THE RELATIONSHIP OF TRUST AND SECURITY IN DEVELOPING CUSTOMER WORD-OF-MOUTH AND LOYALTY IN MOBILE BANKING

TAHMINEH JAVABDEH

A dissertation submitted in partial fulfillment of the requirements for the award of the degree of Master of Science (Information Technology - Management)

Faculty of Computing
Universiti Teknologi Malaysia

July 2014
To my beloved parents and husband, thank you for always being there for me, supporting me and encouraging me to be the best that I can be.
ACKNOWLEDGEMENT

Praises to God for giving me the patience, strength and determination to go through and complete my study. I would like to express my appreciation to my supervisor, Dr. Norasnita Ahmad, for her support and guidance during the course of this study and the writing of the dissertation. Without her continued support and interest, this dissertation would not have been the same as presented here. I would like to dedicate this dissertation to my family. Without their love and support I would have never come this far. Finally, I would also like to extend my thanks to my husband who has given me the encouragement and support when I needed him.
Currently the large number of people involved in electronic commerce. Mobile banking which introduced by developing mobile technology is new adopted technology in electronic commerce. Even though mobile banking is accepted as part of daily life of people, focusing on just adopting this technology is not enough and managers should also go far beyond to increase customers. In addition, it is difficult to increase the number of customers in online business without considering the effecting factors. Therefore the importance of investigation in development of customer loyalty and positive word-of-mouth as two main concerns of online managers is obvious. Trust and security as two main technical factors cited by most of researchers in adopting mobile banking needs more consideration. Focusing on the relationships between customers and banks through mobile technologies, there is still a lack of studies that analyze the formation of both concepts. Hence, this research investigates on the relationship of security and trust for developing customer loyalty and positive word-of-mouth in the mobile banking services. Data is collected through questionnaire from CIMB mobile banking users in Malaysia. The data of this research analyzed through SPSS and LISREL software. The results of this research indicate that there is a direct and positive relationship between both factors namely security and trust in developing customer loyalty and positive word-of-mouth.
ABSTRAK

Kini terdapat ramai orang yang terlibat dalam perdagangan elektronik. Perbankan mudah alih yang diperkenalkan dengan membangunkan teknologi mudah alih adalah teknologi baru yang diterima pakai dalam perdagangan elektronik. Walaupun perbankan mudah alih diterima sebagai sebahagian daripada kehidupan harian, memberi fokus hanya kepada teknologi ini sahaja tidak mencukupi dan pengurus juga harus bergerak selangkah maju ke hadapan untuk meningkatkan bilangan pelanggan. Tambahan pula, ia adalah sukar untuk meningkatkan jumlah pelanggan dalam perniagaan dalam talian tanpa mempertimbangkan faktor-faktor yang berkaitan. Oleh itu, kepentingan kajian dalam membina kesetiaan pelanggan dan penyebaran maklumat positif sebagai dua kebimbangan utama pengurus dalam talian, adalah ketara. Kepercayaan dan keselamatan adalah dua faktor teknikal utama yang sering disebut oleh kebanyakan penyelidik dalam menerima pakai perbankan mudah alih dan memerlukan lebih banyak pertimbangan. Berfokus kepada hubungan antara pelanggan dan bank-bank melalui teknologi mudah alih, masih terdapat kekurangan kajian yang menganalisis pembentukan kedua-dua konsep. Maka, penyelidikan ini mengkaji hubungan keselamatan dan kepercayaan untuk membangunkan kesetiaan pelanggan dan penyebaran maklumat positif dalam perkhidmatan perbankan mudah alih. Data telah dikumpul melalui soal selidik daripada pengguna perbankan mudah alih CIMB di Malaysia. Data kajian ini dianalisis menggunakan SPSS dan perisian LISREL. Hasil kajian ini menunjukkan bahawa terdapat hubungan langsung dan positif antara kedua-dua faktor iaitu keselamatan dan kepercayaan dalam membangunkan kesetiaan pelanggan dan penyebaran maklumat positif.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECLARATION</td>
<td>ii</td>
<td></td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iii</td>
<td></td>
</tr>
<tr>
<td>ACKNOWLEDGMENT</td>
<td>iv</td>
<td></td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>v</td>
<td></td>
</tr>
<tr>
<td>ABSTRAKT</td>
<td>vi</td>
<td></td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>vii</td>
<td></td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xi</td>
<td></td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiii</td>
<td></td>
</tr>
</tbody>
</table>

## 1 INTRODUCTION

1.1 Introduction 1
1.2 Research Background 2
1.3 Research Important 4
1.4 Problem Statement 5
1.5 Research Questions 5
1.6 Research Objectives 6
1.7 Research Scope 7

## 2 LITERATURE REVIEW

2.1 Introduction 8
2.2 Adoption and Evolution of Information Technology in Banking 10
2.3 Mobile banking 11
2.3.1 Definitions of Mobile Banking 12
2.3.2 Mobile Banking Related Terms 13
2.3.3 Advantages of Mobile Banking 14
2.3.4 Mobile banking in Malaysia 15
2.4 Factors of Mobile Banking Adaption 16
2.5 Security 18
  2.5.1 Mobile and Computer Security 19
  2.5.2 Mobile Security Risks 19
    2.5.2.1 Rootkits 20
    2.5.2.2 Web-Based and Network-Based Attacks 20
    2.5.2.3 Social Engineering Attacks 21
    2.5.2.4 Resource Abuse Attacks 21
    2.5.2.5 Data Loss 21
    2.5.2.6 Data Integrity Threats 22
    2.5.2.7 Mobile-Based Branchless Service 22
  2.5.3 Mobile Security Measures 22
  2.5.4 Terms and Concepts in Mobile Security 26
  2.5.5 Critical Security Recommendations 27
  2.5.6 The Security of a Mobile App 29
  2.5.7 Dimensions of Security 30
    2.5.7.1 Privacy 31
    2.5.7.2 Safety 31
    2.5.7.3 Reliability 32
  2.5.8 The Security and Mobile Banking Related Paper 33
2.6 Trust 36
  2.6.1 Trust and Mobile Banking Related Paper 40
2.7 Word-of-Mouth 42
  2.7.1 WOM and Bank Services 46
  2.7.2 Impact of WOM on Banking 47
  2.7.3 WOM and Mobile Banking Related Paper 48
2.8 Loyalty 51
  2.8.1 Customer Loyalty within the Bank Industry 53
  2.8.2 Behavioral and Attitudinal Loyalty 54
  2.8.3 Loyalty and Related Research in Mobile Banking 55
2.9 Researches Gap Analysis
2.10 Investigated Research model

3 RESEARCH METHODOLOGY

3.1 Introduction
3.2 Case Study
  3.2.1 CIMB Mobile Banking
3.3 Sample Size
3.4 Methodology
3.5 Data Collection
3.6 Validity and Reliability of the Instrument
3.7 Proposed Model
3.8 Hypothesis Formulation
3.9 Pilot Study: Reliability and Validity

4 FINDING AND ANALYSIS

4.1 Introduction
4.2 Data Collection Method
4.3 Data Source and Sample Selection
4.4 Demographic Data Analysis
  4.4.1 Gender
  4.4.2 Age
  4.4.3 Education
  4.4.4 Occupation
  4.4.5 Nationality
  4.4.6 Online Shopping Frequency
  4.4.7 Mobile Banking Frequency
  4.4.8 Income
  4.4.9 Usage Purpose
4.5 Quality Standard: Validity and Reliability
  4.5.1 Reliability Analysis
  4.5.2 Validity Analysis
    4.5.2.1 Confirmatory Factor Analysis
    4.5.2.2 RMSEA
4.5.2.3 (X2/df) indices 95
4.5.2.4 Root Mean Square Residual RMR 96
4.5.2.5 Goodness-of-Fit Statistic (GFI) and (AGFI) 96
4.5.2.6 NFI and NNFI 97
4.5.2.7 CFI (Comparative fit index) 97
4.6 Statistical Analysis 100
  4.6.1 One-Sample t-test 101
  4.6.2 Correlation Analysis 102
  4.6.3 Structural Equation Modeling 102
4.7 Hypothesis Test and Result 104
4.8 Model Goodness of Fit 106
4.9 Other Findings 107

5 CONCLUSION 108
  5.1 Introduction 108
  5.2 Findings of the Study 109
  5.3 Contribution of the Study 111
  5.4 Limitation of the Study and Future Works 112

REFERENCES 114
Appendix A 133
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE NO.</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Effecting Factors on mobile banking adoption among customers</td>
<td>17</td>
</tr>
<tr>
<td>2.2</td>
<td>Security Dimensions in previous researches</td>
<td>30</td>
</tr>
<tr>
<td>2.3</td>
<td>Summarizing the Security and Mobile banking related paper</td>
<td>35</td>
</tr>
<tr>
<td>2.4</td>
<td>Summarizing Trust and Mobile banking related paper</td>
<td>41</td>
</tr>
<tr>
<td>2.5</td>
<td>Summarizing WOM and Mobile banking related paper</td>
<td>51</td>
</tr>
<tr>
<td>2.6</td>
<td>Summarizing loyalty and Mobile banking related paper</td>
<td>56</td>
</tr>
<tr>
<td>3.1</td>
<td>Operational Framework Table</td>
<td>67</td>
</tr>
<tr>
<td>3.2</td>
<td>Sources for designing each question in designed questionnaire</td>
<td>71</td>
</tr>
<tr>
<td>3.3</td>
<td>The designed questions for each dimension</td>
<td>72</td>
</tr>
<tr>
<td>3.4</td>
<td>Dimension Reliability Value</td>
<td>77</td>
</tr>
<tr>
<td>4.1</td>
<td>Gender distribution of the studied sample</td>
<td>80</td>
</tr>
<tr>
<td>4.2</td>
<td>Distribution of population by age</td>
<td>81</td>
</tr>
<tr>
<td>4.3</td>
<td>Distribution of the sample according to educational level</td>
<td>83</td>
</tr>
<tr>
<td>4.4</td>
<td>Distribution of respondent’s occupation</td>
<td>84</td>
</tr>
<tr>
<td>4.5</td>
<td>Distribution of respondents’ Nationality</td>
<td>85</td>
</tr>
<tr>
<td>4.6</td>
<td>Distribution of respondents’ frequency usage of online shopping</td>
<td>86</td>
</tr>
<tr>
<td>4.7</td>
<td>Distribution of respondents’ frequency of usage Mobile banking</td>
<td>88</td>
</tr>
<tr>
<td>4.8</td>
<td>Distribution of respondents’ income</td>
<td>89</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>4.9</td>
<td>Distribution of respondents’ usage Purpose</td>
<td>90</td>
</tr>
<tr>
<td>4.10</td>
<td>Cronbach’s alpha coefficient for each construct of the model</td>
<td>92</td>
</tr>
<tr>
<td>4.11</td>
<td>Goodness of fit (model right side)</td>
<td>95</td>
</tr>
<tr>
<td>4.12</td>
<td>Goodness of fit (model left side)</td>
<td>100</td>
</tr>
<tr>
<td>4.13</td>
<td>Results of One-Sample t-test for all construct</td>
<td>101</td>
</tr>
<tr>
<td>4.14</td>
<td>Results of Spearman’s correlation analysis</td>
<td>102</td>
</tr>
<tr>
<td>4.15</td>
<td>Results of hypothesis analysis</td>
<td>105</td>
</tr>
<tr>
<td>4.16</td>
<td>Model Goodness of fit</td>
<td>106</td>
</tr>
<tr>
<td>4.17</td>
<td>ANOVA test results based on the investigated regions</td>
<td>107</td>
</tr>
<tr>
<td>5.1</td>
<td>Results of hypothesis analysis</td>
<td>110</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE NO.</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Global cell phone penetration by region from 2002 to 2007 (Source: ITU 2009)</td>
<td>9</td>
</tr>
<tr>
<td>2.2</td>
<td>The role of website usability and customer satisfaction in customer loyalty and WOM in internet banking services</td>
<td>61</td>
</tr>
<tr>
<td>2.3</td>
<td>The Conceptual model by Javadin <em>et al.</em> (2011)</td>
<td>62</td>
</tr>
<tr>
<td>2.4</td>
<td>Conceptual Framework of this research</td>
<td>62</td>
</tr>
<tr>
<td>3.1</td>
<td>Research Operational Framework</td>
<td>66</td>
</tr>
<tr>
<td>3.2</td>
<td>Proposed model for this research</td>
<td>75</td>
</tr>
<tr>
<td>4.1</td>
<td>Gender distribution of the studied sample</td>
<td>81</td>
</tr>
<tr>
<td>4.2</td>
<td>Distribution of population by age</td>
<td>82</td>
</tr>
<tr>
<td>4.3</td>
<td>Distribution of the sample according to educational level</td>
<td>83</td>
</tr>
<tr>
<td>4.4</td>
<td>Distribution of respondents’ occupation</td>
<td>84</td>
</tr>
<tr>
<td>4.5</td>
<td>Distribution of respondents’ Nationality</td>
<td>86</td>
</tr>
<tr>
<td>4.6</td>
<td>Distribution of respondents’ frequency usage of online shopping</td>
<td>87</td>
</tr>
<tr>
<td>4.7</td>
<td>Distribution of respondents’ frequency usage of Mobile banking</td>
<td>88</td>
</tr>
<tr>
<td>4.8</td>
<td>Distribution of respondents’ income</td>
<td>89</td>
</tr>
<tr>
<td>4.9</td>
<td>Distribution of respondents’ usage Purpose</td>
<td>90</td>
</tr>
<tr>
<td>4.10</td>
<td>The standardized coefficients for the variables of the model right side</td>
<td>93</td>
</tr>
<tr>
<td>4.11</td>
<td>Significant values obtained for the variable of the model right side</td>
<td>94</td>
</tr>
</tbody>
</table>
4.12 The standardized coefficients for the variables of the model left side.
4.13 Significant values obtained for the variables of the model left side
4.14 The standardized coefficients for the variables of the model
4.15 Significant values obtained for the variables of the model
5.1 Conceptual framework of this research based on the obtained significant values and standardized coefficients
CHAPTER 1

INTRODUCTION

1.1 Introduction

Currently the reduced search expenses and the high power obtained by customers with the internet are the main factors in growing competitiveness in electronic commerce which involved too many organizations and people in electronic commerce. On the other hand, it is really hard to increase the number of customers in online commerce without considering the effecting factors, therefore the importance of investigation in development of customer loyalty and positive word-of-mouth (WOM) - “written or oral recommendation by a satisfied customer to the prospective customers of a goods or service” - as two main concerns of online managers, is obvious especially these days by growing new technologies. In fact, managers have conventionally documented the overall significance of both relevant concepts and because of that, marketing studies has extensively analyzed both concept of WOM (For example: Bansal and Voyer, 2000; Chung and Darke, 2006) and loyalty (For instance: Dick and Basu, 1994, Hallowell, 1996, Oliver, 1999; Lindestad and Andreassen, 1998). In addition mobile banking is one of the new technologies which introduced by developing mobile technology. Presently Mobile banking as a new adopted technology in electronic commerce has become accepted as part of daily life. Meanwhile the importance of security in mobile banking cannot be neglected as a key factor for customers. Concentrating on the relationships between banks and customers through mobile technologies, there is still a lack of
studies that analyze the formation of both concepts. Hence, this research investigates on the relationship of security and trust for developing customer positive WOM and loyalty in mobile banking services. With the aim of moving on this topic, this study puts forward a descriptive model that characterizes customer loyalty and positive WOM in the context of mobile banking.

Bearing these considerations in mind, the research is structured as follows: firstly, we carry out an in-depth review of the relevant literature concerning the four variables included in the study. Secondly, we formalize the hypotheses. Thirdly, we explain the process of data collection and measures validation and afterwards we are going to present the main results. Lastly, we show the main conclusions of the study and we will focus on future works.

1.2 Research Background

Nowadays everything done through technology since the world is very small with that like a global village. IT has an important role in the world for development of industries and organizations. The experts in the area of information technologies try to use new methods and techniques for easing daily affairs of human being specially the owners of industries and businesses in order to give opportunity to them to be able to communicate with their customers in the earliest time without any limitations of time and place and by the cheapest way. In addition with the increase of internet influence and the invention of new ways to serve customers through electronic media, this is one of the concerns of managers to increase the tendency of customers toward using new channels. One of the clear and emerging new channels in the space of banking and payments is mobile.
The banking industry in recent times has been undergoing radical change and this is taking place in all aspects of the banking sector. One of these new changes in the banking industry is the information technology system (IT) and is mainly used by banks to reduce turnaround time and improve business in general. The introduction of mobile technology and its devices have indeed brought about efficiency in the manner in which commercial and business activities are been carried out (Tiwari and Buse, 2007; UNCTAD, 2007).

Mobile banking is a new technology which adopted by banks around the world. Research shows that 30 percent of households in the United State of America use mobile phones to perform banking services. This is also the case in European and Asian countries where 80 percent of households use mobile banking services (Gupta, 2005). Presently, mobile phones are the most popular means of communication technology in Africa (ITU, 2007). Although there has been unprecedented growth in the mobile banking market in many nations in recent years, but focusing on the relationships between customers and banks through mobile banking services is one of the main concerns of managers (Taavasoli, 2011). How they can keep the loyal customers and how to increase the number of customers through positive word-of-mouth (WOM) concept, which have been traditionally two important goals targeted by managers, cannot be achieved unless doing investigation on the effecting factors on mobile banking context.

Focusing on the relationships between customers and mobile banking (M-banking), there is still a lack of studies that analyze the formation of both concepts in investigating role of effecting factors point of view. Thus, although the increasing competitiveness in electronic business is motivating an exponential growth in the number of studies that analyze loyalty development (e.g. Auh et al., 2007; Flavia’n and Guinali’u, 2006; Harris and Goode, 2004; Srinivasan et al., 2002), and customer positive WOM (e.g. Kozinets, 2002; Smith et al., 2005; Brown et al., 2007; Sen and Lerman, 2007) in the online context, there is a call for studies that will help to understand how customer loyalty and positive WOM are formed in the mobile banking business in greater detail. However, most of the studies on these
Concepts have been carried out in the context of traditional distribution channels (e.g. Swan and Oliver, 1989; Mizerski, 1982; Hallowell, 1996; Knox and Denison, 2000) and, as a result, this research tackles an interesting topic of research which has not been yet addressed in literature by these factors.

1.3 Research Importance

Today, financial firms are competing to increase their profit share in the market. Among these firms, banks have radically shifted from traditional banking to branchless mode of banking. Adoption of latest technology has enabled banks to extend their customer base, where electronic banking has proved to be the chief advancement. Mobile banking can be categorized as the latest advancement in electronic banking, which has widened customers’ access to bank accounts through wireless channels. Mobile banking is a financial service where the bank customers perform balance inquiry, credit transfer, and other businesses according to instruction sent through the mobile phone. From customers’ perspective adopting mobile banking services benefit in terms of convenience to perform banking transactions anytime and anywhere, with ease to use. On the other hand, there will be more threats to mobile devices these days than ever, including company data leakage, mobile-based viruses, and more. Although mobile banking is somewhat secure because of using different layer of security and there are so many variations of banking apps and methods in the market, but still is a key area of concern for consumers and financial service providers. High security may lead to increasing the percentage of trust by customer and it creates customer loyalty which leads to increasing the possibility of positive word of mouth by loyal customers.
1.4 Problem Statement

By emerging new technologies in electronic commerce area especially increasing competitiveness in financial organizations, managers are really interested to increase their market profit share by finding the effecting factors for attracting customers.

Banks are one of these organizations which shifted very fast from traditional version to the branchless mode. Using new technologies provided this opportunity for banks to attract more customers. Mobile banking can be categorized as the latest improvement in electronic banking, which has extended customers’ access to bank accounts through wireless channels.

Based on an in-depth review of relevant literature, there is still a lack of studies that analyze the formation of the relationships between customers and mobile banking. Therefore investigating on the effecting factors in the relationship between them is one of the concerns of managers. Thus the main focus of the author in this research is investigating on the relation of security and trust for developing customer positive word-of-mouth (WOM) and loyalty in the mobile banking services.

1.5 Research Questions

According to the related literature at the first phase the role of security and trust as two main factors in adopting mobile banking is really important, while in the second phase we need to investigate the formation of these two factors in developing customer loyalty and positive WOM, therefore the main research question is arise as follows:
“How to investigate the formation and effect of security and trust for developing customer loyalty and positive word-of-mouth (WOM) in the mobile banking services?”

Hence, the sub-questions of this research are:

1- What is the relationship between security and customer loyalty in mobile banking context?

2- What is the relationship between trust and customer loyalty in mobile banking context?

3- What is the relationship between security and customer positive word of mouth (WOM) in mobile banking context?

4- What is the relationship between trust and customer positive word of mouth (WOM) in mobile banking context?

1.6 Research Objectives

This research investigates on the relationship of security and trust for developing customer loyalty and positive word-of-mouth (WOM) in the mobile banking services. The proposed model for this research is indicated in chapter 4. Therefore the objectives of this research are:
i) To investigate the relationship between security and customer loyalty in mobile banking.

ii) To investigate the relationship between trust and customer loyalty in mobile banking.

iii) To investigate the relationship between security and customer positive word of mouth (WOM) in mobile banking.

iv) To investigate the relationship between trust and customer positive word of mouth (WOM) in mobile banking.

1.7 Research Scope

As it mentioned before, this research investigates on the relationship of security and trust for developing customer positive word-of-mouth and loyalty in mobile banking services. In addition to the theoretical development, real-world case studies are investigated in this research to gain insights into the practicability of proposed models. According to the suggestion by (Casaló et al., 2008), study of this research uses a wider sample of customer in order to investigate possible differences in customers’ behavior from different nationalities in the mobile banking context. Therefore this research is based on an in-depth case study of mobile banking customers of CIMB BANK in Malaysia. The designed questionnaire is distributed to UTM community.
REFERENCES


Altun, Ö. (2012). Factors Affecting the Use of Internet Banking; the Case of Northern Cyprus (Doctoral dissertation, Eastern Mediterranean University (EMU)).


eleventh workshop on mobile computing systems & applications (pp. 49-54).

ACM.


Harris, L. C., & Goode, M. M. (2004). The four levels of loyalty and the pivotal role of trust: a study of online service dynamics. Journal of retailing, 80(2), 139-158.


Hu, X., Li, W., & Hu, Q. (2008). Are mobile payment and banking the killer apps for mobile commerce?. In Hawaii International Conference on System Sciences, Proceedings of the 41st Annual (pp. 84-84). IEEE.


