

Value Added Services and Adoption of Mobile Payments

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ABSTRACT

In this paper, we investigate the role of Value Added Services (VAS) in consumers' adoption of mobile payments. VAS are supplementary digital services offered in connection with mobile payments; in this study exemplified by receipts, loyalty cards, and coupons. A research model is derived from existing literature and empirically tested through an experimental design survey, in which the experimental group is exposed to a mobile payment solution with VAS, including receipts, loyalty cards, and coupons, and the control group is exposed to a mobile payment solution without VAS. Our findings show that intention to adopt mobile payments increases as VAS are introduced and that this increase comes from a positive change in Perceived Usefulness, compatibility, and Convenience.

Categories and Subject Descriptors

K.4.4 [Electronic Commerce]: Payment adoption

General Terms

Design, Experimentation, Human Factors.

Keywords

Mobile Payments, Value Added Services, Experimental Survey

1. INTRODUCTION

Given the global widespread use of mobile devices, mobile payments have long been predicted to become an important technology in the payment market. However, while a few successful solutions have been launched in Asia and Africa, for instance M-Pesa, mobile payments in general are not as successful as expected in the Western hemisphere [1, 18, 21].

There are several explanations for the slow diffusion and adoption, including failure in understanding the two-sided payment market [18], few payment innovations [3], poor business models [15], intra-operability issues between mobile phone operators and payment service providers [2]. Innovation and Diffusion Theory (IDT) [20] provides another, but general, explanation, namely that mobile payment providers have failed to demonstrate the relative advantage of mobile payments over existing payment instruments, such as cash or payment cards.

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Research by Gartner [6] provides support for this. They found that mobile payments do not offer any obvious consumer benefits over cash or payment cards. Their recommendation to mobile payment providers is to bundle mobile payments with other services such as loyalty cards, bonus points, coupons, and rewards, to provide customer value. Similarly, Accenture [1:9] suggest that mobile payment providers should incorporate "other value-added tools in order to encourage broad adoption as quickly as possible". These services, or tools, are referred to as Value Added Services (VAS) [8], which are digitalized payment related services, and include for instance receipts, loyalty cards, coupons, or financial services solutions.

In the existing mobile payment adoption research, the focus has mainly been on the payment service in itself, thereby not including VAS [2, 21]. While the research offers insightful information about the underlying drivers of adoption, its failure to report the full potential of mobile payments could present a distorted and incomplete image of consumer acceptance. Some research has been carried out on the concept of mobile wallets [22], which incorporates the concept of VAS, but no existing research has been found to investigate the relationship between VAS and the intention to adopt. Furthermore, the majority of existing research was conducted on consumer perception of mobile payment after the system was adopted [for example 2, 9, 15, 22]. However, as mobile payments have failed to spread in the majority of western countries, and have therefore not yet been adopted, it is interesting to understand consumer perception prior to adoption [28].

In view of the current state of existing research on mobile payments, the purpose of this study is to investigate how VAS affect consumer intention to adopt mobile payments, i.e. how the future inclusion of VAS in the mobile payment value proposition affects consumers' intention to adopt and use mobile payments. The focus is on the role of VAS in the adoption – does it matter or not. We do this by developing a research model from existing mobile payment adoption literature, and empirically testing the model by means of an experimental survey design. An experimental group is exposed to a mobile payment solution (stimulus) including three examples of VAS, whereas a control group is exposed to the payment solution alone, after which both groups are asked the same adoption related questions. The respective findings are compared and tested for significance in difference of means and effect of VAS. By doing so, this research contributes to the existing literature by concluding on the effect of VAS on consumer intention to adopt mobile payments.

The remaining paper is organized as follows: In the next section, we describe existing research on mobile payments and on the role of VAS, and in section three we present our research model. In section four, we describe the research approach and our experimental survey design. Section five presents the results. In

the following section six, we discuss the findings and the limitations. Finally, section seven concludes the paper.

2. LITTERATURE REVIEW

Our current understanding of consumer adoption of mobile payments is strongly framed by the perspective of Technology Acceptance Model (TAM) [4, 5]. There are many empirical studies that apply TAM [for example 2, 21, 25, 26]. The original TAM examines people's intention to adopt a technology [4], i.e. attitude towards using a technology, defined as the likelihood that an individual will adopt a technology [4]. The antecedents to intention to adopt are Perceived Usefulness and Perceived Ease of Use [4, 5, 25, 26].

Although very useful for predicting intention, it has in previous research been suggested that the model should be extended to include factors particularly relevant to the technology in question [21, 25, 26]. Accordingly, we view the TAM as a reference point in this research and include extensions in order to contextualize mobile payment adoption accordingly.

Another influential model that has been widely used in mobile payment adoption research [for example 14, 15] is Innovation Diffusion Theory (IDT) [20]. However, a meta-analysis [23] indicates that out of the five original constructs, only Relative Advantage, Complexity, and Compatibility were consistently related to adoption. Therefore, the remaining two constructs (trialability and observability) are not considered in this research.

The similarity between IDT's Relative Advantage and Complexity, and TAM's Perceived Usefulness and Perceived Ease of Use, respectively, is noticeable, and the comparison has been drawn by several authors [25, 26]. Therefore, we assume that Perceived Usefulness and relative advantage as well as Perceived Ease of Use and Complexity can be used interchangeably.

2.1 Mobile payment adoption

Mobile payments are defined as "payment for goods and services authorized, initiated, or realized with a mobile phone" [adapted from 21]. Since the focus is on consumer or payer acceptance, the scope is limited to B2C payments. Furthermore, the focus is on proximity payments, defined as in-store or location-based payments with a smartphone to a point of sale.

Perceived Usefulness (PU) is defined as "the degree to which a person believes that using a particular system or technology would enhance his or her job performance" [4]. Several studies have shown that PU positively affects intention to adopt mobile payment [3, 10, 11, 19, 21].

Perceived Ease of Use (PEOU) measures "the degree to which a person believes that using a system would be free of effort" [5:320]. Existing research shows that PEOU positively affects the intention to adopt mobile payment [3, 10, 11, 19, 21].

Compatibility (COM) is a construct from the IDT [20], and measures "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" [20:15]. COM has been shown to positively affect the intention to adopt mobile payment [3, 14, 15].

Convenience (CONV) is related to "the effort consumers spend on obtaining the payment service" [27] and has been found to be an important driver of the intention to adopt mobile payments [3, 14, 15, 17].

2.2 Value Added Services

In telecom, VAS are mobile services that complement the core service, voice calls. We extend this definition to mobile payments, and consider VAS complementary services to the payment itself. Furthermore, when extending the idea to a more traditional management discipline of marketing, the mobile payment is the "core service", and VAS are "supplementary services" [12]. The term, VAS, thus signifies the idea of supplementary services limited to telecom, and it is therefore useful to broaden the scope of the literature review to gain a general understanding of the role of supplementary services.

The literature proposes two reasons for attaching supplementary services to a core product: 1) To increase the perceived value of the core product [24], and 2) to make up for declining revenue from core product sales [7]. Supplementary services are found to significantly influence the perceived value of a product [7, 8, 16 24] and have been found to be an important driver of product adoption [8, 24]. As a supplementary service to mobile payments, we therefore propose that VAS will positively affect the perceived value of the mobile payment offering and thereby the intention to adopt mobile payments.

3. RESEARCH MODEL

In the following section, we outline our research model and hypotheses. The research model is a synthesis of TAM [4,5] and IDT [20]. We have decided not to make any extensions of TAM or IDT, as the key focus of the paper is whether VAS influences intention to adopt or not – not to establish which factors influence adoption. TAM and IDT are chosen as the reference point for this study, because both theories have been proven very successful in predicting intention to adopt mobile payments [3, 10, 11, 13, 14, 15, 21, 22, 28]

VAS are a kind of supplementary services, which have been found to positively affect the intention to adopt a core product [17, 24], therefore we hypothesize that:

H1: VAS will increase the perceived value of mobile payments and positively affect the intention to adopt mobile payments.

The antecedents to intention to adopt are PU and PEOU, and have in this research been extended to also include COM and CONV.

PU of mobile payments is usually measured according to easiness and speed/efficiency [for example 2, 10, 21]. VAS are likely to increase the PU of mobile payments as consumers do not need to use physical versions of VAS items as these will be embedded in the phone. The payment process will thus be easier and more efficient. We therefore hypothesize that:

H2: VAS will positively affect the Perceived Usefulness of mobile payments.

PEOU measures an individual's perception of the extent to which using a system will be free of effort, and positively affects an individual's intention to adopt [5]. However, as VAS add more features to the system, it is likely that this will complicate the use of the system. Thus, we hypothesize that:

H3: VAS will negatively affect the Perceived Ease of Use of mobile payments

COM measures how well a technology fits with a person's lifestyle and need. Mobile payments are expected to be of high compatibility [14, 21] because people carry their phone with them most of the time and it is therefore readily available in most situations [14]. The access to VAS is likely to increase COM of

mobile payments, as VASs are made readily available on the phone. Thus, we hypothesize that:

H4: VAS will positively affect the compatibility of mobile payments

CONV measures the effort consumers spend obtaining the service [27], and as payments are carried out with a phone it reduces the need for carrying a physical wallet. VAS further reduce this need as these services will be embedded in the phone, and it is therefore hypothesized that:

H5: VAS will positively affect the Convenience of mobile payments

4. METHOD

To explore our research question whether VAS influence people’s intention to adopt mobile payments or not, we applied an experimental survey design. Two surveys were developed with different stimuli. For the control group, the stimulus was text and pictures describing a mobile payment solution. For the experimental group, the same stimulus was used; however, we extended this stimulus by adding text and pictures showing and explaining VAS. A brief summary of this is: “In the future you can receive your receipts digitally, you can store your loyalty cards on your phone, and you can receive coupons automatically”.

The questionnaire for both the control and experimental group included questions about demography (age, income, gender, education), payment habit and payment experience, attitude (PU, PEOU, COM, and CONV), and intention to adopt. To the extent possible, items were adopted from prior research and modified to fit the research context.

The surveys were pre-tested by 10 people in face-to-face interview and adapted based on feedback. The following items were used for the main constructs and measured by a 7 point Likert scale. PU: 1. Mobile payment makes paying easier; 2. Mobile payment provides me with better overview of my expenditure; and 3. Mobile payment makes paying more efficient. PEOU: 4. It is clear to me how I should interact with mobile payment; 5. It is easy to perform the steps required to use mobile payment; and 6. Learning to use mobile payment is easy for me. COM: 7. Mobile payment fits my daily routine tasks; 8. Mobile payment is attractive because the phone is always with me; 9. Using mobile payment fits well with how I like to pay. CONV: 10. Mobile payment is attractive because I can use it anytime; 11. Mobile payment limits how many items I have to carry around; and 12. Mobile payment is useful because I don’t always have to remember to bring my wallet. Intention to Adopt: 13. I am likely to use mobile payment in the future; 14. I plan to use mobile payment when the opportunity arises; and 15. I plan to use mobile payment instead of cash or card.

There are of course other factors influencing the adoption of mobile payments, including risk, trust, habit and security, which could have been included. However, the purpose is not to develop a mobile payment adoption model, but to increase the understanding and the role of VAS in the adoption. The research is conducted in Denmark, which have some unique characteristics. Danes trust the payment system, they mainly use the national debit card, and rapidly adopt mobile payments. Since the spring of 2013 when the p2p app, MobilePay, was launched, it has reached 30% of the population. So these contextual factors have influenced which factors to include or not.

4.1 Data collection

The survey was conducted in Denmark, but in English, and was distributed in the fall of 2013 through one of the author’s personal Facebook network, in person, e-mail invitation, and Twitter posts. The total numbers of 254 responses were collected through SurveyMonkey of which 204 were used, based on whether respondents had fully completed the survey. The number of men and women is roughly equal; men make up 53% of the total respondents. As expected, students largely dominated the survey respondents, making up 55% of the total respondents, with 36% being employed, 5% unemployed and 4% self-employed. Of the 204 usable responses 105 answered the control survey and 99 answered the experimental survey. The scales showed good internal consistency, with a Cronbach’s Alpha of .926 for the control survey and .924 for the experimental survey. Table 1 shows some of the demographics for the two groups. We tested the similarity between the two groups using t-test for age, income, gender, and payment habits. We found no significant differences between the experimental and the control group.

Table 1. Demographics

	Age	Income	Male in %
Both groups	27	12,334	53
Control	27	11,648	57
Experimental	27	13,055	52

5. RESULT

In table 2, we show the mean and std. dev. for the individual items. We can see that the mean is higher for the experimental group than for the control group for most items (except for item 6: “Learning to use mobile payment is difficult for me”). The same is true for the std. dev. The items for PEOU show low difference between control and experimental group, indicating that VAS do not influence much.

Table 2. Mean and Std. Dev.

Construct	Item	Group	Mean	Std. Dev.
PU	1	C	5.25	1.691
		E	5.80	1.471
	2	C	3.42	1.780
		E	5.35	1.837
	3	C	4.66	1.646
		E	5.45	1.745
PEOU	4	C	5.28	1.650
		E	5.30	1.381
	5	C	5.07	1.339
		E	5.23	1.413
	6	C	6.17	1.087
		E	6.15	1.014
COM	7	C	4.95	1.701
		E	5.65	1.662
	8	C	4.38	2.141
		E	5.25	2.012
	9	C	4.02	2.126
		E	5.34	2.016
CON	10	C	4.99	1.795
		E	5.53	1.650
	11	C	5.10	1.779
		E	5.42	1.944

Intention	12	C	5.39	1.572
		E	5.81	1.664
	13	C	5.46	1.721
		E	6.04	1.609
	14	C	5.11	1.862
		E	5.76	1.773
	15	C	4.02	1.936
		E	5.34	1.802

In table 3, we show the differences in means between control group and experimental group at significance level 95%. From the table, we find that a large proportion of the differences in means are statistically significant. All question items measuring the constructs, PU, COM, and Intention to Use, are significant. One of the questions measuring CON is significant, whereas the two others are not (note, however, that the significance is 2-tailed even though the hypotheses are directional, which indicates that if the 1-tailed significance was used, the difference would be significant, as p is then halved). PEOU reveal very small differences in means and accordingly the p-value shows non-significance.

Table 3. Difference in mean between control and experimental group

Construct	Item	Mean difference	Sig. 82-tailed), p	Significant
PU	1	-0.550	0.014	Yes
	2	-1.934	0.000	Yes
	3	-0.797	0.001	Yes
PEOU	4	-0.027	0.900	No
	5	-0.166	0.391	No
	6	0.020	0.893	No
COM	7	-0.694	0.004	Yes
	8	-0.872	0.003	Yes
	9	-1.324	0.000	Yes
CON	10	-0.535	0.028	Yes
	11	-0.329	0.208	No
	12	-0.418	0.067	No
Intention	13	-0.583	0.013	Yes
	14	-0.643	0.012	Yes
	15	-1.324	0.000	Yes

In order to test the hypotheses, we compared the aggregated mean of each item belonging to the single constructs. The findings are summarized in Table 4. Intention to Adopt appears to increase with VAS with a significance of difference in means of $p=0.000$ and an effect size of $r=0.247$, and thus hypothesis 1 is supported. Further, in support of hypothesis 2, the results show a statistically significant difference in means ($p=0.000$) and an effect size of

$r=0.247$. In fact, Perceived Usefulness is the parameter where VAS appear to have the biggest effect. In contrast to this, there is no statistically significant difference in means of Perceived Ease of Use ($p=0.654$) and likewise the effect is close to none ($r=0.032$). Consequently, hypothesis 3 is not supported. However, hypothesis 4 is supported, with a significance of 0.000 and an effect size of $r=0.298$, which shows that VAS have a medium-sized effect on Compatibility. Finally, the expected positive relationship between VAS and Convenience is supported with $p=0.035$ and an effect size of $r=0.147$, thus hypothesis 5 is supported.

Table 4. Hypotheses support

Hypotheses	Mean	Sig. 82-tailed), p	Effect, r	Supported or not supported
H1	-0.850	0.000	0.247	Yes
H2	-1.094	0.000	0.353	Yes
H3	-0.058	0.654	0.032	No
H4	-0.963	0.000	0.289	Yes
H5	-0.427	0.035	0.149	Yes

6. DISCUSSION

The present study examined the extent to which VAS affect consumers' intention to adopt mobile payments. Based on existing theory, we derived a model that illustrates the relationship between PU, PEOU, COM and CON and the intention to adopt a technology. The effect of VAS on each of these constructs was tested by means of an experimental design, in which the experimental group was exposed to a mobile payment solution and three VAS, whereas the control group was exposed to only the mobile payment solution.

Our results show that VAS positively influences the intention to adopt mobile payments. This is a contribution to existing literature research on mobile payments as it reveals the importance of VAS in the proposed value proposition of mobile payment. It also provides support for Gartner's and Accenture's reports.

We find that VAS have the greatest impact on PU, which shows that consumers see the payment process being easier and more efficient when VAS are integrated with the mobile payment service. This is important as previous research shows that PU is an important driver of intention to adopt mobile payment [3, 10, 11, 13, 14, 15, 21, 22, 28]. The higher PU resulting from the offering of VAS can therefore be expected to lead to an increase in intention to adopt mobile payments.

The same is true for the second most influential factor. Our findings show that that VAS increase the COM of mobile payments, which is an important finding when relating it to previous research findings of COM being one of the most crucial factors of intention to adopt mobile payments [2,21].

Finally, CONV also increased as a result of VAS. These findings are consistent with Chen's [2] observation that consumers prefer a single payment device over carrying around an array of payment options; as VAS are integrated in the mobile payment technology, consumers can carry around less items.

We found no effect of VAS on the PEOU so consequently H3 was rejected. This shows that consumers do not expect VAS to complicate the PEOU of mobile payments, which is positive for the likelihood of adoption.

6.1 Theoretical implications

This study is to our knowledge the first to empirically show an effect of VAS on consumer intention to adopt mobile payments. The findings have implications for mobile payment adoption research as it suggests a need to broaden the scope of research to focus not only on the core service – the payment – but also include VAS.

Additionally, the findings can be extended to other academic disciplines as the effect of supplementary services on adoption of a core product is expected to be positive in general [24]. Thus, future research on technology adoption behavior should aim to take potential supplementary services into consideration.

In the future, when mobile payments are more common, it would be valuable to expand upon the model and include factors such as risk, trust, habit, and security. We also suggest that mobile payments should be studied in a context where multiple or competing technologies are present.

6.2 Practical implications

Our findings suggest that mobile payment service providers should include VAS in their offering in order to encourage faster adoption. Alternatively VAS providers, such as coupon or loyalty card providers should include mobile payments in their offerings. Another practical implication is that mobile payment providers or VAS providers would be able to leverage their offering and achieve critical mass faster (achieve network effects). This suggestion is supported by existing research that shows that supplementary services increase the intention to continue using a product [7, 24], which further emphasizes the importance of VAS in the post adoption success of mobile payments.

An important aspect is for companies to leave the choice of which VAS to offer to the consumers. Shierz [21] points out that “industry players are challenged to develop and advertise mobile payment devices and solutions in a way that consumers regard them as well-suited to their individual behavioral patterns”. Therefore, it is not advisable that a mobile payment solution includes all the possible VAS, but rather that the consumers can select which services to use, for instance when setting up the payment system or in a “VAS marketplace”.

The hypothesized negative effect of VAS on PEOU was rejected. However, the scores by both the experimental and the control group for this parameter showed that the respondents are highly comfortable with the idea of utilizing both mobile payment and VAS, and that they are not likely to hesitate adoption due to perceived Complexity. In this connection, it is important to note that the respondents are of a more tech-savvy population and are therefore likely to be less prone to view technologies as complex [10]. Should an older generation be asked, it is possible that a different result would show. This suggests that companies should focus on more tech-savvy consumers for initial adoption. Once these early adopters have taken to the technology, the early and late majorities are likely to join once they see that it works [20].

6.3 Limitations

This study contains some overall limitations. Firstly, the research does not differentiate between the three chosen VAS, but presents them all to the experimental group. In reality, the VAS offer

different value propositions and some may be more attractive to certain consumers than others.

Secondly, true experiments not only prove that if an event occurs then an outcome occurs, but also that if an event does not occur, then the outcome does not occur. The latter has not been proven in this research; in fact, the control group still showed a positive attitude towards the intention to adopt mobile payments.

Thirdly, as the focus is on the intention to adopt mobile payments, the research only measures expected behavior. Although intention to adopt is a good predictor of future behavior [25], it cannot be said with certainty that it will happen. To fully understand actual drivers of behavior, a study focusing on consumers’ use of mobile payments and VAS is desirable. This would give a more accurate picture of the drivers of adoption, as they have already had the opportunity to try the mobile payment and Value Added Services in question, and are therefore in a better position to evaluate mobile payment in terms of the factors. This could also provide insights into H3, which was rejected.

Fourthly, since the study took place in Denmark, a country with very high mobile usage and very high maturity in card usage, the high intention to use mobile payment with or without VAS is not surprising. In other western countries with high cash usage the result may be very different.

Fifthly, the questionnaire was in English, even though the study took place in Denmark. Therefore, some caution should be considered regarding result. Danes believe that they are excellent in English, but there are issues when non-native fill-out questionnaires.

7. CONCLUSION

Grounded in existing research about mobile payment adoption and the role of supplementary services, the experimental design showed that VAS indeed increase the intention to adopt mobile payments. VASs have not been included in previous research on mobile payments, but as both Accenture and Gartner Group suggest, this is a missing link in large-scale adoption.

Additionally, three antecedents to the intention to adopt mobile payments were found to be positively affected by VAS. Firstly, it was shown that VAS positively affect the Perceived Usefulness of mobile payments, which in previous research has been shown to be an important driver of mobile payment adoption [3, 10, 21]. Secondly, compatibility increased as VAS was introduced, which is an interesting finding, as this factor has on several occasions proven important to adoption [10, 21]. Thirdly, Convenience, which is an important factor for adoption [3] was positively affected by VAS.

8. ACKNOWLEDGMENTS

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