




Public perceptions towards ChatGPT as the Robo-Assistant

Kris Jangjarat ¹

 0000-0002-1868-7643

Tanpat Kraiwanit ^{1*}

 0000-0002-5130-6427

Pongsakorn Limna ¹

 0000-0002-7448-5261

Rattaphong Sonsuphap ²

 0000-0001-7697-0255

¹ Faculty of Economics, Rangsit University, Pathum Thani, THAILAND

² College of Social Innovation, Rangsit University, Pathum Thani, THAILAND

* Corresponding author: tanpat.k@rsu.ac.th

Citation: Jangjarat, K., Kraiwanit, T., Limna, P., & Sonsuphap, R. (2023). Public perceptions towards ChatGPT as the Robo-Assistant. *Online Journal of Communication and Media Technologies*, 13(3), e202338. <https://doi.org/10.30935/ojcm/13366>

ARTICLE INFO

Received: 30 Apr 2023

Accepted: 18 May 2023

ABSTRACT

The widespread adoption of digital technologies in various economic activities paves the way for the establishment of a unified digital space. ChatGPT, an artificial intelligence language model, can generate increasingly realistic text, with no information on the accuracy and integrity of using these models in scientific writing. This study aims to investigate factors influencing public perceptions toward the acceptance of ChatGPT as the Robo-Assistant, using a mixed method. The quantitative approach in this study employed convenience sampling to collect data through closed-ended questionnaires from a sample size of 1,880 respondents. Statistical analysis software was used for data analysis. The researchers used binary regression to examine the relationship between various independent variables (such as score, gender, education, social media usage) and the acceptance of ChatGPT, as dependent variable. As part of the qualitative approach, in-depth interviews were conducted with a purposive sample of six participants. The qualitative data was analyzed using the content analysis method and the NVivo software program. Findings show that ChatGPT awareness and usage are influenced by variables like score, gender, education, and social media usage. Occupation and monthly income were not significant factors. The model with all independent variables was able to predict the use of ChatGPT as the Robo-Assistant in Thailand with an accuracy rate of 96.3%. The study also confirms acceptance of ChatGPT among Thai people and emphasizes the importance of developing sociable robots that consider human interaction factors. This study significantly enhances our comprehension of public perceptions, acceptance, and the prospective ramifications associated with the adoption of ChatGPT as the Robo-Assistant. The acquired findings offer indispensable guidance for the effective utilization of AI models and the advancement of sociable robots within the domain of human-robot interaction.

Keywords: public perception, acceptance, ChatGPT, Robo-Assistant

INTRODUCTION

The widespread adoption of digital technologies in various areas of economic activity opens the door to the creation of a unified digital space (Yakimova, 2020). Since the invention of the first robot by humans, robotics has advanced dramatically. Intellectual robots are now widely used in a variety of applications, and people are investigating the role of robots in our association. Moreover, humans and robots become more integrated, and humanization has reemerged to meet the demands of human-machine interaction. Furthermore, robots are becoming more intelligent and human-like (Cai et al., 2020). The rapid rise in interest

in collaborative robots used for industrial tasks is a result of the emergence of Industry 4.0 in most developed countries. Work cells that employ both human workers and robots expand the field of use of robotics to medium- and small-series productions. Robots and humans can best utilize their mutual skills and strengths in a collaborative workplace (Antonelli & Bruno, 2023). Recognizing how human interactions can be adhered to human-robot interactions is also essential in the creation of truly sociable robots. A sociable robot must be able to interact with people while considering both verbal and nonverbal cues such as emotions, postures, and gestures (Rincon et al., 2019).

Without the humongous innovation of related technologies over the last few years, the robotics field could not have experienced such a productive and rapid development. Robots were slow and clumsy a few decades ago, and they could not complete a complex task without our assistance. The current situation is completely different. In a factory, we can now see a group of robots working well together to complete a series of tasks. Service robots can converse fluently with humans, understand their needs, and provide the assistance they require. Robots are intelligent and adaptable enough to help us in a variety of situations. Technology advancement has resulted in the development of new technologies, such as artificial intelligence (AI). AI is the most substantial difference between a modern intelligent robot and a standard machine. AI is making robots smarter than ever before, allowing them to handle complex tasks rather than routine ones. Robots can self-learn, allowing them to adapt to complex environments and adjust their behaviors for task completion or interaction with humans (Cai et al., 2020). Furthermore, AI and robots are critical in a variety of industries, including banking (Arjun et al., 2021), education (Limna et al., 2022; Siripipatthanakul et al., 2023), healthcare (Jiang & Cheng, 2021), and hospitality (Yang et al., 2020).

In November 2022, OpenAI unveiled ChatGPT (chat generative pre-trained transformer), a new AI chatbot that uses AI to simulate human-like conversations. This free preview release boosted OpenAI's estimated value to US\$29 billion. With ChatGPT, users can quickly receive responses to their inquiries or requests. In just five days following its initial launch, ChatGPT had already accumulated one million users, solidifying its position as the most advanced chatbot in existence. Unlike other chatbots, ChatGPT can produce exceptional prose in a matter of seconds, which has generated a lot of excitement and concern regarding its potential impact on student evaluations in higher education, among other issues. ChatGPT is an innovative language model that can generate text that is nearly indistinguishable from text written by humans. Its conversations with users are intuitive and natural (Dwivedi et al., 2023; Rathore, 2023; Rudolph et al., 2023). Since its launch, ChatGPT has gained widespread attention and attracted 100 million users within two months. OpenAI has introduced a subscription plan costing \$20 per month that provides unrestricted access to ChatGPT, especially during peak periods, and quicker response times. Further developments and updates to ChatGPT are expected, given its popularity and potential applications in various fields (Halaweh, 2023).

Given that ChatGPT is a recent technology, it is essential to investigate how people's perceptions of it as a Robo-Assistant differ across various demographics and regions. Such research could provide valuable insights into the tool's acceptance and usage among different user groups and in different contexts. Furthermore, multiple studies have been conducted on ChatGPT. For instance, Paul et al. (2023) conducted a study that provided valuable insights into the benefits and challenges of ChatGPT, offering a deeper understanding of its potential applications. Yan (2023) studied the impact of ChatGPT on learners in a second language (L2) writing practice. Still, there is a limited number of studies that delve into the factors that influence public perceptions regarding the acceptance of ChatGPT as a Robo-Assistant. Therefore, this study investigates the factors influencing public perceptions towards the acceptance of ChatGPT as a Robo-Assistant in Thailand.

This study makes a valuable contribution to the existing knowledge by uncovering the factors that influence public perceptions towards the acceptance of ChatGPT as a Robo-Assistant specifically in Thailand. Examining public perceptions in this context is crucial as it supports various important outcomes such as promoting user acceptance, enhancing user experience, addressing concerns, anticipating societal impact, and enabling informed decision-making among researchers, developers, and policymakers. This understanding empowers stakeholders to prioritize user needs, uphold ethical considerations, and develop AI technologies that have a positive impact on society. Ultimately, these implications pave the way for the successful implementation and integration of AI technologies in the field of human-robot interaction, resulting in improved user experiences and greater acceptance of such systems.

LITERATURE REVIEW

AI, automation, and robots are no longer considered far-off goals in this day and age. They have already made their way into people's daily lives and will become more prevalent in the near future. With technological advancements continuing to astound humans, most industries have recently adopted these technologies in order to remain competitive and improve their quality. The robotics market, for example, is growing faster than anyone predicted (Yarlagadda, 2015). Industry 4.0, also referred to as the fourth revolution, is a new era in which industry will deal with technologies such as robotics, automation, and AI, among others. Robotics are being used more and more in industries all over the world. Humans and robots both have advantages and disadvantages. Working safely together results in a higher quality, more accurate product in less time. The ultimate focus of robotics and Industry 4.0 is to increase productivity, produce high-quality products at a low cost, and satisfy customer expectations (Goel & Gupta, 2020). Moreover, robots have recently gained traction outside of factory floors, infiltrating unstructured environments such as homes, stores, and hospitals. They encompass everything from small devices and systems for Internet-of-Things (IoT) applications to larger physical robots capable of autonomously navigating both indoor and outdoor environments, sharing a workspace with people, and even interacting with them (Mišeikis et al., 2020).

Chatbot, a robot assistant, is a conversation software system that automatically interacts with users and mimics human communication skills. Chatbots use AI techniques to understand natural language, identify meaning and emotions, and design meaningful responses, for example, making it simple for customers to get timely answers to their questions without wasting time waiting on phone lines or sending emails repeatedly. Chatbots have the potential to reduce the number of customer calls, the average handling time, and the costs associated with customer service (Wijaya & Zoromi, 2020). Furthermore, robo-advisors have been applauded as the next operating system in finance and the new wealth management interface of the 21st century. They offer investment advice without the assistance of a human advisor. In a nutshell, robo-advisors are digital interfaces that guide investors through an entirely automated investment advisory process that begins with assessing financial goals and ends with managing the entire portfolio (Hildebrand & Bergner, 2021). While digitalization increases efficiency, it also eliminates the social aspect of human-to-human interaction in favor of human-to-computer interaction (Morana et al., 2020). There are several Robo-Assistances. For instance, ChatGPT is an AI language model that generates conversational responses to question prompts. ChatGPT allows users to enter text prompts and quickly generates text responses based on knowledge acquired through machine learning in internet engagement. On over 150 billion parameters, the model is trained using a combination of reinforcement learning algorithms and human input. The platform attracted a million users in its first week of public availability and has been dubbed the industry's next big disruptor (Dowling & Lucey, 2023; Pavlik, 2023).

Technology trend awareness refers to an individual's capacity to stay informed and attentive to emerging and popular technologies that are gaining widespread acceptance in relevant industries or markets. It encompasses the ability to recognize and comprehend the practical applications and advantages of these technologies for achieving business success. Being aware of technology trends is crucial for individuals to adapt, make informed decisions, and leverage these advancements to stay competitive in their respective fields (Pandey et al., 2021). The concept of "digital awareness" encompasses individuals' experiential understanding, comfort level, and proficiency in utilizing basic and advanced technologies. It encompasses knowledge about the functioning of various technological tools and devices and the ability to navigate them effectively. In today's technology-driven world, digital awareness is crucial for individuals to adapt, thrive, and take advantage of the numerous opportunities for personal and professional development that technology offers (Ranky, 2023). Furthermore, technological usage refers to the practical application and utilization of various technologies by individuals, organizations, or society as a whole. It encompasses the ways in which technology is employed to perform specific tasks, achieve goals, enhance efficiency, or improve overall productivity. Technological usage can include activities such as using software applications, operating electronic devices, accessing online platforms, implementing automation systems, or leveraging advanced tools and techniques to accomplish desired outcomes (Adel & Karaci, 2020; Blut & Wang, 2020; Tsou & Chen, 2022). In this study, ChatGPT awareness refers to the level of knowledge or familiarity that individuals have about ChatGPT as an AI language model and its potential applications. It encompasses understanding the

capabilities, features, and general existence of ChatGPT as a tool or service. ChatGPT usage, on the other hand, refers to the actual engagement or utilization of ChatGPT by individuals. This can include activities such as interacting with the model, generating text, or incorporating ChatGPT into specific applications or systems. Both awareness and usage are important factors to consider when examining the adoption and acceptance of ChatGPT as they provide insights into the extent to which individuals are familiar with and actively engage with the technology.

Hildebrand and Bergner (2021) studied a novel conceptualization of conversational robo-advisors based on prior work in human-to-human communication and interpersonal psychology, demonstrating that conversational robo-advisors elicit higher levels of affective trust than non-conversational robo-advisors and a more favorable evaluation of a financial services firm. They demonstrated that an increase in affective trust has a significant impact on not only firm perception, but also investor behavior, such as increased recommendation acceptance and asset allocation toward conversational robo-advisors. Furthermore, Lee et al. (2021) attempted to comprehend the underlying perceptions of hotel guests' robot-using behaviors. The findings revealed six factors influencing hotel guests' perceptions of using robot assistants, including three functional aspects (facilitating conditions, performance expectancy, and innovativeness) and three emotional aspects (i.e., social presence, hedonic motivation, and perceived importance). Gouraguine et al. (2023) proposed a collaborative tutoring environment in which a humanoid robot assisted in classroom teaching and learning. The use of educational robots has recently evolved significantly. The teaching humanlike robot assistant can entice students' interest before assisting teachers in enhancing course presentation and class management. Hjorth et al. (2021) presented a case study on the impact of plug-and-play deployment of a collaborative robot assistant to replace a human worker at manual workstations on a production line on productivity. Physical experiments were used to generate realistic cycle and changeover times, which were then used to analyze two scenarios using simulation of discrete events. If an operator must leave his or her workstation, replacing him or her with a robot assistant reduces productivity loss.

As a language model, ChatGPT can be used as a virtual assistant for various applications, including as a robot assistance. ChatGPT can be used as a chatbot for customer service in a wide range of industries, including retail, banking, healthcare, and more. It can be programmed to answer common questions, provide information, and assist customers with their needs (Kergaravat, 2023; OpenBots, 2023). ChatGPT can be used as an educational tool for children and adults alike. It can be programmed to answer questions on various topics, provide explanations, and offer guidance on how to solve problems. Moreover, ChatGPT can be used as a language translation tool for communication with people who speak different languages. It can translate text or speech in real-time and facilitate communication between people who do not speak the same language (Kasneji et al., 2023; Lo, 2023). ChatGPT can be used as an entertainment tool by providing games, jokes, and stories to users. It can be programmed to engage in conversation, tell jokes, and play games with users (AIContentfy Team, 2023). Overall, ChatGPT has the potential to be a versatile and useful robot assistant in various contexts, thanks to its ability to understand natural language and provide personalized responses (George et al., 2023; Shahriar & Hayawi, 2023).

Firat (2023) conducted a study exploring the implications of ChatGPT in the context of education. The research focused on gathering the perspectives of scholars and students to understand their perceptions. The feedback obtained from scholars and PhD students revealed a range of opinions and concerns regarding the integration of ChatGPT and AI into the educational landscape. The findings indicated a consensus among participants that AI will have a profound impact on traditional learning methods. They noted that AI technologies would shift the emphasis towards developing skills and competencies while redefining the roles of educational institutions. Despite recognizing potential challenges and issues that may arise during this transition, participants expressed optimism regarding the future of AI in education. Salah et al. (2023) explored the associations between trust in ChatGPT, user perception of ChatGPT, stereotype perception of ChatGPT, and two psychological outcomes: psychological well-being and self-esteem. The findings revealed that the stereotype perception of ChatGPT significantly predicts self-esteem. Moreover, user perception of ChatGPT and trust in ChatGPT were positively correlated with self-esteem. Additionally, the study identified that job anxiety acts as a moderator in the relationship between user perception of ChatGPT and psychological well-being. In Shoufan's (2023) study, students' perceptions of ChatGPT were examined. The findings revealed that students held a positive view of ChatGPT, finding it intriguing, motivating, and beneficial

for their studies and work. User-friendly interface providing well-structured responses and explanations, was particularly appreciated. But students also expressed concerns about accuracy of ChatGPT's answers and acknowledged that it relies on users' background knowledge as it does not replace human intelligence. Despite the limitations, students remained optimistic that ChatGPT would be improved in the future.

METHODOLOGY

A mixed method was used as the research strategy. For the quantitative approach, closed-ended questionnaires were conducted to collect the data. The questionnaire questions were developed based on reliable and valid research data. Furthermore, the questionnaire was pre-tested on 30 respondents to obtain a dedicated questionnaire, as recommended by Sitthipon et al. (2022). Moreover, the measurement instruments' validity was evaluated. Testing was performed to determine the dependability and accuracy of the measurement instruments. The target population for this study consists of ChatGPT users in Thailand. The researchers opted for convenience sampling and employed statistical analysis techniques to determine the appropriate sample size for an indefinite population. Data collection involved the distribution of questionnaires and an online survey to a total of 1,880 respondents who were ChatGPT users in Thailand and over the age of 18. The online survey was administered over a span of four months, specifically from December 2022 to March 2023. To analyze the collected data, the researchers utilized statistical analysis software to conduct descriptive and inferential analyses. According to Chicco et al. (2021) and Gomila (2021), binary regression is a model in which the target can only take one of two values, 0 or 1. Thus, the researchers used binary regression to examine the relationship between various independent variables (score, gender, education, occupation, monthly income, monthly savings, Twitter, Line, Facebook, YouTube, and Instagram) and the acceptance of ChatGPT, as a dependent variable. In statistical analysis, a dummy variable is often used to represent categorical variables, such as gender, in regression models. By including gender as a dummy variable, researchers can examine potential gender-related differences or effects while controlling for other variables in the regression model (Grotenhuis & Thijs, 2015). In the context of gender as a dummy variable, it typically takes on two values, often coded as 0 for female and 1 for male, representing different genders. The term "score" in this study refers to the cognitive test of multiple-choice answers regarding information technology. Participants' scores indicate their performance or level of knowledge in the field of information technology based on their responses to the multiple-choice questions. These scores can be used to assess participants' understanding, proficiency, and cognitive abilities specifically related to information technology concepts and principles.

For the qualitative approach, in-depth interviews were conducted. The secondary data was reviewed for appropriate key survey questions via in-depth interviews using the documentary method to obtain the primary data results. Purposive sampling is a qualitative research technique in which researchers choose the most useful sample based on their expertise. Its goal is to comprehend everything there is to know about a particular phenomenon or population (Limna & Kraiwanit, 2022). Thus, a purposeful sampling was used as a sampling method. According to Francis et al. (2010) and Namey (2017), it has been suggested that a minimum of six interviews is generally considered optimal for achieving data saturation in qualitative research. In alignment with this recommendation, the present study included a total of six respondents who possessed expertise in the fields of ChatGPT, smart AI, and Robot-Assistant. To ensure eligibility for participation, specific inclusion criteria were imposed. Firstly, participants needed to be legally recognized adults, aged 18 years or older. Secondly, they were required to be residents of Thailand, currently residing within the geographical boundaries of the country. Thirdly, the targeted population consisted of individuals with specialized knowledge and expertise in the domains of smart AI and Robot-Assistant. Lastly, candidates were expected to demonstrate prior familiarity and practical experience in utilizing ChatGPT. The interviews were conducted in February 2023, allowing for recent and relevant insights to be captured. Content analysis is a qualitative method for comprehensively and objectively explaining and quantifying specific phenomena through the use of valid inferences derived from verbal, visual, or written data (Siripipatthanakul et al., 2022). Moreover, according to Mortelmans (2019), NVivo is a helpful tool to gain depth and breadth in one's analysis. Hence, the content analysis method and the NVivo software program were also used to analyze the qualitative data gathered through in-depth interviews.

Table 1. Omnibus test of the model's performance using all the independent variables

		Chi-square	df	Sig.
Step 1	Step	493.645	7	.000
	Block	493.645	7	.000
	Model	493.645	7	.000

Table 2. Model summary using all the independent variables

Step	-2 log likelihood	Cox & Snell R-square	Nagelkerke R-square
1	750.492 ^a	.231	.477

Note. ^aEstimation terminated at iteration number eight because parameter estimates changed by less than .001

Table 3. Classification table for back-testing (including all the independent variables)

Observed	Predicted		Percentage correct
	Awareness		
	No	Yes	
Step 1 Awareness	No	90	46.60
	Yes	87	94.80
Overall percentage		1,600	89.89

Note. The cut-off value is .500

Table 4. Variables in model using all independent variables to predict ChatGPT as Robo-Assistant awareness

	B	Standard error	Wald	df	Sig.	Exp (B)	
Step 1 ^a	Score	-.433	.097	20.013	1	.000	.649
	Gender	-1.684	.273	38.018	1	.000	.186
	Education	-.808	.254	10.068	1	.002	.446
	Occupation	.317	.247	1.642	1	.200	1.373
	Monthly income	-.154	.103	2.219	1	.136	.857
	Monthly savings	-.093	.091	1.048	1	.306	.911
	Twitter	.815	.226	13.042	1	.000	2.258
	Line	1.122	.243	21.265	1	.000	3.072
	Facebook	.998	.204	24.007	1	.000	2.712
	YouTube	.623	.227	7.550	1	.006	1.865
	Instagram	1.423	.214	44.196	1	.000	4.149
	Constant	4.130	.827	24.917	1	.000	62.167

Note. ^aVariable(s) entered in step 1: score, gender, education, occupation, monthly income, monthly savings, Twitter, Line, Facebook, YouTube, & Instagram

RESULTS

This study participants were Thai people who used technology on a daily basis. 1,880 participants completed online questionnaires.

ChatGPT as Robo-Assistant Awareness

As shown in **Table 1**, given that Chi-square value of 493.645 exceeds the critical value at a significance level of 0.05 and with seven degrees of freedom, it indicates that the dependent variable is indeed significantly explained by all of the independent variables included in the model. This implies that the independent variables collectively have a meaningful impact on the outcome of the dependent variable.

According to **Table 2**, the model with an R-squared value of 0.477 implies that it explains approximately 47.7% of the variation in the result, while the significance value of 0.05 suggests that the relationship between the independent variables and the dependent variable is statistically significant at the 5% level.

According to **Table 3**, the classification specifies that the model with all independent variables was able to predict ChatGPT as Robo-Assistant awareness in Thailand with an accuracy rate of 89.89% of cases when a cut-off value of 0.500 or 50% was used.

Predictive regression equation of **model 1** using coefficients from **Table 4** can be described by equation: $P = \frac{1}{1+e^{-z}}$, where P is ChatGPT as Robo-Assistant awareness, and $Z=4.130-0.433$ (score)-1.684 (gender)-0.808 (education)+0.815 (Twitter)+1.122 (Line)+0.998 (Facebook)+0.623 (YouTube)+1.423 (Instagram).

Table 5. Omnibus test of the model's performance using all the independent variables

		Chi-square	df	Sig.
Step 1	Step	1301.235	10	.000
	Block	1301.235	10	.000
	Model	1301.235	10	.000

Table 6. Model summary using all the independent variables

Step	-2 log likelihood	Cox & Snell R-square	Nagelkerke R-square
1	825.943 ^a	.538	.750

Note. ^aEstimation terminated at iteration number eight because parameter estimates changed by less than .001

Table 7. Classification table for back-testing (including all the independent variables)

Observed	Predicted			Percentage correct	
	Awareness				
	No	Yes			
Step 1	Awareness	No	518	30	94.50
		Yes	32	1,107	97.20
Overall percentage					96.30

Note. The cut-off value is .500

The significance level of each independent variable is presented in **Table 4**. It shows that the dependent variable (ChatGPT as Robo-Assistant awareness) could be described by score, gender, education, Twitter, Line, Facebook, YouTube, and Instagram. Conversely, occupation, monthly income, and monthly savings were not significant. When there was an increase of one unit in score, ChatGPT awareness decreased from 1 to 0.649 (1-0.649=0.351). When the gender changed from female (coded as 0) to male (coded as 1), there was a decrease in the awareness rate from 1 to 0.186 (1-0.186=0.814). This suggests that males were less likely to have ChatGPT awareness compared to females based on the results of the study. When there was an increase of one unit in education, ChatGPT awareness decreased from 1 to 0.446 (1-0.446=0.554). Moreover, when using Twitter, ChatGPT awareness increased by 2.258. When using Line, ChatGPT awareness increased by 3.072. When using Facebook, ChatGPT awareness increased by 2.712. When using YouTube, ChatGPT awareness increased by 1.865. When using Instagram, the ChatGPT awareness increased by 4.149.

ChatGPT as Robo-Assistant Usage

As shown in **Table 5**, with a Chi-square value of 1301.235 and 10 degrees of freedom, the dependent variable can indeed be explained by all the independent variables included in the model at a significance level of 0.05. This suggests that there is a statistically significant relationship between the independent and dependent variables, indicating that the independent variables contribute significantly to explaining the variation in the dependent variable.

According to **Table 6**, the model's ability to explain 75.0% of the variation in the result, coupled with a significance value of 0.05, indicates a strong and statistically significant relationship between the independent variables and the dependent variable.

According to **Table 7**, the model with all independent variables was able to predict the use of ChatGPT as Robo-Assistant in Thailand with an accuracy rate of 96.3% when a cut-off value of 0.500 or 50% was used.

The predictive regression equation of **model 2** using the coefficients from **Table 8** can be described by the following equation: $P = \frac{1}{1+e^{-z}}$, where P is ChatGPT as Robo-Assistant usage, and $Z=3.728-0.545$ (score)-1.593 (gender)-3.015 (education)+0.324 (monthly savings)+0.815 (Twitter)+1.122 (Line)+0.998 (Facebook)+0.623 (YouTube)+1.423 (Instagram).

The significance level of each independent variable is presented in **Table 8**. It shows that the dependent variable (ChatGPT as Robo-Assistant usage) could be described by score, gender, education, monthly savings, Twitter, Line, Facebook, YouTube, and Instagram. Conversely, occupation and monthly income were not significant. When there was an increase of one unit in score, ChatGPT usage decreased from 1 to 0.580 (1-0.580=0.420). When the gender changed from female (coded as 0) to male (coded as 1), there was a decrease in the usage rate from 1 to 0.203 (1-0.203=0.797).

Table 8. Variables in model using all independent variables to predict ChatGPT as Robo-Assistant usage

		B	Standard error	Wald	df	Sig.	Exp (B)
Step 1 ^a	Score	-.545	.080	46.903	1	.000	.580
	Gender	-1.593	.270	34.778	1	.000	.203
	Education	-3.015	.341	78.041	1	.000	.049
	Occupation	-.084	.317	.070	1	.792	.920
	Monthly income	.324	.190	2.927	1	.087	1.383
	Monthly savings	-.445	.146	9.300	1	.002	.641
	Twitter	.815	.226	13.042	1	.000	2.258
	Line	1.122	.243	21.265	1	.000	3.072
	Facebook	.998	.204	24.007	1	.000	2.712
	YouTube	.623	.227	7.550	1	.006	1.865
	Instagram	1.423	.214	44.196	1	.000	4.149
	Constant	3.728	.572	42.422	1	.000	41.606

Note. ^aVariable(s) entered in step 1: score, gender, education, occupation, monthly income, monthly savings, Twitter, Line, Facebook, YouTube, & Instagram

This suggests that males were less likely to use ChatGPT compared to females based on the results of the study. When there was an increase of one unit in education, ChatGPT usage decreased from 1 to 0.049 ($1 - 0.049 = 0.951$). When there was an increase of one unit in monthly savings, ChatGPT usage decreased from 1 to 0.641 ($1 - 0.641 = 0.359$). Moreover, when using Twitter, ChatGPT usage increased by 2.258. When using Line, ChatGPT usage increased by 3.072. When using Facebook, ChatGPT usage increased by 2.712. When using YouTube, ChatGPT usage increased by 1.865, and when using Instagram, ChatGPT usage increased by 4.149.

Content Analysis and NVivo

In this study, a diverse range of respondents was included, each with unique demographic characteristics and professional backgrounds. Respondent one, a 32-year-old female, held a position as an educator. Respondent two, a 30-year-old male, was engaged in the occupation of content moderation. Respondent three, a 29-year-old female, worked as a writer, while respondent four, a 37-year-old male, also pursued a career in writing. Respondent five, a 42-year-old female, brought the perspective of a doctor to the study. Lastly, respondent six, a 29-year-old female, contributed insights as a language translator.

Six respondents who used Robo-Assistant were interviewed, during which time the respondents said that they were aware of Robo-Assistant. Moreover, they agreed that Robo-Assistant is beneficial in several ways. For instance, ChatGPT, a chatbot launched by OpenAI, can write code to create an online store, and it can also organise trips.

We live in an age of intelligent personal assistants. Companies of all sizes are moving forward with the vision of intelligent virtual personal assistants, such as Amazon Alexa and ChatGPT, and conversational interaction with these assistants will increasingly be the norm as the primary way of interacting with these companies' services.

I am aware of Robo-Assistant, and I would like to use it. With technology advancing at such a rapid pace, one of the opportunities for us is to see if we can combine robotics, AI, and other technologies to create tools that will benefit society.

Actually, I have been using ChatGPT for weeks. When ChatGPT was released to the public, it proved to be far more advanced than many in the tech industry had anticipated. You can tell the chatbot you are gluten-free and a fan of Italian food, and it will generate a meal plan and grocery list for you in seconds. I think it is convenient.

The interpretation of interviews and analysis were based on NVivo. To make the results more understandable, a word frequency query was run in NVivo. The words that are frequently used by respondents during interviews are displayed in the word cloud in [Figure 1](#).

highlighted how robo-advisors could help consumers make difficult investment decisions, as well as how social design elements influenced consumers' perceptions of the advisory system and advice-seeking behavior, paving the way for a better understanding of the benefits of new technological developments in terms of reducing behavioral biases that could impose significant economic costs. Moreover, Bertacchini et al. (2017) concluded that by merging social robotics and machine learning systems, the potential of robotics to support people in real-life situations would increase, allowing customers to accept advanced technologies in a more gradual manner. As concluded by George et al. (2023), ChatGPT represents a significant advancement in the field of AI and natural language processing. Its potential applications are numerous, ranging from customer service to language translation to education and entertainment. With features such as topic detection, emotion detection, and sentiment analysis, it has the potential to create more realistic and personalized interactions between users and bots. Furthermore, the article suggests that ChatGPT could be used to enhance e-commerce via chat, as well as other sectors such as education, finance, news, and productivity. It is clear that ChatGPT has the potential to revolutionize how we interact with technology and improve our daily lives. However, as with any new technology, there will likely be challenges to overcome, such as ensuring ethical use, addressing biases, and protecting user privacy. Nevertheless, with ongoing research and development, it's possible that ChatGPT and other AI technologies could usher in the next definitive moment in history.

CONCLUSIONS

The study explored public perceptions towards the acceptance of ChatGPT as a Robo-Assistant in Thailand, using a mixed method approach that collected data through closed-ended questionnaires and in-depth interviews. The study found that ChatGPT awareness and usage were influenced by factors such as gender, education, and social media use, but not by occupation or monthly income. The study confirmed acceptance of ChatGPT among Thai people and highlighted the importance of developing sociable robots that consider human interaction and communication. However, ChatGPT as Robo-Assistant may pose a risk. Hence, a policy for the use of ChatGPT as Robo-Assistant should be developed. Also, developing ChatGPT as a Robo-Assistant is critical because establishing truly sociable robots necessitates understanding how human interactions can be applied to human-robot interactions. A sociable robot must be capable of interacting with humans while considering aspects like verbal and nonverbal communication (emotions, postures, and gestures).

The study provides valuable insights into the factors influencing ChatGPT awareness and usage, including gender, education, and social media use. These findings can inform researchers and developers in understanding the target audience and devising strategies to promote ChatGPT's acceptance and adoption. Importantly, the study reveals that factors such as occupation and monthly income have little impact on ChatGPT acceptance, indicating the need to focus on more relevant determinants when designing interventions and marketing campaigns. Furthermore, the study confirms a positive attitude towards AI-based assistants among Thai people, suggesting a potential market and encouraging further research and development in this domain. The study emphasizes the importance of considering human interaction and communication in the development of sociable robots like ChatGPT, underscoring the value of creating assistants that can engage in natural, human-like conversations. As digital technologies become increasingly integrated into various economic activities, the practical insights from this study can guide decision-making processes, aiding in target audience selection, feature customization, and user experience design for ChatGPT and similar AI-based assistants.

While the study sheds light on public perceptions of ChatGPT as a Robo-Assistant, there is scope for further research to explore different contexts and demographics. Future studies could investigate the acceptance of Robo-Assistants in diverse countries and cultures, considering how cultural and societal factors may influence perceptions. Additionally, there is a need for more research to examine the potential social, ethical, and economic implications of utilizing Robo-Assistants, particularly in sensitive domains like healthcare and law. Furthermore, research focused on the design and development of sociable robots can contribute to improving human-robot interactions and enhancing overall acceptance of Robo-Assistants. Undertaking additional research can provide valuable insights into the potential benefits and risks associated with Robo-Assistants, ultimately guiding their future development and implementation.

This study acknowledges a limitation that should be taken into consideration. When researchers choose to employ a convenient sampling method for sample collection, it is important to acknowledge the inherent limitations associated with this approach. The lack of random selection in convenience sampling increases the risk of sampling bias, thereby reducing the generalizability of the study's findings to the broader population. It is imperative for researchers to explicitly recognize this limitation and discuss its potential impact on the validity and reliability of the study's outcomes. By openly acknowledging the risk of sampling bias, researchers exhibit transparency and allow readers to critically evaluate the extent to which the findings can be applied beyond the specific sample. To improve future research, it is recommended that more rigorous sampling methods be employed to enhance the generalizability of the findings and foster a more representative understanding of the phenomenon being studied.

Author contributions: KJ & TK: investigation; KJ, TK, & PL: conceptualization, methodology; KJ, TK, PL, & PS: software, validation, writing, & resources; & TK: supervision. All authors approved the final version of the article.

Funding: The authors received no financial support for the research and/or authorship of this article.

Ethics declaration: Authors declared that the study comprises a mixed-methods approach involving a quantitative online questionnaire survey and a qualitative interview survey. To address potential ethical complications, the study's surveys were subjected to validation by three experts specializing in the fields of business and education. Additionally, stringent measures were implemented to ensure participants' compliance with ethical guidelines. Specifically, individuals below 18 years of age were explicitly excluded from participating in the study. Authors further declared that the research objective was transparently communicated to participants, accompanied by a clear statement emphasizing their right to discontinue their participation at any point if they so desired. Furthermore, a mechanism was in place whereby incomplete responses would render the submission invalid, effectively removing participants who failed to answer all questions from the survey. Consequently, the study was granted a waiver for formal approval, indicating compliance with relevant ethical considerations.

Declaration of interest: Authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

REFERENCES

- Adel, A. Y. A. D., & Karaci, A. (2020). Adaptation of media and technology usage scale and attitude scale to Arabic. *Avrupa Bilim ve Teknoloji Dergisi [European Journal of Science and Technology]*, 18, 389-400. <https://doi.org/10.31590/ejosat.670527>
- AIContentfy Team. (2023). ChatGPT and the entertainment industry: Transforming storytelling. *AIContentfy*. <https://aicontentfy.com/en/blog/chatgpt-and-entertainment-industry-transforming-storytelling-1>
- Antonelli, D., & Bruno, G. (2023). Human-robot collaboration in industry: Threats and opportunities. In V. K. Manupati, G. D. Putnik, & M. L. R. Varela (Eds.), *Smart and sustainable manufacturing systems for industry 4.0* (pp. 65-83). CRC Press. <https://doi.org/10.1201/9781003123866>
- Arjun, R., Kuanr, A., & Suprabha, K. R. (2021). Developing banking intelligence in emerging markets: Systematic review and agenda. *International Journal of Information Management Data Insights*, 1(2), 100026. <https://doi.org/10.1016/j.ijime.2021.100026>
- Back, C., Morana, S., & Spann, M. (2022). Do robo-advisors make us better investors? *SSRN*. <https://doi.org/10.2139/ssrn.3777387>
- Bertacchini, F., Bilotta, E., & Pantano, P. (2017). Shopping with a robotic companion. *Computers in Human Behavior*, 77, 382-395. <https://doi.org/10.1016/j.chb.2017.02.064>
- Blut, M., & Wang, C. (2020). Technology readiness: A meta-analysis of conceptualizations of the construct and its impact on technology usage. *Journal of the Academy of Marketing Science*, 48, 649-669. <https://doi.org/10.1007/s11747-019-00680-8>
- Cai, X., Ning, H., Dhelim, S., Zhou, R., Zhang, T., Xu, Y., & Wan, Y. (2020). Robot and its living space: A roadmap for robot development based on the view of living space. *Digital Communications and Networks*, 7(4), 505-517. <https://doi.org/10.1016/j.dcan.2020.12.001>
- Chicco, D., Warrens, M. J., & Jurman, G. (2021). The coefficient of determination R-squared is more informative than SMAPE, MAE, MAPE, MSE and RMSE in regression analysis evaluation. *PeerJ Computer Science*, 7, e623. <https://doi.org/10.7717/peerj-cs.623>
- Dowling, M., & Lucey, B. (2023). ChatGPT for (finance) research: The Bananarama conjecture. *Finance Research Letters*, 103662. <https://doi.org/10.1016/j.frl.2023.103662>

- Dwivedi, Y.K., Kshetri, N., Hughes, L., Slade, E.L., Jeyaraj, A., Kar, A.K., Baabdullah, A.M., Koohang, A., Raghavan, V., Ahuja, M., & Albanna, H. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- Firat, M. (2023). What ChatGPT means for universities: Perceptions of scholars and students. *Journal of Applied Learning and Teaching*, 6(1), 1-7. <https://doi.org/10.37074/jalt.2023.6.1.22>
- Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalizing data saturation for theory-based interview studies. *Psychology and Health*, 25(10), 1229-1245. <https://doi.org/10.1080/08870440903194015>
- Gavrilova, L., Petrov, V., Kotik, A., Sagitov, A., Khalitova, L., & Tsoy, T. (2019). Pilot study of teaching English language for preschool children with a small-size humanoid robot assistant. In *Proceedings of the 2019 12th International Conference on Developments in eSystems Engineering* (pp. 253-260). IEEE. <https://doi.org/10.1109/DeSE.2019.00055>
- George, A. S., George, A. S. H., & Martin, A. S. G. (2023). A review of ChatGPT AI's impact on several business sectors. *Partners Universal International Innovation Journal*, 1(1), 9-23. <https://doi.org/10.5281/zenodo.7644359>
- Goel, R., & Gupta, P. (2020). Robotics and industry 4.0. In A. Nayyar, & A. Kumar (Eds.), *A roadmap to industry 4.0: Smart production, sharp business and sustainable development* (pp. 157-169). Springer. https://doi.org/10.1007/978-3-030-14544-6_9
- Gomila, R. (2021). Logistic or linear? Estimating causal effects of experimental treatments on binary outcomes using regression analysis. *Journal of Experimental Psychology: General*, 150(4), 700. <https://doi.org/10.1037/xge0000920>
- Gouraguine, S., Salhi, I., Riad, M., Qbadou, M., & Mansouri, K. (2023). Towards a humanoid teaching assistant-robot-primitives knowledge modeling. In *Proceedings of the International Conference on Advanced Intelligent Systems and Informatics* (pp. 802-811). Springer. https://doi.org/10.1007/978-3-031-20601-6_66
- Grotenhuis, M. T., & Thijs, P. (2015). Dummy variables and their interactions in regression analysis: Examples from research on body mass index. *arXiv*. <https://doi.org/10.48550/arXiv.1511.05728>
- Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology*, 15(2), ep421. <https://doi.org/10.30935/cedtech/13036>
- Hildebrand, C., & Bergner, A. (2021). Conversational robo advisors as surrogates of trust: Onboarding experience, firm perception, and consumer financial decision making. *Journal of the Academy of Marketing Science*, 49(4), 659-676. <https://doi.org/10.1007/s11747-020-00753-z>
- Hjorth, S., Schou, C., Ribeiro da Silva, E., Tryggvason, F., Sparre Sørensen, M., & Forbech, H. (2021). A case study of plug and produce robot assistants for hybrid manufacturing workstations. In *Towards sustainable customization: Bridging smart products and manufacturing systems* (pp. 242-249). Springer. https://doi.org/10.1007/978-3-030-90700-6_27
- Jiang, H., & Cheng, L. (2021). Public perception and reception of robotic applications in public health emergencies based on a questionnaire survey conducted during COVID-19. *International Journal of Environmental Research and Public Health*, 18(20), 10908. <https://doi.org/10.3390/ijerph182010908>
- Kasneji, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., & Krusche, S. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- Kergaravat, C. (2023). ChatGPT in customer service: How your business can leverage the technology. *Apizee*. <https://www.apizee.com/chatgpt-customer-service/>
- Kraiwanit, T., Jangjarat, K., & Atcharanuwat, J. (2022). The acceptance of financial robo-advisors among investors: The emerging market study. *Journal of Governance & Regulation*, 11(2), 332-339. <https://doi.org/10.22495/jgrv11i2siart12>
- Lee, Y., Lee, S., & Kim, D. Y. (2021). Exploring hotel guests' perceptions of using robot assistants. *Tourism Management Perspectives*, 37, 100781. <https://doi.org/10.1016/j.tmp.2020.100781>

- Limna, P., & Kraiwanit, T. (2022). Service quality and its effect on customer satisfaction and customer loyalty: A qualitative study of Muang Thai Insurance Company in Krabi, Thailand. *Journal for Strategy and Enterprise Competitiveness*, 1(2), 1-16.
- Limna, P., Jakwatanatham, S., Siripipattanakul, S., Kaewpuang, P., & Sriboonruang, P. (2022). A review of artificial intelligence (AI) in education during the digital era. *Advance Knowledge for Executives*, 1(1), 1-9.
- Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410. <https://doi.org/10.3390/educsci13040410>
- Ma, X., Yang, X., Zhao, S., Fu, C. W., Lan, Z., & Pu, Y. (2012). Robots in my contact list: Using social media platforms for human-robot interaction in domestic environment. In *Proceedings of the 10th Asia Pacific Conference on Computer Human Interaction* (pp. 133-140). <https://doi.org/10.1145/2350046.2350076>
- Mišeikis, J., Caroni, P., Duchamp, P., Gasser, A., Marko, R., Mišeikienė, N., Zwilling, F., De Castelbajac, C., Eicher, L., Früh, M., & Früh, H. (2020). Lio-A personal robot assistant for human-robot interaction and care applications. *IEEE Robotics and Automation Letters*, 5(4), 5339-5346. <https://doi.org/10.1109/LRA.2020.3007462>
- Morana, S., Gnewuch, U., Jung, D., & Granig, C. (2020). The effect of anthropomorphism on investment decision-making with robo-advisor Chatbots. In *Proceedings of European Conference on Information Systems*.
- Mortelmans, D. (2019). Analyzing qualitative data using NVivo. In H. Van den Bulck, M. Puppis, K. Donders, & L. Van Audenhove (Eds.), *The Palgrave handbook of methods for media policy research* (pp. 435-450). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-16065-4_25
- Namey, E. (2017). Riddle me this: How many interviews (or focus groups) are enough? *R&E Research for Evidence*. <https://researchforevidence.fhi360.org/riddle-me-this-how-many-interviews-or-focus-groups-are-enough>
- OpenBots. (2023). ChatGPT for customer support, sales and communication. *OpenBots*. <https://openbots.ai/chatgpt-for-customer-support-sales-and-communication/>
- Pandey, V., Misra, N., Greeshma, R., Astha, A., Jeyavel, S., Lakshmana, G., Rajkumar, E., & Prabhu, G. (2021). Techno trend awareness and its attitude towards social connectedness and mitigating factors of COVID-19. *Frontiers in Psychology*, 12, 637395. <https://doi.org/10.3389/fpsyg.2021.637395>
- Paul, J., Ueno, A., & Dennis, C. (2023). ChatGPT and consumers: Benefits, pitfalls and future research agenda. *International Journal of Consumer Studies*, 1-13. <https://doi.org/10.1111/ijcs.12928>
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. *Journalism & Mass Communication Educator*, 10776958221149577. <https://doi.org/10.1177/10776958221149577>
- Ranky. (2023). Digital awareness—An essential of today's increasingly interconnected world. *Ranky*. <https://www.ranky.co/growth-hacking-and-inbound-marketing-blog/digital-awareness-an-essential-of-todays-increasingly-interconnected-world#>
- Rathore, B. (2023). Future of AI & generation alpha: ChatGPT beyond boundaries. *Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal*, 12(1), 63-68.
- Rincon, J. A., Costa, A., Novais, P., Julian, V., & Carrascosa, C. (2019). A new emotional robot assistant that facilitates human interaction and persuasion. *Knowledge and Information Systems*, 60(1), 363-383. <https://doi.org/10.1007/s10115-018-1231-9>
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 1-22. <https://doi.org/10.37074/jalt.2023.6.1.9>
- Salah, M., Alhalbusi, H., Ismail, M. M., & Abdelfattah, F. (2023). Chatting with ChatGPT: Decoding the mind of Chatbot users and unveiling the intricate connections between user perception, trust and stereotype perception on self-esteem and psychological well-being. *Research Square*, 1-26. <https://doi.org/10.21203/rs.3.rs-2610655/v2>
- Shahriar, S., & Hayawi, K. (2023). Let's have a chat! A conversation with ChatGPT: Technology, applications, and limitations. *arXiv*. <https://doi.org/10.48550/arXiv.2302.13817>
- Siripipatthanakul, S., Jaipong, P., Limna, P., Sitthipon, T., Kaewpuang, P., & Sriboonruang, P. (2022). The impact of talent management on employee satisfaction and business performance in the digital economy: A qualitative study in Bangkok, Thailand. *Advance Knowledge for Executives*, 1(1), 1-17.

- Siripipatthanakul, S., Muthmainnah, Siripipattanakul, S., Sriboonruang, P., Kaewpuang, P., Sitthipon, T., Limna, P., & Jaipong, P. (2023). Gamification and edutainment in 21st century learning. In *Multidisciplinary approaches to research* (pp. 210-219). Yayasan Corolla Education Center.
- Sitthipon, T., Limna, P., Jaipong, P., Siripipattanakul, S., & Auttawechasakoon, P. (2022). Gamification predicting customers' repurchase intention via e-commerce platforms through mediating effect of customer satisfaction in Thailand. *Review of Advanced Multidisciplinary Sciences, Engineering & Innovation*, 1(1), 1-14.
- Tsou, H. T., & Chen, J. S. (2022). How does digital technology usage benefit firm performance? Digital transformation strategy and organizational innovation as mediators. *Technology Analysis & Strategic Management*, 1-14. <https://doi.org/10.1080/09537325.2021.1991575>
- Wijaya, Y., & Zoromi, F. (2020). Chatbot designing information service for new student registration based on AIML and machine learning. *Journal of Artificial Intelligence and Applications*, 1(1), 1-10. <https://doi.org/10.33372/jaia.v1i1.638>
- Yakimova, V. A. (2020). Cognitive mechanism for creating a robot assistant in compliance activities. In *Proceedings of the 2nd International Scientific and Practical Conference on Digital Economy* (pp. 241-245). Atlantis Press. <https://doi.org/10.2991/aebmr.k.201205.040>
- Yan, D. (2023). Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation. *Education and Information Technologies*, 1-25. <https://doi.org/10.1007/s10639-023-11742-4>
- Yang, L., Henthorne, T. L., & George, B. (2020). Artificial intelligence and robotics technology in the hospitality industry: Current applications and future trends. In B. George, & J. Paul (Eds.), *Digital transformation in business and society* (pp. 211-228). https://doi.org/10.1007/978-3-030-08277-2_13
- Yarlagadda, R. T. (2015). Future of robots, AI and automation in the United States. *International Engineering Journal for Research & Development*, 1(5), 1-6.

