

# **MOBILE WEB-BASED ONLINE MONETARY TRANSFER MODEL**

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**UNIVERSITI UTARA MALAYSIA**

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# **MOBILE WEB-BASED ONLINE MONETARY TRANSFER MODEL**

**A thesis submitted to the Faculty of Information Technology  
in partial fulfillment of the requirements for  
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**By**

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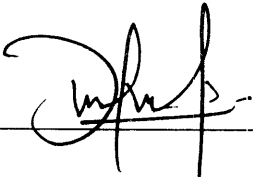
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## **ABSTRACT**

The bank institutions are now offer mobile banking to persuade their customers to perform online banking anywhere and anytime however the bank services are not permit customers to perform third party funds transfer between banks. This project has aim to propose model for Mobile Monetary Transfer System (MMTS), which use as a model to develop a MMTS prototype. With the MMTS prototype, user can transfer money from his bank's account to another bank's account. The MMTS prototype was evaluated the usability by using semi-structured interviewing techniques. In the finding founds that all respondents was accepted MMTS prototype to perform third party funds transfer.

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## LIST OF ABBREVIATIONS

<b>ATM</b>	- Automatic Teller Machine
<b>BCB</b>	- Bumiputra-Commerce Bank
<b>cHTML</b>	- compact Hypertext Markup Language
<b>E-Banking</b>	- Electronic Banking
<b>E-commerce</b>	- Electronic Commerce
<b>E-mail</b>	- Electronic mail
<b>E-Mail</b>	- Electronic Mail
<b>E-Wallets</b>	- Electronic Wallets
<b>GPRS</b>	- General Packet Radio Service
<b>HDML</b>	- Handheld Device Markup Language
<b>HTML</b>	- Hypertext Markup Language
<b>ISO</b>	- International Standards Organization
<b>IT</b>	- Information Technology
<b>M-Banking</b>	- Mobile Banking
<b>M-commerce</b>	- Mobile Commerce
<b>MMTS</b>	- Mobile Monetary Transfer System
<b>M-Wallets</b>	- Mobile Wallets
<b>OBMB</b>	- OCBC Bank Malaysia Berhad
<b>PC</b>	- Personal Computer
<b>PDA</b>	- Personal Digital Assistant
<b>PHP</b>	- PHP Hypertext Preprocessor
<b>PIN</b>	- Personal Identification Number
<b>Pocket IE</b>	- Pocket Internet Explorer
<b>SIM</b>	- Subscriber Identity Module
<b>SMS</b>	- Short Message Service
<b>UML</b>	- Unified Modelling Language
<b>UMTS</b>	- Universal Mobile Telephony Service
<b>UOB</b>	- United Oversea Bank
<b>VML</b>	-Voice Markup Language

<b>WAP</b>	- Wireless Application Protocol
<b>WLAN</b>	- Wireless Local Area Network
<b>WML</b>	- Wireless Markup Language
<b>XHTML</b>	- eXtensible Hypertext Markup Language

# **CHAPTER 1**

## **BACKGROUND OF THE STUDY**

### **1.1 Introduction**

The growth of the Internet and network communication has changed the way of people life and lives (Deitel, Deitel, & Kate, 2001). The Web technologies are the technologies available with a variety of content and application platforms that use pass Web browsers when connect to the Internet. Electronic mail (E-mail) is one of web application types that have the capability of quick and easy communication via Internet. E-mail facilitates communication among hundreds of millions of people worldwide. Another popular web application service is Internet banking which make available, electronic payment. Kerem (2003) studied Internet banking in Estonia and found that, since it was made available in 1996, until 2002 the Internet has become the main transactions channel of the usage dynamics in a variety of different transaction methods. Other transaction methods are at the office, ATM, direct order, standing order, phone, and PC Bank. And 57% of Internet accessing is using Internet banking.

The contents of  
the thesis is for  
internal user  
only

## REFERENCES

- Beaulieu, M. (2001). *Wireless Internet Applications and Architecture: building professional wireless*: Pearson Education, Inc.
- Bennett, S., McRobb, S., & Farmer, R. (2002). *Object-Oriented System Analysis and Design Using UML*, 2<sup>nd</sup> ed, McGraw-Hill Education.
- Conallen, J. (2002). *Building Web Applications with UML*, 2<sup>nd</sup> ed., Pearson Education, Inc.
- Connolly, T. M., & Begg, C. E. (2002). *Database Systems: A Practical Approach to Design, Implementation, and Management*, 3<sup>rd</sup> ed, Pearson Education Limited
- Deitel, H., Deitel, P., & Kate, S. (2001). *E-business and e-commerce for managers*: Prentice-Hall, Inc.
- Deitel, H., Deitel, P., Nieto, T. R., & Steinbuhler, K. (2002). *Wireless Internet & Mobile Business How To Program*: Pearson Education, Inc.
- Elliott, G., & Phillips, N. (2004). *Mobile Commerce And Wireless Computing Systems*: Pearson Education Limited.

- Farahwahida, & Salyani. (n.d.). *Towards The Future of Mobile Commerce (M-Cormmerce) in Malaysia*. Retrieved June 12, 2005, from [http://sts.um.edu.my/seminar/PersidanganS&T\\_KertasKerja/Farahwida.pdf](http://sts.um.edu.my/seminar/PersidanganS&T_KertasKerja/Farahwida.pdf)
- Hisham, A. (2002). *ATM in your pocket: A Proposed Framework for Mobile Internet Banking*. Unpublished Thesis: MSc. (IT). Universiti Utara Malaysia, Sintok, Kedah.
- Huovinen, E. R., Torbit, S., & Harald, B. (1999, May 24). Nokia and Visa to pilot mobile payment. News posted to <http://www.merita.fi/E/Merita/sijoita/uutta/990524.ASP>
- Jordan, P. W. (1998). *An Introduction to Usability*, Taylor & Francis Ltd.
- Kerem, K. (2003). *Internet Banking in Estonia*. PRAXIS Center. Retrieved March 30, 2005, from <http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN018529.pdf>
- Llazani, A. and M. Othman (2004). *SMSBanking: An M-Commerce Application Based on User Requirement Survey*. Retrieved June 15, 2005, from <http://perdana.fsktm.um.edu.my/~mazliza/papers/SMSbanking.pdf>



- Mallat, N., Rossi, M., & Tuunainen, V. K. (2004). Mobile Banking Services. *Communications of The ACH*, 47, 42-46. Retrieved March 31, 2005, from [http://portal.acm.org.eservice.uum.edu.my/ft\\_gateway.cfm?id=986236&type=pdf&coll=Portal&dl=GUIDE&CFID=46080717&CFTOKEN=76394205](http://portal.acm.org.eservice.uum.edu.my/ft_gateway.cfm?id=986236&type=pdf&coll=Portal&dl=GUIDE&CFID=46080717&CFTOKEN=76394205)
- Masniza. (2005). *Guidelines in Designing the e-Publishing Environment for Handheld Devices: A Study on eInfoC Website*. Unpublished Thesis: MSc. (IT). Universiti Utara Malaysia, Sintok, Kedah.
- Mobey Forum. (2000, May 10). Leading on-line financial institutions and mobile phone manufacturers to drive mobile financial services. Forum posted to <http://www.mobiletransaction.org/pressreleases/may10.html>
- Mueller, L., Hamilton, L., & Melley, K. (2000, August 29). Bank of America launches U.S. Wireless Financial Services. News posted to <http://www.bankofamerica.com/newsroom/press/press.cfm?PressID=press.20000829.05.htm&LOBID=1>
- Nielsen, J. (2000). *Why You Only Need to Test With 5 Users*, from Nielsen, J. (2000). *Why You Only Need to Test With 5 Users*. Retrieved September 28, 2005, from <http://www.useit.com/alertbox/20000319.html>

Singh, I. K. (n.d). *Usability Issues in Mobile Commerce*. Retrieved March 30,2005,  
from <http://general.rau.ac.za/infosci/www2003/Papers/Singh,%20IK%20Mobile%20commerce%20-%20usage%20and%20usability.pdf>

Tachikawa, K. (2003). *A Perspective on the Evolution of Mobile Communications*. IEEE Communications Magazine. Retrieved Febuary 1, 2005, from  
<http://www.comsoc.org/livepubs/ci1/private/2003/oct/tachikawa.html>

Vaishnavi, V.. & Kuechler, B. (2005). *Design Research in Information Systems*. Retrieved October 18, 2005, from  
<http://www.isworld.org/Researchdesign/drislSworld.htm>

Varshney, U. (2003). Wireless I: Mobile and Wireless Information Systems: Applications, Networks, and Research Problems. *Communications of the Association for Information Systems* 12: 155-166. Retrieved March 31, 2005, from <http://www.cis.gsu.edu/~uvarshne/cis8390/WIS.pdf>

Welch, B. (1999). *Electronic Banking and Treasury Security, 2<sup>nd</sup> ed.*. Woodhead Publishing Limited and The Association of Corporate Treasurers.

Wikipedia (2005). *Personal Digital Assistant*. Retrieved June 26, 2005, from  
<http://en.wikipedia.org>