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1.Literature Survey

1.1 Banking technologies' adoption by customers

The banking industry has been profoundly influenced by technological evolution in recent decades and consumer adoption of banking technologies is a widely researched topic in the literature. Thus, a more in-depth look into the processes behind the adoption of banking chatbots can be gained through the review of the existing literature on the adoption of other technologies applied in the banking sector, such as i-banking and m-banking. Several theories have been implemented in order to analyze the adoption of different IT systems. According to Hanafizadeh and Khedmatgozar (2012), the most influential theoretical models applied in i-banking adoption studies, are the Diffusion of innovation theory (DIT), the Technology acceptance model, the Decomposed theory of planned behavior (DTPB), the Extended technology acceptance model and the Unified theory of user acceptance of technology (UTAUT), the latter becoming dominant in the literature in recent years. Shaikh and Karjaluoto (2015) analyzed and synthesized existing studies of m-banking adoption and concluded that the most frequently used adoption models were TAM, followed by DIT and UTAUT, while several studies applied a combination of different technology acceptance models (e.g. TAM and DIT). Several of the above mentioned models are composed of intention to use or actual usage as the dependent variables. Consequently, the key dependent variables in the i-banking adoption literature (Yousafzai, 2012) are behavioral intention to use and actual usage of the technology, while in m-banking adoption, besides the two earlier mentioned dependents, attitude is also adopted in order to analyze technology acceptance (Shaikh and Karjaluoto, 2015). Based on the literature review, it could be concluded that usefulness and ease of use are fundamental variables in studying technology acceptance in the banking sector. It should also be highlighted that compatibility was found as a key determinant for m-banking and i-banking (Giovanis et al., 2012) adoption. Therefore, it is expected that compatibility will influence banking chatbot adoption as well.

1.2 Chatbot technology: description and previous research

A chatbot application is a computer program that mimics human conversations in its natural format, including text or spoken language, using artificial intelligence techniques, such as Natural Language Processing (NLP), image and video processing and audio analysis (Bala et al., 2017). 16 Chatbot applications offer benefits for both companies and consumers. First, chatbots enable consumers to get in touch with companies anytime from anywhere using their own mobile devices, thus they can get quick and relevant responses to their questions. Second, the implementation of these applications allows companies to target consumers in a more direct and personal way, and companies can save on personnel costs in the area of customer services. In addition to the benefits of the technology, the usage of chatbots may also involve several risk factors, including issues regarding data security and financial risks (Vieira and Sehgal, 2017; Richad et al., 2019). Recently published scientific papers analyzed the adoption of chatbot technology in the tourism industry (Melián-González et al., 2021), in the health care industry (Laumer et al., 2020), and in the field of higher education (Almahri et al., 2020). Regarding the adoption of chatbots applied in the financial industry, only a few studies examined the acceptance of these applications in the context of the insurance sector (Cardona et al., 2019) and the banking sector (Gupta and Sharma, 2019; Quah and Chua, 2019; Trivedi, 2019, Richad et al., 2019; Sarbabidya and Saha, 2020). Although several studies have examined the factors influencing the acceptance of chatbots, the findings carried out in different fields may not be transferable for financial services (Cardona et al., 2019). Specific research is required in case of banking.

1.3 Chatbot technology in the banking industry

Chatbots applied in the financial industry can assist customers in managing financial transaction such as reviewing an account, reporting lost cards or making payments, renewing a policy or handling a refund (Tarbal, 2020). In the literature, there are several recently published studies that focused on chatbot technology applied in the financial industry (Cardona et al., 2019; Gupta and Sharma, 2019; Quah and Chua, 2019; Richad et al., 2019; Trivedi, 2019; Sarbabidya and Saha, 2020) (Table 1). Cardona et al. (2019) studied the adoption and diffusion of chatbots in the context of insurance, concluding that the majority of the participant were familiar with the technology and would prefer to use it at the beginning of the advisory process, while one third of the participants rejected the adoption of chatbots. Gupta and Sharma (2019) examined the customers' attitude towards chatbots in the banking industry and the findings of the study revealed positive correlation between the positive attitude for chatbots and their utility, accessibility and threats. Quah and Chua (2019) explored the effectiveness of the use of chatbot technology in Singapore's banking industry and investigated chatbot functionality to determine if it would meet customer expectations. They found that detailed information provided by the banking chatbot was the most important factor for consumers, followed by fast response, functionality, interactivity, ease of use and data privacy and protection. It was also found that some of the users were not satisfied with the banking chatbot because it didn't provide an immediate answer when needed. Richad et al. (2019) investigated the acceptance factors of chatbot technology in the banking industry in Indonesia in case of Millennials based on TAM, and found that innovativeness, perceived usefulness, perceived ease of use and attitude towards using the chatbot had significant effect on behavioral intention. Trivedi (2019) examined customer experience of using banking chatbots and its impact on brand love adopting the Information Systems (IS) success model among. The results showed that system quality, information quality and service quality had significant impact on customer experience, system quality being the strongest predictor. Perceived risk reduced the impact of the three quality dimensions on customer experience, and customer experience of using the chatbot led to love for the brand that provided the technology. Sarbabidya and Saha (2020) found that the role of chatbots in customer service of the banking industry was positively affected by advisory services, ease of use and convenient service, cost effective and efficient service, customer-friendly service.

Authors	The aim of the study	Theories/Studied variables	Research method/ sample	Data analysis
(Cardona et al., 2019)	Adoption and diffusion of chatbots in the German insurance sector	Relative advantages, compatibility, complexity, trialability, observability top management support, IS infrastructure, costs, environmental threats, competitive pressure, collaborative networks perceived usefulness, perceived ease of use, perceived behavioural control	Qualitative, quantitative Semi-Structured Expert Interviews, N=7 Web-based cross sectional survey, N=300 Data collected in Germany in 2018	Descriptive
(Gupta and Sharma, 2019)	Analysis of customers' attitude towards the chatbots in banking industry of India	Attitude observed utility (ease of use, ease of process, engagement with customer service) observed accessibility (easy for basic transactions, speedy process, user friendliness) observed threat and awareness (data security and privacy, social awareness, friends and family using it)	Quantitative Data collected via Facebook and WhatsApp, N=72 Data collected in India in 2019	Bivariate analysis

(Quah and Chua, 2019)	Analysis of the effectiveness of the current use of chatbots in Singapore's banking industry	user experience: response rate, functionality and usability satisfaction: interactivity, informative, data privacy and protection	Quantitative, qualitative Interviews Qualitative user tests	Descriptive
(Richad et al., 2019)	Analysis of the factors that influence millennial's technology acceptance of chatbots in the banking industry in Indonesia	Attitude towards usage, behavioural intention innovativeness, perceived usefulness, perceived ease of use	Quantitative Simple random sampling technique, N=400 Data collected in Indonesia in 2018	SEM
(Trivedi, 2019)	Examination of customer experience of using banking chatbots and its impact on brand love in India	Information Systems (IS) success model customer experience, brand love system quality, information quality, service quality, perceived risk	Quantitative Online questionnaire sent to Gen Z individuals, N=258 Data collected in India in 2018	SEM
(Sarbabidy a and Saha, 2020)	Examination of the role of chatbots in customer service of the banking industry of Bangladesh	customer service advisory services, ease of use and convenient service, cost effective and efficient service, customer-friendly service, customized service, relationship banking services, responsive service, trustworthy service, value based usefulness, security and privacy	Quantitative Judgment sampling method, N=125 Data collected in Bangladesh in 2019	Regression