our results show that Facilitating conditions is the strongest predictor of Effort expectancy (path coefficient of 0.513) and Attitude is the strongest predictor of Behavioral intention (path coefficient of 0.409). Other path coefficients reveal significant path coefficient at different levels. Finally, we note that Facilitating conditions explain 51.3% of the variance of Effort expectancy. We also note that performance expectancy, Effort expectancy, Personal innovativeness, Anxiety and Trust explain 44% of the variance of Attitude. Facilitating conditions and Attitude explain 40.9% of the variance of Behavioral intention. Performance expectancy and Behavioral intention explain 20.8% of the construct User behavior. Thus, results show that while the majority of hypotheses are significant (H1, H2, H3, H5, H6, H7, H8, H9, H11 and H12), two hypotheses are not significant (H4 and H10).

Table 4 : Structural model analysis

Hypothesis	Indepedant construct	Dependent construct	Path coefficients	R^2	t-value	p value	Expected result	Obtained result	Hypothesis support
H1	Performance expectancy	Attitude	0.194	0.542	3.422	0.001	+	+	Yes
H3	Effort expectancy		0.180		2.825	0.005	+	+	Yes
H7	Personal innovativeness		0.229		3.995	0.000	+	+	Yes
H8	Anxiety		0.182		3.208	0.001	-	+	Yes
H9	Trust		0.153		2.276	0.023	+	+	Yes
H4	Social influence	Behavioral Intention	0.007	0.609	0.163	0.871	+	NS	No
H5	Facilitating conditions		0.335		5.605	0.000	+	+	Yes
H11	Attitude		0.406		6.126	0.000	+	+	Yes
H6	Facilitating conditions	Effort expectancy	0.513	0.263	10.393	0.000	+	+	Yes
H2	Performance expectancy	User behavior	0.297	0.502	4.421	0.000	+	+	Yes
H10	Grievance redressal		-0.051		0.891	0.373	+	NS	No
H12	Behavioral intention		0.261		4.191	0.000	+	+	Yes

g. Discussion

In this section, we investigate Moroccan consumers use of mobile payment using seven independent variables (Performance expectancy, Effort expectancy, Social influence, Facilitating conditions, Personal innovativeness, Anxiety and Trust) and four dependent variables (Effort expectancy, Attitude, Behavioral intention and Use behavior). Twelve hypotheses have been defined. Our model confirms ten hypotheses (H1, H2, H3, H5, H6, H7, H8, H9, H11 and H12) and rejects two hypotheses (H4 and H10). This result is different from Patil *et al.* (2020), which confirms the twelve hypotheses. Our model explains variance of 60.9% on Moroccan consumer intention towards mobile payment which is similar to other studies obtained in India (66% by Patil *et al.*, 2020; 67,5% by Gupta *et al.*, 2019b), in Qatar (66% by Alshare and Moussa, 2014) and in the UK (67% by Slade *et al.*, 2015). Our model explains variance of 50.2% of Moroccan consumer use of mobile payment (figure 2).

Performance expectancy appears as a significant predictor of both Moroccan consumer attitude (H1) and use behavior towards mobile payment (H2). This result is consistent with prior studies. We note that relationship between Performance expectancy and attitude is significant and weaker than expected (0.194). Patil *et al.* (2020) found a path coefficient of 0.273. Also, relationship between Performance expectancy and user behavior is significant and weaker than expected. Indeed, Patil *et al.* (2020) found a path coefficient of 0.542 while Farah *et al.* (2018) found a path coefficient of 0.299 in Pakistan. The second construct, Effort expectancy, is defined as a significant predictor of Moroccan attitude towards mobile payment, which is consistent to prior studies (Farah *et al.* ; 2018 ; Patil *et al.,* 2020. Indeed, as the penetration rate of mobile in Morocco is more than 99% (in 2019), it facilitates the attitude towards mobile payment. Thus, we find a coefficient of 0.18 which confirms H3. We find also that Facilitating conditions have significant and positive influence both on Effort expectancy (H6) and on

Behavioral intention (H5) whith path coefficient of 0.513 and 0.335 respectively. This relationship is found non significant in Pakistan (Farah *et al.*, 2018) and in Indonesia (Yang *et al.* (2021). Personal innovativeness has a positive and significant impact on attitude (0.229) which confirm precedent results (Thakur *et al.*, 2014; Wang and Dai, 2020 ; Chen *et al.*, 2019 and Patil *et al.*, 2020). The impact of trust on trust is also significant and positive (0.153). This result confirms prior studies (Slade *et al.*, 2015; Khalilzadeh *et al.*, 2017, Patil *et al.*, 2020 ; Widyanto *et al.*, 2021). However, contrary to our expectations, anxiety has a significant and positive impact on attitude (0.182). Prior studies found that anxiety influences negatively attitude (*e.g.* Zhou, 2011; Park *et al.,* 2019; Patil, 2020 ; Wei *et al.,* 2021). Our results show that the attitude towards the use of mobile payment is influenced by performance expectancy (0.194), effort expectancy (0.180), personal innovativeness (0.220), anxiety (0.182) and trust (0.153). Attitude has a significant and positive impact on attitude on behavioral intention (0.406) which has a significant and positive impact on user behavior (0.261). The weaker relationship obtained is the influence of trust on attitude (0.153). Other weak relationships are those of anxiety on attitude (0.182), effort expectancy on attitude (0.180) and of performance expectancy on attitude (0. 194). Moderately strong relationships are those of Personal innovativeness on attitude (0.229), behavioral intention on user behavior (0.261), performance expectancy on user behavior (0.297) and facilitating conditions on behavioral intention (0.335) while strong relationship are those of attitude on behavioral intention (0.406) and facilitating conditions on effort expectancy (0.513). In this paper, two relationships were found to be non significant. Thus, we find no evidence of influence of social influence on behavioral intention (H4 rejected). This result is contrary to results obtained by Slade *et al.* (2015), De Sena Abrahao (2016), Gupta *et al.* (2019b), Rosnidah *et al.* (2019), Chen *et al.* (2019), Al-Saedi *et al.* (2020), Wang and Dai (2020) and Yang *et al.* (2021). We also find no evidence of relationship between Grievance redressal and use behavior (H10 rejected).

Figure 2: Structural model results

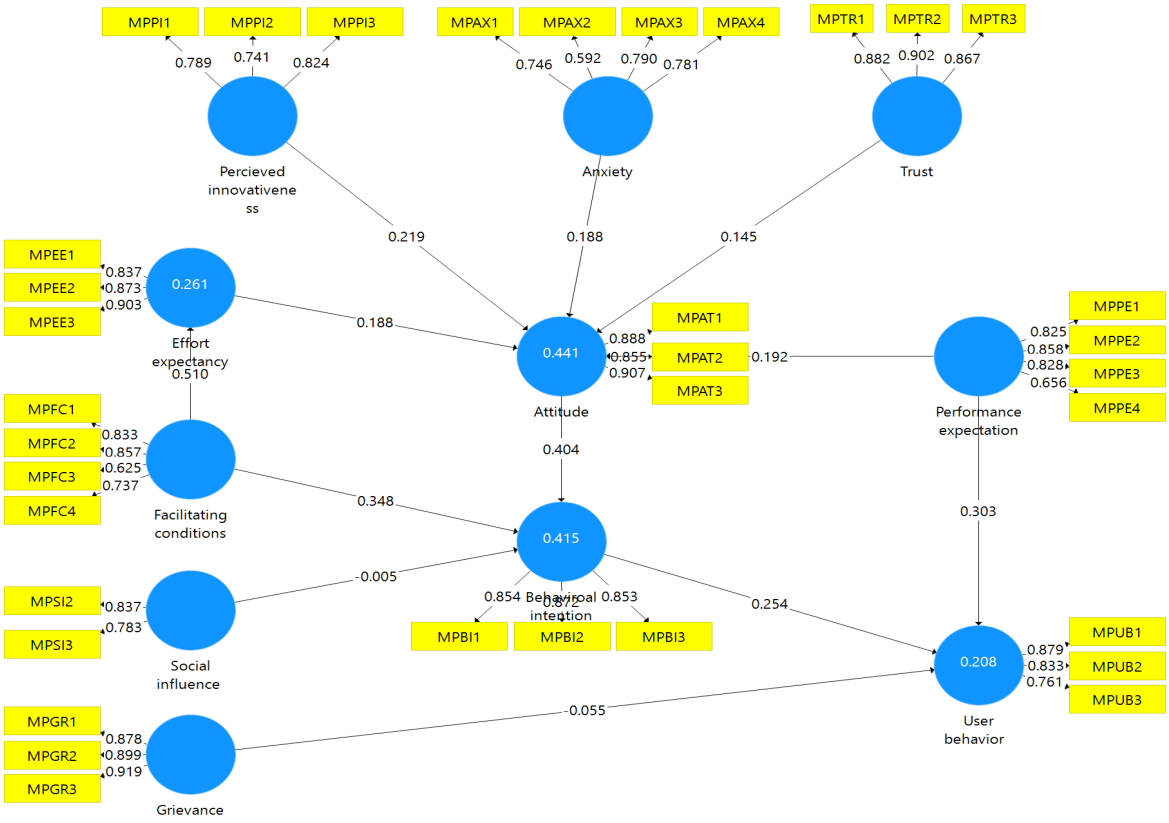
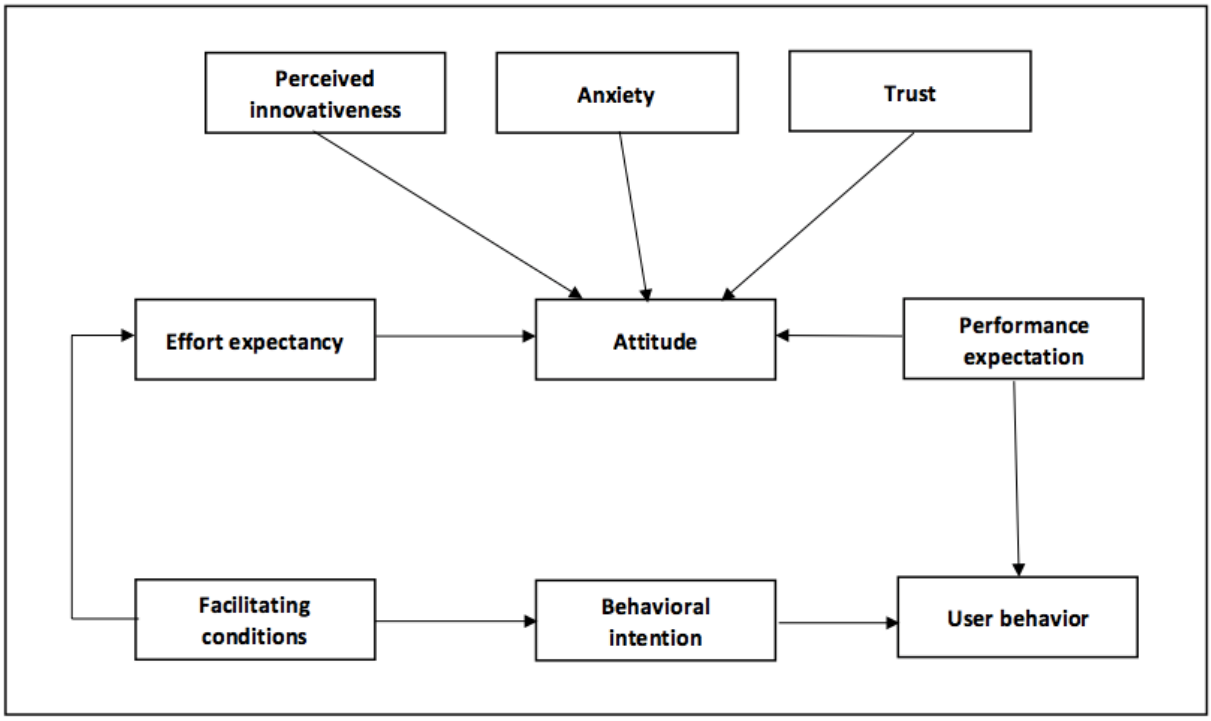


Figure 3: Proposed meta-UTAUT model



1. Why do Moroccan users adopt m-wallet?

Mobile wallet is an alternative payment method that offers the possibility to make several financial transactions easily and quickly. Launched in Morocco in 2018, the adoption of m-wallet by Moroccan users remains at a low level. Thus, we aim to identify the factors that drive Moroccan users to adopt the m-wallet. This study is based on the extended meta-UTAUT model using ten constructs (Performance expectancy, Effort expectancy, social influence, Facilitating conditions, Perceived innovativeness, Anxiety, Trust, Grievance redressal and Attitude). Results show that behavioral intention is influenced by performance expectancy, facilitating conditions and attitude whereas the influence of social influence and grievance redressal is not significant.

a. Literature review

Studies on mobile wallet adoption intention have been conducted primarily in Asia *e.g.* in India (Kumar *et al.,* 2018 ; Chatterjee and Bolar, 2019; Chawla and Joshi, 2019, Sharma and Kulshreshtha, 2019 ; Banerji and Singh, 2022 ; Chand *et al.* ; 2022 ; Guhan and Nigama, 2022 ; Hasan and Gupta, 2020), in Vietnam (To *et al.*, 2021 ; Tran Le Na and Hien, 2021), in Indonesia (Sari *et al.* ; 2021 and Estiyanti *et al.*, 2021), in Malaysia (Chelvarayan *et al.*, 2022), in Saudi Arabia (Hidayat-ur-Rehman *et al.*, 2022 ; Salamah, 2022), and in Kuwait (Rabaa'i, 2021). Thus, in India, Kumar *et al.* (2018) analyzed the use and intention to use the mobile wallet by youth using expectation confirmation theory. The results show that perceived usefulness and perceived ease positively influence the intention to use the m-wallet. The results also show that perceived safety influences m-wallet users' satisfaction whereas grievance redressal mediates the effect of perceived safety on the intention to use m-wallet. Chatterjee and Bolar (2019) investigated the intention to adopt m-wallet through different theories and models (e.g. Diffusion of Innovation Theory, the Theory of Planned Behavior, Technology Acceptance Model) and found that Perceived Behavioral Control is a predictor of m-wallet adoption intention. Based on a combined TAM-UTAUT model (Technology Acceptance Model - Unified Theory of Acceptance and Use of Technology), Chawla and Joshi (2019) found that perceived ease of use, perceived usefulness, trust, security, facilitating conditions and lifestyle compatibility positively influence the intention to use m-wallet. Sharma and Kulshreshtha (2019) defined availability of information, compatibility, convenience, complexity, ease of use, privacy, safety, service quality, trialability as factors that influence the adoption of m-wallet. Banerji and Singh (2022) analyzed mobile wallet adoption using a combined TAM-IDT model. Results confirmed the positive impact of perceived usefulness, perceived ease of use, compatibility and observability on the intention to adopt m-wallet. However, unlike Sharma and Kulshreshtha (2019), Banerji and Singh (2022) found no evidence of influence of trialability on the intention to adopt m-wallet. Based on an extended UTAUT model, Jaiswal et al. (2022) confirmed the role of performance expectancy, effort expectancy, facilitating conditions and individual mobility as determinants of mobile wallet adoption. Chand *et al.* (2022) used a modified UTAUT model and found the use of mobile wallet is directly and indirectly influenced by perception. Based on the UTAUT2 model, Guhan and Nigama (2022) showed that social influence, effort expectancy and performance expectancy influence positively and significantly Generation X intention to adopt m-wallet. Hasan and Gupta (2020) analyzed the factors that influence tourists' intention to use m-wallet in India and found evidence of the influence of perceived value, trust, compatibility and social influence. In Vietnam, To et al. (2021) extended TAM with perceived enjoyment and trust to investigate factors influencing the intention to adopt mobile wallet. Results show a positive impact of perceived ease of use, perceived usefulness, and enjoyment on the intention while the influence

of trust is insignificant. Tran Le Na and Hien (2021) combined the technology acceptance model (TAM), the diffusion of innovation theory (DOI), the theory of perceived risk (TPB) and the perceived value model (PERVAL) and found that commitment and recommendation to use m-wallet. In Indonesia, Sari *et al.* (2021) found that perceived usefulness, lifestyle, and trust influence the intention to adopt mobile wallet whereas Estiyanti et al. (2021) found intention of influenced by perceived usability. In Malaysia, Chelvarayan et al. (2022) used Technology Acceptance Model (TAM) to investigate the factors influencing university students' intention to use e-wallet. Results show that perceived usefulness, perceived risk and trust influence significantly the intention while perceived ease of use has no influence on the intention to use e-wallet. In Saudi Arabia, Hidayat-ur-Rehman *et al.* (2022) used the Diffusion of Innovation Theory and found that compatibility, ease of use, observability, convenience, relative advantage, personal innovativeness, perceived trust, and perceived security influence the intention to use mobile wallets. Salamah (2022) investigates the factors that influence the adoption of Apple Pay in Saudi Arabia and found that the attitude is influenced by performance expectancy, effort expectancy, personal innovativeness, trust and anxiety. In Kuwait and based on an extended unified theory of acceptance and use of technology (UTAUT2) model, Rabaa'i (2021) found that the intention is determined by performance expectancy, effort expectancy, hedonic motivation, facilitating conditions, perceived compatibility, personal innovativeness, individual mobility, trust and perceived risk; whereas the influence price value and social influence were not significant.

Other studies have examined factors influencing mobile wallet adoption intention during the actual Covid-19. Thus, in Vietnam, Ly *et al.* (2022) found that performance expectancy, facilitating conditions, hedonic motivation, habit, trust and price saving orientation influence significantly behavioral intention while the influence of effort expectancy and social influence is insignificant. In Malaysia and based on TAM and HBM (Health Belief Model), Soe (2022) found that the behavioral intention is influenced directly by Perceived Usefulness and Perceived Ease of Use. Results show also that Perceived Usefulness plays a mediating role between, on the one hand, Government support, Perceived Susceptibility and Perceived Ease of Use, and behavioral intention on the other hand. Also, results show that Perceived Ease of Use plays a mediating role between on the one hand, Government support and Perceived Susceptibility, and behavioral intention on the other hand. In Cameroon, Okonkwo *et al.* (2022) found that whereas image, relative advantage, perceived usefulness, information quality, system quality and service quality influence the adoption of mobile wallet, the influence of compatibility and perceived ease of use was insignificant.

b. Hypotheses development

Based on the models proposed by Dwivedi *et al.* (2019) and Patil *et al.* (2020) and the literature review, an extended meta-UTAUT model (Figure 4) is proposed to determine the factors influencing Moroccan consumers' intention to adopt mobile wallet. The following constructs have been defined:

- *Performance expectancy:* Precedent studies found evidence of positive influence of performance expectancy on the intention to adopt m-wallet (Gupta *et al.*, 2019a; Leong *et al.,* 2020; Rabaa'i, 2021 ; Jaiswal *et al.*, 2022 ; Guhan and Nigama, 2022 ; Ly *et al.*, 2022). Also, Patil *et al.* (2020) and Salamah (2022) found evidence of positive impact of performance expectancy on the attitude toward the use of mobile payment.
- *Effort expectancy*: While several studies found evidence of positive impact of effort expectancy on the intention to adopt m-wallet (Gupta *et al.*, 2019a; Rabaa'i, 2021 ; Patil *et al.*, 2020 ; Jaiswal *et al.*, 2022 ; Guhan and Nigama, 2022 ; Salamah, 2022), Ly *et al.*

(2022) found that this relationship is insignificant. Also, Alswaigh and Aloud (2021), To and Trinh (2021) and Chawla and Joshi, (2020) implemented perceived ease of use as a reference to effort expectancy and found evidence of positive influence of perceived ease of use on attitude.

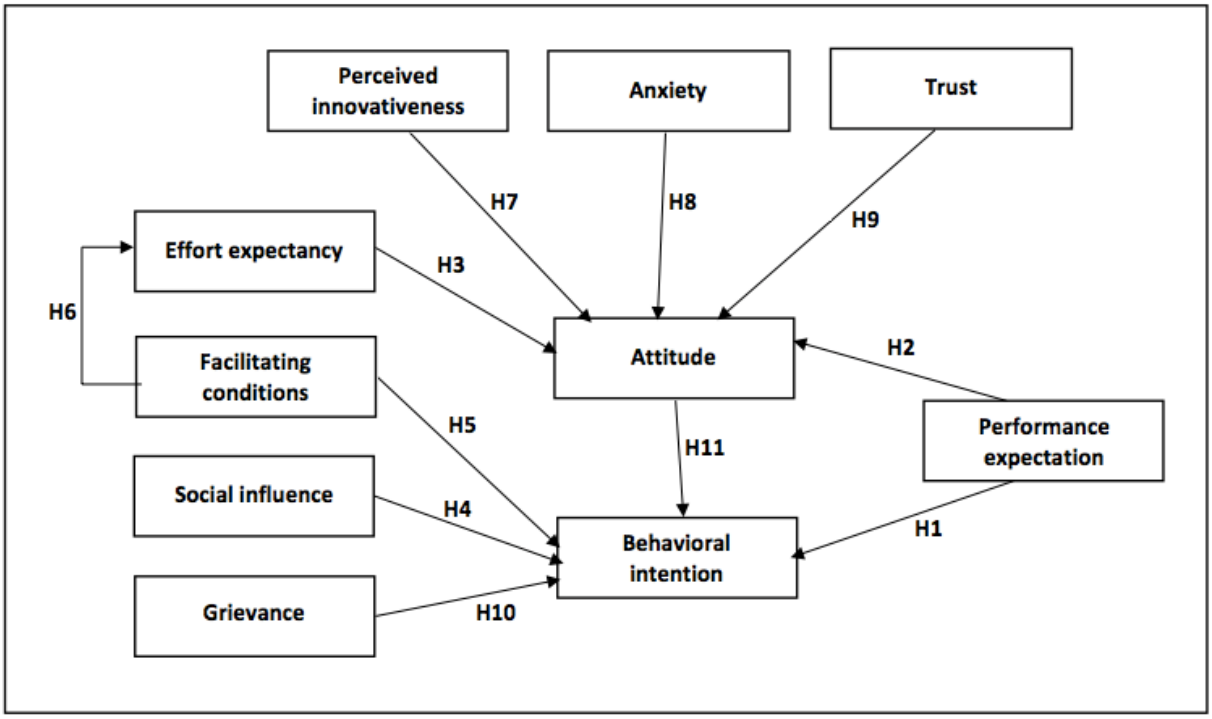
- *Social influence*: The influence of social influence on the intention is mixed. Indeed, Guhan and Nigama (2022) and Hasan and Gupta (2020) found a positive and significant influence. However, Rabaa'i (2021) and Ly et al. (2022) found no evidence of influence of social influence on the intention.
- *Facilitating conditions*: Several studies found evidence of facilitating conditions on attitude (Alswaigh and Aloud, 2021, Chawla and Joshi, 2020). Other studies found evidence of the influence of facilitating conditions on the intention (Chawla and Joshi, 2019; Leong et al., 2020; Rabaa'i, 2021 ; Jaiswal *et al.*, 2022 ; Ly et al., 2022). There is also evidence of positive influence of facilitating conditions on effort expectancy (Stefi, 2015; Upadhyay *et al.*, 2022).
- *Perceived innovativeness*: There is an evidence of a positive impact of perceived innovativeness on the attitude (Patil *et al.*, 2020; Salamah, 2022).
- *Anxiety* is defined in the autonomous car context as the degree to which a person responds to a situation with apprehension, uneasiness, or feelings of arousal (Seuwou *et al.*, 2020). Chen and Chang (2013) found evidence of significant influence of anxiety on attitude whereas this influence is found to be negative by Park *et al.,* (2019), Wei *et al.,* (2021) and Salamah (2022).
- *Trust* is defined as a psychological state which relies on positive expectations of intentions of a person to the other (Rousseau *et al.*, 1998). Trust may impact the attitude. Indeed, Gupta *et al.*, 2019a, Chawla and Joshi, 2020, Alswaigh and Aloud (2021) and Salamah, 2022 found evidence of direct influence. This impact is the most significant according to Sharma *et al.,* 2019. Trust plays also a mediating role between perceived usefulness and intention to adopt m-wallets (Sari *et al.*, 2021). However, To and Trinh (2021) found that this relationship is insignificant.
- *Grievance redressal* : According to Kumar *et al.* (2018), grievance redressal mediates the effect of perceived safety on the intention to use m- wallet. Patil *et al.* (2020) shows a direct effect of grievance redressal on user behavior. However, it is supposed that grievance redressal influences on behavioral intention.
- *Attitude* is defined as an intellectual and emotional entity that shows how people reason, perceive, and incline to act regarding an event or object (Shiferaw *el al.*, 2021). Previous studies found that attitude impacts significantly the intention (Patil *et al*., 2020 ; Alswaigh and Aloud, 2021).

Eleven hypotheses have been proposed:

- H1 : Performance expectancy influences behavioral intention to adopt m-wallet
- H2 : Performance expectancy influences the attitude toward the use of mobile payment
- H3 : Effort expectancy influences the attitude to adopt m-wallet
- H4 : Social influence influences behavioral intention to adopt m-wallet
- H5 : Facilitating conditions influences the intention to adopt m-wallet
- H6 : Facilitating conditions influences the effort expectancy
- H7 : Perceived innovativeness influences the attitude toward using mobile payment
- H8 : Anxiety influences the attitude toward using mobile payment
- H9 : Trust influences the attitude toward using mobile payment
- H10 : Grievance redressal influences behavioral intention to adopt m-wallet

- H11 : Attitude towards influences behavioral intention to adopt m-wallet

Figure 4 : Extended Meta-UTAUT model



Source : adapted from Diwivedi *et al.* (2019) and Patil *et al.* (2020)

c. Results and discussion

Confirmatory analysis was tested using Cronbach's alpha, Standardized Factor Loadings, Composite Reliability, and Average Variance Extracted. The results show that Cronbach's Alpha values are greater than 0.7, Standardized Factor Loadings (FL) values for all items are greater than 0.5; Composite Reliability (CR) values are greater than 0.7; and Average Variance Extracted AVE values are greater than 0.5 for all constructs (Table 5). These results confirm the reliability and convergent validity. Discriminant validity is confirmed as the square roots of the AVE are greater than the correlation coefficients between the other constructs (Table 6).

Table 5 : Confirmatory analysis results

Construct	Items	Cronbach's Alpha	FL	CR	AVE

Anxiety	MWAX1 MWAX2 MWAX3 MWAX4	0.902	0.874 0.876 0.895 0.871	0.931	0.773
Attitude	MWAT1 MWAT2 MWAT3 MWAT4	0.940	0.899 0.924 0.926 0.933	0.957	0.848
Behavioral intention	MWBI1 MWBI2 MWBI3 MWBI4 MWBI5	0.912	0.815 0.858 0.863 0.892 0.874	0.934	0.740
Effort expectancy	MWEE1 MWEE2 MWEE3	0.924	0.917 0.935 0.944	0.952	0.869
Facilitating conditions	MWFC1 MWFC2 MWFC3 MWFC4	0.892	0.862 0.901 0.837 0.875	0.925	0.755
Grievance redressal	MWGR1 MWGR2 MWGR3	0.960	0.954 0.969 0.964	0.974	0.926
Perceived innovativeness	MWPI1 MWPI2 MWPI3	0.924	0.932 0.944 0.918	0.952	0.867
Performance expectation	MWPE1 MWPE2 MWPE3 MWPE4	0.912	0.916 0.922 0.917 0.804	0.939	0.794
Social influence	MWSI1 MWSI2 MWSI3 MWSI4	0.831	0.777 0.817 0.830 0.826	0.886	0.661
Trust	MWTR1 MWTR2 MWTR3 MWTR4	0.916	0.909 0.906 0.887 0.870	0.941	0.798

Table 6 : Discriminent validity

	AX	AT	BI	EE	FC	GR	PI	PE	SI	TR
AX	**0.879**									
AT	0.559	**0.921**								

BI	0.466	0.604	**0.860**							
EE	0.397	0.602	0.518	**0.932**						
FC	0.440	0.566	0.527	0.646	**0.869**					
GR	0.508	0.479	0.393	0.453	0.560	**0.962**				
PI	0.570	0.715	0.632	0.599	0.582	0.569	**0.931**			
PE	0.441	0.605	0.522	0.614	0.497	0.430	0.551	**0.891**		
SI	0.452	0.406	0.379	0.526	0.430	0.393	0.410	0.416	**0.813**	
TR	0.542	0.658	0.534	0.576	0.529	0.382	0.583	0.488	0.452	**0.893**

Model fit results are represented in Table 7 and show that all these indices are above the accepted norms.

Table 7 : Goodness of fit indices

	Estimated model	Recommended value	References
x2/df	2.051	< 5	Tabachnick *et al.* (2007)
AGFI	0.919	> 0.90	Hu and Bentler (1999)
NFI	0.839	> 0.80	Hooper *et al.* (2008)
CFI	0.947	> 0.90	Bentler and Dudgeon (1996)
RMSEA	0.077	< 0.08	Hu and Bentler (1999)

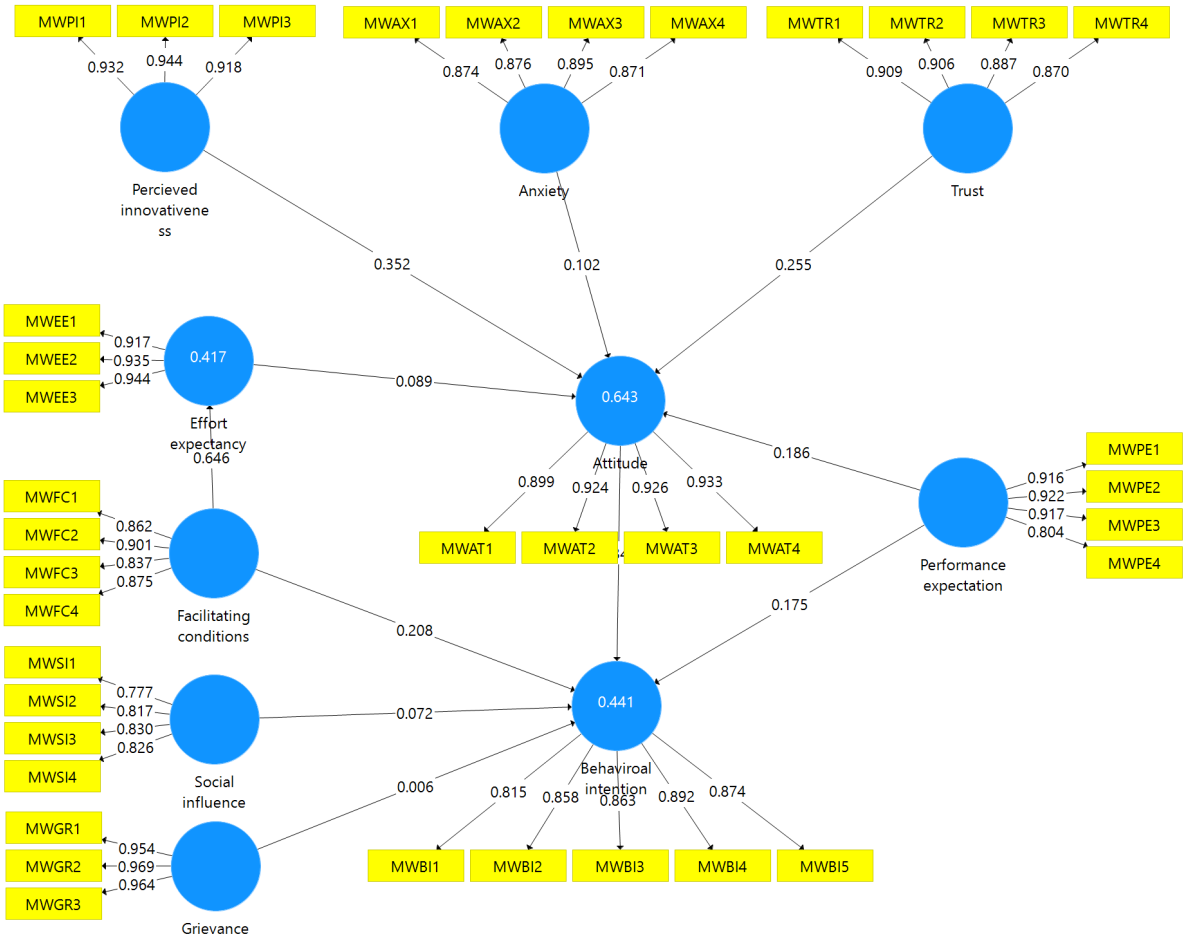
Thus, the proposed extended-meta UTAUT model defines seven exogenous variables (facilitating conditions, perceived expectancy, social influence, grievance redressal, perceived innovativeness, anxiety and trust), three endogeneous variables (effort expectancy, attitude and behavioral intention) and eleven hypotheses were tested: eight were supported and three were rejected. Eleven hypotheses were tested: eight were supported and three were rejected (Table 8).

Figure 5 represents the results of structural equation modeling. Regarding attitude, the results show that it is influenced by performance expectancy (path coefficient 0.189; p-value = 0.003) and H2 hypothesis is accepted. Attitude is also influenced by perceived innovativeness (path coefficient = 0.348; p-value = 0.000) which confirms H7. However, results show that unlike previous studies, anxiety influences positively the attitude to use the m-wallet (path coefficient = 0.102; p-value = 0.028). This result confirms H8. Finally, trust is found to have a positive influence on attitude and confirms H9 (path coefficient = 0.255; p-value = 0.000). It should be noted that the influence of perceived innovativeness is more pronounced (path coefficient of 0.348) and that the influence of trust, performance expectancy, and anxiety is almost the same (path coefficient values of 0.255, 0.189, 0.102). Results show also that effort expectancy is significantly and positively influenced by facilitating conditions (R2 value of 0.517; path coefficient = 0.648; p value = 0.000) which confirms hypothesis H6. Also, results found evidence of influence of performance expectancy, facilitating conditions and attitude on behavioral intention (path coefficients respectively of 0.171, 0.207, 0.349 ; R2 value of 0.541). The influence of attitude on behavioral intention is more pronounced (path coefficient of 0.349). Thus, hypotheses H1, H5, and H11 are accepted. However, the results reject H4 and H10. Indeed, the impact of social influence and grievance redressal on behavioral intention is insignificant.

Table 8 : Structural model analysis

Hypothesis	Independent construct	Dependent construct	Estimate	R^2	t-value	p-value	Support
H2	Performance expectancy	Attitude	0.189	0.643	2.988	0.003	Accepted
H3	**Effort expectancy**		**0.092**		**1.349**	**0.178**	**Rejected**
H7	Percieved innovativeness		0.348		5.715	0.000	Accepted
H8	Anxiety		0.102		2.197	0.028	Accepted
H9	Trust		0.255		4.285	0.000	Accepted
H6	Facilitating conditions	Effort expectancy	0.648	0.517	16.918	0.000	Accepted
H1	Performance expectancy	Behavioral intention	0.171	0.541	2.694	0.007	Accepted
H4	**Social influence**		**0.078**		**1.336**	**0.182**	**Rejected**
H5	Facilitating conditions		0.207		3.034	0.003	Accepted
H10	**Grievance redressal**		**0.005**		**0.105**	**0.917**	**Rejected**
H11	Attitude		0.349		4.735	0.000	Accepted

Figure 5 : Structural model analysis



The proposed model explained variance of 64.3% on attitude which is consistent with Chawla and Joshi, 2019; Sari *et al.,* 2021). Also, the proposed model explained variance of 54.1% on behavioral intention which is like Alshare and Mousa (2014), Gupta *et al.* (2019b), Slade *et al.* (2015) and Patil *et al.* (2020).

Performance expectancy has a positive influence on the intention to adopt m-wallet (**H1 accepted**) which supports Gupta *et al.* (2019a), Leong *et al.* (2020), Rabaa'i (2021), Jaiswal *et al.* (2022), Guhan and Nigama (2022) and Ly *et al.* (2022). Also, performance expectancy is found to have a positive influence on attitude (**H2 accepted**). This result supports those of Patil *et al.* (2020) and Salamah (2022). Thus, and despite the lack of knowledge of the m-wallet, respondents believe that this means of payment could increase their performance and therefore encourage them to use it and thus influence both their intention and their attitude towards m-wallet.

Regarding effort expectancy, results show that its influence on the attitude to adopt m-wallet is insignificant (**H3 rejected**). This result confirms those of Ly *et al.* (2022) whereas Gupta *et al.* (2019a), Rabaa'i (2021), Alswaigh and Aloud (2021), To and Trinh (2021), Patil *et al.* (2020), Jaiswal *et al.* (2022), Guhan and Nigama (2022), Salamah (2022), and Chawla and Joshi (2020) found positive influence. Indeed, as the mobile is widely used in Morocco, Moroccan consumers are accustomed to the use of mobile applications and in particular banking and financial applications. Moroccan consumers are predisposed to use m-wallet but it still has to be easy to use. Respondents believe that the easier it is to use the m-wallet, the more it influences its adoption. Banks and payment institutions are thus required to develop easy-to-use m-wallet applications.

Regarding The influence of social influence on behavioral intention, while Guhan and Nigama (2022) and Hasan and Gupta (2020) found a positive influence, results obained show that this influence is not significant (**H4 rejected**) and confirms Rabaa'i (2021) and Ly et al. (2022). Thus, potential consumers of the m-wallet in Morocco believe that its use cannot be considered a sign of prestige or social influence, since the use of mobile payment and mobile applications has become common in Morocco.

Facilitating conditions influences both intentions to adopt m-wallet (**H5 accepted**) and attitude (**H6 accepted**) and confirms Stefi (2015), Alswaigh and Aloud (2021), Chawla and Joshi (2020) and Upadhyay *et al.*, 2022. The existence of a support structure is also a prerequisite for m-wallet adoption. The existence of such an entity should be communicated and publicized to the public so that potential consumers become aware of its existence.

In accordance with the works of Patil *et al.* (2020) and Salamah (2022), perceived innovativeness influences the attitude toward using mobile payment (**H7 accepted**). The use of the m-wallet is very recent in Morocco, which makes the respondents think it is new, innovative, and unique. However, Moroccan consumers will not hesitate to use this new technology.

Unlike Park *et al.,* (2019), Wei *et al.,* (2021) and Salamah (2022), Anxiety influences the attitude toward using mobile payment (**H8 accepted**), which confirms Chen and Chang (2013). Thus, instead of being a brake on the adoption of the m-wallet, anxiety is a driver for its adoption.

Regarding trust, results show a positive influence on attitude toward using mobile payment (**H9 accepted**). This result is consistent with the results obtained by Gupta *et al.* (2019a), Sharma *et al.* (2019), Chawla and Joshi, 2020, Alswaigh and Aloud (2021) and Salamah (2022). Thus, building consumer confidence is a prerequisite for adopting the m-wallet. Trust can be acquired through the establishment of an easy-to-use application, an advisory service and customer support as well as customer protection.

The influence of grievance redressal on behavioral intention is not significant (**H10 rejected**) which confirms Patil *et al.* (2020). According to Khurshid *et al.* (2019), grievance redressal is defined as a mechanism/system to address the disputes between a consumer and a service

provider. Thus, consumer protection requires the establishment of rules, mechanisms, and systems for consumer protection. However, the results show that the existence of such a system does not influence the intention of the customers regarding the adoption of the m-wallet. Previous studies have shown a positive influence since the existence of this system would give customers confidence and encourage them to adopt the m-wallet more (Kumar *et al.,* 2018; Patil *et al.*, 2020). Finally, Attitude influences behavioral intention postively (**H11 accepted**), which is consistent with Patil *et al*. (2020) and Alswaigh and Aloud (2021). Thus, it seems obvious the lack of knowledge of the m-wallet on the part of the respondents. Indeed, 56.69% of the respondents attest to never having heard of this payment method. Providers should do more to show the benefit that using the m-wallet could bring, especially through media coverage and social media. Also, the results show that despite this lack of knowledge of the m-wallet, Moroccan consumers are not reluctant to use this new means of payment.

Future research perspectives suggest studying the adoption of the m-wallet from the side of merchants and from the side of payment institutions and banks. The expected results will provide a better and complete understanding of the causes of aversion to the adoption of the m-wallet.

2. Grocery retailers acceptance of mobile payment

The development of mobile commerce depends on extensively accepted mobile payment (MP) systems (Khan and Ali, 2018). In this section, we conduct interviews with 100 grocery retailers in 5 main Moroccan cities (Casablanca, Fes, Marrakech, Rabat and Tangier). The objective is to determine the factors that influence the intention to adopt mobile payment among grocers.

a. Literature review

While several studies have focused on customers' adoption of mobile payment, few studies have studied the adoption of mobile payment by merchants (Hayashi and Bradford, 2014; Cabanillas *et al.*, 2016; Altwairesh and Aloud, 2021; Liébana Cabanillas *et al.*, 2016). Indeed, retailers' mobile payment acceptance is a prerequesite for consumer mobile payment adoption (Mallat and Tuunainen, 2005).

The first theoretical contribution was conducted by Mallat and Tuunainen (2005) who found that the adoption of m-payment by merchants is driven by increased sales and reduced payment processing costs. The adoption of mobile payment is however hampered by factors relating to the systems (*e.g.* complexity and the lack of standardization). Hayashi and Bradford (2014) define five main drivers of retailers adoption of m-payment in the US: customer shopping experience (*e.g.* convenience, reception of promotions and advertisements, individualized communications), cost (while some technologies such as NFC and POS require terminals, others such as mobile payment requires no hardware investment), customer data control (consumer data collected by merchants can enable them to tailor marketing and meet customer needs), Security (both payment security and consumer data security) and fragmented market (the existence of multiple mobile payment technologies and applications provides more flexibility).

In Europe, Apanasevic et al. (2016) shows that the existence of a service that meets the expectations of retailers and consumers, as well as the construction of a network of these two stakeholders simultaneously, determines the acceptance of mobile payment in Sweden. Liébana-Cabanillas *et al.* (2017) found that the main drivers in Spain are convenience, speed, security and high turnover while barriers are the lack of knowledge, the lack of demand from consumers, the lack of trust, costs, security problems and technological problems. In Germany,

Schuster *et al.* (2016) identified perceived usefulness and attitude as factors influencing merchants' adoption of mobile payment.

In Gulf countries, Halaweh and Al Qaisi (2016) found that the main barriers of NFC mobile payment system in the UAE are lack of knowledge, awareness, and experience, from both merchants and retailers. Technology infrastructure, switching cost, availability, and ecosystem complexity. The main determinants of merchants and retailers' adoption of NFC are Security, promptness, and business sustainability. In Saudi Arabia, Altwairesh and Aloud (2021) examine the factors that affect the intention of merchants to adopt mobile payments in Saudi Arabia. Obtained results support the influence of perceived usefulness and compatibility on intention, while there is no influence of Perceived ease of use, perceived trust, and perceived cost on intention.

In China, studies were conducted by Moghavvemi *et al.* (2021), Ariffin *et al.* (2020) and Altounjy *et al.* (2020). Thus, based on in-depth interviews with Malaysia retailers, Moghavvemi et al. (2021) identified reducing payment processing time, customer appeal, convenience, promotional channel, payment processing cost and the improvement of payment security as the drivers of m-payment adoption. In the other hand, the barriers identified were service providers/facilities, technological incompatibility, complexity and lack of training/support, cost of investment, security and trust, infrastructure and technological issues, lack of critical mass, cultural barriers, *Readiness, mobile payment ecosystem.* In Malaysia, Ariffin *et al.* (2020) investigate determinants of mobile payment acceptance by retailers in Malaysia the UTAUT model and found that retailer intention is influenced by effort expectancy, social influence, facilitating conditions, habit, privacy, and perceived security. Altounjy et al. (2020) found positive impact of perceived usefulness on Malaysian merchants' acceptance of m-payment while the perceived ease of use has no significant influence.

In China, Li and Li (2020) found that merchant's adoption of m-payment is driven by merchant activity, daily revenue (the number of daily transactions and amount spent by each consumer), and m-payment adoption by neighboring merchants. Singh and Sinha (2020) defined perceived usefulness, perceived trust and perceived customer value addition as factors influencing merchants intention to adopt mobile wallet while the effect of perceived cost is insignificant.

In India, Mishra *et al.* (2022) examined unorganized retailers acceptance of m-payment in India and found that it is influenced by factors related to persons (e.g. curiosity, innovativeness, initiative, knowledge, education and technology expertise), to the environment (technology and regulatory/non-regulatory actors), to the technology (hardware and software) and to the to the process of using the m-payment technology itself (e.g., charges on m-payment, security, physical risk, time, connectivity, cash convertibility, infrastructure). The authors found also that the Indian authorities play an important role in the diffusion of mobile payment. Gupta *et al.* (2022) investigate the drivers of merchants adoption of mobile wallet in India using a combined UTAUT-TTF model. Results show that the intention to adopt and use mobile wallet is influenced by task-technology fit, price value, perceived trust, and social influence.

In Africa, Abebe and Lessa (2020) revealed the influence of relative advantage, ease of use, usefulness, attitude, trust, risk/security, and cost on the adoption of m-payment by merchants in Ethiopia.

This study is the first to study the drivers and barriers to the adoption of mobile payment by merchants in North Africa. This study is prompted by the importance for the Moroccan authorities for the adoption of mobile payment in Morocco. Indeed, the Central Bank and the Moroccan Government define mobile payment as a pillar of the Moroccan National Financial Inclusion Strategy. However, four years after its adoption, the adoption of mobile payment is still low and below the expectations of the Moroccan authorities. The definition of drivers and barriers to the adoption of mobile payment by merchants will allow the Moroccan authorities

to better understand the expectations of merchants to take appropriate measures to involve merchants more in the adoption of mobile payment.
In the next section, we will present the research methodology. Section 3 will be allocated to the presentation of the results of our research before concluding in section 4.

b. Methodology

In order to have a national representativeness, we conducted interviews with 100 merchants from the five main Moroccan cities: Rabat, Casablanca, Tangier, Fes and Marrakech.
The qualitative approach has been employed in order to identify and understand the drivers and barriers of Moroccan merchants' adoption of m-payment. Thus, based on Hayashi and Bradford (2014) and Moghavvemi *et al.* (2021) and in the absence of an official list of merchants, a purposive sampling approach was used and merchants were selected in various activities *i.e.* retail grocery, pharmacy, gas stations (appli), restaurants, cafes and drugstores/ Vêtements (appli), in order to obtain generalizable results. The diversification of sectors of activity aims to see if the preferences for mobile payment varied according to the activity. We have favored small retailers because they are the most widespread merchants in Morocco.
Some merchants (large stores) have been contacted by email whereas others have been contacted directly to make an appointment. The majority agreed to answer our questions without making an appointment.
The interviewees represent the different functions in the companies studied and only individuals with managerial responsibility of more than 5 years were selected to answer our questions.
Based on research objectives, five questions have been asked:

- Do you accept mobile payments or do you plan to do so on the coming years?
- What types of mobile payments do you accept or plan to accept?
- Do you offer or plan to offer a mobile application to improve the customer experience? If yes, what type?
- What are the expected benefits of adopting mobile payment?
- What are the expected disadvantages of adopting mobile payment?

The first question is closed while questions from 2 to 5 are open. The answer to the first question gives an idea of the business strategy of the company while answers 2 to 5 help to understand the preferences for mobile payments.
Responses to the third question show that some merchants surveyed offer apps for aggregating points, sharing vouchers, and sending promotions and discounts.
The answers to questions 4 and 5 made it possible to define the levers and obstacles to the adoption of mobile payment by merchants.
The questions were asked in Darija (Moroccan Arabic). We conducted interviews during the period of May 2022 and September 2022. In-depth interviews were carried out, each lasting on average 1h-1h30. The interviews were recorded and transcribed, with the permission of the respondents, to whom confidentiality and anonymity were promised. Then, the responses were analyzed using thematic analysis.

c. Results

As presented in the introduction (Data collection), interviews have been conducted with 100 merchants from the five main Moroccan cities: Casablanca, Fes, Marrakech, Rabat and Tangier.
The first remark is the lack of knowledge of m-payment. Thus, only 5 percent of merchants have attested to knowing what m-payment is. The second remark is that none of the interviewees offer mobile payment. Also, only 10 percent of interviewed plan to adopt in the coming years.

i. Drivers of m-payment adoption

Saving time and speed of transactions

For most respondents, the first advantage of mobile payment is the speed of transactions. Indeed, by paying by mobile, payment will be made almost instantaneously and neither the customer nor the merchant will have to look for change. According to the respondents, it will also avoid having long queues in the store: "The customer will only have to take his phone with him without worrying about the delay due to the search for change" ; " Customers won't have to queue, they can just send the amount directly to my m-wallet by phone or scan the QR Code without waiting for other customers" ; "Mobile payment will save me having to look for change for my customers".

Ease of use

Although respondents do not offer m-payment, several respondents found mobile payment easy to use. Indeed, respondents believe that scanning the QR Code to make a payment is easy and will avoid exchange return errors: "Sometimes you can make a mistake and give change more or less than necessary. A mobile application in which you write the amount to be paid will be easier to use and more efficient".

Security

Respondents believe that mobile payment is safer than traditional means of payment: cash and check. Indeed, the use of cash or checks can expose both the customer and the merchants to several risks such as theft, loss of the wallet or even making a mistake when giving change. Thus, the use of an interoperable mobile payment would be safer for both parties involved: merchants and customers: "The customer does not have to worry about losing his wallet or his money. Even the loss of the phone does not allow access to the mobile payment method. I think mobile payment is safer than cash. Also, I wouldn't even have to look for change".

Stakeholder protection

Respondents believe that the existence of clear regulations and a body that monitors their application would also reduce the risk of fraud and protect stakeholders: "I think such a system is the responsibility of the Central Bank. Putting in place a clear regulatory framework that protects mobile payment transactions will encourage both merchants and customers to adopt it."

Attracting new customers

Although considered very insignificant, customers requesting mobile payment could constitute a new niche of potential customers for respondents. Thus, some respondents believe that, as it is the case with the bank card, offering m-payment could attract new customers: "If I want to attract people adopting mobile payment, I will have to offer it as a means of payment. Today, no customer has ever asked to pay with his or her mobile. But if the customers ask for it, of course I will ask that I be equipped with this new technology".

ii. Barriers to mobile payment adoption

Lack of knowledge of mobile payment

The main cause of the non-adoption of mobile payment by the respondents is the ignorance of this means of payment. Indeed, most respondents do not know what mobile payment is. Several respondents even testified that they had never heard of mobile payment: "This is the first time I have heard of mobile payment".

Insufficient and poor of communication

The majority of respondents believe that the lack of knowledge of mobile payment is mainly due to the insufficient and poor of communication on the part of establishments offering mobile payment: Banks and credit institutions: "We have already been offered the electronic payment terminal but no one has ever invited to use or adopt mobile payment"; "I think those who offer this payment method should contact the merchants. Indeed, it could be a very interesting way, but it takes communication."

Traceability and tax cause

Respondents showed an aversion to the adoption of mobile payment mainly due to the risk of traceability of operations carried out by the tax authorities. Indeed, cash allows merchants to declare revenue to the tax authorities which are generally lower than those made. Thus, most respondents prefer to use cash so that the tax authorities do not know exactly the income earned by merchants. Respondents are also afraid that they will be taxed on transactions carried out by mobile payment. Merchants have shown an aversion to the transparency of financial operations: "Mobile payment is a way that the tax authorities use to know the receipts of merchants. We will be forced to pay more taxes. I do not think that merchants accept that all their operations are traceable for the tax authorities".

Lack of demand

"No one has ever asked to pay by mobile" is the answer of almost all respondents. This response shows that consumers do not demand mobile payment, which is why merchants do not offer it.

Security issues

Most merchants cited the security risk as a barrier to the adoption of mobile payment. Thus, two main risks have been put forward: the operational risk (due to problems with the payment system) and the risk of loss of the mobile (due to its loss or theft). At the first risk, respondents believe that since it is a new technology, the system could have flaws and not be reliable: "I think we should wait before offering mobile payment. We still don't know, for example, the risk if I ever lose the connection in the middle of the payment operation".

As for the second risk, the majority of respondents believe that if the mobile phone is lost or stolen, it could be used to make payments even without the owner's consent: "Mobile payment is very risky. If I ever lose my phone, who can assure me that whoever finds it does not make purchases with it?".

The results of this study are presented in Table 9. The results defined 5 drivers and 5 obstacles to the adoption of mobile payment.

Table 9 : Drivers and barriers of m-payment adoption

Drivers of m-wallet adoption	Barriers to m-wallet adoption
Saving time and speed of transactions	Lack of knowledge of mobile wallet
Ease of use	Insufficient communication
Security	Traceability and tax cause
Stakeholder protection	Lack of demand
Attracting new customers	Security issues

d. Discussion

In this section, we identified five drivers of mobile payment adoption. Thus, the use of mobile payment saves time and speeds up transaction times. By using mobile payment, merchants will no longer have to search for change, thus reducing transaction times and avoiding customers queuing. The second advantage of using mobile payment is ease of use. Indeed, making a payment using the phone number or by scanning the QR Code is easy and will also prevent both merchants and customers from exchange errors. The third advantage is in terms of security. Indeed, the use of mobile payment makes it possible to hedge against certain risks such as theft, loss of the wallet or even making a mistake when giving change. The fourth benefit identified is counterparty protection. Thus, the existence of a regulatory and control authority, namely the Central Bank or any other regulatory authority, would make it possible to build the confidence of both customers and merchants, especially in the event of an incident. The fifth and final benefit identified is the attraction of new consumers. Indeed, offering mobile payment as a payment solution would undoubtedly attract new customers, whether residents or tourists.

As for the barriers, five main obstacles have been identified. Thus, we have identified two main obstacles relating to the lack of knowledge or even ignorance of mobile payment on the part of merchants as well as the lack of communication. This is mainly due to the lack of financial education. We therefore recommend setting up advertising campaigns to inform and educate both consumers and merchants about the existence of new means of payment. We also note a third obstacle, which is the reluctance of traceability for tax reasons. Indeed, unlike the use of cash, which does not allow traceability of merchants' income, the use of mobile payment guarantees traceability of transactions, which for merchants would allow the tax authorities to tax them based on their revenue generated by mobile payment. We believe that awareness and clarification campaigns by the authorities could create some confidence among merchants. The reluctance to use mobile payment is also due to lack of customer demand. Thus, most respondents confirmed that no customer has ever asked to pay by mobile. We believe that financial education should concern both customers and merchants. The fifth and last barrier relates to security issues. Thus, according to the respondents, the loss of the phone could cause them to lose their mobile wallet. Connection problems and system failures could also generate losses for merchants.

3. What is the point of view of professionals?

In order to explore the point of view of professionals regarding the opportunities, challenges and recommendations that can encourage the adoption of m-payment and m-wallet in Morocco, we conducted six interviews with officials from the main stakeholders of the ecosystem of mobile payment and mobile wallet in Morocco:

- The Moroccan Central Bank « Bank Al-Maghrib »: Hakima El Alami, Director of Payment Systems and Means Oversight and Financial Inclusion;
- HPS : Abdessalam Alaoui Smaili, CEO. HPS is a Moroccan company created in 1995 whose vocation is to offer payment software. The company is present in 90 countries. It achieves between 5 and 10% of its turnover in Morocco and between 90% and 95% abroad. HPS ensures the interoperability of m-wallet and bank cards in Morocco.
- Al-Barid Bank: Reda Marrakchi, Head of Mobile and Internet Banking Division – Digital and Electronic Department at Al Barid Bank. Al Barid bank is a bank whose subsidiary is the payment institution Barid Cash.

- Lana Cash: Karim Ouahban: CEO. Lana Cash is a payment institution that proposes four main services: national and international money transfer, bill payment, Tax payment and Mobile payment.
- Three Banks and two Payment institutions, all Heads of Mobile Banking Divisions. The respondents have requested that they remain anonymous.

In each interview, we have tried to take the point of view of the interviewees concerning the opportunities, the challenges and the recommendations relating to the adoption of mobile payment. We asked three general questions and three specific ones:

- **General questions**
  - What is your institution?
  - What is your name ?
  - What is your position?
  - What role does your institution play in mobile payment?
- **Specific questions**
  - What are the main opportunities of using m-wallet?
  - What are the barriers ?
  - What are your recommandations ?

a. Definition of financial inclusion

Hakima El Alami, Director of Payment Systems and Means Oversight and Financial Inclusion in Bank Al Maghrib defines financial inclusion as fair and low-cost access to financial services for NFIS targets, which are the least served segments, particularly in rural areas, women, young people and VSMEs. The particularity of the Moroccan NFIS is that it is not a stand-alone strategy but complements, modifies or adds other actions to other national strategies.
According to El Alami, the ultimate objective of the Central Bank is to widen the range of electronic payment methods that are accepted, which will ultimately reduce the mass of circulating cash and, in turn, take a segment of the population out of the informal sector towards the formal. To achieve this objective, other objectives were also defined such as:

- to allow better access to underserved and excluded populations (individuals, informal sector) / Better access to excluded people (from informal to formal) ;
- to widen the acceptance of this means of payment to allow the reduction of cash (objective: to tackle small amounts, e.g. payment of bread) ;
- overcome the fear of going to the bank ;
- to facilitate access to accounts;
- to facilitate the opening of accounts for local merchants.

b. State of play of financial inclusion in Morocco

Regarding the progress of the implementation of the NFIS, El Alami confirms that some actions are progressing well such as the opening of payment accounts, the deployment of mobile payment (the results do not reach the objectives set), the access to financing (through Intilaka program[6]) and the access to financing for VSMEs, in particular with the establishment of the register of real estate securities, the national agricultural register, the relaxation of financing conditions at the level of the capital market, monitoring and payment. Other actions are still in development, such as the deployment of mobile payment among merchants, which is still not

[6] Integrated Business Support And Financing Program

forthcoming due to the fragility of the Moroccan productive fabric characterized by a majority (92%) of small businesses with less than 3 million dirhams annual turnover of which 84% does not exceed one million dirhams annually.
According to El Alami, Bank Al Maghrib plays a financial education role and works on a digital ecosystem. Also, under the Tayssir program[7], payments are made in cash. Indeed, the Governor of the Moroccan Central Bank, the Minister of National Education and the Minister of Trade and Industry have signed an agreement to dematerialize the cash flows. The idea is to get people to open payment accounts to receive the scholarships. The experiment was initially carried out in four cities (Fes, Meknes, Ben Guerir and Azilal). As part of this program, 44,000 payment accounts have been created.
For his part, Abdeslam Alaoui, CEO of HPS confirmed that, technically, everything is ready: the switching is interoperable and the banks have their own wallet solutions.
According to Marrakchi (Al Barid Bank), the mobile wallet project was launched four years ago but there is still no communication regarding interoperability between wallets. Ouahban (Lana Cash) believes the adoption of the mobile wallet is very low or even insignificant and that customers prefer cash.

c. Opportunities

Several opportunities to adopt mobile payment have been identified:

- ***Increase purchases of merchants.*** The Central Bank official confirms that by using mobile payment, the average merchant basket will increase. Also, Ouahban (CEO of Lana Cash) confirmed that the m-wallet makes it possible to have new customers;
- ***Dematerialization of financial operations and reduction of use of cash***: Indeed, according to El Alami, it allows to reduce the cash (better security), a better knowledge of the retailers and an understanding of their profiles (through a digital management of customers) and a better commercial strategy in particular through loyalty programs ;
- **The immediacy of transactions and interoperability.** According to Alaoui (HPS), once you receive money, you can send it to someone else, pay at a merchant or withdraw. Some banks have also allowed customers of payment institutions to be able to withdraw their money from ATMs. Two options are available for making a mobile payment: by using the phone number or by scanning the QR Code.
- ***Ease of payment***. Indeed, mobile payment offers the possibility of using the QR Code or of generating a QR Code. One of the most important aspects of the QR Code is that it is standardized and the standard was freely distributed and designed by HPS. It enables interoperability. At the checkout, instead of issuing a check or paying by card, simply scan the QR Code and pay (offer already available at Carrefour and Marjane, which have electronic payment terminals). Regarding the QR Code and the interoperability of the QR Code, the technology is ready on the HPS side.
- ***Safety and ease***. According to Alaoui (HPS), using the wallet increases security against the risk of theft or loss. Tips can be given by mobile wallet.
- ***Reduction of corruption***. According to Alaoui (HPS) the fight against corruption is an opportunity to use the mobile wallet and this through the traceability of payments;
- ***Reduction of the use of cash***. Alaoui (HPS) confirmed that there is a real need to reduce cash for cost issues and the acceleration of the economy.

[7] Tayssir is a conditional cash transfer program that makes a financial contribution to poor families, on the condition that their children use the education service provided by the public school.

d. Barriers

According Ouahban (Lana Cash), costs are not obtacles. However, several barriers have been identified :

- ***Lack of knowledge or even ignorance about this means of payment for both consumers and merchants***. All the respondents confirms that this new means still unknown for the main stakeholders (merchants and clients). According to El Alami, there is a lack of knowledge of the different possibilities for accessing accounts and the ignorance of the reductions made by Bank Al Maghrib in terms of access to accounts. For its part, El Alaoui confirms that the m-wallet is not even known yet by all the staff of banks and payment institutions. He justifies the lack of knowledge of the Maroc Pay brand by the lack of communication;
- **Lack of Communication**. All respondents confirmed the existence of a lack of communication. Thus, according to El Alaoui, there is a lack or even absence of display plates on businesses bearing the Maroc Pay logo. The manager also cited the complexity of communication given the existence of several brands on the market, which means that the 'Morocco Pay' brand is less valued. Also, El Alaoui notes a communication problem with the Maroc Pay brand. Also, according to Marrakchi (Al Barid Bank), banks lack communication and wait for the merchant to come to them to ask to open a payment account. Marrakchi also noted the lack of nationwide communication on the subject by BKAM and GP2M. For Ouahban (Lana Cash), the lack of communication constitutes an important obstacle for the popularization of the mobile wallet. Respondents from banks X and Y felt that neither Bank Al Maghrib nor acquirers (banks and payment institutions) communicate on the m-wallet. According to the respondent from the bank Z, there are no Moroccan Central Bank press conferences on mobile wallet and there is a need of more communiation;
- ***Fear of complexity and lack of confidence***. Fear of using m-wallet for fear of difficulties in use, processing of complaints and delays in processing complaints (Bank Al-Maghrib). According to El Alaoui, customers may wonder about the success or otherwise of the m-wallet. Also, the manager pointed out the absence or lack of traders who would set an example;
- ***Taxation***. El Alami (Bank Al Maghrib) raised the issue of taxation and the fear of future tax impacts of the use of mobile wallets by merchants. According to El Alaoui (HPS) the frivolity of neighborhood traders to equip themselves could come from a fear of the taxman. For Ouahban (Lana Cash) the first obstacle to the adoption of the m-wallet for the merchant is fiscal. Indeed, traders are afraid of the tax fallout. Respondents from Banks X and Z believe that the Ministry of Finance could use the data collected to force grocers to pay more taxes;
- ***Lack of mass demand***. For El Alaoui, one of the reasons for the lack of adoption by traders is that they feel there is no demand. For their part, customers do not adopt the mobile wallet because they believe that merchants do not accept this means of payment. One of the solutions that has been proposed is the mass creation of electronic wallets for the distribution of state aid (Tayssir program: 50,000 grants transferred). Also, the respondent from bank Z revealed that the refusal can be explained by the lack of demand. He confirmed that even in the largest cities in Morocco, the use of the bank card for payment remains in several cases very low;
- ***Lack of staff training***. El Alaoui noted the lack of understanding of the procedure for registering mobile wallets on the correspondence table. The manager of bank Y considered that the training given to the staff of his bank was insufficient;

- ***Problems with m-wallet registration procedures***. Ouahban (Lana Cash) explained the non-adoption of mobile wallets by the existence of technical problems. El Alaoui also raised two main issues:
    - Difficulties encountered when choosing the default wallet in the case of the mutliwallet
    - In the event of holding several m-wallets, the existence of a default m-wallet means that the other wallets do not go back to the switch, which generates rejections.
- ***Low yield.*** Our respondents from banks X, Y and Z confirmed that the banks believe that the m-wallet pays less than the other products offered by the banks, hence the lack of importance given to the m-wallet.
- ***Lack of need***. According to Marrakchi (Al Barid Bank), customers believe that the classic bank account and the means of payment already available allow them to carry out all the necessary transactions;
- ***Security***. According to Marrakchi (Al Barid Bank), Morocco is a safe country unlike other countries where the customer prefers not to use cash for fear of being attacked;
- ***Reluctance to change habits***. According to Ouahban (Lana Cash), customers are reluctant to change. This reluctance can be explained by the highly developed cash capillarity and the high illiteracy rate. Ouahban gave as an example of reluctance to change habits the delay in adopting bank cards.
- **Traceability**. According to Ouahban (Lana Cah) and the managers of banks X and Z, traders do not prefer the traceability of their operations.

e. Recommandations

The main recommendations that were presented by the respondents are:

- ***Financial education and communication.*** All respondents confirmed the need for more communication and financial education. Thus, according to El Alami (Bank Al Maghrib) and Alaoui (HPS), there is a need for more financial education and communication of issuers to their customers: banks and payment institutions must communicate by this means. Respondents of banks X, Y and Z believe that Bank Al Maghrib should also communicate more about this new means of payment. For Ouahban (Lana Cash), financial education should start in primary school;
- ***The involvement of stakeholders.*** According to Alaoui (HPS), it would be necessary to federate the efforts of all stakeholders involving all stakeholders (banks, payment institutions, telecom operators, merchants and end customers) to successfully deploy the mobile wallet. Marrakchi (Al Barid Bank) believes that acquirers need to make more effort to contact merchants;
- ***The role of government.*** According to Alaoui (HPS), the government should pay aid, grants to individuals and student grants to m-wallets. Indeed, today the payment of several aids is made in cash and others are made by bank transfer while the payments (government to person) should be made on these wallets;
- **Obligation for the exercise of a commercial activity**. Alaoui (HPS) also proposed that the authorization to exercise granted to professionals should be subject to a contract for the acceptance of electronic payment methods such as the wallet and ATM payment.
- ***Fiscal incitations***: All respondents confirmed the importance of tax incentives that should be offered to merchants. Thus, to encourage the adoption of mobile payment, the 2020 finance law[8] provides that companies and merchants benefit from an exemption

[8] Finance Law of 2020. https://www.finances.gov.ma/Publication/dgi/2020/cgi2020-fr.pdf

of 25% of the tax base corresponding to the turnover achieved by mobile payment. The provisions of the 2020 finance law concerning mobile payment have been modified in the amending finance law[9] of 2020[10]. The amending finance law of 2020 plans to replace this reduction for 5 years with an exemption of 100% of the aforementioned turnover. In the finance laws of 2021[11] and 2022[12], the amount of turnover achieved by mobile payment is not taken into account for the determination of the taxable base of Income Tax. This exemption is provided for declarations made for the years 2020 to 2024. These tax incentives should be publicized and communicated to the public.

4. Conclusion

In order to explain the low adoption of mobile payment and mobile wallet in Morocco, we investigate factors influencing the adoption of mobile payment and mobile wallet by end-users, merchants and also the point of view of professionals.

This paper is divided into five sections. The first section introduces the context, objectives and contributions of the study. The second section investigates factors influencing the adoption and the intention of adoption of mobile payment in Morocco based on the Meta-UTAUT model. Thus, seven independent variables (Performance expectancy, Effort expectancy, Social influence, Facilitating conditions, Personal innovativeness, Anxiety and Trust) and four dependent variables (Effort expectancy, Attitude, Behavioral intention and Use behavior) were defined. Our main theoretical contribution in this section is the revision of the extended-Meta UTAUT model. Thus, two relationships were obtained to be non-significant (the impact of social influence on behavioral intention and the impact of grievance redressal on user behavior). The contextualization of the extended Meta-UTAUT to the Moroccan context shows that these two relationships are not significant, which is specific to the Moroccan users of mobile payment. Thus, we present a revised Meta-UTAUT model specific to the Moroccan context (Figure 3).

Our research confirms previous findings that show the importance of trust, anxiety, and personal innovation. However, while anxiety was thought to have a negative influence on attitude (Zhou, 2011; Park et al., 2019; Patil, 2020; Wei et al., 2021), we found that this relationship is positive in the Moroccan context. This result can be explained by the fact that fear is not an obstacle to the use of mobile payment, especially since Moroccans are familiar with the use of banking and financial applications and with the mobile phone use.

Regarding the practical implications, this paper presents several implications that should be taken into consideration to improve the use of mobile payment by Moroccan consumers. First, the significant impact of performance expectancy on attitude and on use behavior indicates that Moroccan consumers believes in the importance of the use of mobile payment to achieve better performance and that mobile payment is useful. More effort in advertisement should be done to convince potential consumers to adopt mobile payment. Banks and payment companies have to propose mobile payment applications easy to use and complexity, as the effort expectancy has a significant impact on attitude towards mobile payment.

The existence of technical infrastructure, such as technical assistance and support (in particular through call centers and technical support to users), influences positively both the perception

[9] The purpose of the amending finance law was to respond to the impacts of the economic situation characterized by the Covid-19 health crisis.

[10] Amending Finance Law for the 2020 budget year. https://www.finances.gov.ma/fr/vous-orientez/Pages/plfr-2020.aspx#:~:text=Corps%20de%20Loi%20de%20Finances%20rectificative%20n%C2%B035%2D20%20pour%20l%27ann%C3%A9e%20budg%C3%A9taire%202020%3B%C2%A0

[11] Finance Law of 2021. https://www.finances.gov.ma/Publication/dgi/2021/cgi2021-fr.pdf

[12] Finance Law of 2022. http://www.finances.gov.ma/Publication/dgi/2022/CGI2022Fr.pdf

of users towards the ease of use of mobile payment (effort expectancy) and users intention to use mobile payment.
The willingness to use mobile payment influences the attitude of mobile payment users. We believe that more effort on financial education should be done. Also, the implication of grocery, hotels, and merchants in the sense that they should accept mobile payment so users will have more will to use a safe and quick mean of payment.
Regarding anxiety, we find that it positively impacts attitude of using mobile payment. While this result is contrary to our expectations, we can explain it as a sense of taking risk and will of discovery of mobile payment. Thus, anxiety does not constitute a barrier to the use of mobile payment but a lever for its use.
However, results show that social influence has no impact on mobile payment which means that the respondents believe that using mobile payment is a necessity as it is easy, rapid, safe, facilitates payment and do not adopt it to boast or as a sign of prestige. Also, Moroccan users are not influenced by others' opinions regarding the use of mobile payment. Today, the use of mobile payment in Morocco is not a synonymous of wealth but it is a need. It is still necessary to put the means by encouraging merchants to adopt it and to offer it to their customers.
As trust influences the attitude of using mobile payment, the risk relating to the non-execution of operations should be neutralized and controlled in order to encourage risk averse people to adopt mobile payment.
Finally, even if the results show that Grievance redressal does not influence the behavior of users, we believe that the Central Bank should put in place processes for settling disputes between consumers and suppliers. Thus, this could improve trust and attitude towards the use of mobile payment.
Section 3 investigates factors influencing the adoption and the intention to adopt mobile wallets. Collected data were analysed using an extended meta-UTAUT model. Thus, performance expectancy has a positive influence on both the intention and attitude to adopt m-wallets; facilitating conditions influences both intention to adopt m-wallets and attitude; perceived innovativeness influences the attitude toward using mobile payment; anxiety influences the attitude toward using mobile payment and trust influences attitude toward using mobile payment. However, some relationships are found insignificant: the influence of effort expectancy on the attitude to adopt an m-wallet, the influence of social influence on behavioral intention and the influence of grievance redressal on behavioral intention.
These results show that consumers are predisposed to use m-wallet and that ease of use influences consumer adoption behavior. Banks and payment institutions are thus led to develop easy-to-use m-wallet applications. Also, despite the lack of knowledge of the m-wallet, respondents believe that this means of payment could increase their performance and therefore encourage them to use it and thus influence both their intention and their attitude towards m-wallet. Potential consumers of m-wallet believe that its use cannot be considered as a sign of prestige or social influence, since the use of mobile payment and mobile applications has become commonplace in Morocco. Also, the existence of a support structure is a prerequisite for m-wallet adoption and the existence of such an entity should be communicated and publicized so that potential consumers become aware of its existence.
Regarding consumers confidence, trust can be acquired through the establishment of an easy-to-use application, an advisory service and customer support as well as customer protection. Finally, consumer protection requires the establishment of rules, mechanisms and systems for consumer protection. However, the results show that the existence of such a system does not influence the intention of the customers with regard to the adoption of the m-wallet. Also, providers should do more to show the benefit that using the m-wallet could bring, especially through media coverage and social media. Finally, despite the lack of knowledge of the m-wallet, Moroccan consumers will not hesitate to use this new means of payment.

The results obtained in sections 2 and 3 show the predisposition of customers to use mobile payment and mobile wallet. These results were complemented by a study of grocery retailers' acceptance of mobile wallet (Section 4). The respondents identified five drivers of m-payment adoption: saving time and speed of transactions, ease of use, security, stakeholder protection and attracting new customers. However, results show that there is a lack of knowledge of mobile payment and a lack of communication. The results also show that grocers have an aversion to traceability that would allow tax authorities to tax them on the sales made by mobile payment. The results of interviews with professionals (Section 5) show that mobile payment would increase purchases of merchants, dematerialize financial operations and reduce use of cash, the immediacy of transactions and interoperability, make payment easier, increase safety and ease, fight against corruption, and reduce the use of cash. However, professionals have identified a lack of knowledge or even ignorance about this means of payment for both consumers and merchants due to a lack of Communication. Professionals have also identified other obstacles such as fear of complexity and lack of confidence, taxation, lack of mass demand, lack of staff training, problems with m-wallet registration procedures, low yield, lack of need, security, reluctance to change habits and traceability. Respondents thus proposed five main recommendations: more effort in terms of financial education and communication, the involvement of stakeholders, greater government involvement, the obligation to use m-payment and m-wallet for the exercise of a commercial activity and more tax incentives.

5. Future research perspectives

Based on the precedent results and in order to further explore the adoption of m-payment and m-wallet in Morocco, several future research areas could be explored:

- The study of cultural factors influencing consumer behavior to adopt m-payment and m-wallet (for example, cultural values, social norms and beliefs) could provide information on the implementation of strategies to increase their adoption;
- The study of psychological factors that could influence the decision process of consumers when choosing between traditional payment methods and mobile payment;
- The study of the impact of financial education on the adoption of m-payment and m-wallet in Morocco. En effet, il est primordial d'évaluer l'impact de financial education, one of the pillars of the Moroccan National Financial Inclusion Strategy;
- The study of technology literacy and its relationship with the adoption of mobile payment and the mobile wallet. Indeed, assess how improving digital skills and accessibility for various user segments could contribute to higher adoption rates;
- The study of long-term adoption trends. It seems important to conduct a longitudinal study to observe how the adoption of mobile payment (specifically) evolves over time in Morocco;
- The comparison of mobile payment and mobile wallet adoption in Morocco with similar contexts or neighboring countries. Identifying similarities and differences allows to better understanding the unique factors affecting mobile payment and mobile wallet adoption in Morocco;
- Exploring alternative innovation adoption models beyond UTAUT/UTAUT2 that could provide a better understanding of adoption factors specific to the Moroccan context.

These future research perspectives constitute serious and valuable avenues that would make it possible to better understand the determinants of adoption of mobile payment and the mobile wallet specific to users (cultural or psychological factors) and to assess the impact and effectiveness of the Moroccan National Financial Inclusion Strategy, in terms of financial education and technological literacy.

The comparison from year to year, and with similar contexts (countries) would also make it possible to identify the determinants of adoption specific to Morocco. The use of theories/models other than UTAUT/UTAUT2 to model the adoption of mobile payment and mobile wallet could also better explain adoption and take into consideration variables that could be more relevant and representative.

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Appendix 1: Survey measurement for mobile payment

Construct	Code	Item	Source
Anxiety	MPAX1	I feel nervous about using mobile payment systems	Rana *et al.* (2017) ; Patil et al. (2020)
	MPAX3	I hesitate to use mobile payment systems in fear of making mistakes I cannot correct	
	MPAX4	Using mobile payment systems is somewhat scary to me	
Attitude	MPAT1	Using mobile payment systems is a wise/good idea	van der Heijden (2003), Yang and Yoo (2004), Oh et al. (2013), Schierz et al. (2018), Patil et al. (2020),
	MPAT2	Using mobile payment systems is pleasant	
	MPAT3	Using mobile payment systems is beneficial	
Behavioral intention	MPBI1	Assuming that I have access to the m-payment, I intend to use it	Venkatesh et al. (2012), Farah *et al*., 2018, Patil et al. (2020)
	MPBI2	During the next six (6) months I intend to pay for purchases with a mobile phone	
	MPBI3	I will always try to use mobile payment systems in my daily life	

Effort expectancy	MPEE1	I find mobile payment systems easy to use	Venkatesh et al. (2012), de Sena Abrahão et al., (2016), Farah et al., (2018), Patil et al. (2020)
	MPEE2	It is easy for me to become skilful at using mobile payment systems / It would be easy for me to develop the skills to use the mobile payment service	
	MPEE3	My interaction with mobile payment systems is clear and understandable	
Facilitating conditions	MPFC1	I have the resources necessary to use mobile payment systems	Venkatesh et aL. (2012) ; Patil et al. (2020)
	MPFC2	I have the knowledge necessary to use mobile payment systems	
	MPFC4	Specialized instructions concerning use of mobile payment systems are available to me	
Grievance redressal	MPGR1	There should be some authority to approach in the case of failed mobile payment transactions	Kumar et al. (2018)
	MPGR2	There should be transparency in settling claims for failed mobile payment transactions	
	MPGR3	Legal disputes about mobile payment should be resolved in a timely manner	
Percieved innovativeness	MPPI1	I like to experiment using mobile payment systems / I like to experiment with new information technologies	Agarwal and Prasad (1998) ; Patil (2020)
	MPPI2	Among my peers, I am usually among the first to try new ways of transaction mechanism through mobile payment systems / Among my peers, I am usually the first to try out new information technologies	
	MPPI3	If I heard about new transaction mechanism like mobile payment systems, I look for ways to experiment with it / If I heard about a new information technology, I would look for ways to experiment with it	
Performance expectancy	MPPE1	Using mobile payment systems helps me accomplish transaction (i.e. shopping, purchases, transfers etc) more quickly	Venkatesh et al. (2012), de Sena Abrahão et al., (2016), Farah et al., (2018), Patil et al. (2020)
	MPPE2	Using mobile payment systems makes it easier for me to do transactions (i.e. shopping, purchases, transfers etc.)	
	MPPE3	I find mobile Internet useful in my daily life	
Social influence	MPSI2	Using mobile payment systems is considered a status symbol among my friends	Lu *et al.* (2011b), Farah et al., (2018), Patil et al. (2020)
	MPSI3	Most people surrounding with me use mobile banking	
Trust	MPTR1	I believe that mobile banking is trustworthy	Sristavan et al. (2010), Lu *et al.* (2011b), Zhou and Lu (2011), Zhou (2013b), Farah et al., 2018, Shankar and Datta (2018), Patil et al. (2020)
	MPTR2	I trust mobile payment systems to be reliable / Internet payment always provides reliable financial services	
	MPTR3	I trust mobile payment systems to be secure / Internet payment always provides safe financial services	
User behavior	MPUB1	I use mobile payment systems	Patil et al. (2020), Shakar and Datta, (2018)
	MPUB2	I pay for purchases using mobile payment systems	
	MPUB3	I use mobile payment systems for transferring money to my family, friends and/or other contacts	

Appendix 2: Survey measurement for mobile wallet

Construct	Code	Item	Source
Anxiety	MPAX1	I will feel nervous about using mobile wallet	Patil *et al.* (2020)
	MPAX2	It scares me to think that I can lose personal information by wrongly using mobile wallet	
	MPAX2	I hesitate to use mobile wallet in fear of making mistakes I cannot correct	
	MPAX4	Using mobile wallet is somewhat scary to me	
Attitude	MPAT1	I think that using mobile wallet is a wise/good idea	Patil *et al.* (2020)
	MPAT2	I think that using mobile wallet is pleasant	
	MPAT3	I think that using mobile wallet is beneficial	
	MPAT4	I think that using mobile wallet is interesting	

Behavioral intention	MPBI1	Assuming that I have access to the m-wallet, I intend to use it.	Venkatesh *et al.* (2012) ; Farah *et al.* 2018 ; Patil *et al.* (2020)
	MPBI2	During the next six months, I intend to pay for purchases with a mobile wallet	
	MPBI3	I think that I will always try to use mobile wallet in my daily life	
	MPBI4	I plan to use mobile wallet frequently	
Effort expectancy	MPEE1	I think that I will find mobile wallet easy to use	Venkatesh *et al.* (2012) ; Farah *et al.* (2018) ; Patil *et al.* (2020)
	MPEE2	I think that it will be easy for me to become skilful at using mobile wallet	
	MPEE3	I think that my interaction with mobile wallet will be clear and understandable	
Facilitating conditions	MPFC1	I think that I will have the resources necessary to use mobile wallet	Venkatesh *et al.* (2012) ; Patil *et al.* (2020)
	MPFC2	I think that I will have the knowledge necessary to use mobile wallet	
	MPFC3	I think that I will can get help from others when I will have difficulties using mobile wallet	
	MPFC4	I think that specialized instructions concerning use of mobile wallet will be available to me	
Grievance redressal	MPGR1	I think that there should be some authority to approach in the case of failed mobile wallet	Kumar *et al.* (2018)
	MPGR2	I think that there should be transparency in settling claims for failed mobile wallet	
	MPGR3	I think that legal disputes about mobile wallet should be resolved in a timely manner	
Percieved innovativeness	MPPI1	I think that I will like to experiment using mobile	Agarwal and Prasad (1998) ; Patil (2020)
	MPPI2	Among my peers, I am usually among the first to try new ways of transaction mechanism	
	MPPI3	If I heard about new transaction mechanism like mobile wallet, I look for ways to experiment with it	
Performance expectation	MPPE1	I think that using mobile wallet will help me accomplish transaction more quickly	Venkatesh et al. (2012), Farah *et al.* (2018), Patil *et al.*, (2020)
	MPPE2	I think that using mobile wallet systems will makes it easier for me to do transactions	
	MPPE3	I think that I will find mobile wallet useful in my daily life	
	MWPE4	I think that using mobile wallet will increase my productivity	
Social influence	MWSI1	I think that people around me who use mobile wallet have more prestige than those who do not	Lu *et al.* (2011b) ; Farah *et al.* (2018) ; Patil *et al.* (2020)
	MWSI2	I think that using mobile wallet is considered a status symbol among my friends	
	MWSI3	I think that most people surrounding with me use mobile wallet	
	MWSI4	I think that people who are familiar with me think that I should use mobile wallet	
Trust	MWTR1	I believe that mobile banking is trustworthy	
	MWTR2	I trust mobile wallet to be reliable	

	MWTR3	I trust mobile wallet to be secure	Sristavan *et al.* (2010) ; Lu *et al.* (2011b); Zhou and Lu (2011) ; Farah *et al*. 2018 ; Shankar and Datta (2018)
	MWTR4	I think that m-wallet service provider implements adequate security measures to secure my personal data	