The Predictors of Mobile Banking Usage: A Systematic Literature Review

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Abstract—**Mobile banking has become an essential method to conduct banking transaction. However, number of users worldwide are still limited. The purpose of this study is to review the literature and understand the status of m-banking adoption, usage, and loyalty. Keywords were used to search for related articles in three databases namely, Web of Science (WoS), Scopus, and Google scholar. Filtering process was conducted to select the most related articles. This has resulted in reviewing 45 articles. The findings showed that number of articles pertaining to m-banking is increasing. Malaysia and Indonesia have the largest number of articles. The technology acceptance model (TAM) is being used widely in the m-banking literature and most of the reviewed studies are empirical with adequate sample size. This explains the increased usage of structural equation model (SEM). The most critical factors for m-banking adoption, usage, and loyalty are service quality, trust, perceived usefulness, perceived ease of use, security, risk, privacy, and social influence. Future research is suggested to examine the m-banking in different region and using mediating and moderating variables to explain the variation in the adoption.**

Keywords—*M-banking; TAM; Service quality; Loyalty; UTAUT*

I. INTRODUCTION

Mobile banking is a new technology that enables the access and the execution of financial transaction using mobile device. This trend has been increasingly used by users around the world with varied percentage.

In developed countries, it was noted that three out of ten are using m-banking to settle their financial transaction. The percentage reduced in other non-developed countries. M-banking is beneficial for users and the banks as it reduces the physical effort of users and enable them to conduct their transactions without the need to visit banks or going through routines and paperwork. On the other hand, the m-banking speed the service process and reduce the workload of employees at banks and it also reduces the financial operational cost for banks. However, it has been observed that the use of m-banking by users is still limited and more studies are needed to understand the application and the adoption of users regarding the use of m-banking.

Previous studies with the opinion that the perceived usefulness (PU) and perceived ease of use (PEOU) are critical factors for the adoption [1, 2, 3]. On the other hand, the privacy, security, and trust were identified as the most important variables in the context of m-banking [4, 5, 6]. Other studies related the usage to the service quality [7, 8]. Literature regarding the critical factors that lead to the usage of m-banking has no agreement on the variables that can be deployed to enhance the utilization of m-banking. However, it has been observed that the use of m-banking by users is still limited and more studies are needed to understand the application and the adoption of users regarding the use of m-banking. Theoretical framework has been deployed by previous studies to enhance the explanatory power of the m-banking. One of the widely used theoretical models is the technology acceptance model (TAM) by Davis [9].

TAM is with the opinion that the adoption is mainly related to the perception of users regarding the PEOU and the PU of the technology. On the same context, one of the emerging models is the unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. [10]. UTAUT deployed four main variables and considered these variables as critical for the adoption of any new technology. These variables include the effort expectancy (EE), performance expectancy (PE), social influence (SI), and facilitating condition (FC). Other theoretical models are used also in the literature. These include the information system success (IS) success which relates the usage of a new technology to the quality of service, system, and information as well as the satisfaction of users.

There is no agreement in the literature regarding the predictors of m-banking or the theoretical model that explain the loyalty to use m-banking. Previous studies are in general empirical and there is a need for a review to understand the status of the literature. Accordingly, this study aims to review the literature and identify the most critical theories and predictors in the context of m-banking. The study also aims to provide the stakeholders with the research gaps and the directions of future works. Based on the fact that this study is a literature review study, the next section discusses the methodology of conducting the systematic literature review (SLR) followed by a summary of the reviewed studies. The findings are discussed as well as the limitation and direction of future work.

II. RESEARCH METHODOLOGY

This study is an SLR that aims to understand the status of the literature and identify the critical factors for adopting m-banking. To fulfil this objective, the study used specific keywords to look for articles. The keywords include m-banking, predictor of m-banking, m-banking usage, and theories of m-banking. Reliable databases were searched to extract the articles (Fig. 1). Web of Science (WoS), Scopus, and google scholar were used to find the articles.

A total of 399 articles were found related to the issue. However, to have an updated view, the articles between 2016 and 2021 were selected. This has reduced the articles to 187. Further filtering using the language i.e., English language or the scope i.e., theoretical article and remove technical articles. This has further reduced the articles to 76 articles. A full reading was conducted on these 76 articles, and this has resulted in 45 articles that are related to the m-banking adoption.
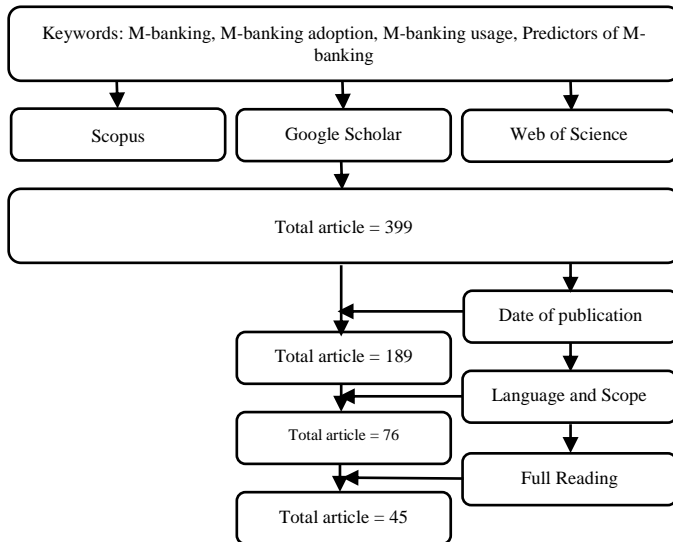

Fig. 1. Process of selecting the articles.

III. SUMMARY OF REVIEWED STUDIES

The reviewed studies can be divided into categories based on the theoretical framework. Previous studies deployed TAM. For example, Zhao, Chen and Wang deployed TAM to examine the satisfaction and loyalty of using M-banking [1]. The findings showed that social influence and the psychological ownership has greater effect than the variables of TAM. Similarly, the findings of Rubiah Abu Bakar indicated that variables such as security and privacy are more critical than the PEOU of m-banking [11]. Yuan et al. also deployed TAM to examine the effect of satisfaction and technology fit along with variables of TAM. The findings indicated that satisfaction, PU, task-technology fit, and risk positively associated with customer' loyalty [2]. Moreover, the results showed that confirmation, PEOU, and task-technology fit positively impact PU.

Yun Min Low deployed TAM to examine the loyalty of using m-banking. The findings showed that subjective norms, PEOU and convenience risk are critical factors for the usage of loyalty [12]. Liébana-Cabanillas et al. found that customer loyalty has been significantly influenced by satisfaction [13]. Munoz-Leiva et al. and found that TAM can explain the intention to use the M-banking [14]. Abdinoor and Mbamba found that the TAM model integrated with cost and awareness are useful in explaining the intention to use M-banking [15]. Aliza Kasim found that variables of TAM and facilitating conditions are positively influencing the customer intention to use M-banking [16]. Priya, Gandhi et al. utilized TAM and found that customer's behavioural intention and satisfaction in

using the service are significantly influencing by PU, PEOU, perceived credibility, and structural assurance [17]. Moreover, the positive mediating effect of customer satisfaction has confirmed on the relationship among the related factors and behavioural intention. Meanwhile, the effect of perceived risk on behavioural intention to use the service has been reported to have insignificant effect.

Mostafa and Eneizan indicated that facilitating conditions and self-efficacy are positively affecting on PEOU and PU factors. Furthermore, the results have indicated a positive impact of PEOU and PU on costumer's behavioural intentions to accept and use M-banking technology [18]. Nawaz and Yamin utilized TAM and found that PEOU and PU have a direct positive impact on the behavioral intention to use the service. Trust found to have a positive impact on customer behavioral intention to use m-banking [19]. Mutahar proposed perceived value as a moderator in among the variables of TAM [20]. Ezeh and Nwankwo utilized TAM and found that PEOU, financial cost and perceived credibility have significant effect on intention to use m-banking [21]. Malaquias and Hwang also found that PEOU and PU as well as trust and social influence affect the actual use of m-banking [22]. Mulia et al. added the customer intimacy as a variable and deployed TAM to examine the user satisfaction and loyalty of using m-banking. The findings showed that Customer intimacy affected the directly the customer satisfaction and the loyalty [23].

Another theoretical framework that has been used by the reviewed studies is the unified theory of acceptance and use of technology (UTAUT). De Sena Abrahão et al. deployed UTATU and included variables such as cost and risk to examine the behavioural intention to use m-banking [24]. The findings showed that large portion of the variation can be explained by UTAUT. Maduku found that variables of UTAUT as well as self-efficacy and structural awareness affected positively the behavioural intention to use m-banking [25]. Zendehdel, Paim et al. found that PE, EE, cost and trust are significantly affecting the customer intention to use M-banking [26]. Singh and Srivastava found that trust, security, privacy, and social influence affected the intention to use M-banking [27]. Baabdullah, Alalwan et al. found that UTAUT variables can explain the loyalty to use M-banking applications [28].

The third theoretical model that has been used is the IS success. This model was deployed to emphasize on the service, system, and information quality. For instance, Mohd Thas Thanker, Amin et al. deployed the model to explain the loyalty of using m-banking. The findings showed that usability, customer service, satisfaction and trust in m-banking service influencing the continuance intention or loyalty toward using m-banking service. In addition, continuance usage or loyalty is positively affected by trust and customer satisfaction mediator factors [29]. Sharma and Sharma uses the model also to explain the actual use of m-banking. The study found that satisfaction and intention to use are significantly influenced by the service quality and trust which leads to influencing the actual usage of the service [30]. Expressly, a more trustable service with better quality will help in keep the current customer using the service and attract a new wave of users to join the system. Service quality theory has been used also in the literature of M-

banking. For example, Suariedewi and Suprapti deployed the theory to explain the e-loyalty of m-banking [8]. Similarly, Zhou et al. used the theory to explain the m-banking service quality and loyalty [7].

Mixed theories were used in few numbers of previous studies. Kumar, Israel et al. combined ECT and SDT to explain the continuous of usage and loyalty to m-banking. The findings showed that the continuance intention to use m-banking is influencing by the following factors: satisfaction, intrinsic regulation and identified regulations, while influenced by expectation-confirmation, trust, and quality factors effect stingingly in the customer satisfaction [31]. UTAUT and IS success theories were combined in the study of Windasari and Albashrawi and the findings based on gender suggested that service quality affected PE and EE of male but not female. Information quality affected the facilitating condition of male but not female. PE, EE, and FC affected the loyalty. Service quality affected satisfaction of female and satisfaction affected the loyalty [32]. Symbolic value theory and brand equity theory were combined in the study of Esmaeili et al., the findings showed that usability affected trust and satisfaction. Perceived risk affected loyalty and relative advantage affected customer loyalty [33].

Large number of the reviewed studies did not deploy any theory, and this can be seen in the different studies [34, 35, 36, 37, 38, 4, 39, 40, 5, 6, 41, 42, 43]. Most of these studies focus on the security, privacy, and risk of using m-banking. Table I shows a summary of the reviewed articles which include the author, years, country, sample, and theory.

TABLE I.   SUMMARY OF REVIEWED STUDIES

Author/ Year	Country	Sample	Subhead
(Zhao, Chen, & Wang, 2016) [1]	Taiwan	791 users	TAM
(Susanto et al., 2016) [34]	South Korea	201	ECT
(Yuan et al., 2016) [2]	China	434	TAM
(de Sena Abrahão et al., 2016) [24]	Brazil	605	UTAUT
(Rubiah Abu Bakar 2017) [11]	Malaysia	150	TAM
(Shuhidan, Hamidi et al. 2017) [35]	Malaysia	384	-
(Yun Min Low 2017) [12]	Malaysia	261	TAM
(Liébana-Cabanillas et al. 2017) [13]	Chile	218	TAM
(Munoz-Leiva, Climent-Climent et al. 2017) [14]	Spain	218	TAM
(Chiu, Bool et al. 2017) [36]	Philippines	314	-
(Abdinoor and Mbamba 2017) [15]	Tanzania	200	TAM
(Aliza Kasim 2017) [16]	Malaysia	359	TAM
(Maduku 2017) [25]	South Africa	401	UTAUT
(Alalwan et al., 2017) [44]	Jordan	343	UTAUT2
(Kumar, Israel et al. 2018) [31]	India	744	ECT, SDT
(Masrek, Halim et al. 2018) [37]	Malaysia	365	-

Author/ Year	Country	Sample	Subhead
(Jamshidi, Keshavarz et al. 2018) [38]	Iran	927	-
(Zendehdel, Paim et al. 2018) [26]	Malaysia	400	UTAUT
(Singh and Srivastava 2018) [27]	India	875	UTAUT2
(Priya, Gandhi et al. 2018) [17]	India	269	TAM
(Khasawneh, Hujran et al. 2018) [4]	Jordan	404	-
(Mohd Thas Thaker, Amin et al. 2018) [29]	Malaysia	250	D&M IS
(Mostafa and Eneizan 2018) [18]	Libya	261	TAM
(Wichittakul and Prasongsukarn 2018) [39]	Thailand	336	-
(Nawaz and Yamin 2018) [19]	Sri Lankan	695	TAM
(Ahmed M. Mutahar 2018) [45]	Yemen	Review	TAM
(Johannes, Indarini et al. 2018) [40]	Indonesia	200	-
(Ezeh and Nwankwo 2018) [21]	Nigeria	200	TAM
(Khan, Lima et al. 2018) [5]	Bangladesh	240	-
(Baabdullah, Alalwan et al. 2019) [28]	Saudi Arabia	429	UTAUT2
(Sharma and Sharma 2019) [30]	Oman	227	D&M IS
(Malaquias and Hwang 2019) [22]	Brazil and USA	375	TAM
(Windasari & Albashrawi, 2020) [32]	US	516	UTAUT and IS success
(Purwanto et al., 2020) [6]	Indonesia	395	-
(Mulia et al., 2020) [23]	Global	300	TAM
(Tumewah et al., 2020) [41]	Indonesia	505	NIL
(Suariedewi & Suprapti, 2020) [8]	Indonesia	120	Service quality
(Khan et al., 2021) [42]	Bangladesh	362	Nil
(Esmaeili et al., 2021) [33]	Iran	411	Symbolic value theory Brand equity theory
(Zhou et al., 2021) [7]	China	224	Service quality
(Parera & Susanti, 2021) [43]	Indonesia	105	Nil

IV. FINDINGS

The findings of this study are derived using frequency analysis. The analysis was contacted after extracting the information of the articles. The analysis is conducted using excel sheet and it includes the year of publication, country, theoretical framework, approach, sample size, and data analysis technique. More importantly, the analysis included the most critical factors for m-banking.

A. Year of Publications

The year of publication is given in Fig. 2. It shows that the number of articles has increased between 2016 and 2018 and

this could be due to the notion that the application of m-banking has increased during this period. Number of articles reduced between 2019 and 2022 and this could be due to the searching criteria for articles in this period (see Fig. 2).
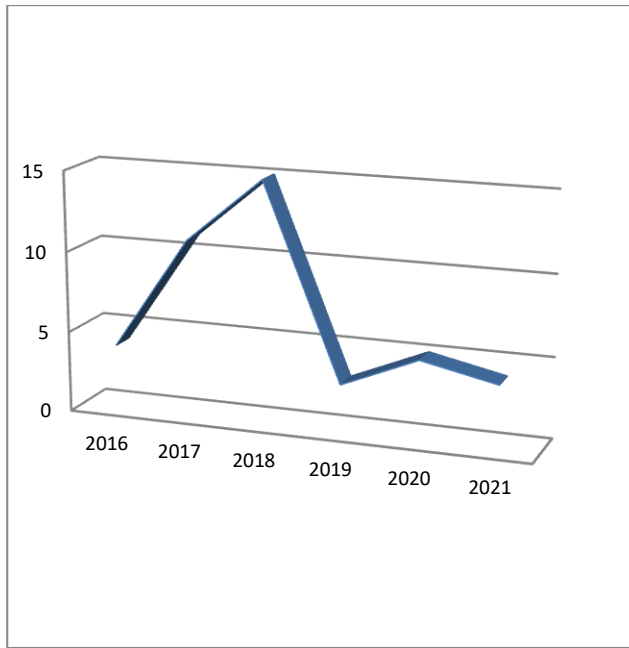

Fig. 2. Year of publications.

B. Country of Origin

The country of origin is where the research has been conducted. It can be seen that the number of articles in Malaysia is the highest followed by Indonesia, India, and Bangladesh. This could be also due to the wide spread of M-banking by banks in the Asian region. Fig. 3 shows the distribution of articles based on country of origin.
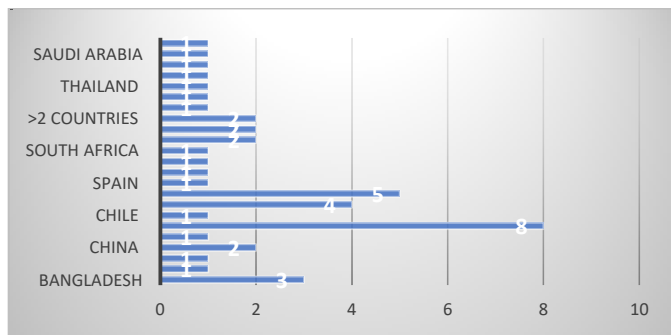

Fig. 3. Country of origin.

C. Sample Size

The sample size of the reviewed studies is shown in Fig. 4. The minimum sample size has been used in the reviewed studies account to 105 and the maximum is 927 with mean score of 373. This means that on average, there are 373 respondents in the reviewed studies. This average indicates that there is a shift in the analytical approach. Fig. 5 shows the sample size.
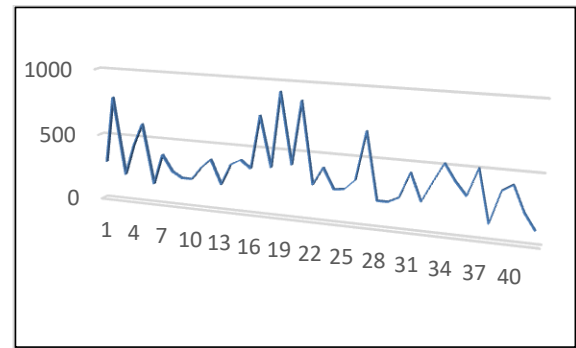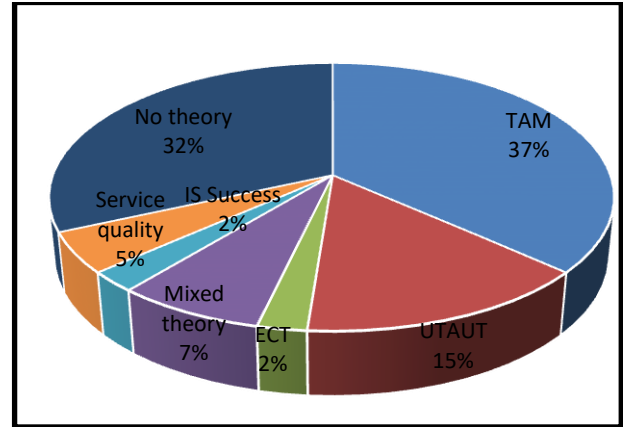

Fig. 4. Sample size.

Fig. 5. Theoretical framework.

D. Study Approach

The study approach is shown in Fig. 6. It can be seen that there are 98% of empirical studies while review studies accounted to 2%. This shows that the literature is empirical in nature and limited numbers of review studies were conducted.

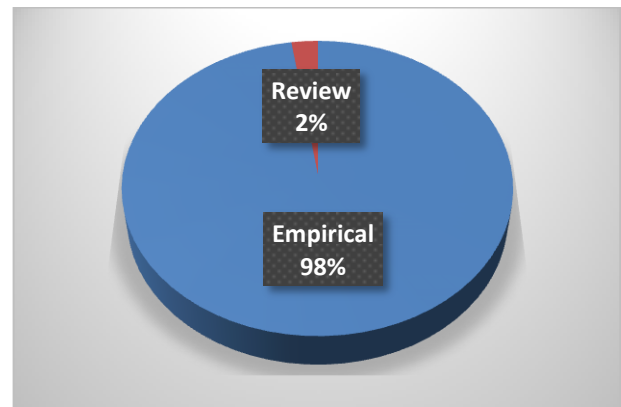Fig. 6. Theoretical framework.

E. Statistical Tools

The statistical tools that have been used by the reviewed studies to analyses and explain the findings are shown in Fig. 7. It can be seen the SPSS has been used by 41% of the reviewed studies followed by PLS with 32%, AMOS with 20% and LISREL with 7%. The first generation of data analysis represented by SPSS accounted to 41% while the second

generation known as structural equation modelling (SEM) and includes LISREL, AMOS, and PLS accounted to 59%. This confirms that there is a shift toward using advance analytical tools to examine the association among the variables. Again, this is also confirmed from the mean of sample size which is 373. This is because the use of SEM requires a minimum of sample size of 200.
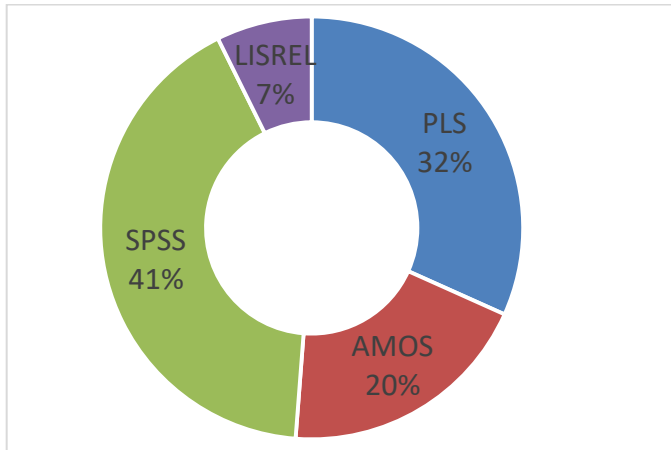

Fig. 7.   Analytical techniques.

F. Critical Factors

Factors of the 45 articles were extracted and a frequency analysis was conducted to identify the most related articles. The findings showed that service quality is one of the most critical factors for user satisfaction and loyalty to use m-banking. This followed by trust, PU, PEOU, security, and perceived risk as well as privacy, and social influence. These variables have been identified by prior literature to be critical for the behavioral and actual behavior toward using the m-banking by customers in various countries as shown in Fig. 8.
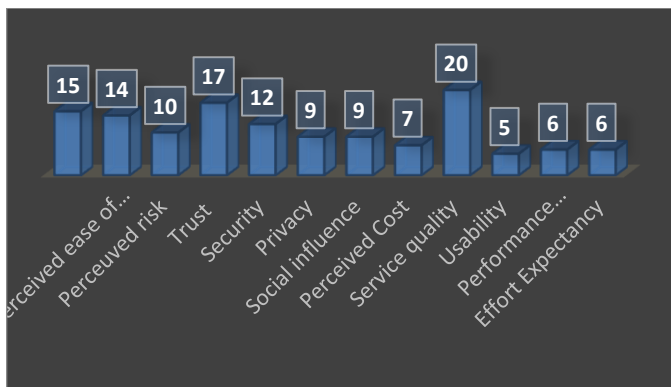

Fig. 8.   Critical factors for m-banking.

V.   DISCUSSION AND IMPLICATIONS

This study was conducted to review the literature pertaining to the m-banking usage and adoption by users. The study also aimed to identify the gaps and the direction of future work as well as the predictors of using the m-banking. The finding showed that the number of articles published is increasing and this is a signal that the awareness about m-banking is also increasing. The country of origin shows that Malaysia is a leading country in m-banking studies followed by Indonesia.

This could be due to the lifestyle of the people in these countries as online banking has become the norm and the preferred method of settling the financial transaction. In term of the theoretical model, the literature showed that TAM is still dominating the research of m-banking followed by to a less degree with UTAUT. Emerging theories such as IS success is used by limited number of studies. The quantitative approach is used widely by the literature and sample size is adequate for the analyses of the studies. In addition, the use of SEM is increasing in the literature.

In terms of the predictors, the service quality is the most important predictor of m-banking loyalty, adoption, and usage. This is followed by trust and the variable of TAM such as PEOU and PU. Security, perceived risk and privacy as well as social influence are also critical for the usage of m-banking. This finding is in line with the findings of previous literature who found that the service quality and trust as well as security and privacy along with the variables of TAM are critical for the m-banking usage [1, 2, 12, 8, 45].

Accordingly, this study suggested that these factors can represent the predictors of users of m-banking across various countries and region. In addition, the study suggests that TAM is one of the most used theoretical frameworks. Therefore, decision makers are suggested to focus on the service provided by the m-banking application. Creating trust between the banks and the customers is essential for enhancing the intention to use the application. In addition, the security procedures is vital for the increase adoption of m-banking. The PU and the ease of using the application can be important variables for the adoption of m-banking.

VI.   CONCLUSION, LIMITATION, AND FUTURE WORK

This study has been conducted to describe the literature about the m-banking adoption and to understand the predictors and theoretical foundation of the literature. The findings showed that there is an increase in the awareness and academic research into m-banking. The finding also showed that countries such as Malaysia, Indonesia, and India have received largest number of research into m-banking. TAM is still the dominating theoretical framework followed by UTAUT with empirical approach is overwhelming in the literature. The sample size is sufficient and larger than 200 responses which indicate that there is a shift toward using SEM which requires more than 200 responses. More importantly, the findings showed that service quality is the most important and widely frequent variable in the literature followed by trust, PU, PEOU, security, risk, social influence, and privacy.

The study reviewed 45 articles extracted from Scopus, Woos, and Google scholar. The number of articles is limited due to the searching criteria, scope, and year of publication. Future studies can expand the scope, year of publication to increase the number of the reviewed article and the generalization of the findings. The findings showed that there is limited number of review studies and therefore, it is suggested for more studies to review the literature of m-banking. In term of the year of publication, number of articles between 2019 and 2021 has decreased and researchers are suggested to conduct more studies and especially in the time of COVID-19 where the online banking has become essential for

all individual and organization to finalize their financial transaction. Research into m-banking is high in Asian countries such as Malaysia and Indonesia. However, few studies observed in other countries. Thus, more studies are suggested in other countries and region such as the Middle East, and Africa to have clearer view about the m-banking worldwide.

In term of theoretical framework, the TAM is widely used followed by UTAUT. However, mixed theories or combined theories have been used by a few numbers of studies. Therefore, it is suggested that the future research should include the more theories such as the TAM and social exchange theory or TAM and IS success, UTAUT and IS success and these theories can explain more the aviator in technology adoption such as m-banking. It was also noted that few of the previous studies have deployed mediator or moderator. Thus, future studies can incorporate moderating variables such as trust, innovativeness, education, gender, and IT knowledge. Mediating variables can be the enjoyment and playfulness of m-banking.

The critical variables identified in this study include service quality, trust, PU, PEOU, risk, security, social influence, and privacy. Future researcher can examine empirically the effect of these variables on the m-banking adoption to provide the decision makers with empirical view that can lead to more usage of m-banking.

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