

RESHAPING BANKING: THE USE OF CHATBOTS FOR CUSTOMER SERVICES

Nurul Afidah Mohamad Yusof¹
Anthonysamy, Lilian^{2*}
Wan Rozima Mior Ahmed Shahimi³
Tun-Pin, Chong⁴
Kogilavani Apadore⁵

¹Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR), Kampar, Malaysia,
(E-mail: afidahj@utar.edu.my)

²Faculty of Management, Multimedia University, Cyberjaya, Malaysia,
(Email: lilian.anthonysamy@mmu.edu.my)

³Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR), Kampar, Malaysia,
(E-mail: rozima@utar.edu.my)

⁴Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR), Kampar, Malaysia,
(E-mail: chongtp@utar.edu.my)

⁵Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR), Kampar, Malaysia,
(E-mail: kogilavani@utar.edu.my)

* Corresponding author

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Abstract: *The use of digital technology in the banking sector has been crucial now more than ever. To achieve competitive advantage, banks have been fast to adopt digital strategies to transform their customer experience. The objective of this study is to examine the factors influencing bank customers' intention to use chatbot for their banking customer service solution. This study extended the use of UTAUT by analysing the antecedents to its four main elements based on the stages of the launch of new technology products. By using questionnaires, data from 136 respondents were collected and analysed using structural equation modelling (SEM). Findings revealed that the four stages of new technology launch (market preparation, targeting, positioning execution) are significant antecedents to the UTAUT variables in examining the factors influencing the intention to use chatbot for banking customer service. In addition, the results indicated that performance expectancy, effort expectancy, and social influence have a significant influence on behavioural intention. Therefore, banks should carefully consider all these factors during the development of chatbot system for their customer service solutions.*

Keywords: *Chatbot, Technology, Banking, Customer Service, UTAUT*

Introduction

The use of digital technology in the banking sector has been crucial now more than ever. To achieve competitive advantage, banks have been fast to adopt digital strategies to transform their customer experience. Intensive technological innovations are being adapted in services, products, and interaction channels. Parallel with the rampant development in digital technology, its adoption could be the leverage for banking industry to achieve efficiency in its operation. With the advancement of artificial intelligence (AI) and natural language programming (NLP), the application of chatbot presents significant opportunity for the banking industry to improve especially in the customer service segment.

Chatbot, or also known as conversational agent, is an artificial intelligence (AI) based computer programme which could conduct human-like interactions on various platforms such as messaging applications, mobile applications, websites, or telephone. This technology has been gaining traction in customer service, mainly due to its ability to understand user requests and subsequently provide prompt answers (van der Goot & Pilgrim, 2020). Chatbot is still considered as an emerging technology in banking customer service. Banking, as a sector that is characterised by rich and sensitive data, may have to deal with the challenge to ensure safe end-to-end data processing of customer data and privacy in adopting Chatbot for the customer service (Cardona et al., 2021). Nevertheless, the adoption of chatbot is believed to help overcome various issues currently faced by the customer service department. For instance, it could automate repetitive tasks, responding to general and simpler customer queries. This would help to reduce the traffic of the inbound voice-calls in contact centres, as well as the email and social media inquiries. For more complex inquiries, chatbot could serve as the transition to live chats with customer service personnel. Relevant customer information could be obtained from the chatbot interactions and further passed to the customer service personnel for faster resolution, and hence lower cost per query. The use of chatbot will also made the customer support available and accessible 24/7. Banks may also place the chatbot in various existing messaging platforms which are extensively used by the customers nowadays. With this, customers would find it more convenient to seek assistance from the banks. Furthermore, it also allows the banks to manage thousands of queries simultaneously.

Given the development of technology and internet connectivity, banks have transformed from traditional physical interaction or call with customer into apps and websites. It is undeniable that with the Covid-19 pandemic and various social restrictions, the use of apps and website is gaining its traction. However, the perception of consumers in using integrated financial services such as chatbot technology are often left unchecked and not clearly defined. In order to design comprehensive chatbot services, banks must understand consumer expectation and needs for this technology.

In light of the above discussion, the objective of this study is to examine the factors influencing bank customers' intention to use chatbot for their banking customer service solution. The findings from this study could further provide an insight to the banks on important aspects that need to be taken into account in integrating chatbots as part of their customer services. This would allow the banks to devise appropriate strategies to enhance effectiveness and efficiency of their customer service.

Literature Review

Underlying Theories

This study is developed mainly based on the unified theory of acceptance and use of technology (UTAUT) which was introduced by Venkatesh et al. (2003). This theory has been prominently used in studies relating to the adoption of various technologies such as e-commerce, RFID, mobile banking, and insurance (Cordona et al., 2021). Following Chan et al. (2010), this study also extended the use of UTAUT by analysing the antecedents to its four main elements based on the stages of the launch of new technology products. As proposed by Easingwood et al. (2006), the four critical stages in new technology launch are market preparation, targeting, positioning, and execution. Each of these stages is represented by its respective variables. First, awareness is measured to represent the market preparation stage. Next, two variables are used to measure the targeting stage i.e., compatibility, and self-efficacy. In the third stage, positioning, the variables used are flexibility, and avoidance of personal interaction. Finally, in the execution stage, the three variables used are trust, convenience, and assistance. Figure 1 presents the research conceptual framework of this study. By integrating the antecedents into the conceptual framework, it is believed to result in better prediction of acceptance and use of technology. With technology currently being the pillar of service industry, a holistic understanding of the customer behaviour will provide valuable insights into the banking industry in devising its strategic plan.

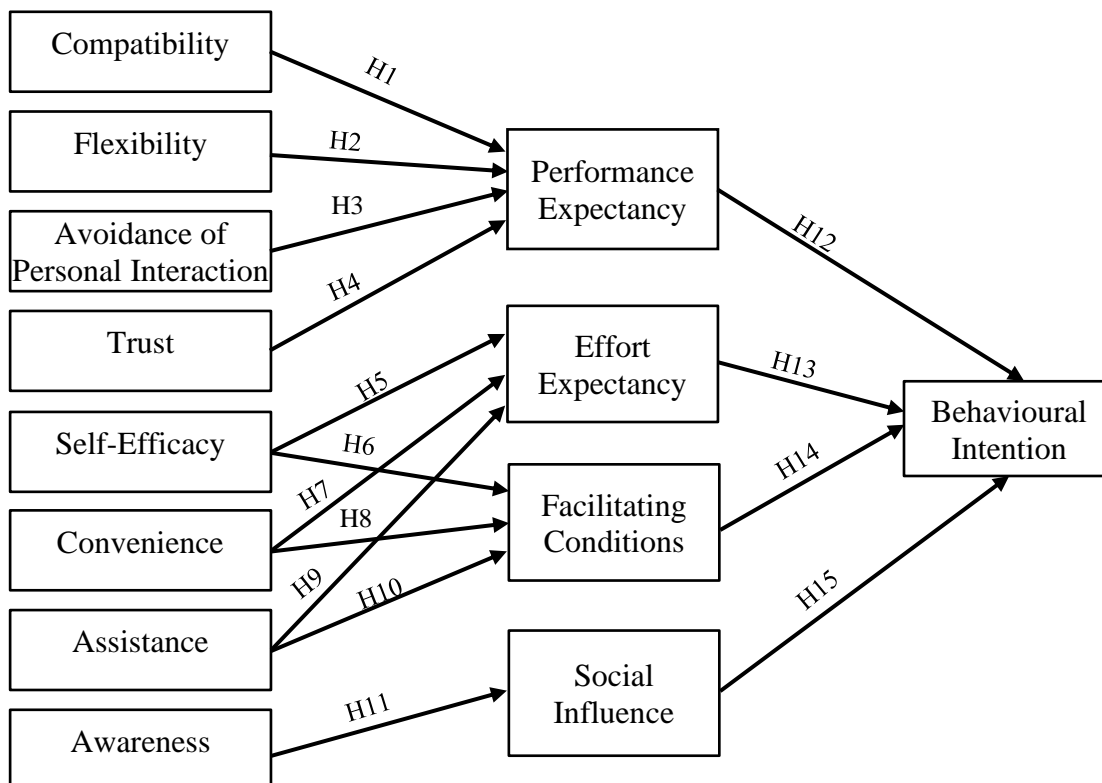


Figure 1: Research Conceptual Framework

Review of Variables

Compatibility and Performance Expectancy

Chan et al. (2010) define compatibility as the degree to which the technology is compatible to user lifestyle, values, and needs. Ultimately, the chatbot technology is designed to ease the process of addressing consumer needs effectively. The novelty of chatbot communication has raised a concern particularly with those who had human-human communication experience (Fryer, Nakao, & Thompson, 2019). They found that chatbot has limited usefulness in language learning performance. This is supported by Park, Lee, and Song (2020) who claimed that the level of chatbot communication reduces human subjective view and only provides objective answers. However, Fryer, Nakao, and Thompson (2019) claimed that chatbot play a key role in supportive function and providing self-exploratory opportunities in financial services. This is rather different than consumer could get from human interaction. Thus, chatbot technology could act as another technological value-added mechanism to financial services performance expectancy. In personal healthcare management study, the chatbot interaction was viewed positively and perceived as humanlike (Griffin et al., 2021). The consistency, functionality and compatibility of chatbot application provides a greater consumer expectation toward its performance and outcome. They suggested that the compatibility of chatbot application with consumer portal or apps would provide positive value. Thus, this study hypothesised that:

H1a: Compatibility has a significant influence on performance expectancy toward chatbot technology

Flexibility and Performance Expectancy

Flexibility is the degree of customisation of technology to cater to the changing services, condition and needs (Chan et al., 2010). Flexibility is considered as one of the vital factors for technology integration and adoption. Constant changing of consumer's needs, financial services and technology has demand a highly flexible and sophisticated chatbot technology. As such, the flexibility of chatbot technology is important to cater for extended functionality and needs, and enhance performance expectancy. There is an increasing trend for 24/7 accessibility to financial services. The advantages of chatbot application in financial service is to get products and information swiftly, easily, and anytime at consumers' discretion (Cardona et al., 2019). Folstad and Halvorsrud (2020) posited that chatbot should be easily accessible and possess relevance in proactive communication in order to enhance efficiency in service offering. Thus, this study hypothesised that:

H2a: Flexibility has a significant influence on performance expectancy toward chatbot technology

Avoidance of Personal Interaction and Performance Expectancy

The integration of chatbot technology in banking services will bring a greater height in banking experience. It is not a mechanism to replace human, but more of assistance to provide additional services. The chatbot functions supports 'do-it-yourself' (DIY) concept. For instance, consumers initiate, acquire, and clarify information themselves without human interaction such as information checking, clarification, and updates. Generally, people prefer DIY than personal contact because of time savings, and more controlling (Meuter, Ostrom, Roundtree, & Bitner, 2000). Furthermore, the movement control order (MCO) implementation has restricted visitation and physical interaction. This has turned people to chatbot platform to address their needs. Such opportunities help in overcoming stigma of Covid-19 infection and reducing

customer difficulties and inefficiency in physical visit to access to information. Indeed, the implementation of social distancing has hindered consumer to have personal interaction which is commonly viewed as unpleasant experience. Anthropomorphism theory suggested that anthropomorphism indicates a positive effect on intention to use (Duffy, 2003). This is also supported by Blut, Wang, Wunderlich, and Brock (2021) which exerts that ‘humanness’ perception helps in guiding social interaction and performance expectations of human-chatbot interaction. Chatbot technology uses artificial intelligence, machine learning, big data and internet of things. Most of the financial services are information intensive. Given the accessibility to information, chatbot technology could perform ‘emotional handshake’ which helps in understanding and managing consumer behaviour and needs. Thus, this study hypothesised that:

H3a: Avoidance of personal interaction has a significant influence on performance expectancy toward chatbot technology

Trust and Performance Expectancy

Trust is defined as the belief and expectation of the concerned parties in an exchange relationship without exploiting its vulnerability (Chan et al, 2010; Eren, 2021). Trust also refers to one’s willingness to be submissive to a counterpart in believing that the party is benevolent, reliability, competent, honest and open (Forsyth, Barnes, & Adams, 2006). There are two types of trust in chatbot namely trust in the service provider to protect customer details (soft trust) and trust in the platform and infrastructure (hard trust) (Latheren & Dootson, 2017). They claimed that both types of trust are critical in banking with chatbot services. User trust provides a positive outlook toward the performance expectancy and adoption of new e-services (Cardona et al., 2021). In an empirical finding, Cardona et al. (2019) articulated that consumer will have low level of trust if chatbot technology is unable to process decision without the presence of human. Should the chatbot technology is not matured to process complicated decisions, it will affect the productivity and performance of chatbot application (Forsyth et al., 2006). In financial service context, consumers are expected to benefit from using chatbot application. If chatbot technology failed to secure consumers’ trust in what it promised, it will hinder the utilization of this application. Thus, this study hypothesised that:

H4a: Trust has a significant influence on performance expectancy toward chatbot technology

Self-efficacy, Effort Expectancy and Facilitating Conditions

According to Chan et al. (2010), self-efficacy was a significant determinant of effort expectancy for e-government technology and services in Hong Kong. In e-health perspective, Van-Houwelingen et al. (2018) used mixed-method approach and also found self-efficacy significantly impacted senior people’s effort expectancy of technology in the Netherlands, which in turn impacted their intention to use videoconferencing in health services. A positive relationship was found between self-efficacy and effort expectations by Sung et al. (2015) and Macdonald et al. (2019) which in turn influence mobile learning behavioural intentions in university students in South Korea and Australian diabetics in using smart insole technology, respectively. Balkaya and Akkucuk (2021) proved a powerful significant positive relationship between self-efficacy and effort expectancy in influencing teachers’ use intentions to adopt a learning management system (LMS). In addition, Macdonald et al. (2019) added while effort expectancy was important domain in the multivariate analysis, it was not individually associated with behavioural intention due to correlation with self-efficacy. It was supported by Balkaya and Akkucuk (2021) that the influence of effort expectancy on intention was found to

be insignificant when measured alone. Many authors indicated that self-efficacy was an indirect antecedent of behavioural intention that was captured by effort expectancy and fully mediated by effort expectancy (Samaradiwakara & Gunawardena, 2014; Venkatesh et al., 2003).

In a study conducted by Kumi et al. (2012), a positive and significant relationship was noted between self-efficacy and facilitating conditions for high school students in the use of iPads for classroom. The authors suggested a strong relationship exists between facilitating conditions, self-efficacy, and behavioural intention to use the equipment. Thus, this study hypothesised that:

H5a: Self-efficacy has a significant influence on effort expectancy toward chatbot technology
H6a: Self-efficacy has a significant influence on facilitating conditions toward chatbot technology

Convenience, Effort Expectancy and Facilitating Conditions

Chan et al. (2010) found that convenience was a significant determinant of effort expectancy and facilitating conditions in the use of mandatory e-government technology in Hong Kong. In the context of India, Sareen and Jain (2014) showed that the expected convenience to be significantly influencing the effort expectancy of online shopping customers and the intention to purchase online was greatly influenced by the convenience offered by the website. Meanwhile, Rey-Moreno and Medina-Molina (2016) found convenience had a significant influence on effort expectancy in the university's e-learning platform. In Cambodia, Hung et al. (2019) found out perceived transaction convenience was significantly having a direct impact on effort expectancy and on behaviour intention towards m-payment offered by the financial institutions. This is in line with Purwanto and Loisa (2020) who stated that the use of banking technology is easier for customers because it saves time and provides convenience in any situation of customers. In addition, Rey-Moreno and Medina-Molina (2016) revealed that convenience had a significant influence on facilitating conditions in the university's e-learning platform. Thus, this study hypothesised that:

H7a: Convenience has a significant influence on effort expectancy toward chatbot technology
H8a: Convenience has a significant influence on facilitating conditions toward chatbot technology

Assistance, Effort Expectancy and Facilitating Conditions

Chan et al. (2010) showed that assistance had a significant positive influence on effort expectancy in the adoption of e-government technology and services in Hong Kong. A similar construct as Chan et al. (2010) in Spain, Rey-Moreno and Medina-Molina (2016) found the same conclusion between the two variables. Using semi-structured interview and analytical sessions, Mokmin and Ibrahim (2021) evaluated chatbots as a tool for health literacy education among Malaysian undergraduate university students via mobile devices. For effort expectancy construct, respondents agreed that chatbot is easy to enhance their learning on health because it provides good conversation. In addition, a large number of respondents stated that they were able to use chatbots without assistance or guidance.

Lewis et al. (2013) argued that individuals typically seek assistance when they are trying to use new technology. Individuals may not be interested in adopting new technology when facilitating conditions are insufficient and absence of support in encouraging them to adopt it (Venkatesh et al., 2011). Chan et al. (2010) investigated the e-government services and found

assistance was significant determinant of facilitating conditions which in turn were significant determinants on citizens' satisfaction with e-government technology through the core technology adoption beliefs. In Spain, Rey-Moreno and Medina-Molina (2016) drew a same conclusion as Chan et al. (2010) to note that assistance had a significant influence on facilitating condition. Users find that the use of technology is much easier if more assistance is given and deliberate assistance as an imperative resource that facilitates the utilization of a technology (Barua et al., 2001; Chan et al., 2010). Thus, this study hypothesised that:

H9a: Assistance has a significant influence on effort expectancy toward chatbot technology

H10a: Assistance has a significant influence on facilitating conditions toward chatbot technology

Awareness and Social Influence

Awareness can be explained as the extent to which the public is aware of the introduction of a product. Abdulquadri, Mogaji, Kieu and Nguyen (2021) has discussed in their studies that it is important to raise the awareness of values of the digital transformation technology to the customers by educating them about the function of a chatbot so that financial inclusion can be enhanced. From the survey done by Cardona et al. (2019), only 51% of the respondents were aware and familiar with chatbot technology. They have further explained that most of the survey's respondents would prefer to use chatbots via official media such as insurance service providers. Chan et al. (2010) claimed that using public service announcements via different media can create users' awareness about the introduction of certain technology. Their research outcomes also proved that awareness is a significant determinant of social influence. Moreover, Richad et al. (2019) concluded that various experiences developed from using chatbots by individuals could end up leading the individuals to prioritise using or recommending them to others. In short, if customers are aware of chatbots, there is a high chance that individuals will create social influence to others towards using a chatbot in the banking industry. Thus, this study hypothesised that:

H11a: Awareness has a significant influence on social influence toward chatbot technology

Performance Expectancy and Behavioural Intention

It is noteworthy that the term performance expectancy in UTAUT is similar to the term perceived usefulness that is used in the Technology Acceptance Model (TAM). According to Venkatesh et al. (2003), performance expectancy can be defined as the perception of the users for certain technology on whether or not it enables or helps the users to perform certain tasks. In other words, users are more likely to use the technology if they think it can efficiently help them to perform their jobs or tasks. What a customer needed is only an accurate and quick response. By providing a feeling of informativeness and usefulness to the users (Nguyen et al., 2020), the chatbot can anytime become a close e-assistant with a humanlike sensibility to everyone soon. Richad, Vivensius, SfenRianto and Kaburuan (2019) investigated the factors that could affect users' acceptance of chatbots in the banking industry, concluding that perceived usefulness was shown to positively and significantly affect users' attitude towards chatbots and their behavioural intention. The findings from Medina-Molina, Rey-Moreno, Cazorro-Barahona and Parrondo (2019) revealed that performance expectancy is significantly correlated to the intention of use of mobile banking apps. In addition, there are few past studies on the adoption of i-banking proving that perceived usefulness will positively impact the intention to use the technology (Alalwan, Dwivedi, Rana & Algharabat, 2018; Martins, Oliveira & Popovic, 2014). Williams, Rana and Dwivedi (2015) studied a total of 174 existing articles

that used the UTAUT model and found out that the best predictor category is performance expectancy and behavioural intention. Outcomes from a study done by Cardona et al. (2021) has also indicated that the effect of performance expectancy on intention to use is prominent. Similar to previous studies, Alt, Vizeli and Saplacan (2021) revealed that performance expectancy is important in the adoption of chatbot technology in the banking sector. Last but not least, Rahman, Ming Baigh and Sarker (2021) who investigated the importance and challenges in adopting AI in the banking industry in Malaysia proved in their studies that perceived usefulness will significantly influence users using AI in banking services. Thus, this study hypothesised that:

H12a: Performance expectancy has a significant influence on customers' intention to use chatbot for banking customer services

Effort Expectancy and Behavioural Intention

Effort expectancy, as mentioned by Venkatesh et al. (2003), is the level of convenience or ease of use experienced by users when using a particular technology. They mentioned that effort expectancy could affect user acceptance of a new technology, which in this case is the chatbot. Gupta and Sharma (2019) analysed users' attitudes towards chatbots in the banking industry and found out that ease of use is strongly and positively related to the attitude of customers towards chatbot usage. Similarly, Martins et al. (2014) and Alalwan et al. (2018) have also observed that effort expectancy could positively affect the users' intention to use the studied technology. Besides, Richad et al. (2019) have proved that effort expectancy has positively influenced users' attitudes towards using chatbots and behavioural intention. Similar results were found in Mansur et al. (2019) which indicated effort expectancy was significant to Indonesian consumer intention behaviour on e-commerce technology. These studies' results led this study to predict that if the operation of chatbot is clear, simple, easy to learn and understand, it will potentially impact users' intention towards the use of chatbot. However, in contrast, the results obtained by Alt et al. (2021) and Rahman et al. (2021) showed that ease of use is not correlated with intention to use. Garg (2021) also found out that there is a negative relationship between effort expectancy and customers' behavioural intention. Cardona et al. (2021) emphasised that effort expectancy has no significant relationship with customers' intention to use a chatbot in the insurance sector as they explained that even if chatbot is user-friendly but the outcome does not match with what is expected, users will not be intended to use it. Thus, this study hypothesised that:

H13a: Effort expectancy has a significant influence on customers' intention to use chatbot for banking customer services

Facilitating Conditions and Behavioural Intention

Venkatesh et al. (2003) explained facilitating conditions as the availability of necessary knowledge and technical infrastructure for users to support the usage of certain technology. In the study done by Nguyen et al. (2020), 96% of the survey participants were students and office staff who have the necessary knowledge to use new technologies and sufficient resources to try new products, which highly influenced their intention to use the Facebook chatbot. A prior study conducted by William et al. (2019) claimed that customers who supported chatbot usage in the banking industry are digital literate as they have the necessary skills, have experience of using it and are ready to accept the digital transformation. It has been further supported by Richad et al. (2019) that Millennials are raised in the era where technology has been further advanced; thus, they can easily accept new technologies including chatbots. This is in line with

Rahi et al. (2019) and Lim et al. (2020) who revealed that facilitating conditions could significantly influence users' intention to adopt internet banking in Pakistan and Malaysia. On the other hand, Chan et al. (2010) found different results on the relationship between facilitating conditions and behavioural intention in their study on e-government technology, which showed that facilitating conditions do not directly impact users' behaviour. They explained that the difference could be due to the mandatory context of smart card adoption in the study. Medina-Molina et al. (2019) who aimed to analyse the adoption of mobile banking apps have also further argued the reason why facilitating conditions and behavioural intention have no relationship, which was because they believe that the convenience of mobile banking services is more important than facilitating conditions. Oppositely, previous studies justified that if users could not afford or do not acquire necessary resources or skills, they will not take the initiative to adopt new technology (Zhou, Lu & Wang, 2010; Hong, Thong, Moon & Tam, 2008). Thus, this study hypothesised that:

H14a: Facilitating conditions has a significant influence on customers' intention to use chatbot for banking customer services

Social Influence and Behavioural Intention

In the study by Venkatesh et al. (2003), social influence simply means the extent to which the opinions and perceptions by environmental factors such as other users, friends or family could bring impact to the users' perception for adopting certain technology. In Vietnam, Facebook and Facebook Messenger are the high social networking platforms that accounted for 95% and 79% of the internet users, respectively (Nguyen et al., 2020). A survey conducted for the platforms revealed that more than half of the customers wish to purchase items from businesses with a chatbot (Nealon, 2018). In, Hong and Kang (2011) have also proven that social impact has a positive influence on the acceptance of fintech services. However, a study done by Medina-Molina et al. (2019) argued that social influence has no significant relationship with customers' intention to use mobile banking apps. However, more past studies are showing that normative beliefs could influence attitude to a certain extent (Schepers & Wetzels, 2007; Ryan, 1982). Given that behavioural intention is considered to be an attitude, this research has expected that social influence could positively affect users' intention. Furthermore, in the investigation of factors influencing the consumers to adopt AI-Powered Chatbot for health and weight management, Huang, Yang and Huang (2021) have proved that social influence can affect users' intention towards the adoption of health chatbots. Thus, this study hypothesised that:

H15a: Social influence has a significant influence on customers' intention to use chatbot for banking customer services

Research Methodology

Sample and Procedure

The research design of this study employed correlational research to enable researchers to assess the relationship between the independent and dependent variables. This study was conducted in Malaysia, a developing country that is emerging in its banking technology. The target sample for this study comprised bank customers who have or have not experienced using the chatbot services of various banks in Malaysia. G Power software was used to estimate the ideal sample size based on the framework. GPower is used when the population is unknown and the sample size is estimated based on the complexity of the framework (Memon et al., 2017).

The minimum sample computed by G power based on the effect size of 0.15, $\alpha=0.05$ and $\beta = 0.20$ (Cohen, 1988) was 127.

Measures and Instrument

The measurement items in the research instrument were adapted from multiple validated sources to fit in the context of study (Chan et al., 2010; Kuberkar & Singhal, 2020; Nguyen, Chiu & Le, 2021; Brown et al., 2010; Venkatesh et al., 2012). All items were based on a five-point Likert scale, with responses ranging from strongly disagree to strongly agree.

A Google form was created to administer the web-based survey. A three-step procedure to ensure the quality of the measurement items in the questionnaire. Firstly, the adapted items were checked by the authors to ensure all the items were suited for the chatbot in the banking industry research. Secondly, a pre-test was carried out with 61 respondents to ensure the respondents understand all questions the way they were designed and intended. The third step involved finalising the questionnaire items. For the final survey administration, 136 number of responses attempted the questionnaire. Subsequently, the data were extracted for the final analysis.

Data Analysis

For this study, structural equation modelling (SEM) using partial least squares, SmartPLS 3.0 software was employed. Variance-based partial least squares (PLS) technique was employed as the desired technique because of its prediction ability. Structural equation modelling (SEM), which is a second-generation multivariate statistical approach uses a two-stage method that analyses the measurement and structural model in the same data analysis. Measurement model evaluates the reliability and validity of the model, while the structural model assesses the hypothesised model. The application of this analysis includes the measurement error analysis and factor analysis, which makes the PLS-SEM the appropriate data analytic tool.

Results

Measurement Model Assessment

Individual indicator reliability is evaluated using factor loadings; internal consistency is evaluated using composite reliability (CR); and convergent validity is evaluated using average variance extracted (AVE). Figure 2 presents the outcomes. This study made sure that all factor loadings for the reflective constructs satisfied the Hulland-recommended minimum threshold value of 0.4. (1999). One item (API4) was eliminated since it did not meet the threshold value. The researchers of this study made sure that no more than 20% of the indications were eliminated, with the proviso of eliminating loadings (Hair et al., 2017). In line with this, all constructs have achieved the desirable AVE and CR results of >0.5 and >0.7 , respectively. Based on Hair et al. (2019), who deem values between 0.6 and 0.7 acceptable, the composite reliability assessment was developed.

Discriminant validity is also evaluated in the reflective measurement model evaluation (see Table 1). The heterotrait-monotrait ratio (HTMT) was utilised in this study to assess discriminant validity. Since cross-loadings and the Fornell-Larcker criterion have been shown in recent studies to not be accurate in identifying discriminant validity concerns, HTMT has been used (Hair et al., 2017). The HTMT method calculates the correlation between two constructs that would exist if they were 100 percent dependable. Following the recommendations of all values below 0.90 (Kline, 2011), Table 3 of the HTMT discriminant

validity assessment shows no difficulty with discriminant validity (Gold, Malhotra, and Segars, 2001).

Structural Model Assessment

In this study, the research hypotheses were evaluated using the bootstrapping procedure. Twelve connections were identified in Table 2 as having t-values ≥ 1.645 and being significant at the 0.05 level of significance. Specifically, the Avoidance of personal Interaction ($\beta=0.257$) and Trust ($\beta=0.503$) constructs have positive relationships with performance expectancy. Self-efficacy ($\beta=0.232$), Convenience ($\beta=0.295$) and Assistance ($\beta=0.353$) are also positively correlated to effort expectancy and facilitating conditions. Additionally, awareness ($\beta=0.405$) has a positive association with social influence. Effort Expectancy ($\beta=0.254$), performance expectancy ($\beta=0.367$) and social influence ($\beta=0.253$) are positively correlated to behavioural intention, thus supporting all hypotheses except H1, H2, and H14. The obtained R2 value of 0.726 indicates the model is significant. R2 values for the target constructs of 0.02, 0.13, and 0.26 are often regarded as weak, medium, and substantial, respectively (Cohen, 1988). The measurement model is shown in Figure 3 together with t-values for this study.

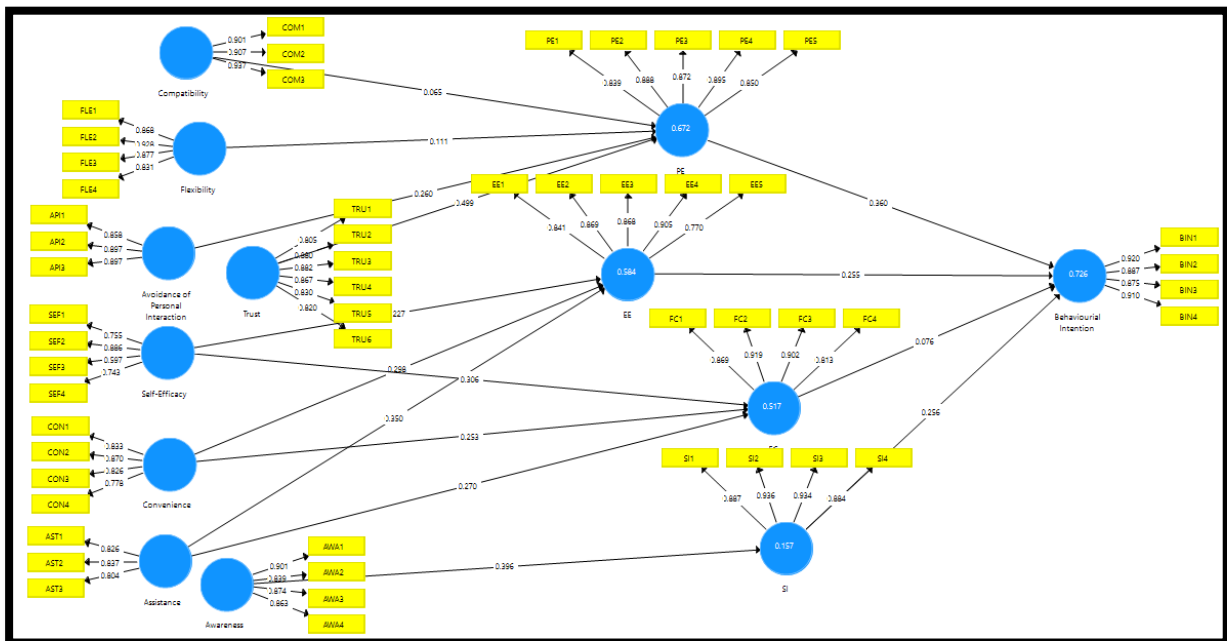


Figure 2: Factor Loading of the Measurement Model

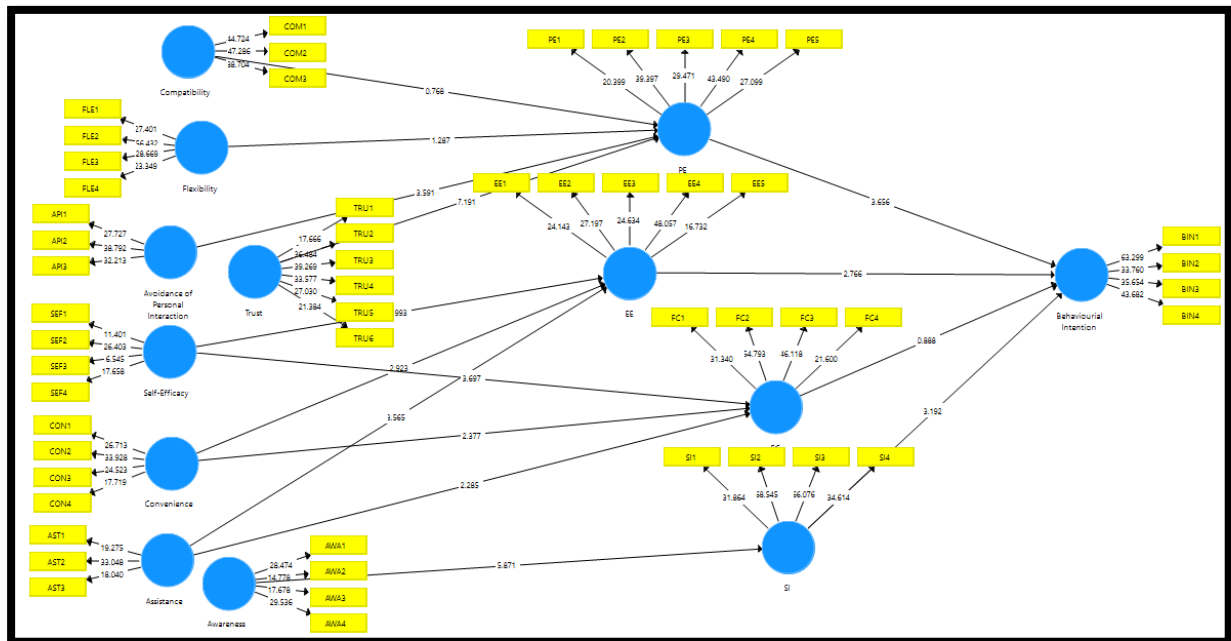


Figure 3: Structural Model with t-values

Table 1: Discriminant Validity using Heterotrait-Monotrait Ratios (HTMT)

| | AST | API | AWA | BIN | COM | CON | EE | FC | FLE | PE | SI | SE | TRU |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| AST | 0.765 | | | | | | | | | | | | |
| API | 0.444 | 0.488 | | | | | | | | | | | |
| AWA | 0.861 | 0.803 | 0.52 | | | | | | | | | | |
| BIN | 0.657 | 0.692 | 0.507 | 0.729 | | | | | | | | | |
| COM | 0.726 | 0.771 | 0.588 | 0.737 | 0.595 | | | | | | | | |
| CON | 0.824 | 0.739 | 0.557 | 0.86 | 0.587 | 0.792 | | | | | | | |
| EE | 0.735 | 0.697 | 0.607 | 0.75 | 0.511 | 0.739 | 0.86 | | | | | | |
| FC | 0.805 | 0.696 | 0.494 | 0.722 | 0.62 | 0.735 | 0.651 | 0.666 | | | | | |
| FLE | 0.898 | 0.742 | 0.426 | 0.857 | 0.683 | 0.838 | 0.883 | 0.72 | 0.718 | | | | |
| PE | 0.7 | 0.633 | 0.399 | 0.791 | 0.636 | 0.554 | 0.781 | 0.737 | 0.496 | 0.728 | | | |
| SI | 0.684 | 0.816 | 0.676 | 0.72 | 0.799 | 0.775 | 0.701 | 0.698 | 0.756 | 0.685 | 0.646 | | |
| SE | 0.849 | 0.651 | 0.464 | 0.803 | 0.73 | 0.719 | 0.782 | 0.687 | 0.761 | 0.829 | 0.714 | 0.793 | |
| TRU | | | | | | | | | | | | | |

Note: AST: Assistance; API : Avoidance of Personal Interaction, AWA : Awareness, COM : Compatibility, CON : Convenience, PE: Performance Expectancy, EE: Effort Expectancy, FC: Facilitating Conditions, SI: Social Influence, BIN: Behavioural Intention

Table 2: Hypotheses Testing

| | Std Beta | Std Error | t-value | p-value | Decision |
|---|----------|-----------|---------|---------|---------------|
| Assistance -> EE | 0.353 | 0.098 | 3.565 | 0.000 | Supported |
| Assistance -> FC | 0.278 | 0.118 | 2.285 | 0.022 | Supported |
| Avoidance of Personal Interaction -> PE | 0.257 | 0.072 | 3.591 | 0.000 | Supported |
| Awareness -> SI | 0.405 | 0.067 | 5.871 | 0.000 | Supported |
| Compatibility -> PE | 0.06 | 0.085 | 0.768 | 0.442 | Not Supported |
| Convenience -> EE | 0.295 | 0.102 | 2.923 | 0.003 | Supported |

| | | | | | |
|------------------------------|-------|-------|-------|-------|------------------|
| Convenience -> FC | 0.245 | 0.107 | 2.377 | 0.018 | Supported |
| EE -> Behaviourial Intention | 0.254 | 0.092 | 2.766 | 0.006 | Supported |
| FC -> Behaviourial Intention | 0.07 | 0.085 | 0.888 | 0.375 | Not Supported |
| Flexibility -> PE | 0.117 | 0.087 | 1.287 | 0.198 | Not Supported |
| PE -> Behaviourial Intention | 0.367 | 0.099 | 3.656 | 0.000 | Supported |
| SI -> Behaviourial Intention | 0.253 | 0.08 | 3.192 | 0.001 | Supported |
| Self-Efficacy -> EE | 0.232 | 0.076 | 2.993 | 0.003 | Supported |
| Self-Efficacy -> FC | 0.316 | 0.083 | 3.697 | 0.000 | Supported |
| Trust -> PE | 0.503 | 0.069 | 7.191 | 0.000 | Supported |

Note: PE: Performance Expectancy, EE: Effort Expectancy, FC: Facilitating Conditions, SI: Social Influence

Discussion

This study examines the factors influencing bank customers' intention to use chatbot for their banking customer service solution in Malaysia. A research model combining the core technology adoption beliefs from UTAUT and stages of new technology launch was empirically tested in this study. The results indicated that performance expectancy, effort expectancy, and social influence have a significant influence on behavioural intention in this study. This is in line with previous studies such as Medina-Molina et al. (2019), Cardona et al. (2021), Alt et al. (2021) for performance expectancy; Martins et al. (2014), Alalwan et al. (2018) for effort expectancy; Huang et al. (2021) and Hong and Kang (2011) for social influence. Generally, the results suggested that a person will be inclined to use chatbot technology for banking customer service solution if the system is believed to effectively help getting the problem resolved, in addition to the fact that the system itself has to be easily used and navigated. As for social influence which was found to significantly lead to customer intention to use chatbot, it implies the increasing popularity of word of mouth (WOM) and e-WOM platforms. Similar to Venkatesh (2003), this study also failed to provide support to the relationship between facilitating condition and behavioural intention. This could be due to the chatbot function mostly embedded in the mobile and internet banking application. Consumers do not need to acquire an additional knowledge as they are frequent users of chat applications (e.g WhatsApp, Facebook Messenger, etc.). Hence, facilitating conditions play a limited role in behavioural intention in chatbot functions.

On another note, results showed that except for the insignificant relationships of Compatibility → Performance Expectancy and Flexibility → Performance Expectancy, all other tested relationships between the stages of new technology launch and UTAUT core technology adoption variables are found significant. This signals the importance of meticulous planning in the four critical stages of new technology launch i.e., market preparation, targeting, positioning, and execution.

The multi-ethnic societies in Malaysia preferred to have human interaction and using their preferred language. Given that chatbot functions support a limited language (mostly English), consumers may have difficulty in utilising it and the performance of chatbot functions was not up to their expectation. It was supported by Fryer et al. (2019) and Griffin et al. (2021) that consumer-chatbot language compatibility diminish the objective and expectation of the chatbot functions.

The pre-programme chatbot services have limited flexibility of the chatbot functions to facilitate non-complex activities. Given that the chatbot service is akin to FAQ functions,

consumers are not keen of the limited functionality of chatbot in addressing their needs. Moreover, consumers who are not well versed with the banking products/jargon may have difficulty in dealing with the chatbot. Also, the standardization of the chatbot functions failed to cater to the uniqueness and constant changing consumers' needs (Chan et al, 2010). This offers a plausible reason to the inconclusive finding between flexibility and performance expectancy. Consumer would prefer someone or a chatbot that could speak and understand their language and needs. So, it could enhance the effectiveness and flexibility in addressing consumers' queries or needs.

The findings also indicated that avoidance of personal interaction is positively associated with performance expectancy; therefore, the result is aligned with the previous studies by Blut et al. (2021) and Chan et al. (2010). Furthermore, the proliferation of text-based interaction such as Whatsapp, WeChat, and other social media messaging platforms have made people to be more comfortable with that particular mode of communication, and hence avoidance of personal interaction.

In addition, this study also suggested that trust is important to performance expectancy as supported by previous studies, namely Cardona et al. (2021), Cardona et al. (2019), Chan et al. (2010) and Forsyth et al. (2006). Increasing cases of banking-related phishing scams will lead the users to question the reliability, accuracy, efficiency and effectiveness of chatbot technology in the banking industry. Thus, banking industry should put more effort into improving its trustworthiness.

Last but not least, the results from the data analysis also revealed that awareness and social influence are positively related, which is in line with previous studies such as Cardona et al. (2019), Gupta & Sharma (2019) and Richad et al. (2019). This is plausibly be supported by the greater society connectivity via social platforms such as TikTok, Facebook, Instagram, LinkedIn, etc. This has facilitated the information sharing and posed an impact to individual's social contact. Consequently, banks should grab every opportunity to improve the awareness of the chatbot's usage and benefits in order to increase the public social influence on others towards using chatbot technology in the banking industry

The results revealed that self-efficacy along with convenience and assistance are positively associated with effort expectancy. It indicated that a higher level of self-efficacy influences the formation of the perception of ease of use on the intention to use a chatbot. The results of this study are in line with the findings of other researchers (Aguirre-Urreta & Marakas, 2010; Balkaya & Akkucuk, 2021; Chan et al., 2010; Macdonald et al., 2019; Sung et al., 2015; Van-Houwelingen et al., 2018) which agree that self-efficacy beliefs play an important role when new technologies are first introduced, but effort considerations are key to successful technology use (Macdonald et al., 2019). Besides, the findings from this study supported previous research on the relationship between convenience and effort expectancy (such as Chan et al., 2021; Hung et al., 2019; Mansur et al., 2019; Purwanto & Loisa, 2020; Rey-Moreno & Medina-Molina, 2016; Sareen & Jain, 2014). The use of banking technology makes it easier for customers because it saves time and provides convenience in any situation faced by customers (Purwanto & Loisa, 2020). Therefore, in order to increase the convenience of using chatbots, banks can provide better support infrastructure to enhance the availability and accessibility of chatbots where they are able to bridge the technology gap if any. Furthermore, this study found that assistance has a positive effect on effort expectancy which is consistent with other studies on the importance of assistance in service-based industries as obtained from the study by Chan et

al. (2010) and Rey-Moreno and Medina-Molina (2016). Our results suggested that customers are more likely use of chatbots if more assistance is provided. Since customers do not get face-to-face assistance when they use chatbot banking services, banks should be able to provide and deliver effective assistance to help overcome the complexity or in the use of chatbots by customers.

Conclusion

From theoretical point of view, despite UTAUT being widely used in existing technology-related studies, this study contributes to the body of literature by incorporating the stages of new technology launch in its proposed model. The aspect of new technology launch is not only sparsely applied in the chatbot literature, but it is also relevant in this paper due to the current underdevelopment of chatbot technology especially in the banking customer service of developing countries. Meanwhile, from the practical point of view, this study provides empirical support on the key factors to be considered by the banking industry players in developing their chatbot system in pursuit of improved customer service. For instance, this study indicated that awareness, self-efficacy, avoidance of personal interaction, trust, convenience, and assistance ultimately have a significant impact on intention to use chatbot through either performance expectancy, effort expectancy, or social influence. Therefore, strategies should be carefully devised taking all these factors into consideration during the development of chatbot system in their banking customer service solutions. As a conclusion, this study suggests that the four stages of new technology launch (market preparation, targeting, positioning execution) are significant antecedents to the UTAUT variables in examining the factors influencing the intention to use chatbot for banking customer service. It indicates the importance of an end-to-end planning of the chatbot system for successful customer service. For future research, exploring the customer satisfaction from the use of chatbots for banking customer services could be a fruitful endeavour for further system improvement.

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