Mobile Payment – Classic Approaches to Promote Consumer Adoption

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ABSTRACT

The development and diffusion of smartphones has led to many new trends, among them a new payment solution in the form of mobile payment. This paper places its focus on factors influencing consumer adoption of mobile payment. The basis for this is often the technology acceptance model and unified theory of acceptance and use of technology. Several factors including perceived ease of use, perceived usefulness, performance expectancy and social influence were found to influence primary adoption while a compelling user experience, usability and enjoyment were found to be a main driver of long-term usage.

CCS CONCEPTS

• CSS → Applied Computing → Electronic commerce → Online shopping

KEYWORDS

Mobile payment, mobile transactions, consumer adoption, technology adoption, technology acceptance model, TAM

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1 Introduction

The tremendous number of worldwide smartphone users (3.5 billion users by 2020 [63]) has given rise to many new trends including a novel form of payment solution called mobile payment where people use their cell phones to make purchases [36]. An analysis of social media conversations on the topic showed that 86% of consumers and retailers view mobile payment positively [39]. Thus, this paper represents an extended version of [52] and examines in detail the concept of mobile payment and places an emphasis on factors influencing consumer adoption. Therefore, initially an introduction on the definition and classification of mobile payment will be given, followed by an overview on mobile payment enabling technologies in Section 2. Section 3 provides on overview on established and successfully applied models for measuring technology adoption. Then, as the core contribution, we analyze in detail scientific studies on factors influencing consumer adoption and acceptance. The final section summarizes the major findings and presents future research directions.

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2 Definition, classification and enabling technology

Mobile payment, also referred to as m-payment, is part of the overarching concept of mobile transactions and can be differentiated into proximity and remote mobile payment. Mobile payment is an economic transaction between two parties [24, 52]. These parties can be individuals and/or businesses [8], enabled by the use of a mobile electronic device that allows for settlement of said payment in a convenient and fast way, anyplace and anytime [36]. Mobile devices may include cell phones, tablet computers, PDAs or any other mobile device with access to a mobile communication network, although the focus is usually placed on the former [41]. Mobile payments fall under the overarching concept of mobile transactions, which comprise all types of transactions enabled through the use of mobile technology regardless of their financial or non-financial nature [2]. Besides mobile payment there are two other concepts falling under mobile transactions [9, 16, 40], i.e. mobile banking and mobile money. The classification of the elements of mobile transactions are described in Table 1.

Mobile banking [71] includes services such as account management with real time information, information and transaction history inquiry, money transfer and portfolio management, and complement other banking services like ATMs

and online banking [43]. Mobile money can be accessed by use of a mobile wallet, which represents the digital version of a wallet to store mobile money [2], but also provides other functionalities of conventional wallets such as holding digital membership cards and loyalty cards as well as personal information including ID, insurance policies or account details [57].

Mobile Transaction	Definition	Examples
Mobile Payment	Economic transaction between two parties enabled through the use of mobile technology	Remote payment (internet), proximity payment (NFC, QR code)
Mobile Banking	Banking services accessed through mobile devices by the use of wireless communication technology	Bank account management, money transfer, online banking
Mobile Money	A currency in a digital format	Money stored in mobile wallets linked to mobile phone number

Table 1: Classification of mobile transaction elements

After having presented the most fundamental definitions and a classification scheme of mobile payment, we turn to the enabling technology and differentiate between remote mobile payment and proximity mobile payment. Remote mobile payment was the initial form of mobile payment to be developed, with the idea of using it to process digital content and online purchases [61]. In its early stages this form of mobile payment typically charged consumers through premium rate SMS or wireless application protocol (WAP) billing, which were either charged directly to the consumer's mobile phone bill or deducted from prepaid airtime [30, 38]. The invention of smartphones along with improved network technologies led to the rise of over the air via the device mobile internet, creating new possibilities for remote mobile payment in the process. Today, consumers often deposit debit or credit card information or can make use of the aforementioned mobile wallets that contain said information or may be billed directly [38, 62]. On the other hand, we have proximity mobile payment. Proximity mobile payment builds on short-range wireless communication technologies including Bluetooth and infrared data association (IrDA) as well as radio-frequency identification (RFID) [34]. These technologies enable users to utilize mobile devices to settle payments for point of sale purchases for which they would otherwise use common payment method like cash or debit/credit cards [61]. The next large step in proximity mobile payment was taken with the development of near field communication (NFC) technology. NFC incorporates RFID and allows for short-range, two-way data exchange between either two NFC capable mobile devices or a capable mobile device and a payment terminal [62]. Compared to previous technologies, NFC offers better security, faster data transfer, usage with depleted battery and incorporation of contactless payment cards [3, 47]. A different option is the use of quick response (QR) codes to conduct proximity payment via a mobile device. A QR code is a two-dimensional barcode first developed in 1994, encompassing up to 7,089 characters of all data types (e.g. numeric, alphanumeric, binary, Kanji, Kana, etc.) in one symbol [15]. During the payment process a QR code is either generated by the payer's mobile device to be read by a special reader or presented by the recipient to be scanned by the payer's mobile device [35].

3 Basic Models for measuring technology adoption

In the context of mobile payment, management based scientific research has placed a strong focus on consumer adoption [10]. Therefore, consumer adoption will also be a focal point of this paper. Typically, studies rely on adoption models for their research and utilize statistical analysis, e.g. a bivariate or multivariate regression analysis, to assess strength and significance of relationships [20, 33]. Since several studies will be introduced in this paper, this section will introduce the most common models that form the basis of many studies (see Figure 1).

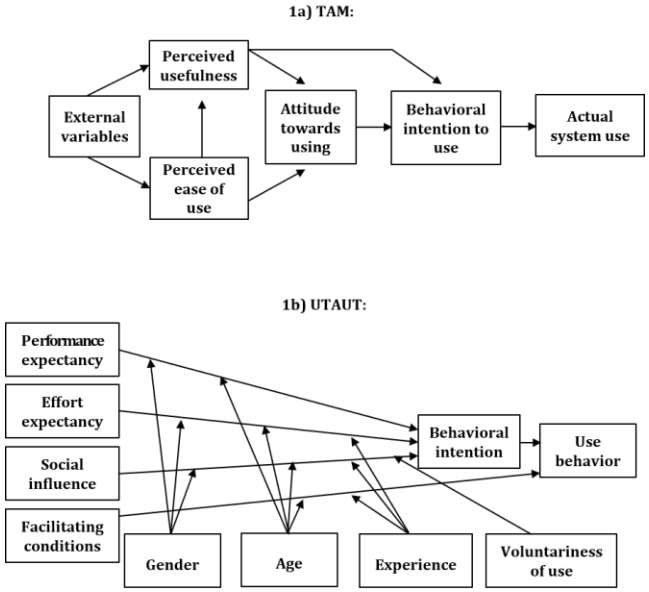

Figure 1: Basic Models and the Operational Terms [11, 67]

3.1 Technology acceptance model

The technology acceptance model (TAM) was first developed by Davis to explain user information technology (IT) adoption behavior [11]. It has become frequently used among researchers to analyze technology acceptance in a large number of IT related contexts [30]. The TAM has its roots in the theory of reasoned action (TRA) and was adapted from this model in order to explain determinants of computer technology acceptance and general user behavior [13]. The TRA is a social psychology model concerned with predicting individual behavior based on the individual's intention to perform said behavior [18]. TAM postulates that perceived usefulness and perceived ease of use are the two variables influencing the acceptance or rejection of technology [12]. Perceived usefulness is the user`s perception to what degree a system will improve performance, whereas perceived ease of use

refers to the degree the user beliefs that a system will be simple and effortless to utilize [11]. The model is depicted in Figure 1 A).

TAM postulates that, along the ideas of TRA, actual usage depends on the user's intention to use a technology. This in turn is influenced by the respective user's attitude towards usage which itself is influenced by the variables of perceived usefulness and perceived ease of use. In contrast to TRA, TAM introduces the notion the intention to use a technology is not only affected by the user's attitude but also by perceived usefulness. Additionally, TAM postulates that perceived ease of use has an effect on perceived usefulness since easier use leads to better performance [13]. Since its original inception, an extension of TAM has been introduced, known as TAM2. TAM2 includes further variables classified as either social influence processes (e.g. subjective norms, voluntariness, image) or cognitive instrumental processes (e.g. job relevance, output quality, result demonstrability) which influence perceived usefulness or intention to use [66].

3.2 Unified theory of acceptance and use of technology

As implied by its name, Venkatesh, Morris, and Davis developed the unified theory of acceptance and use of technology (UTAUT) by consolidating eight other models into one single model, which can be used to explain users' intentions to use information technology [67]. The consolidated models included TRA, TAM, the motivational model, the theory of planned behavior, a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory (IDT), and the social cognitive theory. Due to the large number of concepts incorporated into this unified model, the complexity is larger compared to TAM, as depicted in Figure 1 B).

Similar to TAM, usage intention influences behavior. However, there are a total of four key variables influencing these two. Performance expectancy, effort expectancy and social influence affect usage intention, while facilitating conditions directly affect behavior. Furthermore, several moderating variables (gender, age, experience, voluntariness of use) are included. In their initial study to develop UTAUT, Venkatesh et al. found that it explained up to 70% of variance in usage intention [67].

4 Consumer adoption of mobile payment

The next section of this paper will introduce several studies on the consumer adoption of mobile payment to highlight factors influencing adoption and acceptance. It will be followed by a detailed discussion of the findings.

4.1 Studies on consumer adoption

The first study to be introduced was conducted by Slade et al. and focused on proximity mobile payment based on NFC technology [62]. The study was carried out in the United Kingdom and utilized an extended UTAUT to analyze adoption. The extension is known as UTAUT2 and adds hedonic motivation, price value and habit as additional influencing variables, while dropping voluntariness of use as a moderating variable to better describe consumer acceptance behavior as opposed to the originally intended employee acceptance behavior of UTAUT [68]. Furthermore, Slade et al. proposed the inclusion of trust and perceived risk in their research model [62]. The results of the regression analysis are shown in Table 2.

Hypothesis			β	p value
1.	PE	→ IU	0.382	0.000
2.	EE	→ IU	− 0.093	0.064
3.	SI	→ IU	0.146	0.003
4.	FC	→ IU	0.039	0.437
5.	PV	→ IU	− 0.024	0.588
6.	HA	→ IU	0.140	0.004
7.	HM	→ IU	0.111	0.059
8.	TR	→ IU	0.159	0.006
9.	PR	→ IU	− 0.173	0.003

NOTE: PE = Performance Expectancy; EE = Effort Expectancy; SI = Social Influence; FC = Facilitating Conditions; PV = Price Value; HA = Habit; HM = Hedonic Motivation; TR = Trust; PR = Perceived Risk; IU = Intention to Use

Table 2: Analysis of extended UTAUT2 for NFC based mobile payment [62]

The regression model consisted of the nine constructs of the extended UTAUT2 as independent variables and the intention to use NFC enabled mobile payment as the dependent variable. As can be seen, the model supported five of the nine hypotheses developed by Slade et al. [61]. Performance expectancy ($\beta = 0.382$, $p = 0.000$), social influence ($\beta = 0.146$, $p = 0.003$), habit ($\beta = 0.140$, $p = 0.004$), trust in provider ($\beta = 0.159$, $p = 0.006$) and perceived risk ($\beta = -0.173$, $p = 0.003$) were all found to significantly influence the behavioral intention to use at significance levels below 1%. As predicted, the positive beta coefficients for performance expectancy, social influence, habit and trust in provider indicated a positive influence, whereas the negative beta coefficient of perceived risk indicated a negative influence. The results showed that performance expectancy has the strongest effect, followed by perceived risk. In addition, the adjusted R^2 value of 0.584 stated that the model explained 58.4% of the variance in the intention to use mobile payment.

Leong et al. conducted a similar study on NFC based mobile payment but were more specific by focusing on mobile credit card payment, which involves "uploading" one's credit card to a mobile device [30]. In contrast to the previous study, they based their research on TAM instead of UTAUT2 but hypothesized that perceived usefulness and perceived ease of use would both have a direct effect on intention to use, thereby leaving out the attitude towards using. TAM, too, was extended for the research by the variables social influence, personal innovativeness, trust and perceived financial cost, which were proposed to affect perceived usefulness and perceived ease of use. Social influence refers to the degree to which an individual believes that his or her social environment (e.g. family, friends) supports the individual's adoption of the technology [18]. Personal innovativeness refers to the willingness to test new technologies [1]. Leong et al. defined trust as trustworthiness and reliability of usage [34]. Finally, the

study operationalized perceived financial costs as costs for buying a cell phone, subscription fees, service fees, communication and transaction fees, and cost of maintenance. In addition, Leong et al. proposed to include gender, age, experience and usage as moderating variables as well as industry as a control variable [34]. This led to the formulation of 13 hypotheses. The intention to use mobile credit card payment was hypothesized to be positively influenced by industry, perceived usefulness and perceived ease of use. The latter two were in turn hypothesized to be positively influenced by social influence, personal innovativeness and trust as well as negatively influenced by perceived financial costs. In accordance with the original assumptions of TAM, perceived ease of use was further hypothesized to positively influence perceived usefulness. Finally, Leong et al. hypothesized all relationships among the variables in their research model to be moderated by gender, age, experience and usage [34].

The analysis supported TAM's original assumptions that perceived usefulness ($\beta = 0.260$, $p = 0.000$) as well as perceived ease of use ($\beta = 0.193$, $p = 0.001$) significantly influence the intention to use. Furthermore, Leong et al. were able to confirm the influence of perceived ease of use on perceived usefulness ($\beta = 0.433$, $p = 0.000$) [34]. Of the four newly introduced constructs, only personal innovativeness and trust proved to be statistically significant. Both constructs influence perceived usefulness ($\beta = 0.158$, $p = 0.003$; $\beta = 0.137$, $p = 0.003$) as well as perceived ease of use ($\beta = 0.297$, $p = 0.000$; $\beta = 0.126$, $p = 0.012$). As denoted by their positive beta coefficients, all variables have a positive effect. No support was found for the hypotheses on social influence, perceived financial costs or industry. The analysis of the moderating variables showed that merely age and experience had any significant effect and this only on the relationship between trust and perceived ease of use, perceived financial costs and perceived usefulness, and perceived ease of use and perceived usefulness.

A different proximity technology was the center of the study by Liébana-Cabanillas et al., namely the acceptance of QR code based mobile payment [35]. The study was based on TAM and extended it with several variables. Similar to the previous studies, personal innovativeness was proposed to influence perceived usefulness, perceived ease of use and the intention to use. Individual mobility, brought about by the use of cell phones, was hypothesized to influence perceived usefulness, attitude towards using and intention to use. Another added variable hypothesized to affect perceived usefulness and attitude towards using was perceived compatibility. This refers to the degree of compliance with values, needs and past experiences [53]. Liébana-Cabanillas et al. also added perceived security and subjective norms as influences on attitude, with subjective norms further proposed to directly influence intention to use. Subjective norms are defined similar to social influence in the previous studies [35].

Liébana-Cabanillas et al. found support for their hypotheses based on the original assumptions of TAM regarding the attitude towards using positively influencing the intention to use QR code based mobile payment ($\beta = 0.917$, $p < 0.001$) and its perceived usefulness positively influencing attitude ($\beta = 0.692$, $p < 0.001$) as well as perceived ease of use positively influencing perceived usefulness ($\beta = 0.471$, $p < 0.001$) [31]. However, in contrast to the assumptions of TAM, perceived ease of use was not found to significantly influence the attitude towards using ($p = 0.735$). Of the newly introduced variables, personal innovativeness was shown to have a positive influence on perceived ease of use ($\beta = 0.235$, $p = 0.001$) and intention to use ($\beta = 0.244$, $p = 0.014$). Furthermore, perceived compatibility positively influences perceived usefulness ($\beta = 0.349$, $p < 0.001$) and subjective norms influence the intention to use ($\beta = 0247$, $p < 0.001$). All other hypotheses had to be rejected.

Moving to remote mobile payment, Slade et al. suggested that factors influencing adoption are different compared to proximity mobile payment, since remote mobile payment uses less innovative technology and payer and recipient are spatially and temporally separated [60]. Therefore, they used UTAUT as a theoretical basis for research on remote mobile payment and extended it with personal innovativeness, trust, perceived risk and knowledge of mobile payment. Personal innovativeness should influence behavioral intentions since remote mobile payment is a new technology to settle payments. Perceived risk was included as a negative influence on behavioral intention because of the unfamiliarity and novelty of remote mobile payment technology for users and is a common addition to UTAUT [70]. Slade et al. included trust as an opposite to risk since trust in the technology reduces the perceived risk. Furthermore, trust was hypothesized to influence behavioral intention [60]. Finally, knowledge was hypothesized to moderate the antecedents of intention to use.

Slade et al. were able to find support for five of their seven hypotheses on direct effects [60]. The behavioral intention to use is positively influenced by performance expectancy ($\beta = 0.281$, $p = 0.000$), social influence ($\beta = 0.387$, $p = 0.000$) and personal innovativeness ($\beta = 0.218$, $p = 0.000$) as well as negatively by perceived risk ($\beta = -0.220$, $p = 0.000$). In addition, trust was found to reduce perceived risk ($\beta = -0.732$, $p = 0.000$). In contrast to their prior hypotheses, Slade et al. were not able to find statistically significant relationships between either effort expectancy ($p = 0.227$) or trust ($p = 0.647$) and the behavioral intention to use remote mobile payment [60]. The model was found to explain 67% of the variance in the behavioral intention to use. The moderating effect of knowledge was tested with a chi-square indifference test and with the addition of constraints on the structural paths, Slade et al. were able to show a moderating effect. Further analysis showed that trust had different effects on behavioral intentions in the two groups (knowledge, no knowledge). While it had significant influence in the group with knowledge of mobile payment, it did not in the group without knowledge [60].

As suggested by Slade et al., the existence of various technical solutions for mobile payment means that factors influencing adoption may differ depending on which technology is used [60]. Therefore, a comparison differentiating between different technologies when modelling adoption is desirable. Ramos de Luna et al. addressed this question and focused on SMS, NFC and QR code enabled mobile payment [45]. Their research model utilized TAM as its basis and extended it with subjective norms, which were

hypothesized to positively influence perceived ease of use, perceived usefulness and the behavioral intention to use, as well as perceived security, which was hypothesized to positively influence the behavioral intention to use [51]. Maximum likelihood estimation and bootstrapping were used for the analysis due to the lack of a normal distribution [69]. Table 3 shows the results.

		SMS		NFC		QR	
Hypothesis		β_{SMS}	p value	β_{NFC}	p value	β_{QR}	p value
1. SN → PEOU		0.34	< 0.001	0.407	< 0.001	0.242	< 0.001
2. SN → PU		0.47	< 0.001	0.390	< 0.001	0.284	< 0.001
3. SN → IU		0.12	< 0.1	0.353	< 0.001	0.172	< 0.001
4. PU → ATU		0.48	< 0.001	0.955	< 0.001	0.615	< 0.001
5. PU → IU		0.16	< 0.1	0.336	< 0.001	0.390	< 0.001
6. PEOU → PU		0.27	< 0.001	0.500	< 0.001	0.655	< 0.001
7. PEOU → ATU		0.21	< 0.001	− 0.080	n.s.	− 0.0005	n.s.
8. ATU → IU		0.27	< 0.001	0.375	< 0.001	0.437	< 0.1
9. PS → IU		0.07	< 0.1	0.078	< 0.1	0.062	n.s.

Note: SN = Subjective Norms; PU = Perceived Usefulness; PEOU = Perceived Ease of Use; ATU = Attitude Towards Use; PS = Perceived Security; IU = Intention to Use

Table 3: Analysis of SMS, NFC and QR code enabled mobile payment [60]

For all technologies subjective norms were found to positively influence perceived ease of use, perceived usefulness and the behavioral intention to use the mobile payment method (see H1. - H3. in Table 5), although the relationship between subjective norms and the latter is only weakly significant for SMS enabled mobile payment. Perceived usefulness was shown to have a positive impact on attitude and the behavioral intention to use (see H4. and H5. in Table 5) regardless of technology. Here again, the effect of SMS enabled mobile payment on behavioral intentions is only weakly significant. Perceived ease of use is the first construct that differs with regard to the enabling technology. The influence of perceived ease of use on perceived usefulness was found to be highly significant. However, its influence on attitude was only significant for SMS enabled mobile payment (see H6. and H7. in Table 5). Differences also became visible for the construct of perceived security. While its impact on the behavioral intentions is weakly significant for SMS (β_{SMS} = 0.070, $p < 0.1$) and NFC enabled mobile payment (β_{NFC} = 0.078, $p < 0.1$), no significant relationship could be proven for QR enabled mobile payment.

Ramos de Luna et al. further examined differences between the models for the different technologies by use of a multi-group analysis where the respective path weights of two different paths were subtracted and divided by the root of their summed squared standard errors [51]. Four significant differences became visible between SMS and NFC as well as SMS and QR code mobile payment, while there were two significant differences between constructs of NFC and QR code mobile payment. The comparison between the SMS and NFC model revealed significant differences for the effects of subjective norms on behavioral intentions (dif. = – 2.58, p = 0.01), perceived usefulness on attitude (dif. = – 3.93, p = 0.00) and perceived ease of use on perceived usefulness (dif. = – 2.69, p = 0.01) as well as on attitude (dif. = 2.87, p = 0.00). For the SMS and QR code models the results showed significant differences between the effects of subjective norms on perceived usefulness (dif. = 2.08, p = 0.04) as well as on behavioral intentions (dif. = – 1.68, p = 0.09) and again between the effects of perceived ease of use on perceived usefulness (dif. = – 3.13, p = 0.00) as well as on attitude (dif. = 2.59, p = 0.01). The two significant differences between the NFC and QR code models were between subjective norms on perceived ease of use (dif. = 1.99, p = 0.05) and perceived usefulness on attitude (dif. = 2.52, p = 0.01). Overall, these results indicate that the technology can indeed play an important role when determining the factors influencing adoption.

Johnson et al. differed in their approach from the aforementioned studies in two distinct ways [26]. First, they took a more general perspective to the topic by not focusing on a particular technology. Second, rather than using TAM or UTAUT, they based their research model on IDT. IDT stipulates that there are five different types of adopters based on personal innovativeness (i.e. innovators, early adopters, early majority, late majority, laggards) and tries to explain how new ideas or technologies spread over time by using five factors of adoption (i.e. relative advantage, compatibility, complexity, trialability, observability) [53]. Since the inception of the model, the construct of observability has been criticized as too complex and an alternative has been developed in which this construct is replaced by result demonstrability and visibility [42]. Johnson et al. therefore opted to include visibility in their research model, which describes the degree to which others are observed to use an innovation [26, 42]. Next to visibility, they further included ease of use, relative advantage and perceived security as factors with a positive influence on usage intention. Relative advantage is defined as the degree to which a new technology is perceived to be superior to a predecessor technology and therefore has a positive impact on usage intention [53]. Perceived security was also proposed to fully mediate the negative impact of privacy risk as well as the positive impact of ubiquity and trialability on usage intention. Ubiquity was hypothesized to have a positive impact because a commonly used technology that can be used anytime and anyplace is viewed as more trustworthy [37]. On the other hand, trialability refers to the degree to which users believe they can test a technology, allowing them to become familiar with it and help overcome security concerns [42].

The analysis provided support for all seven hypotheses. Perceived security was found to have the strongest influence on usage intention ($\beta = 0.36$, $p < 0.001$), closely followed by relative advantage ($\beta = 0.31$, $p < 0.001$). Interestingly, the previously often verified construct of ease of use was found to have the lowest, although still significant, influence of the constructs utilized in the present study ($\beta = 0.12$, $p < 0.05$). In addition, privacy risk was shown to have the strongest influence on perceived security ($\beta = -0.39$, $p < 0.001$), closely followed by ubiquity ($\beta = 0.32$, $p < 0.001$). Implementation of a bootstrapping method confirmed the hypothesized mediation effects and an analysis of the possibility of a direct influence of trialability, ubiquity and privacy risk showed that only the latter has a significant effect ($\beta = -1.56$, $p < 0.05$) on usage intention [21, 26].

Augsburg and Hedman explored the impact of value-added services on the adoption of mobile payment [5]. Normally, value-added services in telecommunications refer to digital non-core services

complementing voice calls [32]. For mobile payment Augsburg and Hedman extended this to services complementing the payment [5]. As implied by the name, value-added services are said to increase the value of a product and additionally may be able to compensate for diminishing core product sales [19, 65]. Augsburg and Hedman deployed a synthesized research model of TAM and IDT [5]. They hypothesized that value-added services positively influence the intention to use by increasing value. Further, perceived usefulness should increase since physical added services are made redundant. Being accessible at any time should positively affect compatibility and convenience of mobile payment should be positively influenced by eliminating the need to carry physical services. However, they also proposed that ease of use decreases since more features are added. The previously unmentioned convenience refers to the effort spent on acquiring a service.

Two surveys were created, one asking about a mobile payment solution with value added services and one without. Value-added services were operationalized as receipts, loyalty cards and coupons. The sample of the survey without value-added services acted as the control group, while the sample of the survey with value-added services was the experimental group. To test the hypotheses, the aggregated mean values of the different constructs were compared. The comparison showed that value-added services indeed positively influence the intention to use mobile payment by increasing perceived value [5]. On aggregate, the mean value for intention to use on the utilized seven-point Likert scale was 0.850 points higher in the experimental group than in the control group and this difference proved to be statistically significant ($p = 0.000$). The results further showed that value-added services have the strongest effect on perceived usefulness, with the mean value being 1.094 points higher in the experimental group compared to the control group ($p = 0.000$). The differences in mean values were also found to be significant for both compatibility ($p = 0.000$) and convenience ($p = 0.035$), indicating that these are positively influenced by value-added services. In contrast, the differences in aggregated mean values between the groups for perceived ease of use proved to be statistically insignificant ($p = 0.289$).

The last studies to be introduced do not focus on the primary adoption of mobile payment but rather on continued usage thereafter. Customer retention is vitally important to success and long-term competitiveness [22, 54]. Therefore, Zhou conducted a study based on the information system success model that included system quality, information quality and service quality as independent variables and trust, flow, and satisfaction as mediating variables [71]. The information system success model is another model developed to analyze technology adoption [14]. Zhou proposed that models such as TAM are more suited to analyze initial adoption, while the aforementioned variables of the information system success model affect continued usage [71]. In the proposed research model, the relationship between each independent variable and continuance intention is fully mediated by every mediating variably [56]. The previously unmentioned flow and satisfaction were defined as the tradeoff between as user's skill and challenge, and the discrepancy between expectation and perception of the service, respectively [23, 45]. The research model, strength of relationship and statistical significance of the relationships between the different variables are shown in Figure 2.

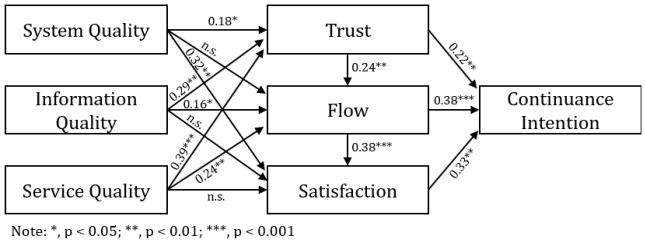

Figure 2: Analysis of information system success model for continued usage of mobile payment [71]

Statistical analysis provided evidence that all relationships except the effects of system quality on flow, information quality on satisfaction, and service quality on satisfaction were significant. The largest overall effect of the independent variables on the mediators was found to be service quality on trust ($\gamma = 0.39$, $p < 0.001$), followed by system quality on satisfaction ($\gamma = 0.32$, $p < 0.01$). The relationship between information quality and trust ($\gamma = 0.29$, $p < 0.01$) as well as service quality on flow ($\gamma = 0.24$, $p < 0.01$) also showed promising results. The mediator flow was found to have the strongest relationship with continuance intention ($\gamma = 0.38$, $p < 0.001$), followed by satisfaction ($\gamma = 0.33$, $p < 0.01$). Furthermore, flow seems to have a strong effect on satisfaction ($\gamma = 0.38$, $p < 0.001$).

In a longitudinal study, Kujala, et al. explore the effects of pre-use expectations on continued usage intentions for mobile payment [31]. Consumers tend to form expectations on post-consumption emotions, and this plays an important role in their degree of satisfaction with a product or service [50]. Confirming expectations can lead to a higher degree of satisfaction and this in turn influences continued usage intentions [6, 7, 45]. Therefore, Kujala et al. [31] developed a research model based on TAM and the expectation-confirmation model (ECM), which models continued usage intentions for information systems based on expectation-confirmation theory [7, 31]. They hypothesized that usability and enjoyment influence behavioral intentions and are themselves influenced by corresponding expectations. Furthermore, the confirmation of the expectations was also predicted to affect behavioral intentions. Continued usage intentions were included by observing the influence over time, i.e. prior to use, after three weeks, and after six weeks.

The analysis revealed that prior expectations on both usability ($\beta = 0.62$, $p < 0.05$) and enjoyment ($\beta = 0.65$, $p < 0.05$) influence the experienced usability and enjoyment after a few weeks of use, respectively. The impact of expectations decreased over time but still significantly influenced usability after six weeks of use ($\beta = 0.35$, $p < 0.05$), although not enjoyment ($\beta = 0.16$, $p > 0.05$). Contrary to prediction, the confirmation of expectations was not found to significantly influence behavioral intention to use the service at any point-in-time. Data supported the hypotheses that usability and enjoyment positively influence people's behavioral

intentions both after three weeks ($\beta = 0.48$, $p < 0.05$; $\beta = 0.41$, $p < 0.05$) and after six weeks ($\beta = 0.27$, $p < 0.05$; $\beta = 0.27$, $p < 0.05$). Again, the results indicated that the impacts decrease over time. The experienced usability and enjoyment after three weeks are further shown to influence the respective experiences after six weeks ($\beta = 0.45$, $p < 0.05$; $\beta = 0.58$, $p < 0.05$). Finally, the behavioral intention to use the service after three weeks positively influenced the behavioral intentions to use the service after six weeks ($\beta = 0.49$, $p < 0.05$). The model explained 64% of the variance in behavioral intentions after three weeks and 74% of the variance after six weeks [31].

4.2 Discussion

Overall, several factors have been found to determine the intention to adopt mobile payment. The studies supported the basic assumption of both TAM and UTAUT, that perceived usefulness and perceived ease of use (via attitude) and performance expectancy and social influence respectively influence the intention to use. Additionally, personal innovativeness, trust, habit and perceived risk were also shown to have a direct influence, while age, experience and knowledge of mobile payment were found to have moderating effects on different constructs.

Performance expectancy and perceived usefulness were shown to be the most important factors of adoption [34, 35, 60, 62]. Due to the similarity of definitions, the assumption can be made that they can be used interchangeably. From this we can deduce that providers of mobile payment solutions have to both offer high value and clearly communicate this value to customers. Slade et al. suggest combining proximity and remote mobile payment in a single application to provide the highest possible value [60]. Value added services may also be used to increase value, usefulness and convenience without complicating the solution and thereby increase adoption [5]. It should be noted, though, that factors influencing adoption have been shown to differ with regard to the various technologies [51]. Therefore, any market launch of an integrated product offer should be preceded by a thorough analysis.

The studies based on TAM highlight the importance of ease of use. This underlines the notion that mobile payment must be uncomplicated to use in order to increase adoption among consumers. Possible ways to achieve this could be simple user interfaces, comprehensive support including online, e-mail and free hotline support [34]. Not only can ease of use influence users' attitude towards usage but it was proven to influence perceived usefulness even stronger [34, 35] The idea that ease of use might be more of an antecedent to usefulness than a stand-alone determinant of adoption was already proposed during the development of the model [12]. When deliberating the proposed relationships, it makes sense that an easier to use product would increase its usefulness but that an easy to use technology with little use would not find its way into mainstream adoption.

The findings regarding the constructs of trust and risk are consistent with many other studies [36, 57, 58, 64]. Trust was shown to be an antecedent to both perceived usefulness and perceived ease of use [34]. A more trustworthy and secure technology can be used without constant deliberation or monitoring and will therefore have a higher usefulness and ease of use [48]. The extension of UTAUT showed that trust also has direct influence on intention to use [60, 62]. In marketing, both trust and risk have been recognized as vital components of consumer behavior [49, 59]. Risk has strong negative effects on the intention to adopt mobile payment [60, 62]. People are naturally risk averse and will therefore forgo risky alternatives [27]. A potential financial loss through hacking or malfunction of the new technology could denote mobile payment as risky [57]. We can derive from this that mobile payment providers should engage in measures that build trust and reduce risk. Sophisticated authentication, third-party certification and advanced encryption have been mentioned as possible measures [57, 60]. Increased trust may also decrease perceived risk, thereby amplifying the effect of an increase in trust [60].

Personal innovativeness was found to play a role in multiple introduced studies. It makes sense that the willingness to test new technologies would play a role in the adoption of a novel technology such as mobile payment. One could assume that in today's technology driven world personal innovativeness will rise by itself. However, providers should also try to actively raise people's willingness to try mobile payment. Exemplary measures could be promotional activities like free trials and demonstrations or drawing attention to innovative features like peer-to-peer money transfer [34, 60].

Slade et al. pioneered the idea that knowledge of mobile payment might have a moderating effect on the antecedents of adoption [60]. We can differentiate between three different kinds of knowledge barriers. Technology related barriers refer to a lack of knowledge on hardware, software, features or standards, project related barriers to lacking knowledge on required resources and development process amongst others, and application related barriers to lacking knowledge on usage areas [44]. In the context of mobile payment technology and application barriers seem most relevant. Slade et al. found stark differences in the various factors when including knowledge [60]. Especially trust suddenly had a significant impact. This suggests that people with knowledge of mobile payment can better weigh its trustworthiness. However, better knowledge also led to some increase in perceived risk. Still, providers should better communicate existing solutions to raise awareness for the technology.

Social influences play an important role in mobile payment adoption. To increase acceptance providers should get well-known, influential people to indorse mobile payment as well as use word-of-mouth marketing to let people directly influence their social environments [62]. In this context, network externalities have also been suggested to be important for adoption [4, 38, 47]. Network externalities exist when the utility of a product increase with the number of users [28]. For mobile payment we can assume that it becomes more attractive to consumers if more retailers accept it. Vice-versa, it also becomes more attractive to retailers the more consumers use it [38]. This represents a "chicken-egg" problem, as one has to come first. Providers could try to solve this by partnering with several retailers to begin with, who will be easier to reach for

them compared to consumers [46]. Mobile payment itself is also not a legal tender since it is not a valid means of pay for all contracts backed by a government [4]. Therefore, similar to crypto currencies, building trust is very important. This ties back into the previously mentioned findings on trust but also goes beyond the need for security feature to rule out the possibility of fraud. Providers must ensure that consumers are able to execute payment transactions using their application at any time to gain consumer trust. This can be achieved through a wide network of accepting partners and constant availability of the service without downtime.

Age acts as a moderating variable on several constructs. Liébana-Cabanillas et al. showed that the impact of external influences on ease of use is higher among older users, while the impacts of trust on ease of use and on attitude towards usage are higher among younger users [36]. From this we can derive that older people should be targeted with measures involving influence by third-parties, while measures building trust may be tailored more towards younger generations to increase adoption.

Finally, Zhou showed that continued usage of mobile payment is influenced by system, information and service quality, stating that solutions need to be reliable, personalized and easy-to-use [70]. While trust and satisfaction are also important factors regarding continuance intentions, a compelling user experience seems to be the most important long-term determinant of usage. Enrichment of the core product of mobile payment by value-added services may also positively influence user intentions to continue using such solutions [5]. For this reason, providers should look to add these types of services, such as receipt tracking as well as the ability to add loyalty cards and receive and use coupons while conducting a payment transaction using mobile payment. To achieve this, they may have to partner with providers of such services, but it also represents an opportunity to grow the network of accepting partners. Furthermore, usability and enjoyment were indicated to influence continued usage intentions and are in turn influenced by expectations, although confirmation of expectations has no direct effect on usage intentions [7, 31]. Nonetheless, as expectations influence experience, managing expectations is very important for providers. They should promote their service well in advance to raise expectations. These campaigns could focus directly on how easy, fun and convenient the service will be to use. However, there should be no over promising as well as negligence of actual usability and enjoyment. If that were the case, providers would risk negative contrast effects. Usability and enjoyment will eventually be experiences by users and even a good product may be perceived as inferior if expectations are raised too high and can therefore not be met. Providers must thus find the correct balance between raising expectations and then providing a product that can meet the communicated standards.

Even though the analyzed studies showed consistencies in several factors regarding adoption, it should be explicitly stated that also unexpected and noncontrollable issues, such as a pandemic, may have a major impact [17]. Nonetheless, as such events are beyond control, we omit force majeure and focus on the fact that newer studies have continually confirmed prior findings on factors influencing adoption.

5 Conclusion

Mobile payment refers to an economic transaction between two parties enabled by the use of a mobile device. The large number of smartphone users paired with the industry independence and low costs give mobile payment a huge market potential [34, 63]. For this potential to be realized consumers and retailers alike must be willing to adopt mobile payment as a universal means of payment. This paper has placed its focus on factors influencing consumer adoption of mobile payment. Perceived ease of use, perceived usefulness, performance expectancy, social influence, personal innovativeness, trust and risk were all found to influence consumers in the adoption process. Furthermore, age and knowledge of mobile payment are major moderators of the relationships while post-adoption usage depends strongly on a compelling user experience, usability and enjoyment. Since network externalities play an important role, retailer adoption would also have to be analyzed to gain a complete picture. This has however not been a focus of management research on the topic [10]. Overall, the success of WeChat Pay and AliPay in China as well as the increasing availability of Google and Apple Pay shows that mobile payment may soon be much more common than it is today [25, 55].

REFERENCES

[1] Agarwal, R., & Prasad, J. 1998. "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology" in *Information Systems Research*, 9(2), pp. 204–215.

[2] Albuquerque, J. P. de, Diniz, E. H., & Cernev, A. K. 2016. "Mobile payments: a scoping study of the literature and issues for future research" in *Information Development*, 32(3), pp. 527–553.

[3] Apanasevic, T. 2013. "Factors Influencing the Slow Rate of Penetration of NFC Mobile Payment in Western Europe" in *International Conference on Mobile Business.*

[4] Au, Y. A., & Kauffman, R. J. 2008 "The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application" in *Electronic Commerce Research and Applications*, 7(2), pp. 141–164.

[5] Augsburg, C., & Hedman, J. 2014. "Value Added Services and Adoption of Mobile Payments" in C. C. Yang, J. Capitano, D. Gefen, D. Fenske, B. Weber, E. K. Clemons, ... S.-F. Cheng (Eds.), *ICPS: ACM international conference proceeding series, ICEC 2014: The 16th International Conference on Electronic Commerce: Philadelphia, PA, USA, August 5-6, 2014* (pp. 27–32). New York, NY, USA: ACM.

[6] Bhattacherjee, A., & Premkumar, G. 2004. "Understanding Changes in Belief and Attitude toward Information Technology Usage: A Theoretical Model and Longitudinal Test" in *MIS Quarterly*, 28(2), pp. 229–254.

[7] Bhattacherjee, A. 2001. "Understanding Information Systems Continuance: An Expectation-Confirmation Model" in *MIS Quarterly*, 25(3), pp. 351–370.

[8] Brasseur, T. M., Mladenow, A., & Strauss, C. 2017. "Open business model innovation: Literature review and agenda for future research". Бизнес-информатика, 4 (42).

[9] Brasseur, T. M., Mladenow, A., & Strauss, C. 2017. "Business model innovation to support smart manufacturing". In Proceedings of American Conference on Information Systems 2017. Workshop on Smart Manufacturing. Boston, USA (pp. 10-12).

[10] Dahlberg, T., Guo, J., & Ondrus, J. 2015. „A critical review of mobile payment research" in *Electronic Commerce Research and Applications*, 14(5), pp. 265–284.

[11] Davis, F. D. 1986. "A technology acceptance model for empirically testing new end-user information systems: Theory and results" (Doctoral Dissertation). Sloan School of Management, MIT.

[12] Davis, F. D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" in *MIS Quarterly*, 13(3), pp. 319–340.

[13] Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models" *Management Science*, 35(8), pp. 982–1003.

[14] DeLone, W. H., & McLean, E. R. 2004. "Measuring e-Commerce Success: Applying the DeLone & McLean Information Systems Success Model" in *International Journal of Electronic Commerce*, 9(1), pp. 31–47.

[15] Denso Wave 2018. What is a QR Code? Available at: https://www.qrcode.com/en/about/ (Accessed: 24 May 2020).

[16] Donner, J., & Tellez, C. A. 2008. Mobile banking and economic development: linking adoption, impact, and use. *Asian Journal of Communication*, 18(4), pp. 318–332.

[17] Drew, D. A., Nguyen, L. H., Steves, C. J., Menni, C., Freydin, M., Varsavsky, T., ... & Spector, T. D. 2020. "Rapid implementation of mobile technology for real-time epidemiology of COVID-19". Science. Available at: https://science.sciencemag.org/content/sci/early/2020/05/05/science.abc0473.full.pdf (Accessed: 24 May 2020).

[18] Fishbein, M., & Ajzen, I. 1975. "Belief, attitude, intention and behavior: An introduction to theory and research". MA: Addison-Wesley.

[19] Goyal, A. 2004. "Role of supplementary services in the purchase of credit card services in India" in *Asia Pacific Journal of Marketing and Logistics*, 16(4), pp. 36–51.

[20] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. 2010. "Multivariate data analysis: A global perspective" (7. ed., global ed.). Upper Saddle River, NJ: Pearson.

[21] Hayes, A. F. 2009. "Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium" in *Communication Monographs*, 76(4), pp. 408–420.

[22] Hennig-Thurau, T., & Klee, A. 1997. "The impact of customer satisfaction and relationship quality on customer retention: A critical reassessment and model development" in *Psychology & Marketing*, 14(8), pp. 737–764.

[23] Hoffman, D. L., & Novak, T. P. 2009. „Flow Online: Lessons Learned and Future Prospects" in *Journal of Interactive Marketing*, 23(1), pp. 23–34.

[24] Hyben, B., Mladenow, A., Novak, N. M., & Strauss, C. 2015. "Consumer acceptance on mobile shopping of textile goods in Austria: modelling an empirical study". In Proceedings of the 13th International Conference on Advances in Mobile Computing and Multimedia, pp. 402-406.

[25] Jacobs, H. 2018. One photo shows that China is already in a cashless future. Available at: https://www.businessinsider.de/alipay-wechat-pay-china-mobile-payments-street-vendors-musicians-2018-5?r=US&IR=T (Accessed: 24 May 2020).

[26] Johnson, V. L., Kiser, A., Washington, R., & Torres, R. 2018. "Limitations to the rapid adoption of M-payment services: Understanding the impact of privacy risk on M-Payment services" in *Computers in Human Behavior*, 79, pp. 111–122.

[27] Kahneman, D., & Tversky, A. 1984. "Choices, values, and frames" in *American Psychologist*, 39(4), pp. 341–350.

[28] Katz, M. L., & Shapiro, C. 1985. „Network externalities, competition, and compatibility" in *The American Economic Review*, 75(3), pp. 424–440.

[29] Khalilzadeh, J., Ozturk, A. B., & Bilgihan, A. 2017. "Security-related factors in extended UTAUT model for NFC based mobile payment in the restaurant industry" in *Computers in Human Behavior*, 70, pp. 460–474.

[30] Kim, C., Mirusmonov, M., & Lee, I. 2010. „An empirical examination of factors influencing the intention to use mobile payment" *Computers in Human Behavior*, 26(3), pp. 310–322.

[31] Kujala, S., Mugge, R., & Miron-Shatz, T. 2017. "The role of expectations in service evaluation: A longitudinal study of a proximity mobile payment service" in *International Journal of Human-Computer Studies*, 98, pp. 51–61.

[32] Kuo, Y.-F., Wu, C.-M., & Deng, W.-J. 2009. „The relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services" in *Computers in Human Behavior*, 25(4), pp. 887–896.

[33] Kutner, M. H., Nachtsheim, C. J., & Neter, J. 2004. „Applied linear regression models" (4. ed., internat. ed.). in *The McGraw-Hill/Irwin series operation and decision sciences*. Boston, Mass.: McGraw-Hill/Irwin.

[34] Leong, L.-Y., Hew, T.-S., Tan, G. W.-H., & Ooi, K.-B. 2013. "Predicting the determinants of the NFC-enabled mobile credit card acceptance: A neural networks approach" in *Expert Systems with Applications*, 40(14), pp. 5604–5620.

[35] Liébana-Cabanillas, F., Ramos de Luna, I., & Montoro-Ríos, F. J. 2015. "User behaviour in QR mobile payment system: the QR Payment Acceptance Model" in *Technology Analysis & Strategic Management*, 27(9), pp. 1031–1049.

[36] Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. 2014. "Antecedents of the adoption of the new mobile payment systems: The moderating effect of age" in *Computers in Human Behavior*, 35, pp. 464–478.

[37] Lu, Y., Yang, S., Chau, P. Y.K., & Cao, Y. 2011. "Dynamics between the trust transfer process and intention to use mobile payment services: A cross-environment perspective" in *Information & Management*, 48(8), pp. 393–403.

[38] Mallat, N. 2007. "Exploring consumer adoption of mobile payments – A qualitative study" in *The Journal of Strategic Information Systems*, 16(4), pp. 413–432.

[39] MasterCard and Prime Research 2014. 13 Million Social Media Conversations Show What Consumers Think about Mobile Payments. Available at: https://newsroom.mastercard.com/press-releases/13-million-social-media-conversations-show-what-consumers-think-about-mobile-payments/ (Accessed: 24 May 2020).

[40] Mladenow, A., Mollova, A., & Strauss, C. 2018. "Mobile Technology Contributing to Omni-Channel *f*". In Proceedings

of the 16th International Conference on Advances in Mobile Computing and Multimedia, pp. 92-101.

[41] Mladenow, A., Novak, N. M., & Strauss, C. 2015. "Mobility for 'Immovables'–clouds supporting the business with real estates". Procedia Computer Science, 63, 120-127.

[42] Moore, G. C., & Benbasat, I. 1991. "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation" in *Information Systems Research*, 2(3), pp. 192–222.

[43] Moser, F. 2015. "Mobile Banking: A fashionable concept or an institutionalized channel in future retail banking? Analyzing patterns in the practical and academic mobile banking literature" in *International Journal of Bank Marketing*, 33(2), pp. 162–177.

[44] Nambisan, S., & Wang, Y.-M. 1999. „Technical opinion: Roadblocks to Web technology adoption?" in *Communications of the ACM*, 42(1), pp. 98–101.

[45] Oliver, R. L. 1980. "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions" in *Journal of Marketing Research*, 17(4), pp. 460–469.

[46] Ondrus, J., Lyytinen, K., & Pigneur, Y. 2009. "Why Mobile Payments Fail? Towards a Dynamic and Multi-Perspective Explanation" in R. H. Sprague (Ed.), *42nd Hawaii '09, Waikoloa, Hawaii, 5 - 8 Jan. 2009* (pp. 1–10). Piscataway, NJ: IEEE.

[47] Ondrus, J., & Pigneur, Y. 2009. "Near field communication: an assessment for future payment systems" in *Information Systems and E-Business Management*, 7(3), pp. 347–361.

[48] Pavlou, P. A. 2003. "Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model" in *International Journal of Electronic Commerce*, 7(3), pp. 101–134.

[49] Peter, J. P., & Tarpey, L. X. 1975. "A Comparative Analysis of Three Consumer Decision Strategies" in *Journal of Consumer Research*, 2(1), pp. 29–37.

[50] Phillips, D. M., & Baumgartner, H. 2002. „The Role of Consumption Emotions in the Satisfaction Response" in *Journal of Consumer Psychology*, 12(3), pp. 243–252.

[51] Ramos de Luna, I., Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. 2019. "Mobile payment is not all the same: The adoption of mobile payment systems depending on the technology applied" in *Technological Forecasting and Social Change*, 146, pp. 931–944.

[52] Reiting, P., Mladenow, A., Strauss, C. & Kotsis, G. 2020. Drivers and Influencing Factors in Mobile Payment Acceptance. In *Proceedings of the Euro American Conference on Telematics and Information Systems (EATIS'20)*, Nov 25 - 27, 2020, Aveiro, Portugal. ACM (to appear).

[53] Rogers, E. M. 2010. "Diffusion of innovations" (4th Ed.). New York, NY: Simon and Schuster.

[54] Rust, R. T., & Zahorik, A. J. 1993. „Customer satisfaction, customer retention, and market share" in *Journal of Retailing*, 69(2), pp. 193–215.

[55] Scheuring, S. 2018. Zahlen per Smartphone: Noch nicht alltagstauglich. Available at: https://www.tagesschau.de/wirtschaft/zahlen-per-smartphone-101.html (Accessed: 24 April 2020).

[56] Shadish, W. R., Cook, T. D., & Campbell, D. T. 2002. "Experimental and quasi-experimental designs for generalized causal inference". Belmont, Calif.: Wadsworth Cengage Learning.

[57] Shin, D.-H. 2009. "Towards an understanding of the consumer acceptance of mobile wallet" in *Computers in Human Behavior*, 25(6), pp. 1343–1354.

[58] Shin, D.-H. 2010. "Modeling the Interaction of Users and Mobile Payment System: Conceptual Framework" in *International Journal of Human-Computer Interaction*, 26(10), pp. 917–940.

[59] Sirdeshmukh, D., Singh, J., & Sabol, B. 2002. "Consumer Trust, Value, and Loyalty in Relational Exchanges" in *Journal of Marketing*, 66(1), pp. 15–37.

[60] Slade, E. L., Dwivedi, Y. K., Piercy, N. C., & Williams, M. D. 2015. "Modeling Consumers' Adoption Intentions of Remote Mobile Payments in the United Kingdom: Extending UTAUT with Innovativeness, Risk, and Trust" in *Psychology & Marketing*, 32(8), pp. 860–873.

[61] Slade, E. L., Williams, M. D., & Dwivedi, Y. K. 2013. "Mobile payment adoption: Classification and review of the extant literature" *The Marketing Review*, 13(2), pp. 167–190.

[62] Slade, E. L., Williams, M. D., Dwivedi, Y. K., & Piercy, N. C. 2014. "Exploring consumer adoption of proximity mobile payments" in *Journal of Strategic Marketing*, 23(3), pp. 209–223.

[63] Statista 2020. Number of smartphone users worldwide. Available at: https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/ (Accessed: 24 May 2020).

[64] Thakur, R., & Srivastava, M. 2014. "Adoption readiness, personal innovativeness, perceived risk and usage intention across customer groups for mobile payment services in India" in *Internet Research*, 24(3), pp. 369–392.

[65] Van Riel, A. C.R., Liljander, V., & Jurriëns, P. 2001. „Exploring consumer evaluations of e-services: a portal site" in *International Journal of Service Industry Management*, 12(4), pp. 359–377.

[66] Venkatesh, V., & Davis, F. D. 2000. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies" in *Management Science*, 46(2), pp. 186–204.

[67] Venkatesh, V., Morris, M. G., & Davis, F. D. 2003. "User Acceptance of Information Technology: Toward a Unified View" in *MIS Quarterly*, 27(3), pp. 425–478.

[68] Venkatesh, V., Thong, & Xu 2012. "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology" in *MIS Quarterly*, 36(1), pp. 157–178.

[69] West, S. G., Finch, J. F., & Curran, P. J. 1995. "Structural equation models with nonnormal variables: Problems and remedies" in R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 56–75). Thousand Oaks, CA, US: Sage Publications, Inc

[70] Williams, M. D., Rana, N. P., Dwivedi, Y. K., & Lal, B. 2011. "Is UTAUT really used or just cited for the sake of it? A systematic review of citations of UTAUT's originating article" in *Proceedings of the European Conference on Information*.

[71] Zhou, T. 2013. "An empirical examination of continuance intention of mobile payment services" in Decision Support Systems, 54(2), pp. 1085–1091.Conference Short Name:WOODSTOCK'18