

Acknowledgements

I would like to express my thanks and gratitude to my supervisor Professor Mohamed Hassan Hafiz for his great support which enabled me to complete this thesis, also I would like to thank my colleagues and friends, Awatif Khidr Hamad and Dr Mohamed Hamad, my husband Kamal for his support and assistance, my thanks are extended to my family and brothers for their moral and kind support throughout the period of the study.

Dedication

To my husband and sons
Mohamed, Ahamed & Awab

To my family, father, mother, brothers and
sisters

ABSTRACT

This study analyzed the introduction of EB in Sudan by assessing the customer's intention to use EB services. Technology acceptance model (TAM) has been chosen as a model for this study, because it is a well tested model concerning users' acceptance of technology. The technology acceptance model consisted of many variables, the perceived ease of use (PEOU) and the perceived usefulness (PU), the intention to use (attitude) as independent variables and the electronic banking usage as a dependant variable.

TAM was developed with an added construct perceived electronic banking security and privacy (PSP) as a basic construct and age, qualifications and the treatment period with the bank as external variables. A questionnaire was designed and tested using SPSS statistical program and obtained a response rate of 71%. The data was analyzed to evaluate the strength of the hypothesized relationships among the constructs of the model. The results provide support of the extended (TAM) model and confirm its validity in predicting and assessing customers' intention to use e. banking in Sudan. The findings of the study provide useful information for bank management in formulating e. banking marketing strategies.

ملخص الدراسة

اهتمت هذه الدراسة بتحليل وتقدير درجة قبول العملاء لتطبيق نظام الصيرفة الالكترونية في الجهاز المصرى السودانى وفقاً لنماذج قبول التقنية الذى يفسر قبول وتعامل المستخدمين مع وسائل وادوات التقنية المختلفة

يحتوى هذا النموذج على نية استخدام العملاء للتقنية كمتغير تابع وسهولة الاستخدام ودرجة الاستفادة من التقنية كمتغيرات مستقلة.

قام الباحث بتطوير هذا النموذج باضافة درجة الامان والسرية كمتغير مستقل وعمر المستخدم ومؤهلاته الاكademie والفتره الزمنية للتعامل مع البنك كعوامل خارجية مرتبطة بالمتغيرات المستقلة.

لتحقيق اهداف الدراسة تم استخدام الاستبيان الذى استهدف عينة مختارة من المصارف التجارية وعملاء هذه المصارف فى السودان.

تم تحليل البيانات احصائيا لاثبات قوة العلاقات بين متغيرات النموذج والتى اعطت نسبة استجابة 71%

واكدت نتائج البحث صلاحية النموذج واستخدامه لتقدير درجة قبول عملاء المصارف لاستخدام وسائل التقنية المختلفة وافادة ادارات المصارف من هذه المعلومات فى صياغة استراتيجيات التسويق المصرفي المختلفة.

TABLE OF CONTENTS

Acknowledgements.....	I
Dedication.....	II
Abstract in English.....	III
Abstract in Arabic.....	IV
Table of contents.....	V
List of tables.....	XI
List of figures.....	XII
Abbreviations.....	XIII
Introduction.....	1
Preface.....	1
Research plan.....	4
1. Importance of the research.....	4
2. Objectives of the research.....	4
3. The problems of the research.....	5
4. The organization of the research.....	6
5. The limitations of the research.....	6
6. Difficulties facing the study.....	7
7. Research methodology.....	7
8. Electronic banking acceptance studies.....	10
9. Technology acceptance model and related studies	13
10. Why TAM used as a model for this research.....	20
11. The research model and hypotheses.....	23
 Chapter one: Literature Review.....	 30
1.1. Definition of electronic banking.....	30
1.2. Developments in electronic banking services.....	30
1.2.1. Automated teller machines ATM's.....	32
1.2.2. Home banking.....	33
1.2.2.1. Tele- banking.....	33
1.2.2.2 Personal computer (PC) banking.....	34
1.2.3. Online investment banking.....	35
1.2.3.1. Traditional IPO process.....	35
1.2.3.2. Online investment banks and the changing role of intermediaries.....	37

1.2.4. Online banking.....	40
1.2.4.1. Online banking methods.....	40
1.2.4.2. Online banking services.....	41
1.2.4.3. EB.Advantages & Drawbacks.....	41
1.2.4.4. Drawbacks.....	42
1.2.4.5. Banking choices.....	43
1.2.4.6. What do you need.....	43
1.2.4.7. Features to compare.....	44
1.2.4.8. Opening account.....	46
1.2.5. Virtual banking.....	47
1.2.6. Internet banking.....	50
1.2.6.1. Internet as a distribution channel	51
1.2.6.2. Areas of the use of the internet in financial institutions...	54
1.2.6.2.1. Information presentation.....	54
1.2.6.2.2. Internet transaction.....	55
1.2.6.2.3. Net banking benefit.....	56
1.2.6.3.1. The individual customer.....	57
1.2.6.3.2. The corporate customer market	57
1.2.6.3.3. The stakeholders.....	58
1.2.6.3.4. Retail customers.....	59
1.2.6.3.5. Corporate customer.....	60
1.2.6.3.6. By number of households.....	62
1.2.6.3.7. By number of transactions.....	63
1.3. Payment system in electronic banking.....	65
1.3.1. Digital coin based money.....	65
1.3.1.1. Actors involved.....	65
1.3.1.2. System requirements.....	66
1.3.1.3. Basic principles of electronic coin- based system	67
1.3.2. Examples of digital coin based money- e.Cash.....	69
1.3.2.1. Payment process with e. cash.....	69
1.3.2.2. Payment process with net. Cash	71
1.3.2.3. Payment process with Millicent.....	72
1.4. Payment technologies for electronic banking	75
1.4.1. Credit cards.....	76
1.4.2. Stored value cards.....	78

1.5. Security, authentication and encryption.....	81
1.5.1. Digital signature.....	81
1.5.2. Privacy.....	83
1.6. Previous studies in electronic banking.....	85
1.6.1. Technology acceptance model for internet banking.....	85
1.6.2. Does information technology provides banks with profit... ..	85
1.6.3. Using technology acceptance model to explain how attitudes determine internet banking usage: the role of perceived access barriers and demographics	86
1.6.4. Consumer acceptance of the internet as a channel of distribution in Taiwan- a channel function perspective	87
1.6.5. Adoption of internet banking: an empirical study in Hong Kong.....	87
1.6.6. Why do people use it? A critical review of the technology acceptance model	88
1.6.7 Effect of trust on consumer acceptance of internet banking.	88
1.6.8. E. Banking value creation strategies, the case of Saudi Investment bank.....	89
1.6.9. The role of social presence in establishing loyalty in e. service environments	89
1.6.10. Understanding consumer adoption of internet banking: an interpretive study in Australian banking context.....	90
1.6.11. The impact of technology on bank training.....	91
1.6.12. Explaining information technology usage: a test of competing models	91
1.6.13. Senior executives' use of information technology.....	92
1.6.14. Banking on the new technology choices and constrains ...	92
1.6.15. Online banking a field study of drivers, developments, challenges and expectations.....	93
1.6.16. Electronically auditing (EDP) systems with the support of emerging information technologies	93
1.6.17. Efficiency analysis in banking firms: An international comparison.....	94
1.6.18. Toward an understanding of the behavioral intention to use mobile banking	95

1.6.19. On the security of today's online electronic systems	96
1.6.20. Use and impact of information technology in Indonesian commercial banks.....	97
1.6.21. The relationship between banks mergers' beliefs and perceptions toward automation of services. A Comparative study of the UAE national banks VS. Foreign banks.....	97
1.6.22. Banking 2000 reengineering at the First National Bank of Southern Africa to create a branch of the future.....	98
1.6.23. Internet access in Bahrain: Business patterns and problems.....	99
1.6.24. The effect of information technology on the growth of the banking industry in Nigeria	100
1.6.25. Adoption and use of the internet banking in sultanate of Oman an exploratory study	100
1.6.26. Consumer acceptance of online banking in Finland: An extension of the technology acceptance model	101

Chapter two: The application of electronic banking in Sudanese commercial banks:

2.1. The development stages of the banking system in Sudan	102
2.1.1. The period 1903- 1958.....	102
2.1.2. The period1959- 1968.....	102
2.1.3. The period 1969- 1977.....	103
2.1.4. The period 1978- 1988.....	104
2.1.5. The period 1989- 1999.....	105
2.1.6. The period 2000-2004.....	105
2.1.7. The period 2005- 2007.....	107
2.2. The case study banks history background.....	108
2.2.1. Omdurman national bank history and background.....	108
2.2.2. Tadamon Islamic bank history and background.....	111
2.2.3. Sudanese French bank historical background.....	113
2.2.4. Faisal Islamic bank history and background.....	115
2.2.5. Albaraka bank history and background.....	117
2.3. Electronic banking services provided by the case study banks in Sudan	120

2.3.1. Automated teller machines (ATM's).....	121
2.3.2. Telephone banking.....	123
2.3.3. Personal computer banking.....	124
2.3.4. Banks network system.....	125
2.3.5. Internet banking.....	125
2.4. Legal regulations of electronic banking in Sudan.....	126

Chapter three: Data analysis and testing of hypotheses:

3.1. Research strategy.....	128
3.2. Sample size.....	129
3.3. Measurement and operationalization of the constructs	130
3.4. Demographic characteristics of the respondent	134
3.5. Reliability and validity of data.....	138
3.6. Post hoc analysis.....	144
3.7. Multi sample test of the model parameters	146
3.8. Additional test of mediation.....	147
3.9. Factor analysis.....	149
3.10. Testing of hypotheses.....	156
3.11. Results of testing of hypotheses.....	163
3.12. Results of testing of hypotheses depending on their correlations and critical ratio.....	166
3.13. Multicollinearity test.....	167
3.14. Model assessment.....	173
3.15. Review of fit statistics.....	174
Conclusion.....	179
The research findings.....	184
Contributions of research findings.....	185
The limitations of the study.....	186
Recommendations.....	187
Suggestions for future researches	193
References.....	194
Bibliography	
Appendix One: SPSS analysis	

Appendix two: Questionnaire

LIST OF TABLES

Table.1.1PC owners with interest in on-line banking.....	63
Table. 2.1 History background and e. banking Services of the Case study banks (ONB, TIB, SFB, BB, FIB).....	119
Table 3.1.The Questionnaire Rate of Return.....	130
Table 3.2 Demographics of respondents.....	135
Table 3.3.Measurement properties for Multi-items Constructs.....	140
Table 3.4 Sub group composition.....	145
Table 3.5 Constructs intercorrelations and measurement Properties for multi- item constructs.....	148
Table 3.6 Confirmatory factor analysis.....	151
Table 3.7 Regression analysis.....	153
Table 3.8 Model coefficients.....	153
Table 3.9 Parameter estimates of re- specified model.....	162
Table 3.10 The correlations.....	165
Table 3.11 Usefulness co linearity statistics.....	167
Table 3.12 Ease of use co linearity statistics.....	168
Table 3.13.the security and privacy co linearity statistics.....	168
Table 3.14.attitude co linearity statistics.....	169
Table 3.15.SPSS explanatory factor analysis for model Assessment.....	175

LIST OF FIGURES

Figure.1 The original TAM.....	13
Figure. 2 The Extended TAM2.....	19
Figure.3 the research mode of customer's intention to Use electronic banking.....	24
Figure 1.1.Systematic of distribution channels 1996- 2000.....	52
Figure 1.2 Security approaches to avoid copying Digital coins.....	69
Figure1.3 Payment process with e. Cash.....	70
Figure 1.4Payment process using Net. Cash.....	72
Figure 1.5 Payment process using Millicent.....	73
Figure 2.1.ONB organizational structure.....	110
Figure 2.2 TIB organizational Structure	112
Figure 2.3 SFB organizational structure.....	114
Figure 2.4 FIB organizational structure.....	116
Figure 2.5 BBS organizational structure.....	118
Figure 2.7TIB Deposits Development 2001-2006.....	119
Figure 3.1The research hypothesized model	133
Figure 3.2 A graphic of the re- specified model For multi- collinearity test.....	172

ABBREVIATIONS

- E: electronic
- E.B: electronic banking
- E.C: electronic commerce
- O.B online banking
- I.B: internet banking
- TAM: technology acceptance model
- PEOU: Perceived ease of use
- PU: Perceived usefulness
- PSP perceived security and privacy
- TRA: theory of reasoned action
- TPB: theory of planned behavior
- WWW: world wide web
- PC: personal computer
- ATM's: automated teller machines
- IT: information technology
- WAN: wide area network
- LAN: local area net work.
- PIN: personal identification number
- ACH: automated clearing house
- POS: point of sale terminal
- ICT: information communication technology
- B2C: business to customer
- B2B: business to business
- EFTA: electronic funds transfers act
- SPSS: statistical package for social science
- MIS: management information system
- EBS: electronic banking service
- SD: Sudanese dinars
- SWIFT: Society for world wide interbank financial telecommunications
- ONB: Omdurman national bank
- HBCI: home-banking communication interface
- FIB: Faisal Islamic bank

- BBS: Baraka bank Sudan
- SFB: Sudanese French bank
- TIB: Tadamon Islamic bank.
- HTTP: hypertext transfer protocol
- SSL: secure socket layer
- URL: The uniform resource locator
- L/Cs: letters of credit
- FONITS: Windows internet based system
- IPO: initial public offering
- APY: annual percentage yield
- FDIC: Federal Deposit Insurance Corporation