



IBIMA
Publishing
mobile

Journal of Electronic Banking Systems

*Vol. 2010 (2010), Article ID 734081,
180 minipages.*

DOI:10.5171/2010.374494

www.ibimapublishing.com

Copyright © 2010 Lim We Tan Chew Beng, and Uchenna C. Eze . This is an open access article distributed under the Creative Commons Attribution License unported 3.0, which permits unrestricted use, distribution, and reproduction in any medium, provided that original work is properly cited.

Title

**Determinants of Mobile
Payment Usage in Malaysia:
A Conceptual Perspective**

Authors

Lim We Tan Chew Beng

and

Uchenna C. Eze

Multimedia University,
Malacca, Malaysia

Abstract

The objective of this paper is to develop specific factors that could influence consumers' intention to use mobile payment systems. Mobile

payment system enables users to make payment via Short-Message-Service (SMS). This paper examines potential key determinants of mobile payment in Malaysia through three perspectives: consumer

features, business features and technology features.

Survey questionnaires will be distributed to about 1000 mobile payment users in Malaysia using convenient sampling method. Data

collected will be analyzed using regression technique to determine the significant levels of interactions between the dependent and independent variables. The outcome could help firms

understand consumers' perspective on the system, which could help firms in providing more functional mobile payment systems that deliver customers needs. This could also be relevant to

Malaysia's goal of building a knowledge-based society by 2020. This research would also provide useful data that could help the industry determine consumers' m-payment needs in the context

of Malaysia. The empirical insights from this study would also be useful for theory building.

Keywords:

M payment System,
Conceptual Framework,
Consumers, E-banking,
Malaysia.

Introduction

The increasing Internet and mobile applications have sharpened global awareness that technology advancement can drive the ability to manage firms better.

However, technologies innovations are meaningless if people do not value these innovations as a way to meet their needs. Firms need to keep up-to-date with the pace of technology to improve their

information infrastructures in order to grow both nationally and globally. Mobile payment system enables users to make payment via Short-Message-Service (SMS). The mobile technology is undeniably an

important application for mobile commerce (m-commerce) (Hu et al, 2008b). However, the factors which determine mobile payment (mobile payment) usage are equally or more important.

Thus, firms need to understand the benefits of m-payment, which could help in satisfying customers and possibly enable the firms to access greater business opportunities.

The simplest and oldest form of payment for any business transaction is what may be called the barter system, which enabled the exchange of goods or services for another. Fast forward to the

21st century, the most common payment system is through legal tender, cheque, debit, credit, or bank transfer. In business transactions, payment can be made by an invoice, which would result in

a receipt. In addition, the use of electronic payment methods has been increasing in the past 2 decades and they include the magnetic stripe card, smartcard, contactless card, and mobile handsets. As

the technology and communication systems improve, the transition from online to mobile payment system improves as well. In the future, every individual would be able to make

payments via their mobile payment devices such as cellular phone, smart phones, and personal digital assistants (PDAs), or mobile terminals. Thus, the m-payment will become a new trend for

individuals and corporate entities to make payments for their business dealings

To address the key issues in this research, we aim to identify the determinants of

m-payment from customers' perspective. Mobile payment can be defined as a wireless-based electronic payment for m-commerce to support point-of-sale / point-of-service (POS) payment

transactions on user's mobile devices (Gao et al, 2005). The determinants in this paper are divided into three constructs including consumer features (price, convenience, and content reliability); business

features (visibility, system quality, and customer service); and technology features (security, SMS services, and transaction process). Finally, these three constructs will be measured

and examined to understand consumers' perspective on mobile payment usage in Malaysia.

Conceptual Development

The proliferation of science and technology has improved methods of paying for purchases. The advancement of mobile devices has created a new business concept.

Consumers will find it an inexpensive alternative means to ease their difficulties in making payments for goods and services. For example, consumers can make payment via mobile devices from

anywhere at anytime and for anything. Technologies such as SMS can create a simple transaction for an e-banking and e-payment process, which could provide lots of convenience to consumers.

Furthermore, consumers can easily credit the payment into their bank account with just a simple SMS. Based on the foregoing, we develop the consumer features construct in the framework and we will

use three variables to describe the construct.

In addition, the mobile technology sector is fast growing in size. The concept of mobile payment (m-

payment) has created a much more dynamic approach to collect payment from consumers by sellers. For example, a firm that implements an m-payment system can directly receive

payment from the bank with the approval of the consumers. There will be 3-tier interaction between consumer, firm and the bank. The m-payment payment shall be visible to all types of

mobile devices. These include the system quality and the customer service by the firm that implements the m-payment system. Based on the foregoing, we will develop the business features construct in

the framework and we will use three variables to describe the constructs.

Addressing consumer features and business features may be inadequate for a firm to enhance the m-payment

system. Firms, therefore, would require technology features to manage the entire flow of the point of sales (POS) to ensure smooth operations. This will include the provision of adequate

security for m-payment such as authentication. A firm will implement an SMS service for their consumer feedback and enquiry. Effective transaction process for the m-payment will also increase the mobile

payment usage. Thus, we will examine the impacts of consumer features, business features and technology features on the mobile payment usage. In each of the input variable, we will discuss

three sub-items. The model generated could be analyzed from both consumer and business perspectives, but in this paper we will focus on the consumer's perspective

See fig 1 online

Figure 1 represents the research framework for this paper and illustrates nine independent variables for the three constructs: price, convenience, content reliability, visibility, system

quality, customer service, security, SMS services, and transaction process. We also generated nine hypotheses – three for each of the constructs namely consumer features, business features

and technology features – to test the influence of the independent variables on mobile payment usage in Malaysia. Table 1 presents the dimensions of the variables we intend to examine in this

paper, the operational definitions and the selected sources of the definitions and related works.

See table1 online

Consumer features in m-payment can be defined as any distinctive, singular, typical or special feature or features, which may be used to distinguish a customer or group of customers from any

other consumer group of consumers in buying or payment process for products or services. These features will be different from one consumer to another consumer. This article

identified three consumer features that could influence mobile payment usage in among consumers and they include price, convenience, and content reliability.

Price in m-payment can be defined as the degree to which a person believes that they should pay for the price of using m-commerce (Cheong and Park, 2005; Choi et al, 2008; Varshney, 2008).

Businesses such as retailers will offer low prices to capture higher store traffic while consumers will respond differently indicating varying levels of price consciousness (Choi et al, 2006; Kukar-

Kinney, 2007; Tan et al, 2009). For example, the m-payment can be integrated with common price strategies such as low-price services, mobile point accumulation for complete transaction, and

zero-fee SMS transactions for e-banking or e-business.

Furthermore, the lower fee of m-payment will encourage more users to use mobile payment services.

According to Poon (2008), one of the determinants of e-banking usage in Malaysia is reasonable fees and charges. In addition, price plays a major role in purchasing process in the retail firms'

perspectives (Alvarez and Casielles, 2008). As for m-payment, reasonable fees and charges should be applied in order to capture wider market share of mobile users. Smart consumers are insistent on

making price comparisons within the products or services to measure the quality and performance (Tan et al, 2009). A minimum transaction fee for SMS transaction fee will make the

consumers keen to use m-payment. Thus, mobile service providers (MSP) that provide lower fee to consumers will enhance the possibility of consumers to use m-payment.

Hence the following
proposition:

*Proposition 1: Price will
significantly affect m-payment
usage.*

Convenience in m-payment can be defined as the degree to which a person believes that navigating or engaging in transactions through m-commerce would be free of efforts (Cheong and Park,

2005; Choi et al, 2008; Kim et al, 2005). In retailing, a consumer satisfaction will increase when the consumer value increase with higher return on investment (ROI) (Ramaseshan, 2006; Tan et al,

2009). As such, a firm can implement an m-payment system in their businesses to increase consumer loyalty. The usage will allow their consumers to make payment with the concept of “3A” that

is “Anywhere, Anytime, Anything”. The concept allows consumers to make payment from any location without the boundary of time to purchase any products or services.

According to Zhang (2008), the biggest advantage of mobile payment is the opportunity to conduct trading anytime and anywhere and it is characterized by mobilization

and individualization.
Consumers with mobile devices can easily make payments by sending SMS to a system application. This SMS will then be authenticated with the related e-banking

system for complete transaction process. In addition, consumers may not need to queue-up like in retail industry to make payment or even find a PC for online payment. As such, consumers

can get products or services faster, which can lead to customer satisfaction. Thus, the convenience m-payment provides would enable consumers to use m-payment

system. Hence the following proposition:

Proposition 2: Convenience will positively influence m-payment usage.

Content reliability in m-payment can be defined as the degree to which a person believes that the mobile portal will enhance the quality of products or services provided (Cheong and Park, 2005; Choi

et al, 2008; Wu and Wang, 2005). In a research (Choi et al, 2008), content reliability is proven to be significant influence in mobile system satisfaction (m-satisfaction) and mobile loyalty (m-loyalty)

in digital music transaction industry in Korea. The type of product or service transacted will be in the form of virtual products, digital content, information, etc. Consumers who use the mobile portal,

which provide a good quality products or services will enhance the consumer's trust and ability to re-purchase the goods. In like manner, the content reliability will enhance re-purchase power

from the consumers in m-payment.

The system requirement for m-payment will allow products to be personalized or customized upon request

by consumers (Hu et al, 2008a). For example, Web content in mobile application can be viewed via either browsers or micro browsers. The content accuracy and precision provided by m-

payment companies will be a key determinant for m-payment usage. If the data are reliable and up-to-date, this will increase the trust of the consumers to make payment via mobile payment system.

The growth of e-banking and e-business with the advancement of technology will enhance the usage of m-payment. Thus, the content reliability in m-payment could change the manner of

business being conducted and may enable great m-payment usage. Hence the following proposition:

Proposition 3: Content reliability will positively influence m-payment usage.

Business features in m-payment can be defined as any distinctive, singular,

typical or special feature or features, which may be used to distinguish a firm or a business entity from any other firms or group of business entity in the industry in creating the buying or

payment process for products or services. These features will be different for different industries. This article identified three business features that could influence mobile payment usage among

consumers and they include visibility, system quality, and customer service.

Visibility in m-payment can be defined as the degree of representation made possible

in the display, site design or visual information provided by the mobile portal (Choi et al, 2008; Kim et al, 2005; Wei and Ozok, 2005). The information must be able to be represented in the display

using various types of mobile techniques and consumers should be able to appreciate the content. The content and the pre-details of the m-payment must be able to shown in the mobile screen.

Reliable and detail information for m-payment is encouraged by the firm and this should be well arranged and organized. For example, the overall design of the screens offered by m-payment

must be able to satisfy consumers' requirements.

In addition, the overall design of the screens offered by m-payment must be able to be constructed in a way

convenient to the consumers. According to Delic and Vukasinovic (2006), the m-payment services can be categorized into three key mobile payment transactions, which include SMS based

applications, micro point of sales (mPOS) based applications, and Internet based applications. All these services should be visible in the m-payment so that the consumer visualizes the

information. For example, if a user uses SMS based application, the user should be able to send a string of SMS in their mobile screen to the mobile provider in order to make a successful transaction.

Thus, the visibility in the m-payment will affect the usage of the m-payment services. Hence the following proposition:

Proposition 4: High visibility in m-payment will positively influence m-payment usage.

System quality can be defined as the degree of connectivity or availability provided by the

firm, which is related to the line of services by the mobile portal (Choi et al, 2008; Varshney, 2008). According to Chen & Zhou (2008), service quality on mobile commerce demonstrates user perception

towards vendor service level, which includes on-time service, timely response and personalization. With good system quality, consumers will be able to use the services to make payment. For example,

consumer can make their payments by debiting the items purchased into their bank account. Next, by the end of the month, the consumers just need to pay the total amount for buying product or

services. Thus, a good system quality can increase the rate of success to m-payment usage.

In mobile applications, the system quality must be able to

have data-mining logic system. For example, if there is a technological problem in the system, then the m-payment must be able to identify the error by providing a next page loaded with

information. The system, as much as possible, should be error free to avoid unnecessary wait of time and frustration. Furthermore, the consumer should only disconnect the access to m-

payment due to a technological problem. If the system quality of the m-payment is good, then this will encourage more users to use the m-payment system. By applying the 3A concept, the

adoption of m-payment would increase as well. Thus, an m-payment should have a good integrated system quality. Hence the following proposition:

Proposition 5: System quality will positively influence m-payment usage.

Customer service in m-payment can be defined as the degree of assistance provided

by a firm in relation to enquires, problems, or feedbacks on usage or transaction process (Choi et al, 2008; Vlachos and Vrechopoulos, 2008). According to Ball et al (2005),

service personalization is important and that it is related in multiple ways to loyalty. For example, consumers can ask for an issue related to failure of their transaction process. The

customer service provided by the m-payment system to assist the consumer would be helpful to ease their plight. Such service will encourage the consumers to use the m-payment. Thus, the consumers

would feel at ease in using the m-payment to conclude their business transactions.

In addition, consumers also expect the time-to-response (TTR) to inquiries by the

mobile service provider to be fast. Their answers on inquiries should be useful and able to solve related problems. The m-business and e-business should recommend the content specification

when the user is accessing the m-payment. For example, the consumer can ask for a location map via their mobile devices by making a small payment to a GPRS system. Furthermore, there should be

several methods for the user to submit their enquiry about the m-payment. These could include the details about the content and services. Thus, a reliable customer service would be a key factor to

encourage m-payment usage.
Hence the following
proposition:

*Proposition 6: Customer
service will positively influence
m-payment usage.*

Technology features in m-payment can be defined as the system used to manage customer information, products and services need. A good technology feature will enable information to be

process from databases with data mining execution.

Effective m-payment system will enable better understanding of customer need, which would drive m-payment usage. This article

identified three business features that could influence mobile payment usage among consumers and they include security, SMS services, and transaction process.

Security in m-payment can be defined as the degree of authorization, authentication, and privacy statements related to mobile transaction (Choi et al, 2008; Khalifa and Shen, 2008; Me et al, 2006).

According to Mohd and Osman (2005), the security of a payment method is undoubtedly crucial if the payment method is to gain widespread acceptance. As a whole, security can be view

from five perspectives namely confidentiality, authentication, integrity, authorization, non-repudiation, and accessibility. For example, the typical content for authentication of a

SMS for a top-up system
(Delic and Vukasinovic, 2006)
as below:

Amount<space>**Topup**
Number

(optional)<space>**AccountNameCode**(optional):
GreetingMessage
(optional)

Next, the message will be sent with defined content to short

number (E.g. 8585) to complete the process.

In Malaysia, for example, you may receive advertisement from a mobile service provider. For example, this

SMS sent by mobile service provider: "RM0. Keep yourself updated with the latest 2010 World Cup Qualifiers! Get match previews, goal alerts, stats & results from Maxis. Sent ON WCQ to 22006.

RM0.30/SMS". In order to activate, just type "ON WCQ" in the SMS and send to 22006. This will be charged RM0.30 per SMS into the user's mobile account. With mobile technology, consumers are

able to make purchase of the information through the m-payment system. The firm that plans to implement m-payment system should emphasis the authorization, authentication and privacy

statement to be able to gain consumers' confidence in the use of m-payment. Thus, proper security plays an important role in determining m-payment usage. Hence the following proposition:

Proposition 7: High security will positively influence m-payment usage.

SMS services can be defined as the degree of auto-response services provided by

mobile portal related to mobile transaction. The enquiry by consumers to the mobile service provider should be in auto-reply system. For every successful transaction, there should be a

reply indicating the success or failure of the process. It will be good if the system will prompt the user to their mobile devices. It also can generate an email to the user indicating their transaction

had been completed. For example, if a consumer enquires about a movie ticket, the system will send a response to the consumer within seconds, which charge a minimum fee. Thus, the

consumer will be able to get the information need without the hassle to look online.

In addition, Maxis Communications Berhad (Maxis) launched the

AeroMobile system, which enables post-paid consumers to make communication services such as voice calls, SMS, e-mail and GPRS (InTech, 2009). The service will be billed to their consumers'

monthly phone bill as with any other international roaming calls. The consumer will be able to make and receive voice calls at RM15 per minute, or send or receive data at RM100 per megabyte.

For SMS, each SMS sent is charged at RM3 per message while receiving SMS is free of charge. These SMSs and data usage are frequent amongst travellers and business travellers. If a firm utilizes the

m-payment system, they will capture this uncontested business opportunity. Thus, an effective m-payment should have relevant SMS services to enable proper implementation process.

Hence the following
proposition:

Proposition 8: SMS services will positively influence m-payment usage.

Transaction process entails the unambiguous and independent execution of a set of operations on data in a relational database, which treats set of actions as a single event (Choi et al, 2008; Kim et

al, 2005). If any part of the transaction process fails, the entire transaction fails and all participating resources are rolled back to their previous state (Pete, 2001). For example, the consumer can

make a micro point of sales (mPOS) with their mobile application. Upon success, a bank will credit their bank account, which indicates payment being made. Thus, the cost and time for

purchasing the products and services will reduce with effective transaction process. A good system is needed for transaction processing and must pass the ACID Test: atomicity, consistency,

isolation and durability (Pete, 2001). Transaction processing systems may consist of computer hardware and software hosting a transaction-oriented application that performs the

routine transactions
necessary to conduct
business. For example, PosPay
(2009) is Malaysia's first
Ringgit-based Virtual Account,
which provides an alternative
to traditional online payment

system. It enables customers to open virtual accounts for payments for online shopping transactions, utility bills, mobile content downloads, and the reloading of points for online games. PosPay

payment services make it easy for customers to process micro-payments without fear of credit-card fraud and for merchants to process transactions and receive payment easily and without

hassle. Table 2 presents how PosPay works and the sequence.

See table 2 online

Hence the following proposition:

Proposition 9: Effective transaction process will positively influence m-payment usage.

Conclusion

We hope that, based on the findings of this research, we would be able to understand specific key factors that tend to influence the decision to use mobile payment systems

and in the process appreciate consumers' need in this respect. An effective mobile payment system will not only be valuable to the firms, particularly as these firms embark on expansion

initiatives to grow their customer base, it will also be valuable to consumers as it will provide higher level of convenience in business transactions including the payment of bills. M-payment

will enable the transaction process to be completed within a very short period. Consequently, consumers would be satisfied with the quality of m-payment and this will generate more profit to

the firms implementing the system. Finally, the three constructs discussed in this paper are considered important factors for firms to take into consideration as they develop approaches for

serving their existing and potential customers.

Theoretical developments in this field of research is still in early stages and this paper provides part of initial assessment of what could be

considered key factors that would be relevant to future research in the specific discipline. Our assessment is that firms that effectively deliver on these three constructs would be able to

increase mobile payment usage in their respective business, which could have an expanded effect in the overall business operations in Malaysia.

References

Alvarez, BA, and Casielles, RV. (2008), 'Effects of price decisions on product categories and brands,' *Asia Pacific Journal of Marketing and Logistics*, 20 (1), 23-43.

Babbie, E. (1990), Survey research methods (2nd ed.), Wadsworth, Belmont, CA.

Ball, D, Coelho, PS, and Vilarés, MJ. (2005), 'Service personalization and loyalty,'

Journal of Services Marketing,
20 (6), 391-403.

Chen, ZY, and Zhou, T. (2008),
'Examining the determinants
of mobile commerce user
repurchase behavior,'

*Proceedings of the 4th
International Conference on
Wireless Communications,
Networking and Mobile
Computing (WiCOM '08), 12-
14 October 2008, Dalian,*

China, 1-4. IEEE Computer Society Press.

Cheong, JH, and Park, MC. (2005), 'Mobile Internet acceptance in Korea,' *Internet Research*, 15 (2), 125-40.

Choi, JW, Seol, HJ, Lee, SJ, Cho, HM, and Park, YT. (2008),
'Customer satisfaction factors of mobile commerce in Korea,'
Internet Research, 18 (3), 313-335.

Choi, DH, Kim, CM, Kim, SI,
and Kim, SH. (2006),
'Customer loyalty and
disloyalty in Internet retail
stores: Its antecedents and its
effect on customer price
sensitivity,' *International*

Journal of Management, 23
(4), 925-944.

Delic, N, and Vukasinovic, A.
(2006), 'Mobile payment
solution: Symbiosis between
banks, application service
providers and mobile network

operators,' *Proceedings of the Third International Conference on Information Technology: New Generations (ITNG '06)*, 10-12 April 2006, Las Vegas, Nevada, USA, 346-350. IEEE Computer Society Press.

Gao, J, Cai, J, Patel, K, and Shim, S. (2005), 'A wireless payment system,' *Proceedings of the 2nd International Conference on Embedded Software and Systems*

(ICESS'05), 16-18 December
2005, Xian, China. IEEE
Computer Society Press.

Hu, WC, Yang, CHT, Yeh, JH,
and Hu, WH. (2008a), 'Mobile
and electronic commerce

systems and technologies,'
*Journal of Electronic
Commerce in Organizations*, 6
(3), 54-73.

Hu, XP, Li, WL, and Hu, Q.
(2008b), 'Are mobile payment

and banking the killer apps
for mobile commerce?’

*Proceedings of the 41st Hawaii
International Conference on
System Science (HICSS 41), 7-
10 January 2008, Big Island,*

Hawaii, USA. IEEE Computer Society Press.

InTech. (2009), 'Make calls in the sky', *The Star Online*, retrieved 31 March 2009,

from <http://star-techcentral.com/tech/story.as>

p?file=/2009/3/31/prodit/3477394&sec=prodit

Khalifa, M, and Shen, KN.
(2008), 'Explaining the
adoption of transactional B2C
mobile commerce,' *Journal of*

*Enterprise Information
Management, 21 (2), 110-124.*

Kim, H, Kim, J, and Lee, Y.
(2005), 'An empirical study of
use context in the mobile
Internet, focusing on the

usability of information
architecture,' *Information
Systems Frontiers*, 7 (2), 175-
86.

Kukar-Kinney, M, Walters, RG,
and MacKenzie, SB. (2007),

‘Consumer responses to characteristics of price-matching guarantees: The moderating role of price consciousness,’ *Journal of Retailing*, 83 (2), 211-221.

Me. G, Strangio, MA, and
Schuster, A. (2006), 'Mobile
local macropayments:
Security and prototyping,'
IEEE Pervasive Computing, 5
(4), 94-100.

Mohd, F, and Osman, S.
(2005), 'Towards the future of
mobile commerce
(MCommerce) in Malaysia,'
*IADIS International Conference
Web Based Communities 2005,*

23-25 February 2005,
Algarve, Portugal.

Pete, L. (2001), 'Transaction processing,' *Computerworld*, 35 (40), 49.

Poon, WC. (2008), 'Users' adoption of e-banking services: The Malaysian perspective,' *Journal of Business & Industrial Marketing*, 23 (1), 59-69.

PosPay (2009), 'PosPay – How it works?', *Neowave Sdn Bhd*, retrieved 31 March, 2009, from

<http://www.neowave.com.my/pospay-howitworks.asp>.

Ramaseshan, B, Bejou, D, Jain, SC, Mason, C, and Pancras, J. (2006), 'Issues and perspectives in global customer relationship management,' *Journal of*

Service Research, 9 (2), 195-207.

Sekaran, U. (2003), *Research methods for business: A skill building approach* (4th ed.),

John Wiley & Sons Hoboken,
NJ.

Tan, CB, Kwan, PY, and Eze,
UC. (2009), 'The impact of
consumer characteristics,
business characteristics, and

knowledge management
system on customer loyalty: A
conceptual framework'
*Proceedings of the 2009
International Conferences on
e-Commerce, e-Administration,
e-Society, and e-Education (e-*

CASE 2009) and e-Technology,
8-10 January 2009, Singapore,
323-336. Knowledge
Association of Taiwan.

Varshney, U. (2008), 'Business
models for mobile commerce

services: Requirements,
design, and the future,' *IT
Professional*, 10 (6), 48-55.

Vlachos, PA, and
Vrechopoulos, AP. (2008),
'Determinants of behavioral

intentions in the mobile
internet services market,'
Journal of Services Marketing,
22 (4), 280-291.

Wei, J, and Ozok, A. (2005),
'Development of a web-based

mobile airline ticketing model
with usability features,'
*Industrial Management & Data
Systems*, 105 (9), 1261-1277.

Wu, J, and Wang, S. (2005),
'What drives mobile

commerce? An empirical study evaluation of the revised technology acceptance model,' *Information and Management*, 42 (5), 719-729.

Zhang, QH. (2008), 'Mobile payment in mobile e-commerce,' *Proceedings of the 7th World Congress on Intelligent Control and Automation (WCICA)*, 25-27 June 2008, Chongqing, China,

6650-6654. IEEE Computer
Society Press.