Proposing a research model for internet banking usage based on a literature review

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Abstract— ***Banking sector is highly influenced by development of the internet and networking technologies. The considerable number of studies in the field of internet banking acceptance and adoption reflects the importance of this issue for customers, stakeholders and developers of internet banking. The purpose of this study is to present a comprehensive overview of users' acceptance and adoption of internet banking. We conducted a systematic literature review (SLR) of 28 journal papers. Findings indicate the prevailing trend in the field, especially in developing countries. Integrated models have been found to be popular in internet banking acceptance researches. Additionally, Structural Equation Modeling (SEM) was the most used statistical method for analyzing data in studies. This study synthesizes the existing knowledge in the field by extracting research factors and the tested relationships in previous studies. In general 61 research factors and 127 relationships were extracted from studies. Moreover, this study suggests a new research model for future studies and highlights the gaps in this research field and then makes recommendations for future studies.***

Keywords-internet banking; technology acceptance; systematic review; users' adoption; users' acceptance.

I. INTRODUCTION

The rapid growth of internet technology has made a radical shift in the way which people live and work. Internet has penetrated all aspects of human lives such as education, commerce, health and so on. Nowadays, all organizations invest to transform their traditional business models into internet enabled business models such as e-commerce, e-learning, e-governance, e-health and e-banking. Every year, billions of dollars are spent on information system (IS) projects, but the failure rate of IS projects was reported as being between 50% -80%. It is thought that the success rate of a new IS system can be affected by people's acceptance or rejection of the system. Therefore, understanding the factors which accelerate or hinder the acceptance of new technology is absolutely essential before a paradigm switch. Internet banking is one of the most well-known self-service technologies which empowers its customers by delegating control of all banking activities to customers which were previously done by branch staffs. In last decades, hundreds of studies were conducted in the field of users' acceptance, adoption and satisfaction of internet banking. Some studies also concentrated on the drivers or barriers of internet banking. Moreover, cross-market studies were performed in order to disclose the effect of cultural differences on the acceptance of internet banking. According to Benbasat and Barki's [31], most of the researches in the field of technology acceptance were the recopy of existing ones which investigate the same research questions. Therefore, systematic literature reviews can provide a guideline for researchers by displaying what is going on in the field and where there is a potential for new researches. To the best of our knowledge, there is no single study in the internet banking context which identifies, evaluates and interprets available studies via a systematic review. In that regard, this research aims to fill in this gap within the IS literature by means of providing a state of the art review of the current studies which are associated with the acceptance and adoption of internet banking.

II. SEARCH METHODOLOGY

This study utilized the Kitchenham systematic review procedure [29] which includes three main phases: Planning the review, conducting the review and reporting the review. Initially we went through planning phase by developing a review protocol then studies were selected and reviewed based on review protocol and finally results were presented. Fig. 1 demonstrates the review plan of the study.

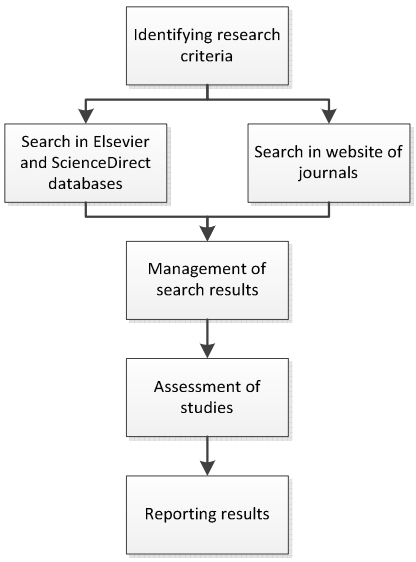

Figure 1. Review protocol

A. *Identifying search criteria*

Only the studies which were written in English were considered. Keywords were limited to "internet banking", "acceptance", "adoption", "online banking" and "e-banking". Six combinations of keywords were applied such as the ones that follow.

- "Internet banking" was combined with "acceptance" by using the Boolean AND operator.
- "Internet banking" was combined with "adoption" by using the Boolean AND operator.
- "E-banking" was combined with "acceptance" by using the Boolean AND operator.
- "E-banking" was combined with "adoption" by using the Boolean AND operator.
- "Online banking" was combined with "acceptance" by using the Boolean AND operator.
- "Online-banking" was combined with "adoption" by using the Boolean AND operator.

In order to restrict the scope of review, we defined some criteria about timeline and format of studies as well. Regarding timeline, this review only covers studies from 2000 to October, 2012. Regarding Format, this review only includes studies published in journals and excluded conference proceedings, textbooks, unpublished papers, master theses and doctoral dissertations.

B. *Search in databases*

The studies were searched in Elsevier and SinceDirect databases, because they are full-text scientific databases which include millions of journal articles and empower their users by sophisticated search tools.

C. *Search in website of journals*

The journals related to information systems, information technologies, internet researches, electronic commerce and electronic banking and also listed in SCI and SSCI (2012) were identified. Website of those journals were visited and investigated manually for achieving studies which may have neglected when searching within databases.

D. *Search results management*

A database was developed to store essential information of collected studies. It included information such as name of authors, name of journals, country of origin, year of publish, employed research models, statistical analysis methods and statistical analysis tools.

E. *Assessment of results*

Initially, the keywords, titles and abstracts of all studies in the database were inspected and the ones which weren't applicable with the aim of this study were excluded. In next step, the full texts of studies were explored and studies which did not follow empirical study design with quantitative methods were eliminated from review as well. Moreover, studies which did not employ a technology acceptance model for identifying influential factors in acceptance, usage and adoption of internet banking were extracted from this review. In other words, investigating the influential factors in internet banking acceptance and adoption based on a theoretical model was the common point of all remaining studies.

III. RESULTS

The 28 studies were selected after applying exclusion/inclusion criteria and they were put into analyses. The results of descriptive analyses are precious from two points of view. First, they reveal what is going on in the field of internet banking acceptance and adoption. Second, they make an insight into the adoption models which were used in the field of internet banking.

A. *Trend in the field*

Fig. 2 displays articles' distribution based on the year that they published. According to fig. 2, it might seem that, there was not any study in the field in 2001. Interpretation for this phenomenon is that the articles which were published in mentioned year did not meet the predefined criteria for being reviewed through this study. Moreover, audience should consider that fig. 2 depicts the number of studies which were available online as of October 30, 2012. In general, the stable trend can be seen in the field which indicates that internet banking has never lost sight of its importance for researchers in the area of technology acceptance.

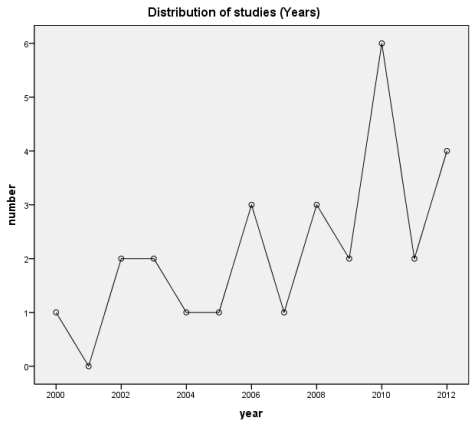

Figure 2. Distribution of studies over years

As seen in fig. 3, developing countries overtook developed countries in terms of carrying out studies on internet banking acceptance and adoption area. 89.2% of the studies were taken in developing countries while developed countries only counted for 10.71% of studies. Additionally, 78.57% of articles were from Asian countries. This high percentage demonstrates that internet banking sector is a trend and a rapidly growing market in Asia.

All studies followed quantitative methodology and employed questionnaires to collect data. 60.71 % of those studies applied paper-based questionnaire while 39.28 % of

them conducted online surveys. Now the question arises as to why researchers preferred paper-based measurement instrument for examining the acceptance of an online service? One possible reason might be the high response rate of paper based questionnaires when compared to online ones.

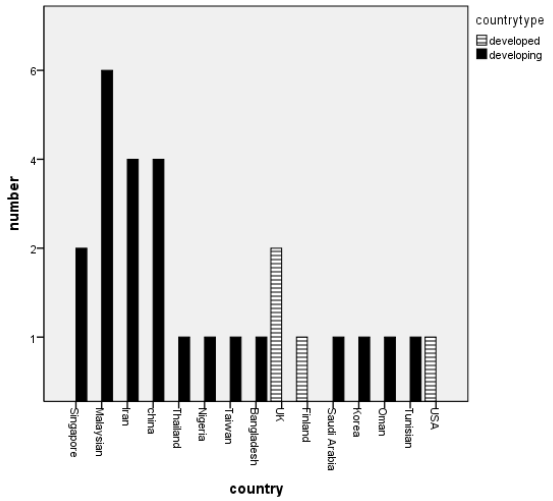

Figure 3. Distribution of studies based on population

Descriptive analysis revealed that 64.28 % of studies employed Structural Equation Modeling (SEM) as their statistical technique for testing hypothesized relationships among constructs. LISREL (33.3% of studies) was the most preferred statistical tool for SEM analysis which was followed by AMOS and PLS. on the other hand, 27.7% of studies did not mentioned the name of statistical tools which they utilized for analyzing data.

All studies reported their sample sizes except one [22]. The average sample size of studies was 377 with maximum amount of 845 people and minimum of 125. Students, bank customers and employees of companies were the sample types of studies which used paper based questionnaires. In the case of online surveys, sample type included students, university staffs, online users and internet banking users. All studies suffered from generalizability power due to small sample size. Studies employed TAM, TRA, TPB, DOI, UTAUT, risk theory and the combination of these original models to investigate factors which affect acceptance and usage of internet banking. As seen in fig. 4, integrated models were the most commonly used models in internet banking acceptance and usage studies. Various combinations of models were observed in studies: TAM and DOI (2 studies); TAM and TPB (4 studies); TAM,

TRA and TPB (2 studies); Perceived risk and TPB; TPB and DOI; TAM and perceived risk. The data show that even today studies employ relatively outdated models instead of developing new models. Only One study proposed its own independent research model to investigate factors which affect actual use of internet banking [27].

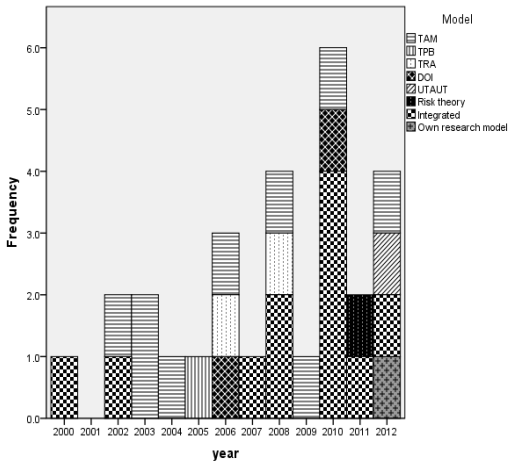

Figure 4. Distribution of studies based on theoretical background

Fig. 4 demonstrates the frequency of the models used over years. In general, TAM was used in 18 studies (as a single model or as a part of integrated models) and TPB were employed in nine studies. The high usage of TAM and TPB might be an indicator of their importance in the field. According to Taylor and Tood (1995), when the objective of study is to predict IT usage, TAM may be a better option; while, TPB may perform better in understanding determinants of intention. Therefore, we can predict that the combination of TAM and TPB will likely result in higher explanatory power when it comes to understanding and predicting internet banking adoption.

B. Factor extraction

This study combined constructs from the internet banking acceptance and adoption studies. 61 constructs were extracted from studies (Appendix 1). Perceived usefulness (18), perceived ease of use (16), attitude (15), intention (13), subjective norms (9), security and privacy (8), perceived behavioral control (9), trust (5), perceived risk (4) and compatibility (4) were among the top 10 constructs which examined in studies.

C. Results of relationship tests

We summarized relationships which were tested across the reviewed studies and noted the significant and none-significant relationships. Finally, we came up with 127 relationships. Only six studies tested the relationships among research factors and actual internet banking usage and internet banking adoption [4, 8, 15, 19, 23, 27]. Other studies only investigated the relationship among research factors and the intention to use internet banking which in turn affects the actual use of internet banking. Relationships which tested in more than three studies are elaborated below.

The relationships between perceived usefulness and attitude were revealed to be significant in all nine studies. The relationships between perceived usefulness and intention to use were found to be significant in 10 studies while it was

insignificant only in one study [3]. 10 studies investigated the relationships between perceived ease of use and attitude. The mentioned relationship was insignificant in two of studies [6, 14]. Nine studies tested the relationships between perceived ease of use and perceived usefulness and they reported that perceived ease of use significantly affects perceived usefulness. The relationships between attitude and intention to use were significant in all of 11 studies which they were examined. The relationships between subjective norms and intention to use were tested in eight studies. Two of eight studies could not find the significant relationship between subjective norms and attitude [7, 26]. The relationships between perceived behavioral control and intention were found to be significant in all of six studies which they were explored.

D. Factor grouping

When we deeply inspected the definitions of extracted factors we noticed that some factors were the part of higher level factors. On the other hand we found some factors which conveyed same meanings and only differed by name. Subsequently, similar factors were put into same groups. In order to confirm the accuracy of the factor categorization, an expert group analysis was conducted. Eight experts participated in this analysis. Seven of them were P.H.D students at Informatics Institute of METU and one was instructor at METU. A list of grouped factors and their definitions were prepared and sent to the experts by e-mail. They were asked to declare their agreement/disagreement about the classification of factors and then assign the best name for each group of factors. Six of participants stated that they are completely agreed with the proposed categorization of factors. Two of participants make some controversies. After a discussion session, we settled with both opponents. Finally, the following eight groups were verified:

- Group1: Perceived usefulness, Perceived benefit, Relative advantages, Importance to bank needs, Performance expectancy.
- Group2: Perceived ease of use, Complexity, User friendliness, Task familiarity, Effort expectance.
- Group3: Perceived behavioral control, Self-efficacy, Perceived manageability.
- Group4: Culture, Social influence, External pressure, Subjective norms.
- Group5: Perceived risk, Social risk, Time risk, Performance risk, Financial risk, Legal risk, Security risk, Security and privacy.
- Group6: Hedonic orientation, Perceived Enjoyment, perceived playfulness.
- Group7: Utilitarian orientation, Feature of website, Quality of internet connection, Accessibility, Transaction speed.
- Group 8: Awareness of service, Information on online banking.

Table 1 demonstrates the names which assigned to each group of factors and the number of participants who selected the same name.

TABLE 1. FACTOR GROUPING

Groups		
Number	***Name***	***Number of agreed participant***
1	Usefulness	5
2	Ease of use	5
3	Control	5
4	Social influence	8
5	Risk	6
6	Enjoyment	7
7	Feature of website	7
8	Awareness of service	7

Table 2 demonstrates the total frequency of the grouping factors in previous studies

TABLE 2. FREQUENCY OF FACTORS

Factors		
Number	***Name***	***frequency***
1	Usefulness	25
2	Ease of use	22
3	Control	11
4	Social influence	14
5	Risk	27
6	Enjoyment	3
7	Feature of website	6
8	Awareness of service	4

IV. PROPOSING A RESEARCH MODEL FOR FUTURE STUDIES

The number of research factors declined from 61 to 34 after grouping. We reorganized the pull of factors and selected the ones with more than three frequencies. These factors were usefulness, ease of use, control, social influence, risk, feature of website, awareness of service, compatibility and trust. We anticipated that these nine factors might play a significant role for deep understanding of internet banking usage in future studies. Fig. 5 shows our proposed model for predicting internet banking usage (IBU) with nine research factors.

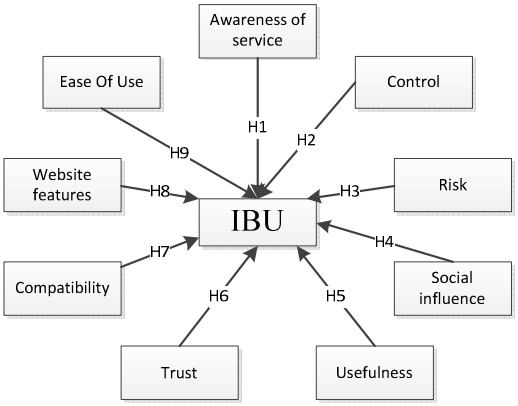

Figure 5. Proposed research model for internet banking usage

The following Hypotheses also were suggested to be researched in future studies.

- H1: Awareness of internet banking service has a positive effect on customer's use of internet banking.
- H2: Control in using of internet banking positively affects the customer's use of internet banking.
- H3: Risk has a negative effect on customer's use of internet banking.
- H4: Social influence has a positive effect on customer's use of internet banking.
- H5: Usefulness of internet banking positively affects the customer's use of internet banking.
- H6: trust has a positive effect on customer's use of internet banking.
- H7: Compatibility of internet banking with customer's values positively affects customer's use of internet banking.
- H8: Bank's website features have a positive effect on customer's use of internet banking.
- H9: Ease of use of internet banking positively affects the customer's use of internet banking.

V. DISCUSSION AND CONCLUSION

This section discusses contributions of this study, highlights the limitations in the internet banking acceptance and adoption literature, makes suggestions for future research, and finally presents the limitations of this study.

A. Contribution of this study

This study has summarized the findings of studies in the field of internet banking acceptance and adoption between years 2000-2012. Both researchers and practitioner can benefit from the result of this study, because it presents the state of the art and concern of internet banking users through a systematic review. Therefore, it could be a roadmap for both new and experienced researchers who want to become familiar with the field or want to conduct a novel research. On the other hand, this study proposed a novel research model which could be employed in future studies. This model was not directly adapted from a specific technology acceptance model and it planned to examine the relationships between nine research factors and internet banking use.

B. The limitation in the studies

Some studies did not present the results of reliability, validity, and data requirements tests. On the other hand, the statistical results of some studies were not adequate to insure the reliability of findings. In addition, 78.5% of studies investigated intention to use internet banking and ignored the actual use of internet banking. Additionally, there was a lack of longitude research which could provide information about continues use of internet banking. Furthermore, all of studies except one employed well-known technology adoption models instead of developing their own research models. As a result, some studies were only a replication of previous ones.

C. Suggestions for future works

Future studies can investigate factors which affect actual use of internet banking. They also could develop their unique research models for predicting Internet banking usage. The effects of some new factors such as personalization, alliance service and so on could be examined in internet banking usage as well. Moreover, Future studies could concentrate on generalizability of their findings by selecting a reasonable sample size.

D. Limitation of this study

This study did not provide any meta-analysis, because of the inconsistency of the reported results in the reviewed studies. Accordingly, we could only summarize the research factors and relationships among them in terms of number of the studies which used these factors. Additionally, this study only included journal articles which met the inclusion criteria for being involved in the study. Therefore, we might miss some precious studies in the field.

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APPENDIX 1 (RESEARCH FACTORS)

Perceived usefulness. Percieved ease of use, attitude, intention to use, social influence, awareness of service, self-efficacy, quality of internet connection, resistance to change, trust, security and privacy, perceived enjoyment, information on online banking, perceived risk, organizational reputation, customization/personalization, alliance service, task familiarity, accessibility, prior experience, volume of transaction, training, external pressure, relative advantages, compatibility, complexity, importance to bank needs, internet experience, triability, subjective norms, perceived technological support, perceived governmental support, perceived benefit, performance risk, social risk, legal risk, time risk, financial risk, security risk, perceived behavioral control, personal innovativeness, perceived manageability, accuracy, user friendliness, transaction speed, performance expectancy, effort expectancy, output quaility, perceived playfulness, website design, personality, perceived credibility, feature of website, personal performance, culture, external environment, utilitarian oriented internet banking sites and hedonism oriented internet banking sites.

Note: Please contact to authors for detailed information about relationships which extracted from reviewed studies.