EXAMINING THE INFLUENCE OF PERCEIVED USEFULNESS ON ATTITUDE TOWARDS CHATBOTS

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ABSTRACT

In Malaysia's pursuit of the Fourth Industrial Revolution, the integration of artificial intelligence tools, notably chatbots, stands out as a key strategy for organizations aiming to elevate customer service. Chatbots are recognized as crucial tools in enhancing efficiency and optimizing customer interactions, reflecting a broader commitment to innovation in the business landscape. In recent years, AI-based chatbot adoption in business has surged, but in Malaysia, this topic is relatively unexplored in the information systems domain. Most studies lack guidance from Information System (IS) theory. This research aims to fill this gap by examining the influence of perceived usefulness on attitudes toward Chatbots, using the Technology Acceptance Model (TAM) as the IS theory reference. This study employed an online survey with a purposive sampling technique, collecting data from 135 postgraduate students at Universiti Utara Malaysia within a month. However, only 121 questionnaires were deemed usable for analysis, as 14 respondents did not use chatbots. Correlational analysis was utilized to validate the research model and test the hypothesis. The findings indicate that their perceived usefulness influences attitudes toward chatbots. The study provides both theoretical and practical contributions for academics and professionals. The study has acknowledged its limitations and provided valuable suggestions for future research endeavours.

Keywords: Chatbot, Adoption, Attitude, Perceived Usefulness

1.0 Introduction

AI-based chatbot technology in banking has revolutionized customer interactions (Mónika-Anetta et al., 2021). These chatbots, powered by artificial intelligence, offer personalized assistance, detect and prevent fraud, enhance anti-money laundering processes, and contribute to cost savings (Business Insider, 2021). Especially relevant during the COVID-19 pandemic, they facilitate remote sales and service provision, ensuring 24/7 availability (Bensley et al., 2020). These chatbots continuously learn and adapt, making them valuable tools for improving customer experiences and operational efficiency in the financial industry (Lee & Park, 2019).

Chatbots are software agents that interact with users through natural language, using text or voice interfaces (Brandtzaeg & Følstad, 2018). The term is interchangeable with "conversational agents" and "dialogue systems." Chatbots can be task-oriented, focusing on specific functions, or non-task-oriented, engaging in open-ended conversations. They find applications in various domains and enhance user experiences by providing accessible information and services.

Chatbots are widely utilized in human-computer interaction (HCI) and serve as virtual customer assistants, using AI to engage with customers through online channels like text messages and web chat (Ho et al., 2018). These applications allow users to freely and limitlessly pose questions (Karri & Kumar, 2020). They operate within set time frames and constraints, often equipped with messaging infrastructure or voice capabilities to deliver information in response to customer queries Essentially, chatbots enhance customer interactions by providing responsive and accessible information through various communication channels.

Chatbots play a prominent role in various sectors, including sales, marketing, customer support, technical assistance, and training (Smutny & Schreiberova, 2020). In the banking industry, they are utilized for customer relations management, sales, marketing, investment analysis, and recommendations. Chatbots offer swift services, personalized digital experiences, and cost-effective access to customer support. The chatbot market is experiencing substantial growth, with projections indicating an increase from $2.6 billion in 2019 to $9.4 billion by 2024, as reported by Business Insider and research by Markets (2019). This underscores the

increasing significance of chatbots in reshaping customer interactions and service delivery across diverse sectors.

2.0 Problem Statement

In response to the global fourth industrial revolution and Malaysia's National Transformation 2050 (TN50), the country is actively embracing AI innovation (Noor & Mansor, 2019). The Malaysian government, particularly through initiatives led by the Malaysian Digital Economy Corporation (MDEC), is committed to advancing AI-enabled technologies (Abdullah et al., 2017). MDEC has established an AI unit with local and international experts to support the National AI Framework, indicating a strategic move towards positioning Malaysia as a leader in AI development. This initiative is expected to generate a demand for new technical skills and higher-level capabilities in the existing workforce, reflecting a commitment to harnessing the transformative potential of AI in the era of the fourth industrial revolution (EAC Focus, 2022).

Chatbots are widely used in Malaysia across industries such as banking, e-commerce, healthcare, and government services. They enhance customer service, streamline operations, and offer personalized experiences. Examples include Maybank's MAE ChatBot for banking, AirAsia's Ava for flight inquiries, MySejahtera's chatbot for COVID-19 information, and Lazada Malaysia's chatbot for e-commerce support. The growing adoption of chatbots reflects their effectiveness in providing 24/7 support, automating processes, and engaging users across diverse sectors.

Chatbots in customer service provide immediate responses, addressing issues like queuing and waiting (Alalwan et al., 2017).. They enhance customer satisfaction by minimizing waiting times and transaction costs (Dospinescu et al., 2019). For businesses, chatbots efficiently handle a large volume of queries, reducing operating costs and contributing to sustainable development (El-Masri & Tarhini, 2017).. As a result, chatbots are widely implemented across various industries, offering benefits for both customers and firms.

Chatbots, despite their advantages, can deviate from scripts, providing incorrect answers and causing customer frustration (Eren, 2021). Security and privacy issues in mobile marketing via chatbots pose challenges for companies (Jimenez-Barreto, Rubio & Molinillo, 2021). Customer perceptions are influenced by factors like usefulness, ease of use, and

associated risks, underscoring the need for careful management of chatbot interactions (Malik et al., 2021)

This study focuses on understanding the influence consumers of perceived usefulness on attitudes towards chatbots, with a specific objective to examine the impact of perceived usefulness on attitudes toward chatbots. Perceived usefulness is defined as the extent to which individuals believe that a technology or system, in this case, chatbots, will make their tasks easier (Moslehpour et al., 2018). Chatbots are described as software agents facilitating access to services and information through text and voice interaction in users' everyday language (Brandtzaeg & Følstad, 2018).

3.0 Literature Review

Perceived usefulness is a key factor in technology adoption, indicating an individual's belief that a system enhances task performance (Moslehpour et al. (2018). This perception influences decisions and attitudes, impacting areas like online shopping (Iriani and Andjarwati, 2020). Studies emphasize the importance of perceived usefulness in shaping user behavior, guiding the design of technologies and marketing strategies to align with user needs for successful adoption.

Tsai et al. (2019) analyzed the relationship between individual motivation and user acceptance of a knowledge management system, finding that the system's impact on work performance affects user frequency. They observed a positive connection between perceived usefulness and users' intention to use the system.

Chiou and Fang (2017) investigated internet users' behavior, concluding that regularly updating valuable information on a website influences user preference. Their study supported a positive association between perceived usefulness and users' attitudes toward the technology. Overall, these findings suggest that perceived usefulness plays a vital role in shaping user acceptance and behavior.

H1: Perceived usefulness positively influences consumer's attitudes towards chatbot.

4.0 Methodology

This study, anchored in the Technology Acceptance Model (TAM), aims to investigate whether attitudes toward chatbots are shaped by the perceived usefulness associated with using these technologies. TAM provides a theoretical framework for understanding users' acceptance and adoption of technology based on these key factors.

This correlational study, conducted in a cross-sectional manner, explores chatbot adoption among consumers, specifically focusing on students with experience in online transactions. The research, employing a survey method, treats each student's response as an individual data source (Kahneman et al., 2004).

The study focuses on postgraduate students at Universiti Utara Malaysia, using convenience sampling to gather 150 participants through social media. It explores perceived usefulness and attitudes toward chatbots within the TAM framework, measuring attitudes with three items from Taylor and Todd (1995) and perceived usefulness with five items from David (1989) and Kasilingan (2020).

5.0 Analysis

Table 1.1 outlines the respondent profile. The distribution is nearly equal between male (43%) and female (57%) respondents. Age distribution shows approximately equal percentages for those below 25 and between 26-35 years old. Sixty-four percent are pursuing master's degrees, with the rest in Ph.D./DBA programs. The majority (67%) of respondents are Malays, followed by 23% Chinese and 21% Indian. In terms of marital status, 61% are married, while 39% are single.

Table 1.1
Profile of the Respondents (N=121)

Variable	Category	Frequency	Percentage (%)
Gender	Male	52	43
	Female	69	57
Ethnic	Malay	67	55
	Chinese	28	23
	India	26	21
	Other	0	0
Marital status	single	74	61

	Married	47	39
Age	<25	41	34
	26-35	36	30
	36-45	21	18
	46-55	15	12
	56 and above	8	7
Academic program	Master's degree	78	64
	PhD/DBA	43	36

Table 1.2 presents descriptive statistics for the main variables in the study. All variables are measured on a five-point Likert scale. Following Pallant (2020), the five-point Likert scale ranges were categorized into equally sized categories of low, moderate, and high.

Therefore, scores of less than 2.33 [4/3 + lowest value (1)] are considered low; scores above 3.67 [highest value (5)– 4/3] are considered high and those in between are considered moderate. From Table 4.3, the mean value for attitude is 3.51, indicating that respondents have a moderate level of attitude towards chatbot. Similarly, with a mean value of 4.01 respectively, it can be concluded that respondents tend to have a high perception of the usefulness of chatbots.

Table 1.2
Descriptive Statistics for Main Variables

Variables	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic
Attitude	1.00	5.00	3.51	.932
Perceived usefulness	1.00	5.00	4.01	.435

The correlation between perceived usefulness and attitude toward chatbots is explored. As indicated in Table 1.3, the correlation among the variables reveals a significant and positive relationship. The correlation is generally strong, with a value of 0.54.

Table 1.3
Correlation Analysis

	ATT	**PU**
Attitude **(ATT)**	1	
Perceived Usefulness	.541**	1

6.0 Discussion

This section delves into a detailed discussion on the influence of perceived usefulness on attitudes toward chatbots. This study aims to enhance our understanding of attitudes toward chatbots using the TAM model, analysing survey data from 121 respondents, leading to significant findings.

The study reveals that perceived usefulness accounts for 67 percent of the variance in explaining attitude. Notably, perceived usefulness has a significant positive influence on fostering a favourable attitude toward chatbots. This suggests that users who perceive chatbots as beneficial are more likely to be satisfied and inclined to continue using them in the future.

Additionally, this study identifies education as the most frequent use of chatbots among respondents. This aligns with the sample being postgraduate students, indicating a prevalent usage of AI chatbots in educational settings. This usage trend is consistent with the broader trend highlighted by Noor Illiana et al. (2022), emphasizing the increasing utilization of chatbots in Higher Education Institutions for teaching and learning purposes among staff and students in the AI era.

Adopting chatbot technology depends on a positive user attitude, influenced by perceived benefits. Users who perceive chatbots as beneficial are more likely to be satisfied and continue usage, supported by findings from Keong (2022) and Toh and Tay (2022). Designing chatbots with a user-friendly interface and useful features is crucial for user preference and acceptance, as ease of use and perceived utility enhance feelings of self-competence and usage tendency (Said et al., 2022).

7.0 Limitations and Future Research Suggestions

First, the study's findings are limited by a small sample size of chatbot users in Malaysia using convenience sampling. While common method bias was not a significant issue, the results may not be representative of all users. Future research should consider alternative approaches, such as experimental methods, for improved respondent quality.

Second, the study's scope is confined to chatbot usage in a single context—UUM, a higher educational institution in Malaysia. Future research should expand comparisons to different cultural backgrounds, institutions, and development levels, considering contexts like Western countries and diverse industries for a more comprehensive understanding.

Furthermore, researchers can improve data collection instruments, like focus group interviews, by comparing quantitative and qualitative results. Future studies could use a longitudinal approach to forecast adoption intention over time, evaluating the model in different periods, such as before and after chatbot adoption.

REFERENCES

Abdullah, S. A., & Woods, J. (2017, September). Question answer system for online feedable new born Chatbot. In *2017 Intelligent Systems Conference (IntelliSys)* (pp. 863-869). IEEE.

Alalwan, A. A., Rana, N. P., Dwivedi, Y. K., & Algharabat, R. (2017). Social media in marketing: A review and analysis of the existing literature. *Telematics and informatics*, *34*(7), 1177-1190.

Bensley, E., Khon, S., Tan, D., & Taraporevala, Z. (2020). Breaking away from the pack in the next normal of retail banking distribution. *McKinsey & Company*. 2(4), 10-24.

Brandtzaeg, P. B., & Følstad, A. (2018). Chatbots: changing user needs and motivations. *interactions*, *25*(5), 38-43.

Brandtzaeg, P. B., & Følstad, A. (2018). Chatbots: changing user needs and motivations. *interactions*, *25*(5), 38-43.

communication and informatics (ICCCI) (pp. 1-5). IEEE

David, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, **13**, 319– 340.

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information Systems Frontiers*, *21*, 719-734.

El-Masri, M., & Tarhini, A. (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational*

Technology Research and Development, *65*, 743-763.

Eren, B. A. (2021). Determinants of customer satisfaction in chatbot use: evidence from a banking application in Turkey. *International Journal of Bank Marketing*, *39*(2), 294-311.

Ho, A., Hancock, J., & Miner, A. S. (2018). Psychological, relational, and emotional effects of self-disclosure after conversations with a chatbot. *Journal of Communication*, *68*(4), 712-733.

implementation of chatbots. In *2020 International conference on computer*

Iriani, S. S., & Andjarwati, A. L. (2020). Analysis of perceived usefulness, perceived ease of use, and perceived risk toward online shopping in the era of Covid-19 pandemic. *Systematic Reviews in Pharmacy*, *11*(12), 313-320.

Jiménez-Barreto, J., Rubio, N., & Molinillo, S. (2021). Find a flight for me, Oscar!: Motivational customer experiences with chatbots. *International Journal of Contemporary Hospitality Management*, *33*(11), 3860-3882.

Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, *306*(5702), 1776-1780.

Karri, S. P. R., & Kumar, B. S. (2020, January). Deep learning techniques for

Kasilingam, D. L. (2020). Understanding the attitude and intention to use smartphone chatbots for shopping. *Technology in Society*, *62*, 101280.

Keong, W. E. Y. Factors Influencing Adoption Intention Towards Chatbots as A Learning Tool. *Published in December 2022*, 96. The International Conference on Education Proceeding 22-26 September 2022.

Lee, M. K., & Park, H. (2019). Exploring factors influencing usage intention of chatbot–chatbot in financial service. *Journal of Korean Society for Quality Management*, *47*(4), 755-765.

Malik, M., Gahlawat, V. K., Mor, R. S., Agnihotri, S., Panghal, A., Rahul, K., & Emanuel, N. (2021). Artificial Intelligence and Data Science in Food Processing Industry. In *Digital Transformation and Industry 4.0 for Sustainable Supply Chain Performance* (pp. 231-244). Cham: Springer International Publishing.

Mónika-Anetta, Alt., Vizeli, I., & Săplăcan, Z. (2021). Banking with a chatbot–A study on technology acceptance. *Studia Universitatis Babes-Bolyai Oeconomica*, *66*(1), 13-35.

Moslehpour, M., Pham, V. K., Wong, W. K., & Bilgiçli, İ. (2018). E-purchase intention of Taiwanese consumers: Sustainable mediation of perceived usefulness and perceived ease of use. *Sustainability*, *10*(1), 234-248.

Moslehpour, M., Pham, V. K., Wong, W. K., & Bilgiçli, İ. (2018). E-purchase intention of Taiwanese consumers: Sustainable mediation of perceived usefulness and perceived ease of use. *Sustainability*, *10*(1), 234-248.

Noor Irliana MR, Iahad NA, Yusof AF, Al-Sharafi M. (2022). AI-based chatbots adoption model for higher-education institutions: A hybrid PLS-SEM-neural network modelling approach. *Sustainability*. 14(19), 12726-12734.

Noor, S., Mansor, M., Wahid, R. A., & Azhar, N. A. A. N. (2022). Anxiety Assistance Mobile Apps Chatbot Using Cognitive Behavioural Therapy. *International Journal of Artificial Intelligence*, *9*(1), 17-23.

Pallant, J. (2020). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS for Windows (Version 10).* Victoria: McPherson's Printing Group.

Smutny, P., & Schreiberova, P. (2020). Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education*, *151*, 103862.

Toh, T. J., & Tay, L. Y. (2022). Banking Chatbots: A Study on Technology Acceptance among Millennials in Malaysia. *Journal of Logistics, Informatics and Service Science*, *9*(3), 1-15.