

AN EMPIRICAL STUDY OF FACTORS AFFECTING THE ACCEPTANCE OF MOBILE PAYMENTS IN JORDAN

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ABSTRACT

Everything in the world is turning into electronic mode; all our basic requirements are now fulfilled electronically through e-business. One of the main operations that are affected is the payment of different transactions and activities. The latest payment techniques emerged recently was mobile payment where a user can proceed with the payment operation easily through mobile. This study identifies the factors affecting the acceptance of mobile payment in Jordan and ensures a successful implementation of such service with the satisfaction of all related parties.

The factors are identified, detailed, and analyzed. The study mainly focused on consumers as they are the party that gets the success or failure for the implementation of any service.

Keywords: *Mobile payment, Payment models, Mobile payment Factors, e-payment.*

1. INTRODUCTION

Mobiles usage developed over the last two decades. From an ordinary phone book with a dialer to a more sophisticated instrument, it became an essential device used by each person for purposes such as messaging, entertaining, running applications, storing information, connecting to the internet, and lately for payments [3].

Based on these changes, technologies used to manufacture mobiles have developed. The infrastructure for areas covered, bandwidth, tower bridges, etc have developed, alongside with developing software lately billing systems were updated in order to provide and match the continuous growth in mobile technology.

Mobile technology, since its introduction, is growing rapidly every couple of weeks. New models are introduced to the market with additional features that modernize the use of mobiles in life.

One of the innovative ideas in mobile applications is its use in **payments** of bills, goods, and services rather than using cash or credit cards. In addition, people are not required to be physically present at payment location in order to complete the process.

The **aim** behind this research is **to study** the acceptance level for Mobile Payment by merchants and consumers in Jordan through the understanding of staff at Petra University which represent a segment of the market.

The research considers that Mobile Payment service is currently available for usage with high security and problems free. Through this research, the **aim** is to **identify the factors** affecting the usage of Mobile Payment through faculty members within Petra University, and to **furnish** the recommendations that may increase the usage of Mobile Payment in Jordan.

As technology advancements, features, and modern techniques are adopted in Jordan and increased quickly. Not having Mobile Payment as one of these technologies widely spread will lead us to answer the question, what factors affecting the acceptance of Mobile Payment in Jordan by the consumers and merchants?

Mobile Payment

Since most people do not prefer to carry large amounts of cash or use credit cards, mobile payment was introduced. Several attempts to implement it were tried in the past, due to high cost of mobile devices, service, and the difficulty in accepting the idea by those who sell and buy; this turned the credit cards payments to be the most useful method at that period. However, cost reduction, increased knowledge, advances in technology, in addition to the spread of mobile use everywhere led to the fact that ordinary people accepted the idea of mobile payment [1].

The idea was implemented in USA in the 90s but it didn't meet the expected results as the mobile usage & technology was not as it became in the last years which caused the process to be hard on citizens [1].

Service of mobile payment is already in use in different regions of the world, especially in Europe and Asia. For an example in Japan, mobile payment is used for paying various types of services, transportation, and bills [2],[4]. Throughout the Middle East, several countries, mainly Kuwait, and UAE, implemented m payment services to limited subscribers through limited banks in order to measure the acceptance of the idea in these countries. International merchants related to fashion, and cosmetics were also involved in this process.

In Jordan, there were several trials to implement this service since 2005. However, this service is still limited to a small number of the population.

Worldwide, number of Mobile Payment users is expected to increase 70% in 2009

- 43.1 million users in 2008 will expand to 73.4 million in 2009
- Developing countries are among the most suitable environments for Mobile Payment.[5]

2-1 Mobile Payment Systems: [2]

There are four main models for Mobile Payment. These are:

- **Direct Mobile Billing.**

The consumer uses mobile billing option during checkout at an ecommerce site to make a payment. After authentication involving PIN and Password, the consumer's mobile account is charged for the purchase.

- **Mobile web payments (WAP).**

The consumer uses web pages displayed or additional applications downloaded and installed on the mobile phone to make a payment. It uses WAP as underlying technology.

- **Contactless NFC (Near Field Communication).**

A consumer uses a special mobile phone equipped with a smartcard waves his/her phone near a reader module.

- **Premium SMS based transactional payments.**

The consumer sends a payment request via an SMS text message to a short code and a premium charge is applied to them. The merchant involved is informed of the payment success.

This research considers the premium SMS based transactional payments model as its primary model for a clarification of the process. This model is chosen as it is the current implementation method for Mobile Payment in Jordan due to its advantages and enhanced functionalities.

Process Flow: [5]

- A user registers his bank account at the service provider to use the service.
- An electronic wallet is created for the user which virtually has money connected to his bank account.
- The user initiates a payment transfer through a predefined operation such as sending an SMS or running a command on the mobile (e.g. *123#), as shown in figure 1. Generally, there are limits on the amount that can be transferred at one time.

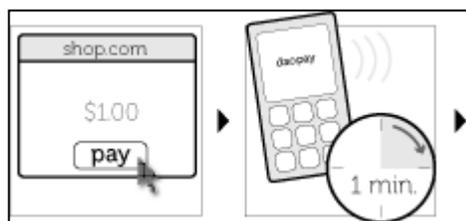


Figure 1: Process flow [7]

- The amount is transferred to an intermediate vendor that manages these transactions.
- The intermediate vendor deducts the amount of transfer electronically from the electronic wallet (which affects the actual amount in the bank account).
- The deducted amount is transferred through the service provider (Telecommunication Company) to the receiver's cell phone account. (Note: The receiver should be also registered to this service).
- The recipient receives a text message, as shown in figure 2, with notice of the transfer of credit to his "electronic wallet."

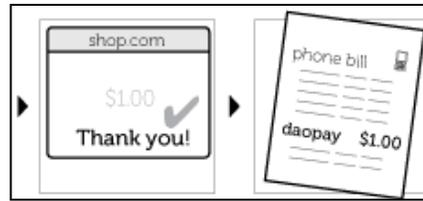


Figure 2: Process flow [7]

As mentioned above, the service has security controls which are:

- Password request and PIN code request by both consumer and merchant.
- Limitation in the maximum transferred amount per transaction.
- Confirmation message at both the consumer and merchant.

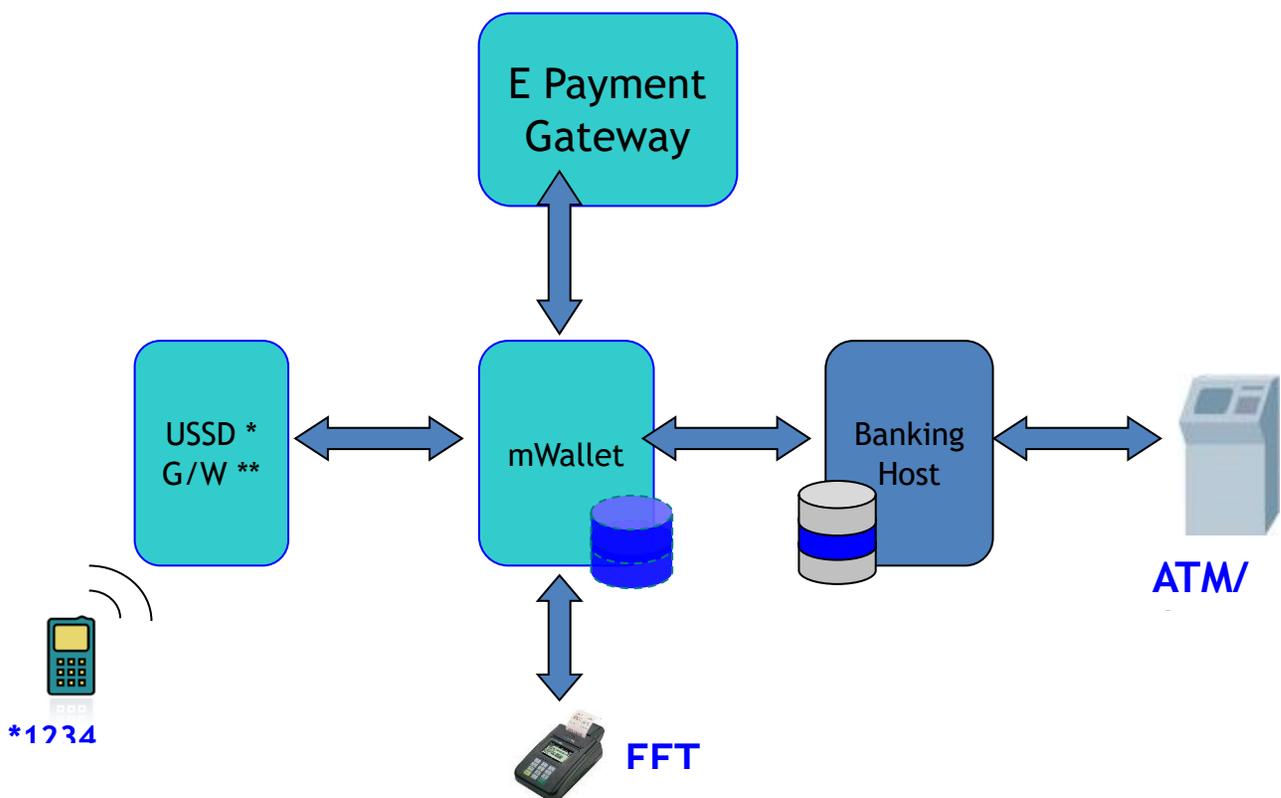


Figure 3: System diagram of mobile payment [8]

* USSD: Unstructured Supplementary Service Data

** G/W: Gateway

M Payment Benefits: [6]

- Ease the payment process.
- Reduce time, cost, and efforts on people.
- Low implementation cost.
- Add revenue generating solutions.
- Grow customer base for merchants & banks.
- Reduce queues in banks and at the ATM.

M Payment Deficits: [6]

- Requires high security considerations.
- Possible abuse of the service (eg. money laundry, terrorist activities).

For a consumer using Mobile Payment, it is simple to switch from Mobile Payment to cash which is simple, fast, and there is no additional cost involved. Because of this, most mobile payment service providers offer the service free of charge to consumers. As such, this is considered an advantage from the consumer perspective since no additional cost is required while it is considered a disadvantage from the provider perspective as switching to case mode is easy for consumers. [6]

2-2 Previous Related Work on Mobile Payment

A number of authors have studied the factors that influence the success of a Mobile Payment system.

In Table 1, [6] mentioned the preliminary factors affecting the successful introduction of mobile payment systems at a common set of factors.

Factors	Related factors	Mentioned by authors
Cost	Transaction fees	(Shon and Swatman 1997; Jayawardhena and Foley 1998; Turban, King et al. 2002)
Ease of use	Flexibility, unobtrusiveness	(Shon and Swatman 1997; Jayawardhena and Foley 1998; Turban, King et al. 2002)
Security	Reliability, Privacy, anonymity, trustworthiness, regulatory framework, regulation, consumer protection	(Shon and Swatman 1997; Jayawardhena and Foley 1998; Bohle, Krueger et al. 2000; Turban, King et al. 2002)
Technical feasibility	Integration effort, interoperability, scalability, remote access	(Shon and Swatman 1997; Jayawardhena and Foley 1998; Bohle, Krueger et al. 2000; Turban, King et al. 2002)
Independence		(Turban, King et al. 2002)
Universality	Critical mass, Transferability, divisibility, standardisation	(Clemons, Croson et al. 1997; Shon and Swatman 1997; Turban, King et al. 2002) (Jayawardhena and Foley 1998; Bohle, Krueger et al. 2000)
User support		(Jayawardhena and Foley 1998)

Table 1. Preliminary set of factors influencing the success of mobile payment systems [6]

He summarized the factors affecting the mobile payment as, their cost relative to other payment methods, their ease of use, and their perceived risk from the consumer area. Transaction fees compared to debit and credit card systems and the ease of use from The merchant area While [7] stressed on the need to identify Mobile Payment success factors, taking past mobile payment system failures into consideration, there is a real need to analyze and understand what requirements are needed to succeed on this market ruled by uncertainty.

On the other hand, [8] identified six factors that manage the success of Mobile Payment which are, Current Payment Relationships, Payment Scenarios, Suitability, Ubiquity, Regulatory & Security Concerns, and Market Segmentation..Moreover, [9] concluded that a greater adoption of Mobile Payment will increase ability of diverse market participants and their regulators working together to cost-effectively design, build, market, price, secure, distribute, and regulate products and services that connect consumers with merchants, billers, banks, and other financial providers. In addition, [10] discussed that intensity of mobile services experience, the nature of the device, and context affect mobile services usage. Finally, [5] considered cost, ease of use, usefulness, expressiveness, trust, and universality as the variables affecting Mobile Payment adoption.

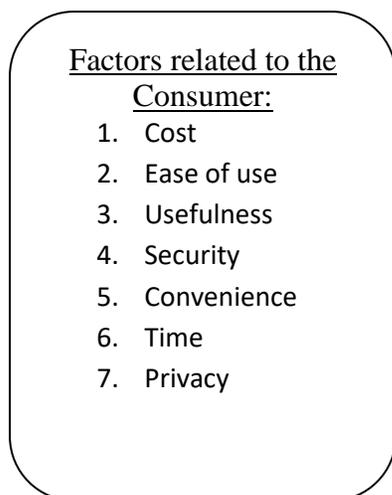
3- Theoretical Part of this Research

In previous sections, we talked about history of mobiles and their usage, types of mobile payment systems through which the mobile payment model was defined, talked about the factors affecting the acceptance of mobile payment defined in previous researches.

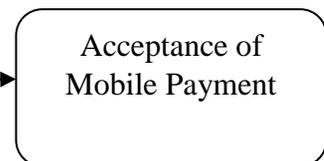
3-1 Methodology

Based on the previously mentioned items, independent factors related to the consumers are identified. In addition, one dependant factor related to the acceptance of Mobile Payment is identified. The below figure explains the theoretical part including the research variables and the dimensions it was measured through.

Independent



Dependent



3-2 Independent Variables

Factors related to the Mobile Payment user (consumer), which pays bills, goods, and services using the mobile phone.

1. Cost: The amount of money to be added to the paid bills, goods, and services. And the amount of money saved in case payment through other methods.
2. Ease of use: The learning & implementation efforts for the required operations.
3. Usefulness: The practicality of using the service.
4. Security: Completeness of process and confirmation of its success.
5. Convenience: The amount of effort saved in paying bills, goods, and services.
6. Time: Time saved due to the implementation of Mobile Payment.
7. Privacy: Confidentiality of information and secured details.

3-3 Hypotheses

Study the relationships between the independent variables and the dependent variable.

General Hypothesis

Study the relationships between all the independent variables together and the dependent variable.

H8: There is astatistically significant relationship between all the independent variables together and the dependent variable.

Secondary Hypothesis

The relation between the independent factors and the dependent factor:

- 1) **H1:** There is a statically significant relationship between cost and the acceptance of Mobile Payment by the user.
- 2) **H2:** There is a statically significant relationship between ease of use and the acceptance of Mobile Payment by the user.
- 3) **H3:** There is a statically significant relationship between usefulness and the acceptance of Mobile Payment by the user.
- 4) **H4:** There is a statically significant relationship between security and the acceptance of Mobile Payment by the user.
- 5) **H5:** There is a statically significant relationship between convenience and the acceptance of Mobile Payment by the user.
- 6) **H6:** There is a statically significant relationship between time spent on the service and the acceptance of Mobile Payment by the user.
- 7) **H7:** There is a statically significant relationship between privacy spent on the service and the acceptance of Mobile Payment by the user.

3-4 Result

Study Sample

This research is an empirical study. The unit of study is Petra University due to the fact of having a heterogeneous environment of different ages, education background, knowledge, and experience. Based on that, a total of 150 questionnaires were distributed to the study sample, 130 questionnaires were collected, 18 questionnaires were isolated, and the remaining were 112.

Collecting Data Methods

- 1- Secondary Sources: Based on previous researches and studies that are identified in the references section.
- 2- Primary Sources: Based on a questionnaire that measured the knowledge and information of its participants and their acceptance in utilizing the mobile payment method.

Data Analysis

Factor analysis using varimax rotation was used to extract constructs and determine variance explained. The results of the factor analysis revealed seven constructs. Those results had factor loadings that ranged from 0.55 to 0.90. The results also indicated that Alpha Cronbach reliability for the constructs ranged from 0.7196 to .8180, indicating reliability of the items measuring the underlying constructs exceeding the threshold limit of 0.60 in case of exploratory research (Sekaran, 2003). Table 2 shows the factor loadings, Reliability, Mean and Standard Deviation of the constructs.

Table 2: Factor loading Reliability, Mean and Standard Deviation

Constructs/Items	Cost	Ease of Use	Usefulness	Security	Convenience	Time	privacy
Total Alpha Cronpach .8886							.7976
Alpha Cronpach	.7196	.8183	.7598	.7856	.7861	.7392	3.59
Mean	3.62	3.89	4.04	3.80	4.11	4.32	.68
Standard Deviation	.74	.63	.51	.58	.54	.80	
Cost 1	.777						
Cost 2	.691						
Cost 3	.578						
Ease of Use 1		.788					
Ease of Use 2		.689					
Ease of Use 3		.809					
Ease of Use 4		.867					
Ease of Use 5		.753					
Ease of Use 6		.746					
Usefulness 1			.559				
Usefulness 2			.831				
Usefulness 3			.630				
Security 1				.797			
Security 2				.553			
Security 3				.759			
Security 4				.703			
Security 5				.597			
Convenience 1					.801		
Convenience 2					.884		
Convenience 3					.559		
Time 1						.908	
Time 2						.908	
Privacy 1							.816
Privacy 2							.816

Research Findings: Testing the Theoretical Hypotheses

Tables (3 to 16) below summarizes the results of simple linear regression for **hypotheses**. The tables show the standardized regression coefficient of each predictor, **R** and **R²**, for all the predictors in linear regression analysis. The standardized regression coefficient represents the correlation coefficient between the independent variables and the dependent variable (**acceptance of mobile payment**).

Hypothesis H1: There is a statically significant relationship between cost and the acceptance of Mobile Payment by the user.

Table 3 and table 4 shows that the entire model has a significant effect on mobile payment ($p < 0.05$). **R²** In the entire model of the **Cost** explains .198% of the variance.

Table 3 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.445(a)	.198	.191	.202

a Predictors: (Constant), COST

Table 4 (Coefficients(a))

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.539	.094		16.313	.000
COST	-.134	.026	-.445	-5.262	.000

a Dependent Variable: Accept

Hypothesis H2: There is a statically significant relationship between ease of use and the acceptance of Mobile Payment by the user.

Table 5 and table 6 shows that the entire model has no significant effect on mobile payment ($p=.225>0.05$). R^2 In the entire model of the **Ease of use** explains .002% of the variance

Table 5 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.040(a)	.002	-.007	.225

a Predictors: (Constant), EASE

Table 6 (Coefficients(a))

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.997	.133		7.494	.000
EASE	1.419E-02	.034	.040	.421	.675

a Dependent Variable: Accept

Hypothesis H3: There is a statically significant relationship between usefulness and the acceptance of Mobile Payment by the user.

Table 7 and table 8 shows that the entire model has a significant effect on mobile payment ($p<0.05$). R^2 In the entire model of the **usefulness** explains .05% of the variance

Table7 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.223(a)	.050	.041	.220

a Predictors: (Constant), USEFULNE

Table 8 (Coefficients(a))

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.450	.165		8.775	.000
	USEFULNE	-.099	.041	-.223	-2.425	.017

a Dependent Variable: Accept

Hypothesis H4: There is a statically significant relationship between security and the acceptance of Mobile Payment by the user.

Table 9 and table 10 shows that the entire model has no significant effect on mobile payment ($p=.225>0.05$). R^2 In the entire model of the **Security** explains .224% of the variance

Table 9 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.110(a)	.012	.003	.224

a Predictors: (Constant), SECURITY

Table 10 (Coefficients(a))

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.213	.139		8.732	.000
	SECURITY	-.042	.036	-.110	-1.167	.246

a Dependent Variable: Accept

Hypothesis H5: There is a statically significant relationship between convenience and the acceptance of Mobile Payment by the user.

Table 11 and table 12 shows that the entire model has no significant effect on mobile payment ($p=.13>0.05$). R^2 In the entire model of the **convenience** explains .02% of the variance

Table 11 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.143(a)	.020	.012	.223

a Predictors: (Constant), CONVIENC

Table 12 (Coefficients(a))

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.294	.160		8.101	.000
	CONVIENC	-.059	.039	-.143	-1.525	.130

a Dependent Variable: Accept

Hypothesis H6: There is a statically significant relationship between time spent on the service and the acceptance of Mobile Payment by the user.

Table 13 and table 14 shows that the entire model has no significant effect on mobile payment ($p=.324>0.05$). R^2 In the entire model of the **time** explains .09% of the variance

Table 13 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093(a)	.009	.000	.224

a Predictors: (Constant), TIME

Table 14 (Coefficients(a))

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.165	.116		10.087	.000
	TIME	-.026	.026	-.093	-.991	.324

a Dependent Variable: Accept

Hypothesis H7: There is a statically significant relationship between privacy spent on the service and the acceptance of Mobile Payment by the user.

Table 15 and table 16 shows that the entire model has no significant effect on mobile payment ($p=.74>0.05$). R^2 In the entire model of the **privacy** explains .001% of the variance

Table 15 (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.031(a)	.001	-.008	.227

a Predictors: (Constant), PRIVACY

Table 16 (Coefficients(a))

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.091	.116		9.405	.000
	PRIVACY	-.010	.032	-.031	-.330	.742

a Dependent Variable: Accept

Hypothesis H8: There is a statically significant relationship between all the independent variables together and the dependent variable.

A multiple regression model was used for testing the hypotheses. Results indicated that out of the seven hypotheses that were tested for significance, two were found to be highly significant in explaining the construct COST (standardized $b = -.154$, $p < .05$) and Ease of use ($b = 7.274E-02$, $p < .05$) were found to be predictors of mobile payments.

However, Usefulness ($b = -0.54$), Security ($b = 1.197E-02$), Convenience ($b = 2.705E-02$) Time ($b = 1.722E-02$) and Privacy ($b = 3.783E-02$) were not predictors of mobile payment, offering no support for hypotheses 3,4,5,6,7. The regression results and the total variance explained by the model are presented in Tables 17 and 18.

Table 17 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.535(a)	.286	.231	.198

a Predictors: (Constant), PRIVACY, SATISFAC, USEFULNE, EASE, COST, TIME, CONVIENC, SECURITY

Table 18 Coefficients(a)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.382	.195		7.081	.000
COST	-.154	.037	-.506	-4.204	.000
EASE	7.274E-02	.039	.204	2.844	.048
USEFULNE	-.054	.047	-.119	-1.129	.262
SECURITY	1.197E-02	.048	.031	.249	.804
CONVIENC	2.705E-02	.050	.066	.546	.586
TIME	1.722E-02	.038	.051	.459	.647
PRIVACY	3.783E-02	.033	.113	1.161	.248

a Dependent Variable: Accept

CONCLUSION

This research targets to identify the factors affecting the acceptance use of mobile payment in Jordan by identifying these factors, their advantages, disadvantages, and most importantly how to reduce the obstacles identified because of these factors in order to allow the easy adoption and usage of mobile payment in Jordan.

These factors were measured against consumers which are the most important stakeholder of mobile payment and are the main starting point of executing the mobile payment service in Jordan. The research allowed us to figure out the fears and concerns these consumers had towards these factors which, if furnished to the service provider, would ensure an increased possibility of a successful implementation of the service.

The results of the research proved that the **cost** saved through the mobile payment model, the **ease of use** (the learning & implementation efforts for the required operations), and **usefulness** (the practicality of using the service) of such service in paying bills for goods and services are of a significant effect to the acceptance of mobile payment. These items would allow an easy adoption of this service in Jordan. This agrees with the results of [6] in his research in which he identified cost, ease of use, and usefulness of the service as the main factors in accepting the usage of mobile payment service.

RECOMMENDATIONS

Based on the above, in order to ensure the acceptance of Mobile Payment in Jordan and the safe implementation of it, it is recommended not to enquire additional fees from the service providers on the payment transactions whether on consumers or merchants, ensure the implementation of the easiest and most meaningful method for the users to utilize and implement, provide the consumers with all details about security considerations taken within the mobile payment service in order for consumers to feel safe in using it.

A recommended startup of the service is to implement it on the payment of electricity, water, and telephone bills as these services are so common between people, easy to monitor, and has a magnificent impact on the consumers affected with it.

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