Public Perceptions of Chatbot Technology

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Abstract

Background: The development of chatbot technology is a sector that has seen incredible advancements from simple rule-based systems to sophisticated conversational agents, with the potential to transform user interactions and customer service paradigms. This study dives into the public's impressions of chatbot technology in order to identify insights that can define the way towards digital transformation in the human-AI field.

Aims: The primary objective of this study was to thoroughly investigate public impressions of chatbot technology. The study aimed to examine whether aspects like consumer comfort, familiarity with technological agents, personalisation levels, privacy concerns associated with their use and enhanced user experiences of chatbot have an effect on people's views on the potential of chatbots to replace humans in various fields in the future. The study also sought to evaluate how these factors impact people's opinion on chatbot identity disclosure during chatbot interactions.

Methodology: A well-established questionnaire was used to gather data from a diverse sample of individuals, mainly using a quantitative research technique. The questionnaire was intended to gather and comprehend participants' perspectives on various aspects of chatbot technology. The investigation was conducted out using chi-square tests to assess the potential of a chatbot to replace humans. The influence of several factors on chatbot identity disclosure viewpoint was assessed using logistic regression.

Results: According to the results chatbot ease of use, personalisation level, and improved experience have a substantial impact on chatbot assessments of proficiency. However, age, gender, degree of comfort, privacy issues, and identity disclosure had no influence. The relationship between human preferences and chatbot potential remains uncertain. The outcome of the logistic regression analysis demonstrated that personalisation levels, individual preference for human interaction over chatbots, and overall improved user experiences have a substantial effect on participants' perceptions towards chatbot disclosure practices.

Conclusion: The research explores diverse user interactions with chatbots, emphasising the influence of personalisation, human preference, technical knowledge, and chatbot competencies on technology adoption, eventually influencing approaches to improving user experiences in a digital society.

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Chapter One

1. Introduction

1.1 Chatbot Technology motivations and adoption

Chatbots are a significant advancement in human-computer interaction technology. A chatbot essentially implies a technology that allows a conversation with a machine. Chatbots began as computer programmes that responded to user enquiries using keywords and pattern matching based on a pre-written script. To deliver human-like replies to inquiries, modern chatbots employ cutting-edge technology such as artificial intelligence (AI), machine learning (ML), natural language understanding (NLU), natural language processing (NLP), and so on (Shweta & Main, 2023). Users heavily rely on chatbots for a variety of different tasks ranging from customer support, banking procedures, education, travel information and booking to healthcare and fitness apps. Through simple interactions with a 'human-like' machine, one can get jobs done or chat without knowing if they are conversing with a human or a robot.

As per Sudhakar (2021), chatbots have enormously evolved in customer assistance, propelling the transition of present-day service desks. These bots have demonstrated the potential for substantial breakthroughs such as sentiment tracking, natural language processing (NLP), and machine learning from the very beginning. Virtual assistants are blurring the differences between human and artificial intelligence in duties connected to service desks and customer support as they evolve. They are designed to talk and act like humans to enhance user experience. The digital revolution, powered by massive companies such as Apple, Google, and Amazon, has increased customer expectations for personalised experiences which demands a continuous contextual comprehension (Sudhakar, 2021). Exploring the history of chatbots, from their earliest versions to today's unsupervised, context-aware conversational AI, offers useful insights into the trajectory of progress.

One of the primary reasons of chatbot implementation by organisations could be the lack of staff to handle specific calls or conversations that are generic FAQs regarding their product or their response time. Chatbots are predominantly used to replace humans when unavailable, similar to a mobile or a bank operator call that diverts to a bot if the line is busy. As per Caldarini et al.’s (2022a) research, chatbots are more engaging than static FAQ sites, give simultaneous support to several users, and are more affordable. This accessibility may be vital in the medical industry, where time-critical decisions must be made.

They can not only give client service, but also entertainment and mutual support. However, user engagement and trust are affected by the amount of human-likeness and the admission of the chatbot's behaviour. A personal assistant chatbot will be assessed primarily based on the effectiveness of the interaction, for instance, did the chatbot fulfil the job requested by the user, but a companion chatbot will be judged on its ability to maintain the discussion and engage people (Caldarini et al., 2022b).

Chatbots are typically categorised in two groups, rule- based and AI-driven chatbots. According to Gupta (2023), with the launch of Facebook's Messenger platform, which provides automated customer care for businesses, rule-based chatbots gained popularity. They thrive at resolving simple requests such as making restaurant reservations or purchasing tickets, and are sometimes known as "button-based" or "menu-based" chatbots. These chatbots use decision trees, which provide users with predetermined possibilities that lead to suitable replies. These chatbots rely on user input and struggle with complicated settings. When searches surpass specified rules, they lack context awareness, making it difficult to solve complex situations. Although some can recognise keywords, their replies are constrained to established criteria, which sometimes leads to dissatisfaction when user inquiries vary from these restrictions. On the other hand, chatbots driven by artificial intelligence employ natural language processing (NLP) technology to grasp the purpose behind the query and address the customer's problem without the need for human intervention (Gupta, 2023). Thus, it can be observed that the most notable distinction between AI chatbots and rule-based chatbots is the use of machine learning models, which considerably boosts the chatbot's functionality by allowing it to recognise a variety of inquiries submitted by humans, resulting in more effective and dynamic thinking.

It is essential to determine why people like or dislike chatbots. The purpose of using chatbots can vary from obtaining information or personal assistance to entertainment. Brandtzaeg & Følstad (2018) found that along with information retrieval, some users reported social and relational factors as their main reason for using chatbots. Some even reported that they were using chatbots to explore new technology. Initially, chatbots were designed to engage in social conversations, but their utility gradually transformed into more task-oriented applications to produce a constructive outcome. In addition, the emotional element in decision-making was incorporated to make the conversations more human-like or socially acceptable Brandtzaeg & Følstad (2018).

1.2 Significance of the study and areas explored

The fundamental concept of this study is built on the interaction between several aspects impacting people's opinions of chatbot technology involving user's experience and evaluation of chatbot conversations. Several significant aspects influence this experience, particularly technology understanding and ability to differentiate between human and AI. The user's broad impression of chatbot technology, including their familiarity with it, past encounters, and opinions about its capabilities and limits encapsulates the technological understanding part. The user experience component incorporates a variety of factors such as the ease of interaction, responsiveness of the chatbot, and overall satisfaction. Undoubtedly, positive user experiences can drive the acceptability and adoption of chatbot technology. Users' degree of comfort and desire to interact with chatbots covers their willingness to use chatbots over humans, for various requirements, for instance, health advice or information.

The comfort levels can be determined by the understanding that people have of chatbots and how they operate, understanding exactly what questions to ask, and how to interpret or apply the responses received by chatbots to solve their task or query. Some domains may require chatbots to be more personalised, and may ask for user information that they are uncomfortable about sharing, this may lead to inhibitions among the public while approaching chatbots with their data. The user concerns may be pertaining to privacy of the data that they share, for instance, during a healthcare advice conversation, or data security, trust, and dependability. Considering the example of mental well-being apps, one can determine their efficiency by examining how closely the chatbot resembles human-like interactions and their influence on the overall user experience. The capability of users to distinguish between a conversation with a chatbot and a conversation with a human impact their perceptions and trust.

All these factors act as drivers in evaluating whether chatbots have a potential to replace humans in the near future. They will also be used to evaluate how much each aspect impacts people’s point of view on whether chatbots should disclose their non-human identity before interaction. These factors together result in varying impressions of chatbot technology. These aspects aids in understanding the complex interaction of components that impact user perceptions, hence assisting in the creation of more successful and user-friendly chatbot applications across several domains. The study hopes to shed light on these issues by investigating them.

1.3 Research Aims and Objectives

The primary goal of the study is to evaluate how chatbot technology is perceived in today's world. This study aims to investigate people's perception regarding chatbot technology and most importantly whether they believe that chatbots have the potential to replace humans in the near future. It also intends to assess the degree to which each factor influences people's perceptions of whether chatbots should reveal their artificial identity prior to engagement. It includes evaluating their willingness, inhibitions and motivations to use chatbots for various types of tasks in their daily lives.

Understanding user requirements and motivations is necessary to create successful automated interaction systems. Moreover, user expectations constantly change according to technological innovations creating new demands in the Human-AI field. Hence, understanding peoples' viewpoints on chatbot technology has become necessary to develop new technologies. The objectives cover the following:

i. To determine whether the comfort and personalisation levels impacts people's impression of chatbot potential.

ii. To explore whether identity disclosure, ease of use, privacy concerns, human representative preference affects people's opinion on chatbot's performance.

iii. To explore people's attitude regarding chatbot's artificial identity disclosure with respect to all the factors.

iv. To understand people's positive and negative experiences regarding chatbots and examine what drives people's attitudes towards the chatbot technology acceptance.

v. To evaluate how people perceive chatbots as a solution to daily problems and whether they believe that chatbots can replace humans in the near future.

1.4 Overview of methodology and expected results

The methodology outlines the systematic procedure used to evaluate individual perceptions of chatbot technology. The main idea of the study emphasises the various factors impacting user attitudes, with a focus on technological comprehension and user experience. These variables interact to determine user opinions about chatbot technology's ability to replace humans. The study strategy follows an inductive method, with the goal of drawing conclusions from data patterns and developing new ideas. By analysing people's responses

to various elements of chatbot behaviour, this research analyses people's impressions of evolving chatbot technology. A questionnaire is designed to collect information using Likert scale-based multiple-choice questions. The factors in the study were derived from questionnaire responses, and they include demographic information, comfort levels, ease of use, personalisation, privacy concerns, preferences, and overall user experience. IBM SPSS Statistics 28 software is used for data analysis, with descriptive and inferential statistics used to analyse the correlations and implications of factors on user impressions. This study aims to give insights into the elements that impact public views and acceptance of chatbots' capacity to replace humans by investigating different aspects of user experiences and interactions. It seeks to add to the knowledge of the implications and applications of this developing technology through a carefully constructed research design and rigorous data analysis methodologies.

1.5 Dissertation Outline

The dissertation introduction sets the stage and context for the research. It specifies the research questions that will guide the investigation and determines the objective and direction of the research by emphasising the relevance of the subject. The following review of the literature dives into the growth of chatbot technology, its growing importance in modern service delivery, and its applications. This review evaluates relevant research on chatbot acceptability and efficiency critically. It also encompasses relevant literature on chatbot usage motivations, trust factor, identity disclosure and chatbot failures and how they affect chatbot adoptability in detail. Further, the methodology section elaborates on the selected research strategy, which is quantitative. It rationalises the selection, specifies variables and operational definitions. Ethical issues are discussed in depth, as are the data analysis techniques used. Moving on to the data analysis phase, the section provides a summary of the participants' demographic characteristics, followed by descriptive statistics of the variables. Inferential statistical tests such as chi-square tests and logistic regression are used, with the findings interpreted in relation to the research questions. The subsequent part that follows synthesises the findings, aligns them with the research questions, and connects them to the existing literature. The consequences for theory and practical applications are discussed, as well as limits and future directions. The conclusion summarises the study objectives, emphasises key findings, and emphasises their relevance. Finally, the references section lists all sources referenced in the dissertation, while appendices provide additional resources such as the ethics approval, questionnaire, and test results.

Chapter Two

2. Literature Review

This section examines existing information and research on chatbot technology. It highlights the current state of chatbot technology, its progress, and the factors influencing its acceptance. It is going to explore the numerous sectors where chatbots have made major advances, such as customer service, healthcare, and finance. This review will investigate user views, looking at the aspects that influence trust, usability, and acceptability of chatbots.

2.1 The Search Strategy

The Search Strategy for this literature review is based on the basic idea of chatbot technology understanding, knowledge and awareness among its users. The literature cited in this dissertation comes from the following databases: Google Scholar, Starplus - Library Catalogue, ACM Digital Library, Emerald Insight, MDPI, ResearchGate and Science Direct. The topics included in the Literature review revolve around people's points of view on chatbot technology, the characteristics they observed and how they felt during the interaction process. It also explores different domains in which chatbots are used, the motivations to use and concerns while conversing with chatbots. The keywords for searching include applications of chatbot technology, human-computer interaction, trust development in chatbots, human behaviour in chatbots, chatbot identity disclosure, chatbot technology failures, etc.

2.2 Chatbot Technology

A chatbot is a computer program that uses AI and deep learning technology to simulate human conversations. The utility of chatbots stems from their capacity to help users look for the information they need by replying to inquiries and requests via text input, audio input, or both without requiring human involvement. The chatbot can assist to prioritise any search through replies and follow-up inquiries, which acts as an advantage over normal human conversations (What is a chatbot?, n.d.). The transition from conventional to digital business platforms has resulted in increased utilisation of AI techniques, particularly chatbots, for improved customer interaction. According to Frankenfield (2022a), chatbots like virtual assistants and messaging applications, simulate human interactions and are available around clock with minimal costs. Chatbots could be deployed by businesses even with limited resources to provide constant customer service and accessibility. However, even with continuous technological advancements, chatbots might struggle to comprehend a customer's input and respond incoherently. Many chatbots are limited in the types of

questions they can answer. Given minimal input, this may lead to dissatisfaction due to a lack of human-like emotion, sympathy, and personalisation. Aside from customer discontent with not being able to reach a real person, chatbots may be costly to create and operate, especially if they must be customised and updated frequently (Frankenfield, 2022a).

Hence, although chatbot technology may seem fully-functional with the advent of virtual assistants like Amazon's Alexa and Google Assistant, it is still a long way from completely replacing humans and automating majority of operations that require humans. While they can mimic human-like interactions to a certain extent, they lack a nuanced understanding. Hence, due to the complexity of human relationships and the demand for empathy and sophisticated understanding, humans will certainly remain crucial in specific fields where these attributes are critical (Frankenfield, 2022b). This study aims to evaluate what people believe regarding chatbots' capability of replacing humans, while exploring what factors influence their opinion.

2.3 Evolution and development of chatbot technology

Weizenbaum (1966) reported that the first chatbot, ELIZA, was created in 1966 and used language rules and pattern-matching techniques to engage in discussions. Despite its importance, ELIZA's knowledge was limited due to its reliance on minimal context recognition and the inflexibility of pattern-matching rules across domains (Weizenbaum, 1966). According to Caldarini et al. (2022b) chatbots have their historical roots in Alan Turing's investigation into artificial thinking in 1950, when he pondered the possibility of machines capable of comprehending and conversing with their creators. Caldarini et al. (2022b) claimed that Turing's explanation closely resembles today's understanding of chatbots and since then, chatbots have evolved with developments in computing capabilities and Natural Language Processing (NLP) techniques over time. Artificial intelligence (AI) gained prominence in the 1980s with the development of A.L.I.C.E. (Artificial Intelligent Internet Computer Entity) built on the Artificial Intelligence Mark-up Language (AIML), which is an XML extension. It was created specifically so that knowledge about conversation patterns may be contributed to A.L.I.C.E.'s software to extend its knowledge base. Modern chatbot frameworks were created as a result of machine learning research that was inspired by the limitations of rule-based systems (Caldarini et al., 2022b). This timeline highlights the iterative evolution of chatbots, which is impacted by both technological developments and constraints.

Smart personal assistants have emerged as a result of deep learning and artificial intelligence developments, such as Amazon's Alexa, Apple's Siri, and others. These built-in

assistants comprehend and respond to voice requests by the users. Due to the variety of human speech, challenges pertaining to their understanding and response communication continue. According to Dormehl (2018), Microsoft researchers noted that a social chatbot's primary objective is not essentially to provide solutions to all of the user queries but rather to be a virtual companion. Social chatbots can better understand people, and consequently aid them over time by building an emotional connection with them. While there are different modes of Human-AI engagement accessible, text messages are the most common. Dormehl (2018) further reported that in the context of this theory, Xiaoice was launched in China in May 2014. Xiaoice's emphasis on text-based communication distinguishes it from other AI assistants that prioritise vocal contact. This highlights the need of long and comprehensive dialogues, as opposed to the short voice requests like "OK Google, will it rain today?" that are frequently used for rapid decisions like dressing appropriately for the weather (Dormehl, 2018). Spencer (2019) described this Microsoft's chatbot venture as merely one component of a vast and multi-dimensional artificial intelligence (AI) system that constantly uses deep learning techniques to absorb the sorts of input that contribute to her emotional intelligence (EQ). He stated that "Xiaoice" is learning human social skills, behaviour, and knowledge through her contact with people and claimed that she is becoming more "us" every day (Spencer, 2019). In past few years there has been a remarkable growth in the voice assistance like Siri in 2010, Cortana in 2015, Google Assistant in 2016 and latest is the Alexa. This progression exemplifies the transition from rule-based to sophisticated AI-driven chatbot systems, which broaden their functions beyond simple help.

2.4 Human-computer Interaction

Human-computer relationships (HCR) have recently been at the forefront of research to better understand their formation (Skjuve et al., 2022) and comprehend people's perceptions and responses to such technology. Skjuve et al. (2022), while exploring the human-chatbot relationship formation process, observed that trust generation, self-disclosure, and interaction variations push human-computer relationship development ahead. Furthermore, this relationship can be affected negatively by technical issues or unpredictable circumstances (Skjuve et al., 2022). In the study conducted by Hill et al. (2015), they mentioned one of the characteristics observed between human-human conversations and human-chatbot interactions was that human-AI conversations are more prolonged than average human interactions since they involve short, concise and less complicated messages. Additionally, users made more effort to rectify misinterpretations when chatbots were seen as human than when the chatbots were perceived as automated. It was noted

that people tend to use restricted vocabulary, get accustomed to bot language quite easily and use profanity while chatting with bots (Hill et al., 2015).

2.5 Applications of chatbots in various domains

Users are mostly motivated by productivity, in addition to entertainment, social features, and novelty. A chatbot should be able to serve as a utility, an enjoyment, and a companion all at the same time for ideal balance. They operate as virtual assistants, answering questions and assisting with transactions, minimising the need for human participation in everyday chores. Consequently, chatbots are widely used in industries such as hospitality, finance, social media, healthcare, and customer service. Chatbots have thus transformed customer engagement by automating activities, improving user experiences, and personalising conversations. Their wide range of applications in industries demonstrates their transformational influence on current business-customer relations.

Palanica et al. (2019) performed a survey of General Practitioners (GPs) to learn about their perspectives on the benefits, obstacles, and hazards of using healthcare chatbots. Physicians claimed that health care chatbots were useful, especially for assisting patients in self-management of their health and indicated a willingness to promote chatbot use. The extent to which health care chatbots will improve patients' physical, psychological, and behavioural health outcomes was debated. While physicians recognised administrative benefits of chatbots for activities such as appointment scheduling and drug reminders, there were worries that chatbots lacked the capacity to manage complicated medical situations, understand human emotion, and appropriately diagnose patients. While chatbots may be useful for less difficult activities, their employment in jobs requiring expert knowledge and personalised patient understanding may offer obstacles and hazards, according to the study (Palanica et al., 2019). Frangoudes et al. (2021) claimed that educational chatbots have the potential to improve learning processes, personalise instruction, and enhance communication skills. They have been used as virtual patients for medical training, patient education, and aiding in the curriculum of healthcare workers. Usability, accessibility, and correctness are among the evaluation indicators, and some additional metrics were considered for assessing cognitive, emotional, and social learning components. (Frangoudes et al., 2021).

The topic of chatbots in education centres around their ability to enhance learning in settings equivalent to human instructors. While the complete substitution of human teachers with chatbots is still a long way off, certain instances observed by Pérez et al. (2020) suggest benefits. Their survey demonstrated that some chatbots succeed in specialised situations,

such as language learning, by providing advantages such as 24-hour availability and responsiveness to student demands. Chatbots also excel as teacher assistants, answering repetitive questions and giving teachers more time to focus on effective training. Despite the fact that personalised education is provided by chatbots, collaboration with human instructors is also vital to achieve curriculum balance (Pérez et al., 2020).

Torresin (2019) claimed that chatbots are and will continue to be pioneers in the digital transformation of banks as well as the development of a customer experience model. The advent of this technology has resulted in a variety of benefits for both users and banks. The ability to receive timely replies with an active 24/7 service improves client support, delivering satisfaction to current clients while increasing the possibilities of acquiring new ones. Additionally, Torresin (2019) acknowledged how banks may use chatbots to improve and innovate the customer experience at a cheap cost, even saving funds on employees (Torresin, 2019). Gupta and Sharma (2019) discussed chatbots in the banking industry in India. Kotak Mahindra Bank was one of the first banks to launch the "Keya" voice chat bot. Bank of Baroda has also implemented a chatbot to answer customer inquiries. EVA (electronic virtual assistance) from HDFC Bank is the largest artificial intelligence-powered chatbot that resolved customer queries with 85% accuracy. The study examined the elements impacting attitudes towards chatbots in the Indian banking business. The primary elements influencing chatbot attitudes are perceived utility, observed accessibility, and observed risks. They concluded that there is a positive association between good attitudes towards chatbots and usefulness, accessibility, and threats. As a result of curiosity, convenience, and technological innovation, consumers in the banking business are eager to use chatbots. Hence, Gupta and Sharma (2019) claimed that banks should begin testing and using chatbots as a crucial tool for interacting with their customers.

Melián-González et al. (2019a) examined the expanding usage of chatbots in the tourist industry, specifically in hotels, restaurants, transportation, and leisure businesses. According to travel website reviews, chatbots are increasingly being used by consumers, either willingly or as a requirement, since some businesses have made them the major means of contact. Professionals in content management are actively involved in installing chatbots, and there are significant instances demonstrating their effective integration in the tourist sector. Chatbots are viewed as the next big thing and are projected to become increasingly common in a variety of businesses (Melián-González et al., 2019a). According to Suta et al. (2020a), a chatbot is an intelligent technology that can converse with a person in real time using natural language. Because of the increased use of the Internet, many organisations now

utilise online platforms to manage consumer enquiries, and many of them resort to chatbots to improve customer service or to streamline processes and increase productivity (Suta et al., 2020a).

The research conducted by (Nicolescu and Tudorache, 2022) revealed characteristics that influence consumer intents and behaviours towards the technology including chatbot usage continuation and acceptance of chatbot solutions or the company product sales or recommendation. Privacy assurance can have a positive impact on consumer experience, leading to increased levels of product acquisition. It also highlighted that response significance and issue resolution are critical variables in customer service chatbots, resulting in customer satisfaction, continued chatbot usage and higher chance of purchase and referrals. When performing low-complexity activities, customer service chatbots do quite well and are positively evaluated by consumers in terms of usefulness, helpfulness, time, and effort in various sectors. Simultaneously, task-oriented chatbots, as opposed to social-oriented chatbots, have been shown in several studies to be more suitable for customer support (Nicolescu and Tudorache, 2022).

2.6 User motivations and willingness for using chatbots

Kasilingam (2020), while researching the factors that influence the use of chatbot smartphones for online shopping, mentioned that Technology Acceptance Model (TAM) was a research model proposed for studying perceived usefulness and perceived ease of use to make rational decisions by those who use technology. Trust, prior experience, potential risks, and usability drive the creation of chatbots. These describe how much the user believes a particular technology will lessen their efforts and deliver what they exactly want (Kasilingam, 2020). The Technology Acceptance Model (TAM) and the Uses and Gratifications (UandG) theory are compared in another study conducted by Rese et al. (2020) to examine the adoption of the text-based chatbot "Emma" for pre-purchase conversations in online fashion commerce. Data was acquired from 205 German Millennials who used "Emma" on Facebook Messenger. According to the findings, elements such as conversation authenticity, perceived usefulness, and enjoyment have a beneficial influence on "Emma's" acceptance. However, privacy issues and technological immaturity have a detrimental impact on usage intention (Rese et al., 2020).

A survey conducted by Userlike, a live chat software, studied the perceptions of people toward chatbots. The survey found that although most people prefer to talk to a human agent, they are open to conversing with a chatbot first. In addition, they liked how chatbots are fast and convenient; however, they felt that many of their issues required human

attention, and the bot conversations led to dead ends (Leah, 2022). Brandtzaeg and Følstad (2017) discussed people's motivations for using chatbots. The main findings included "productivity"; according to users, chatbots provide efficient and timely information, entertainment, and social assistance. In addition, people view chatbots as an innovative technological advancement and are curious to use them (Brandtzaeg & Følstad, 2017). In a questionnaire study by Brandtzaeg and Følstad (2020), users were asked to report instances with chatbots that they found satisfactory or frustrating. In addition, users mentioned pragmatic characteristics like efficient assistance and interpretation issues and hedonic attributes like entertainment and inappropriate and rude replies while talking about their chatbot experience (Brandtzaeg & Følstad, 2020).

Melián-González et al. (2019b) mentioned four important benefits of chatbots in their study. For starters, chatbots save customer service expenses by eliminating the need for personal assistants. Second, they boost customer pleasure by providing real-time interactions and 24-hour availability. Third, chatbots can anticipate consumer requests, allowing them to connect with customers proactively and give relevant information. Finally, chatbots offer advanced analysis by automatically recording and analysing interactions, resulting in a greater understanding of client demands and enhancements to goods and services (Melián-González et al., 2019b).

To explore characteristics of chatbots that attract people to chatbot interactions, Cicco et al. (2020) investigated the attributes that create a positive attitude towards the technology. The study mainly evaluated the millennials' attitudes towards chatbot usage. They concluded that applying a social or human touch in the interaction enhances users' perception of social presence in the chatbot. In addition, they also observed that where the existence of anthropomorphic signals was insufficient to produce a substantial degree of social presence, their study implies that socioemotional, affective, and relational components of the conversation must be present in order to improve the perception of social presence (Cicco et al., 2020).

2.7 Human Behaviour and personalisation of chatbots

Holtgraves et al. (2007) conducted research incorporating two experiments. One was to determine the degree to which a chatbot can be said to exhibit human behavioural traits. The users were aware that they were speaking to a machine, and they ascertained that the bot portrayed human-like behaviour. The second experiment examined the bot's politeness measure, whether it was formal or informal, and called the user by their first name in the conversation. The politeness of the bot was measured by the amount of slang and informal

addressing terms it used, usually considered when depicting closeness to a person (Holtgraves et al., 2007). Personalisation in chatbots includes actions such as addressing someone by their preferred name which works as a way to improve trust since it promotes interpersonal comfort, a sense of companionship, and hence coherence and control (Ng et al., 2020). Anthropomorphism implies attributing human behaviour, traits or intentions to non-human entities like machines or robots. Angeli et al. (2001) conducted research based on "Alice", a chatbot, and concluded that anthropomorphism in human-machine interaction could lead to negative user responses. The analysis highlights the relevance of applying a social framework before designing chat assistants. A significant aspect of developing chatbots is that it is meant to form a relationship with their users. (Angeli et al., 2001).

2.8 Chatbot Identity Disclosure

The efficiency of a chatbot is measured by its ability to mimic human behaviour. According to a report by BBC News (Dauk and Smale, 2022), a Google engineer claimed that an AI system exhibited human feelings. This statement sparked further discussion about whether there is transparency in the application of chatbots and whether the caller communicating with a chatbot at a call centre is aware that he/she is talking to a machine (Dauk & Smale, 2022).

AI-powered chatbots are new technologies with both economic potential and client challenges. Research by Luo et al. (2019) comparing undisclosed chatbots to human workers in outbound sales calls used field trial data from over 6,200 clients. According to the study, undisclosed chatbots outperformed professional human workers as well as inexperienced ones in generating purchases. However, disclosing the identity of the chatbot before the interaction dropped purchase rates by more than 79.7% and also resulted in a shorter call length. The researchers concluded that the reason for such a result might be because the customers perceive chatbots to be less informed and empathetic, demonstrating a subjective prejudice against computers despite their AI capability. This negative impact may be mitigated by timely disclosure and consumer AI experience, with implications for chatbot adoption, customer targeting, and conversational commerce advertising (Luo et al., 2019).

2.9 Trust, Reliability and Comfort Level

Adamopoulou and Moussiades (2020) stated that human-like replies, self-presentation, and professional look, as well as contextual considerations such as the hosting brand, privacy, security, and risk-related features, all impact trust in chatbots. Visual clues, human-

associated names, and copying human language are all strategies for improving human-likeness. Despite the fact that chatbots lack empathy and the ability to completely perceive conversational subtleties, progress is being made in this field. The barrier between human and chatbot conversational partners will dissolve as chatbot interactions become more common (Adamopoulou & Moussiades, 2020).

According to Harrington and Egede (2023), many people find health issues complicated to understand and prefer in-person healthcare consultations. They believe that chatbots are untrustworthy for critical health issues and are hesitant to depend completely on them owing to the necessity to double-check information with a healthcare expert. Because of concerns regarding accuracy, several participants in the study voiced scepticism about depending on chatbots for health information. Participants also believed they may need to simplify their inquiries in order for chatbots to grasp them. As noted in this research on Black Older Adults' opinions of chatbot design for health information seeking, privacy issues and a lack of personalisation contribute to their hesitation. The study found that participants' trust judgements and concerns about the authenticity of health information affected their adoption of chatbots as health information providers (Harrington & Egede, 2023). Hu et al.'s (2023) study on user satisfaction revealed that the relevance and completeness of information provided by chatbots were critical elements in determining customer satisfaction. Additionally, pleasure, assurance, and empathy all have a positive impact on user satisfaction.

2.10 Complex Problem Solving in chatbots

A chatbot fulfils user needs through conversational responses based on the pre-defined data they already have. However, how a chatbot is designed helps it gather information on the go. Sometimes, when there is insufficient knowledge about a particular topic, it fails to resolve the user query. A notable obstacle is that the chatbot design can rarely engage in open-ended conversations with the current knowledge it possesses (Mohamad Suhaili et al., 2021).

According to the research by Suta et al. (2020b), chatbots work in three stages: processing natural language input, creating an automated, relevant answer, and constructing realistic and fluent natural language responses. Due to a lack of natural language processing skills, there is a gap between existing chatbots and desired human-like conversational agents. Chatbots struggle to offer relevant responses without an accurate understanding of user input (Suta et al., 2020b). Chatbots are computer programs that send out automatic responses by recognising the intent of the users' messages, processing them and offering

pre-determined replies (Rajnerowicz, 2023). Some chatbots are increasingly employing complicated algorithms to deliver more nuanced replies. AI chatbots' deep learning capabilities allow interactions to grow more accurate over time, allowing them to construct a network of suitable replies through their interactions with people. Prolonged operation improves their response accuracy, making them better at comprehending query intents than algorithm-based chatbots. In summary, an AI chatbot powered by deep learning may deliver a more thorough and accurate response to a query, particularly the intents behind the query, than a chatbot powered by newly added algorithm-based knowledge.

2.11 Chatbot Failures

Ikea was one of the first companies to launch a virtual assistant, "Anna", to help customers navigate through their website. However, Anna was taken down from their website after serving people for over 10 years. The explanation for taking down Anna was that they tried to make Anna too "human-like", which created issues like people asking stupid and inappropriate questions (Wakefield, 2016). These chats diverted the primary purpose of the chatbot, which was to answer questions regarding the website and enhance the marketing and user experience. This incident was an example that contradicts the fact that chatbots are to be made more human-like for a better experience, where people have complained that their experience lacks a human touch. Microsoft's AI chatbot "Tay" is another example of how chatbots failed. This chatbot was established in 2016 and had to be removed from Twitter within 24 hours owing to the ethical mayhem it caused. The chatbot was intended to learn from the public and have informal and entertaining conversations with individuals on Twitter. However, online trolls managed to "teach" Tay rude, sexist, and racist statements (Ravi, 2021). This event demonstrated how difficult it is to predict human-AI interactions. Furthermore, it raises the question of the degree of human touch a chatbot should hold to make meaningful, speedy and productive conversations. Shanbhag (2022) claimed that commercial chatbot failures are the result of excessively ambitious targets leading to experimental phase failures. It is critical to begin with a narrow set of use cases that provide instant assistance to consumers, allowing for progressive growth based on chatbot performance. Another reason for failure is that success measures that are misaligned, such as humour and naturalness, might mask actual productivity of the chatbot. Long-term investment, constant surveillance, and dedicated personnel are all essential for the long-lasting usability of the chatbot. Moreover, lack of user involvement and neglected improvements also hinder continued chatbot usage. For increased chatbot utility, an

effective transfer to human agents in case of inadequate knowledge about an issue and thus the smooth resolution of complicated inquiries is essential (Shanbhag, 2022).

In conclusion, this section illuminates several features of chatbot technology and its implications. It discusses the present-day state of chatbot technology, its significance in a variety of industries such as customer service, healthcare, and finance, as well as its progression from rule-based systems to complex AI-driven frameworks. According to the several investigations covered, while chatbots have made great advances, they still lack the sophisticated knowledge and emotional depth of human conversations. This review also identifies knowledge gaps, such as the need for more research on chatbot identity disclosure, complicated problem-solving skills, and chatbot's long-term usability. Furthermore, the conflict between making chatbots more human-like while yet maintaining their efficiency and productivity remains a topic that demands deeper exploration. This study aims to bridge these gaps by assessing people's attitudes regarding chatbots' potential to replace humans by investigating the factors that influence these notions.

Chapter Three

3. Methodology

3.1 Research Design

3.1.1 Research Approach

Streefkerk (2023a) stated that an inductive approach gathers data to draw inferences and construct theories based on patterns found in the data, starting with a research topic. It is ideal for studies with little information about the topic or for investigating novel occurrences. The method is exploratory, intending to develop new ideas or explanations based on the evidence gathered. (Streefkerk, 2023a). Thus, an inductive research philosophy is adopted for this study to develop a new theory about how people perceive the emerging chatbot technology by analysing people's responses to various aspects of chatbot behaviour. The primary focus of data collection methods in industrial applications is to gain better consumer insights about a particular product and how likely they will use it. These data can be gathered through observations, interviews, focus groups, surveys and questionnaires (Teodorescu, 2023). According to Streefkerk (2023b), quantitative research is represented by numbers, statistics and graphs. It is used to validate or test theories and assumptions. This research method can be used to develop generalizable facts about a subject. Experiments, observations recorded as numbers, and surveys with closed-ended questions are instances of common quantitative procedures. On the other hand, the results of qualitative research are expressed in words. It is utilised to comprehend ideas, thoughts, or experiences. This form of study is used to gain in-depth knowledge about issues that are not generally understood. Interviews with open-ended inquiries, observations reported in words, and literature studies that investigate concepts and theories are all common qualitative approaches (Streefkerk, 2023b).

This study aims to investigate and evaluate people's opinions regarding chatbot usage in their daily lives, their thoughts on the privacy and transparency of chatbots and their experiences through an extensive questionnaire comprising close-ended questions. Since, a quantitative approach uses numerical data it makes the study process more objective and less prone to researcher bias. Furthermore, quantitative research allows for the generalisation of findings to a broader population. This is especially significant when examining perceptions since it helps find trends and patterns that may be applicable outside the sample. Statistical tests can be applied to establish the significance of relationships between variables, giving a strong foundation for forming conclusions. Additionally, these

tests enable the comparison of groups, such as age groups or genders, in order to uncover statistically significant variations in views. Quantitative studies utilise Likert scales in closed-ended surveys to gather nuanced replies that qualitative approaches may not be able to capture. This enables for a more in-depth study of participants' perspectives.

However, while quantitative approaches have many advantages, they may not represent the entire diversity of human experiences and perspectives. As a result, an open-ended question regarding people's positive and negative experiences of chatbot usage has been included to combine quantitative and qualitative data for obtaining a better and complete picture of chatbot perceptions.

3.1.2 Sampling Method and Data Collection

An online questionnaire was used to explore different aspects of people's perceptions regarding using chatbots and acquire a sufficient and broad sample of chatbot users. The data were gathered using snowball and convenience sampling in order to reach a wider audience. New participants were recruited by recommendations from initial participants, resulting in the formation of a network of participants over time. The initial participants were recruited using convenience sampling that involved selecting persons who were easily accessible by the researcher at the time of the data collection. For this study, participants were recruited via the University of Sheffield mailing lists and the social media platform WhatsApp. A Google Forms link to the questionnaire was distributed among the participants, and they were asked to further distribute it to their acquaintances who would be potential participants that fit the criteria. The data were collected with each participant referring more participants, creating a "snowball" effect.

3.1.3 Questionnaire Structure

According Morgan and Harmon (2001), a questionnaire is composed of a group of questions that may be multiple choice or open-ended, where people can write their responses or select one or more options available. Questionnaires are usually structured and follow a uniform flow from start to end; implying that the questions are inter-related to each other and have to be answered in a consistent sequence. The answers are also usually ordered, for instance, slightly agree, agree, strongly agree, neutral, slightly disagree, disagree, strongly disagree, like the Likert scale. While open-ended questions require participants to compose their responses in their own words, close-ended questions allow them to choose from options that best fit their opinion (Morgan & Harmon, 2001).

The questionnaire for this study primarily contained multiple choice questions, where people could choose one or more answers depending on the question. Most of the questions included a Likert Scale with five options for answers ranging from very likely (5) to very unlikely (1). It also included an open-ended question at the end of the questionnaire where people were asked to add further comments and opinions, both negative and positive.

In line with the aim of this study, questions pertained to the use of chatbots and how often people use chatbots. People were also expected to select all the domains that they have used chatbots in. The options included customer support regarding product queries, online purchases, tracking orders, product recommendations, travel and booking, banking and finance, healthcare information and advice, personal assistance/ information, food ordering services, education, entertainment and social media. It also explored positive and negative experiences and the satisfaction rating given to a particular chatbot conversation. The satisfaction rating was dependent on whether the bot completed the task it was given, for instance, information retrieval, the amount of time taken and if the outcome was as expected. Furthermore, what drives people to have a chatbot conversation was also examined. The comfort level during the conversation, trust in the solutions provided by the chatbots and any ethical concerns that people have were also explored. The age, gender and education level of the participant were also recorded to compare the responses across different demographics.

3.1.4 Participant Selection

Chatbots have become very popular among the public; people are curious about new technological innovations and domains like Human-Computer Interactions (HCI) and Artificial Intelligence (AI). They do not use technology blindly but raise questions about its functionalities, drawbacks, and ethical concerns. In addition, they are curious to know more about the technologies they are already familiar with. People also have their opinions about chatbot systems and how they work. The major focus of the data collection was on people aged 18 and above and use chatbots in their daily lives for various tasks. The participants were mainly people who live in UK and India.

Inclusion criteria:

- Participants must be at least 18 years old.
- Individuals who have a basic understanding of how smartphones and computers work.

- Individuals who have interacted with chatbots in at least one setting (e.g., customer service, virtual assistants, social media).

Exclusion criteria:

- Participants aged below 18 or above 70.
- Individuals with very limited technology experience.
- Individuals with no chatbot experience and have never communicated with a chatbot.

3.1.5 Ethical Considerations

Ethical considerations are a pivotal aspect in data collection and analysis. It is essential to inform the participants about one's identity and work. Transparency about the purpose of the study and data gathering is a vital step in gathering the participants' permission for data acquisition. Their involvement should be voluntary, and participants should be able to withdraw themselves from any ongoing data collection process. It is necessary to be unbiased and not let personal opinions interfere with the process. The information provided should be considered confidential and anonymous while proceeding with the analysis.

The research was deemed a low risk level research, since the study does not involve any kind of sensitive topics. During the data gathering procedure, participants were not exposed to any physical hazards, discomfort, or sensitive issues. The process did not include any physical interventions, medical procedures, or intrusive techniques that might endanger participants' physical or psychological well-being. The participation was entirely voluntary, and participants were informed about the study's objectives and scope. Ethical considerations guarantee that responses of participants are processed confidentially and anonymously. Personal information was not provided in the analysis, eliminating any privacy issues. Because the study depends on questionnaires, there was no personal interaction between the researcher and the participants, which reduces the possibility of interpersonal problems or discomfort. Participants were selected after taking their consent to participate in this research questionnaire. The data collection process followed all the ethical considerations discussed above. The questionnaire was sent as a Google Form, along with a brief information sheet that clearly explained the research purpose, the procedure, important considerations and how the participant data will be recorded and used. Participants were also given a consent form to sign to confirm that their responses collected will be used in the study. The names and personal details were not asked to maintain privacy.

3.1.6 Pilot Study

A pilot study was conducted to investigate the feasibility and usefulness of the questionnaire on public impressions of chatbot technology. The key goal was to ensure that the questions were clear and relevant, successfully capturing participants' thoughts and experiences with chatbots. A modest sample size of 5 people from the population of interest was selected. Participants completed the questionnaire during the pilot, and any comments they offered were reviewed. No major changes were suggested; hence, the results of this pilot survey assisted the researcher in ensuring that the data collection tool fits the research objectives and produces significant insights into how chatbot technology is regarded by the public.

3.2 Data Pre-processing and variable descriptions

The variables selected for the study are illustrated in Table 1. The original variables were the questions that were asked in the questionnaire. These variables have been recoded to new variables by removing any redundant or missing values and the variable values have been combined to form meaningful values for the analysis. Consequently, the variables are renamed to eliminate ambiguity. Each variable has also been given new coded categories to encapsulate their individual values to perform operations on them.

All the variables are categorical, with a combination of nominal(binary) and ordinal. Binary variables have only two values, usually positive and negative like the variable overall user experience, or Identity disclosure with values yes or no. Some demographic variables like gender (Male/Female) are an exception where there are no positive or negative values. Ordinal variables have values that have a specific order between them, like – rarely, sometimes, often, and most of the time.

There are two dependent variables in the study, Bot potential and Identity Disclosure. Both the dependent variables are binary, having values ‘Yes’ and ‘No’, which answers the questions- (1) whether the participant believes if chatbots have the potential to replace humans in the near future and (2) should the chatbot reveal that it is not human before user engagement. The Bot Potential is considered as the dependent variable for the chi square tests, whereas the Identity disclosure variable is the dependent variable for logistic regression. The independent variables include age groups, gender, comfort level, ease of use of chatbots, personalisation levels, privacy concerns, whether participants prefer humans over chatbots, and finally their overall user experience.

Variable	Description	Variable Name	Type of Variable	Values
Bot Potential	Do chatbots have the potential to replace humans in the future?	BotH	Categorical Nominal (Binary) Dependent/ Independent	1= “Yes” 0= “No”
Identity Disclosure	Should the chatbot disclose that it is not human before the conversation?	Disclose	Categorical Nominal (Binary) Dependent/ Independent	1= “Yes” 0= “No”
Age	Definitive age variable	Age_Groups	Categorical Nominal Independent	1= “Age 18 to 25” 2= “Age 26 above”
Gender	Participant’s Gender	Gender	Categorical Nominal (Binary) Independent	1= “Male” 0= “Female”
Comfort Level	How comfortable are you with using chatbots?	Comf	Categorical Ordinal Independent	1= “Comfortable” 2= “Moderately comfortable” 3= “Uncomfortable”
Privacy Concerns	How concerned are you about your personal information being shared with third parties when interacting with chatbots?	Concern	Categorical Nominal (Binary) Independent	1= “Concerned” 0= “Unconcerned”
Ease of Use	How would you define the ease of use of chatbots?	Ease	Categorical Ordinal Independent	1= “Easy to use” 2= “Moderately easy to use” 3= “Difficult to use”
Overall Experience	Have you ever had a chatbot experience that enhanced your overall user experience about a product or service?	Exp	Categorical Nominal (Binary) Independent	1= “Yes” 0= “No”
Personalisation Level	How would you rate the level of personalisation of chatbot responses?	Person	Categorical Ordinal Independent	1= “Very personalized” 2= “Personalized” 3= “Very impersonal”
Human Preference	How often do you prefer to interact with a human customer service representative instead of a chatbot?	Humn	Categorical Ordinal Independent	1= “Always” 2= “Sometimes” 3= “Rarely”

Table 1: Variable Descriptions

3.3 Data Analysis

IBM SPSS Statistics 28 software was used in this research to implement the analysis. The variables in this study are categorical and, therefore, not normally distributed. Hence Chi-square tests were performed to determine the association between the dependent variable and all the independent variables. That is, how various factors influence what people think about the chatbots' potential to replace humans. Initially, the Descriptive statistics are computed for all the variables to make the general picture of the dataset easier to comprehend. They include the number of valid observations that are used in the analysis and the missing observations that are eliminated, which together equal the total recorded observations. Descriptive statistics can identify data problems, missing values, and discrepancies in the data. This is an important stage in the data cleaning and preparation process. The Descriptive statistics display the frequencies, valid percent, cumulative percent and Mode for each variable in the analysis which enables to compare the central tendency and variability of each group since many groups and categories are involved in the analysis.

Next, the Chi-square test was performed using Cross Tabulation in SPSS between each variable and the dependent variable (Bot potential), to examine if their relationship was significant. The Chi-square test for independence is a non-parametric test for conducting inferential statistics on categorical data. It is used to examine the relationship between two categorical variables having two or more categories. This test compares the observed frequencies in each category with the expected values if there was no association between the two values being measured. This analysis has two assumptions- Null Hypothesis (H_0): There is no association between the two categorical variables. In other words, the variables are independent of each other; and Alternate Hypothesis (H_1): There is a significant association between the two categorical variables; i.e., they are not independent. (Pallant, 2013a). Therefore, to explore the association of all the categorical variables with the dependent variable i.e., Potential of bots to replace humans (values Yes/No), the Chi-square test of independence was used to perform the analysis in this study. Further, another dependent variable (Whether a chatbot should disclose that it is not human) is considered to perform Binary Logistic Regression to evaluate how much each aspect impacts this disclosure opinion of chatbot users. Logistic regression is a classification approach that predicts the likelihood of an outcome with just two possible values in a categorical variable. Binary Logistic Regression uses maximum likelihood to try to find the values of B0 and B1 such that the resultant probabilities are close to either 1 or 0. (Datasciencelovers, 2019).

Chapter Four

4. Results

4.1 Descriptive Statistics

Table 2 illustrates the descriptive statistics for all the variables. The range of responses on whether chatbots can replace people reflects participants' perspectives on the role of chatbot technology in the future. The ratio of "Yes" to "No" replies may either show scepticism or acceptance of chatbot technology in performing day-to-day tasks. From the frequencies of responses, majority of the respondents believe that chatbots have the capacity to replace humans in their jobs which indicates that people demonstrate an acceptance towards chatbots.

Variable	Values	Frequency	Valid Percent	Mode
Bot Potential	1= “Yes”	54	44.3	1.00
	0= “No”	43	55.7	
	Total	97	100.0	
Age	1= “Age 18 to 25”	69	71.1	1.00
	2= “Age 26 and above”	28	28.9	
	Total	97	100.0	
Gender	1= “Male”	57	58.8	1.00
	0= “Female”	39	40.2	
	Total	96	100.0	
Privacy Concerns	1= “Concerned”	74	76.3	1.00
	0= “Unconcerned”	23	23.7	
	Total	97	100.0	
Comfort Level	1= “Comfortable”	34	35.1	2.00
	2= “Moderately comfortable”	42	43.3	
	3= “Uncomfortable”	21	21.6	
	Total	97	100.0	
Personalisation Level	1= “Very personalized”	40	41.2	1.00
	2= “Personalized”	30	30.9	
	3= “Very impersonal”	27	27.8	
	Total	97	100.0	
Identity Disclosure	1= “Yes”	74	76.3	1.00
	0= “No”	23	23.7	
	Total	97	100.0	
Ease of Use	1= “Easy to use”	37	38.1	2.00
	2= “Moderately easy to use”	42	43.3	
	3= “Difficult to use”	18	18.6	
	Total	97	100.0	
Overall Experience	1= “Yes”	68	70.1	1.00
	0= “No”	29	29.9	
	Total	97	100.0	

Table 2: Descriptive Statistics

According to the proportion of respondents, most of them are concerned about their privacy when interacting with chatbots. This displays the level of data security understanding and concern. While this is true, a large number of participants desire highly personalised solutions from chatbots. As for the identity disclosure, majority of the participants desire to be aware of machine/AI involvement and wish that the chatbot discloses that it is not human before the conversation. These observations emphasise the ethical significance of transparency in human-AI interactions to motivate their acceptance. It also reflects participants' expectations of honesty in automated interactions. Moreover, although most participants have had an enhanced overall experience due to chatbot involvement, they still find chatbots moderately easy to use, emphasising the need to create more user friendly chatbot systems.

In summary, this frequency table provides a glimpse of how users perceive and interact with chatbot technology. Analysing these distributions and their possible correlations with the dependent variable "Bot Potential" might reveal trends, preferences, and barriers to chatbot technology adoption across distinct user groups.

4.2 Inferential Statistics: Chi-square Tests

Bot Potential is the dependent variable for chi-square tests. The first criterion to check in the Chi-square test is the "minimum expected cell frequency," which needs to be 5 or greater. This is confirmed in the footnote below the Chi-square tests table. This criterion is met for all the Chi-square tests conducted, except with the variable Human Preference.

1. Age groups and Bot potential: This hypothesis is used to check whether there is an association between age groups and the chatbot potential. It implies whether the public responses regarding the chatbot change with age.

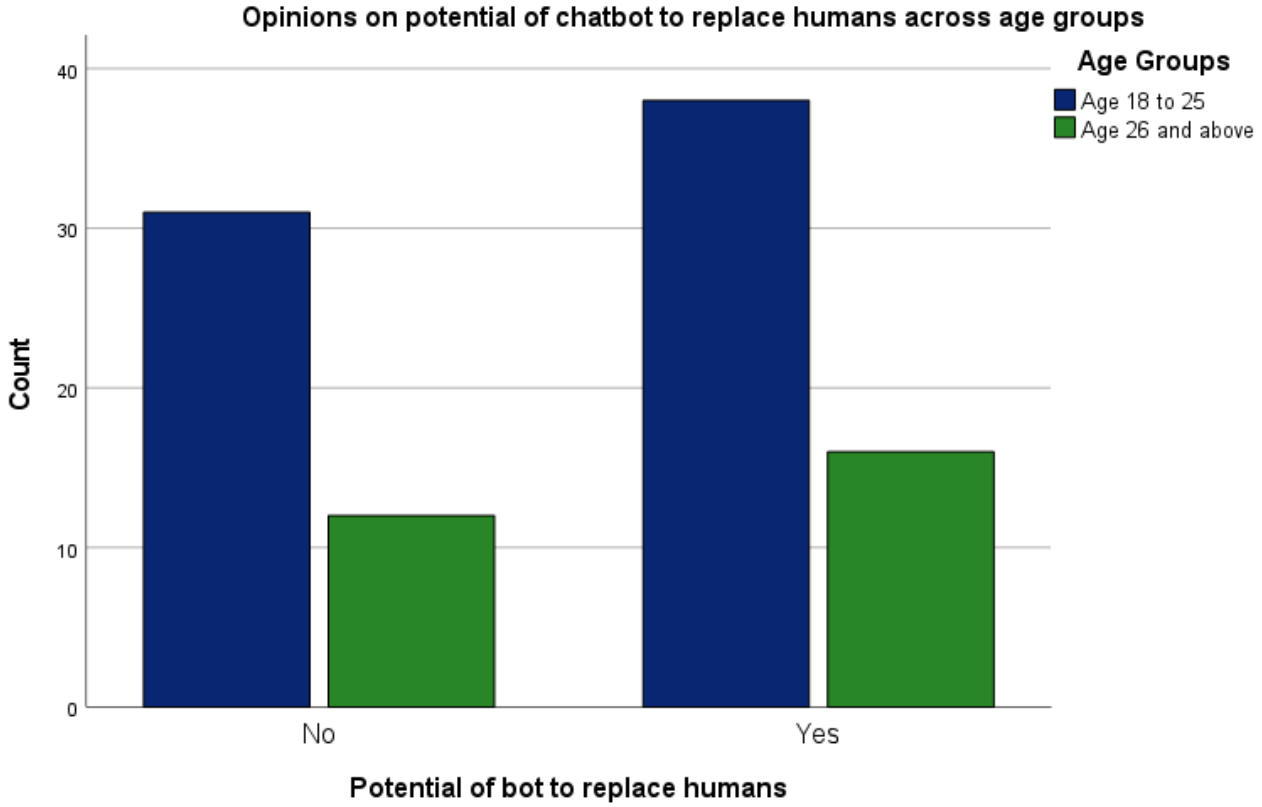
H_0: There is no association between age groups and bot potential.

H_1: There is an association between age groups and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	.035	1	.852
Continuity Correction	.000	1	1.000
Likelihood Ratio	.035	1	.852
Linear-by-Linear Association	.034	1	.853
N of Valid Cases	97		

Table 3: Chi-square Test – Bot Potential and Age

There is no significant association between different age groups and bot potential as seen by values – X^2= 0.000, p=1.000. Therefore, H_0 is accepted and H_1 is rejected. Individuals' opinions on the potential of bots are the same across all age groups. The corresponding graph, which highlights chatbot potential across several age groups, clearly displays this pattern. Notably, the majority of people in both age groups believe that chatbots have the potential to replace humans in the near future.



2. Gender and Bot potential

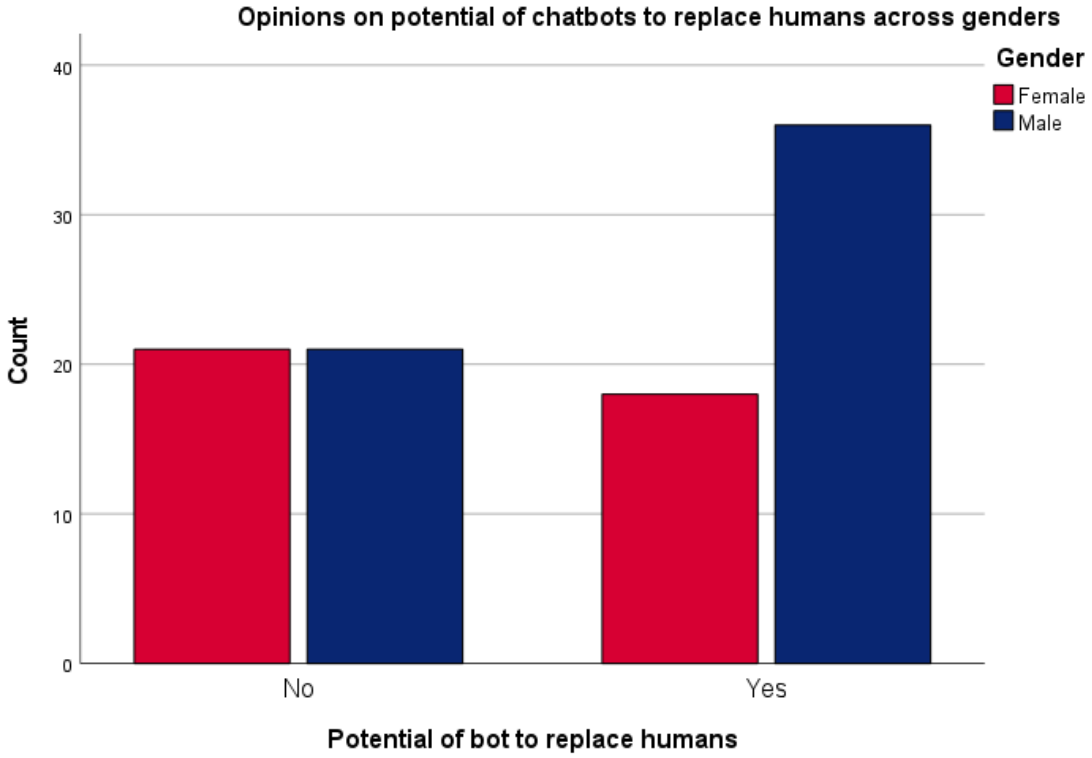
H_0: There is no association between gender and bot potential.

H_1: There is an association between gender and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	2.721	1	.099
Continuity Correction	2.074	1	.150
Likelihood Ratio	2.721	1	.099
Linear-by-Linear Association	2.692	1	.101
N of Valid Cases	96		

Table 4: Chi-square Test – Bot Potential and Gender

There is no significant association between genders and bot potential as observed by values – X^2= 2.074, p=0.150. Since the p-value is greater than 0.05, therefore, H_0 is accepted and H_1 is rejected.



The distribution of opinions on chatbots' potential to replace humans reveals that men and women share the same dissident ideas. Additionally, a closer look at the graph indicates a substantial gender-based difference: more males than females agree with the idea of chatbot potential. Additionally, when only taking the female subgroup into account, the number of those opposed to chatbot potential exceeds the number of people in favour. It is interesting to note that the situation is reversed for men, where a sizeable majority believe chatbots might eventually replace people.

3. Comfort Level and bot potential: This hypothesis is used to check whether there is an association between comfort level and the chatbot potential. It implies whether the public responses regarding the chatbot change with their perception of comfort.

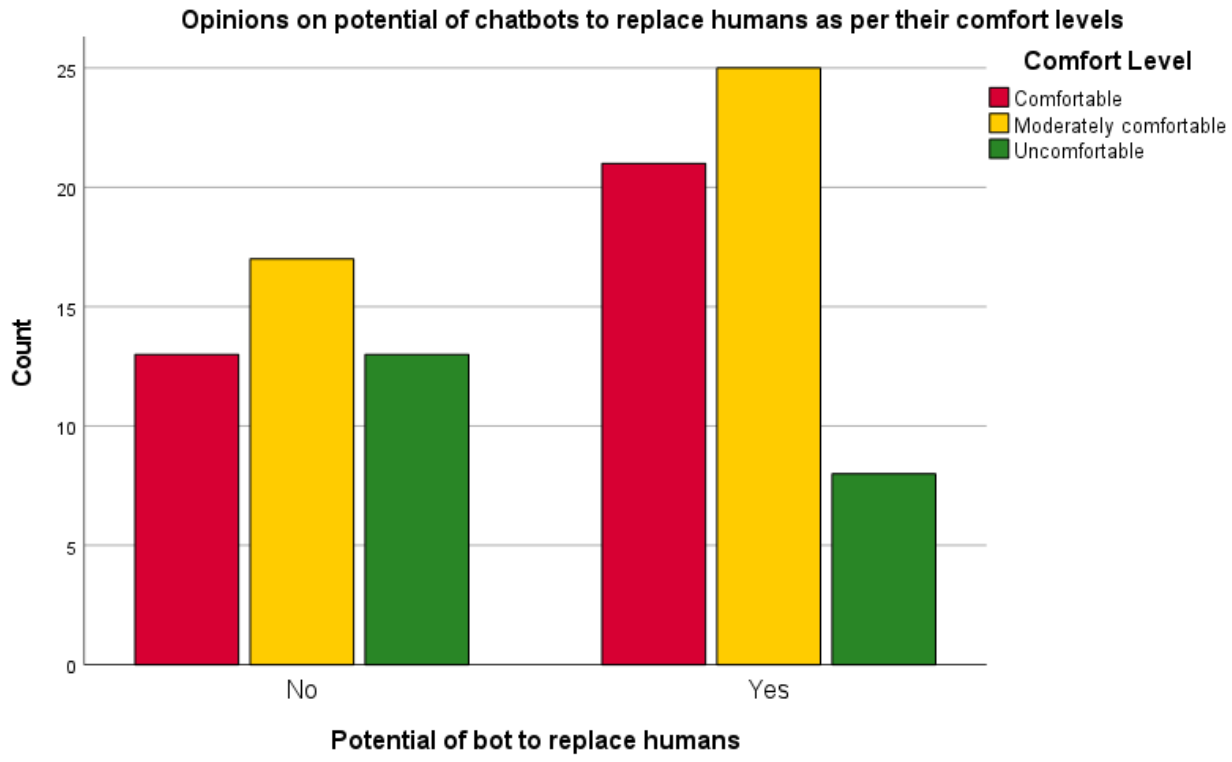
H_0: There is no association between comfort level and bot potential.

H_1: There is an association between comfort level and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	3.393	2	.183
Likelihood Ratio	3.385	2	.184
Linear-by-Linear Association	2.501	1	.114
N of Valid Cases	97		

Table 5: Chi-square Test – Bot Potential and Comfort Level

There is no significant association between the comfort levels and bot potential as observed by values – X^2= 2.501, p=0.114. Since the p-value is greater than 0.05, therefore, H_0 is accepted and H_1 is rejected. This suggests that people's judgements of chatbots' ability to replace humans are not much influenced by how comfortable they are using them. According to the graph below, a sizeable percentage of participants have said they feel at least relatively comfortable, regardless of whether they agree or disagree with chatbot potential. This finding suggests that while chatbots aren't altogether uncomfortable or unfamiliar to use, they still need to improve in order to put people who use this technology completely at ease.



4. Privacy concerns and bot potential: This hypothesis is used to check whether there is an association between privacy concerns and the chatbot potential. It implies whether the public responses regarding the chatbot change with their perception of privacy concerns.

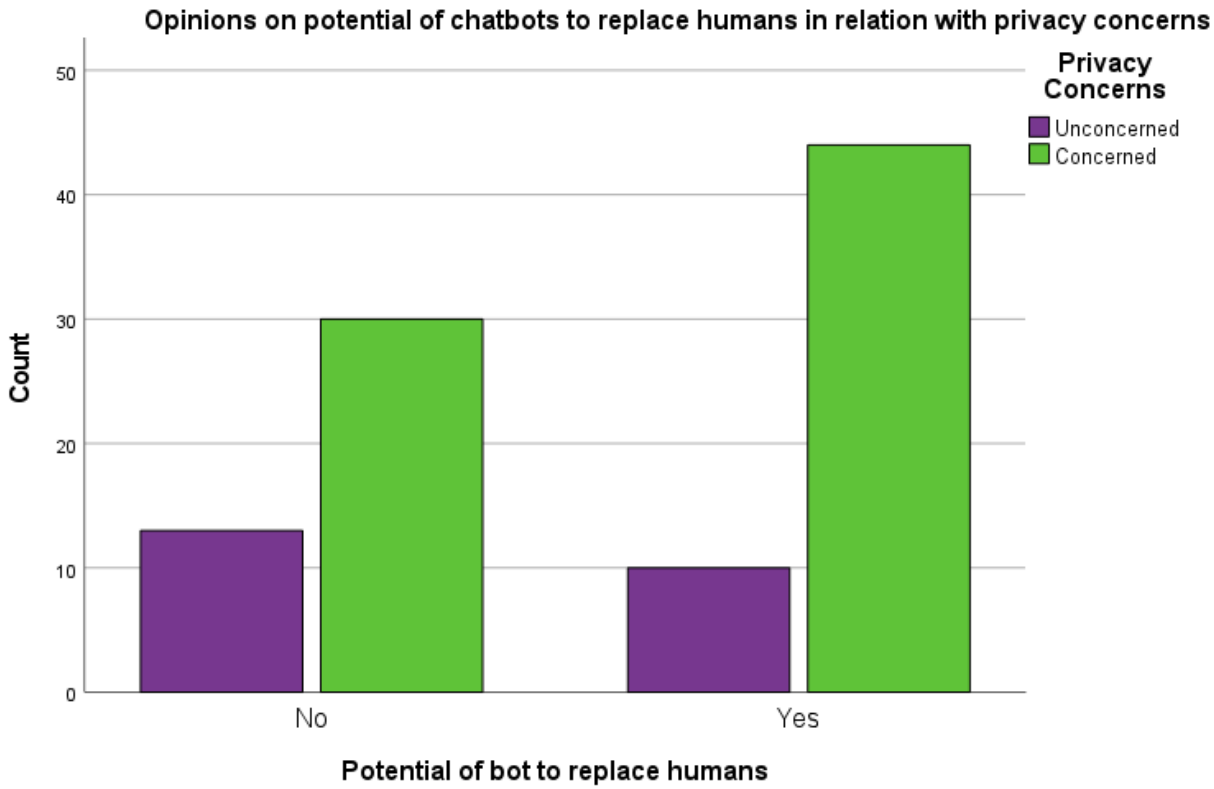
H_0: There is no association between privacy concerns and bot potential.

H_1: There is an association between privacy concerns and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	1.816	1	.178
Continuity Correction	1.226	1	.268
Likelihood Ratio	1.807	1	.179
Linear-by-Linear Association	1.797	1	.180
N of Valid Cases	97		

Table 6: Chi-square Test – Bot Potential and Privacy Concerns

There is no significant association between privacy concerns and bot potential as observed by values – X^2= 1.226, p=0.268. Since the p-value is greater than 0.05, therefore, H_0 is accepted and H_1 is rejected.



The graph and chi-square statistics make it quite evident that for both groups of people who agree and disagree with the potential of chatbots, more users are concerned than are indifferent to privacy and security of their data.

5. Chatbot identity disclosure and bot potential: This hypothesis is used to check whether there is an association between chatbot identity disclosure and the chatbot potential. It means whether the public responses regarding the chatbot change with the opinion of whether chatbot should reveal its identity before conversation.

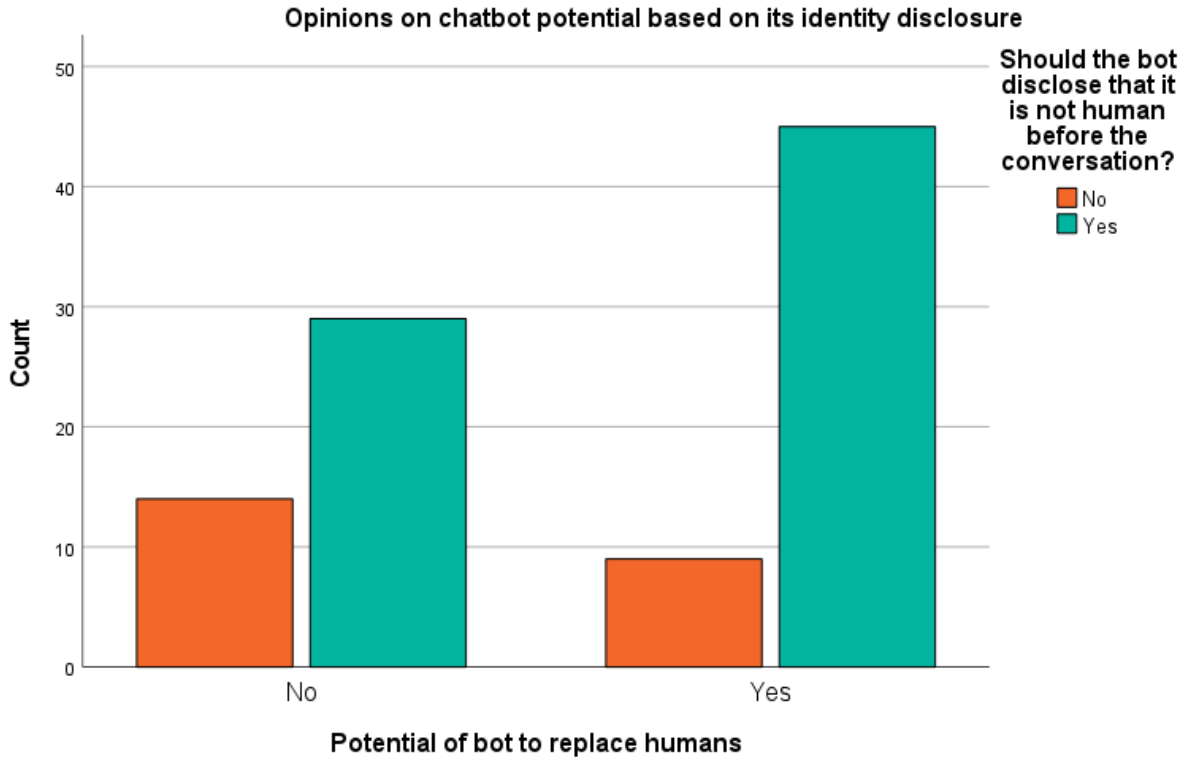
H_0: There is no association between chatbot identity disclosure and bot potential.

H_1: There is an association between chatbot identity disclosure and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	3.342	1	.068
Continuity Correction	2.521	1	.112
Likelihood Ratio	3.333	1	.068
Linear-by-Linear Association	3.308	1	.069
N of Valid Cases	97		

Table 7: Chi-square Test – Bot Potential and Chatbot Identity Disclosure

There is no significant association between identity disclosure and bot potential as observed by values – X^2= 2.521, p=0.112. Since the p-value is greater than 0.05, therefore, H_0 is accepted and H_1 is rejected.



According to the graph, the number of users who demand chatbots to reveal their identity before every discussion is larger than the number of users who wish otherwise for both categories, i.e., those who agree and disagree with the chatbot's potential. Furthermore, a clear conclusion emerges: the majority of individuals who are okay with the uncertainty of communicating with either a chatbot or a human believe that chatbots lack the potential to replace human functions.

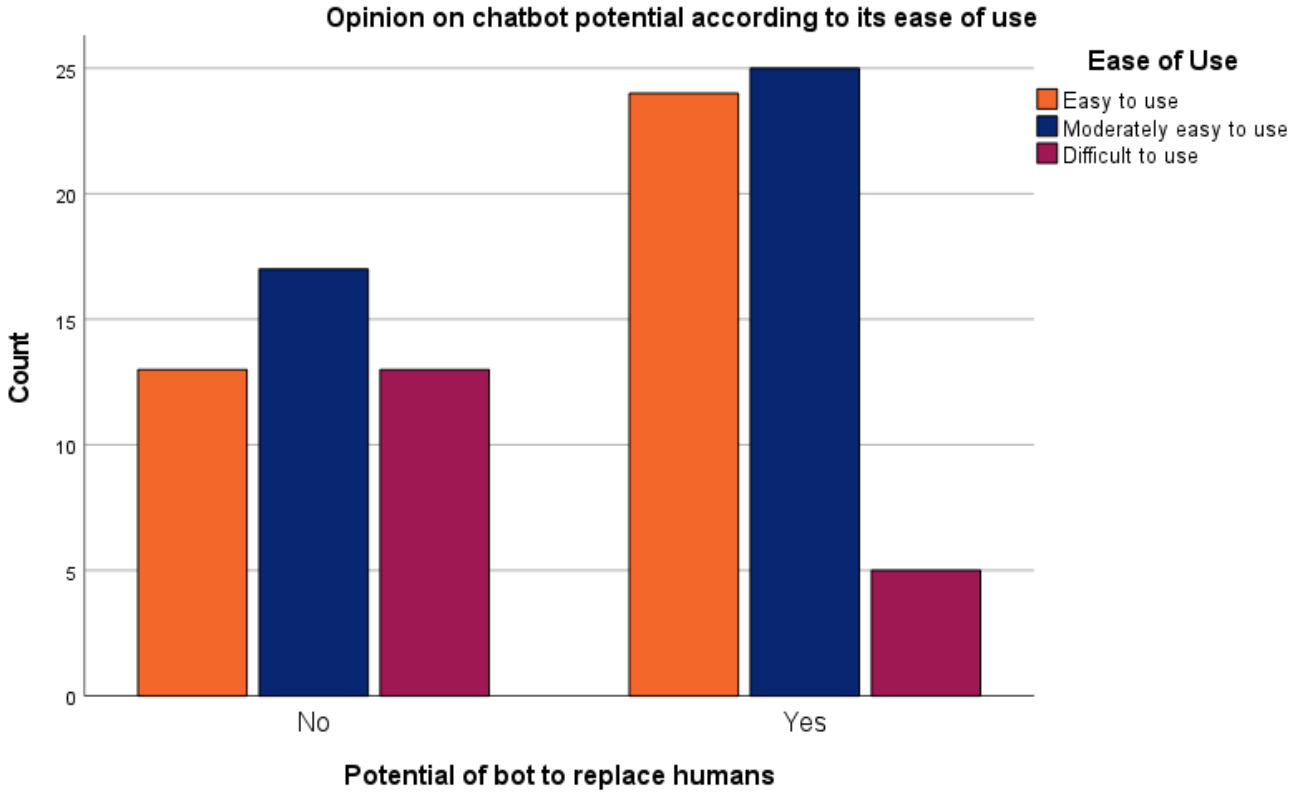
6. Bot Potential and Ease of use of chatbot: The next hypothesis is used to check whether there is an association between ease of use of chatbot technology and the chatbot potential. It implies whether the public responses regarding the chatbot change with its ease of use.

H_0: There is no association between ease of use and bot potential.

H_1: There is an association between ease of use and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	7.195	2	.027
Likelihood Ratio	7.286	2	.026
Linear-by-Linear Association	5.548	1	.019
N of Valid Cases	97		

Table 8: Chi-square Test – Bot Potential and Ease of use of chatbots



As per observed values – X^2= 5.548, p=0.019, there is a significant association between ease of chatbot use and bot potential. Since the p-value is less than 0.05, therefore, H_0 is rejected and H_1 is accepted. From the graph, it is evident that the easier to use the chatbot, the more people believe that it is capable of replacing humans in future.

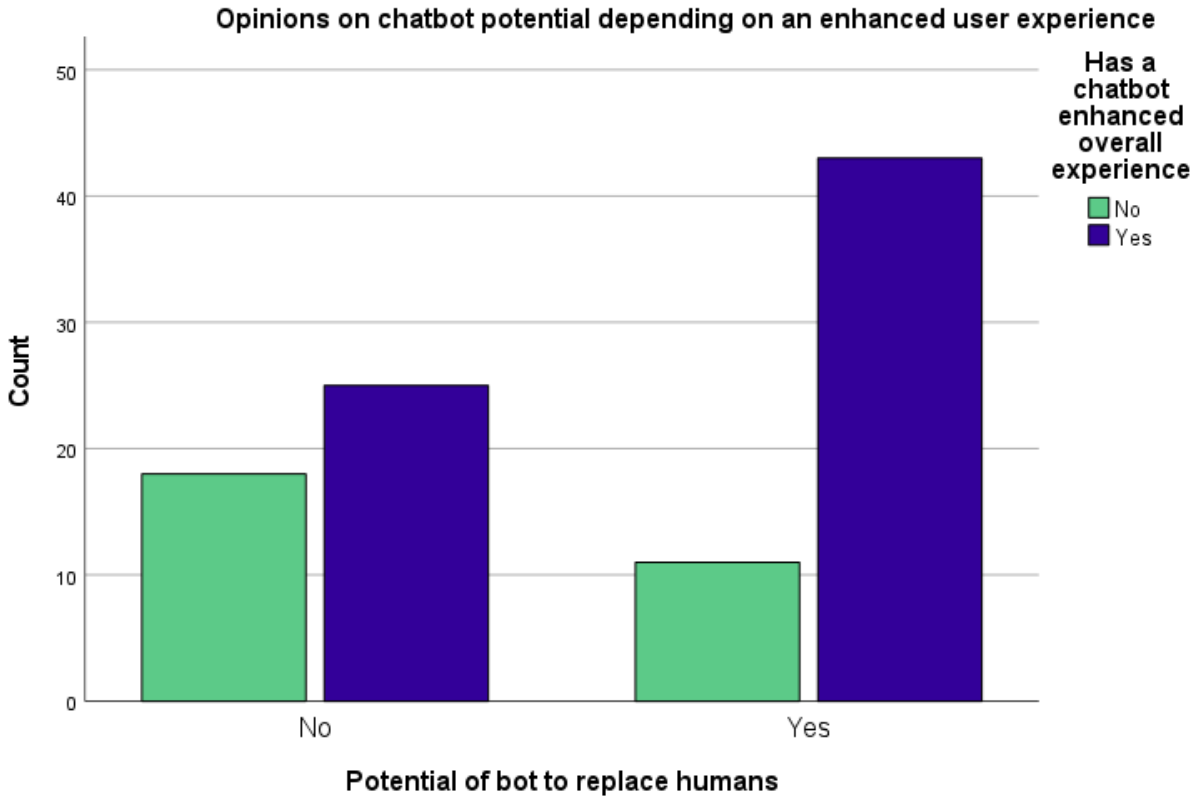
7. Bot Potential and Overall Experience: This hypothesis is used to check whether there is an association between an enhanced experience and the chatbot potential. It is conducted to test whether a chatbot involvement that improves an overall experience of a product has any effect on people's opinion of chatbot capabilities.

H_0: There is no association between enhanced experience and bot potential.

H_1: There is an association between enhanced experience and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	5.275	1	.022
Continuity Correction	4.299	1	.038
Likelihood Ratio	5.278	1	.022
Linear-by-Linear Association	5.220	1	.022
N of Valid Cases	97		

Table 9: Chi-square Test – Bot Potential and Enhanced Overall Experience



As per observed values – X^2= 4.299, p=0.038, there is a significant association between enhanced overall experience and bot potential. Since the p-value is less than 0.05, therefore, H_0 is rejected and H_1 is accepted. It implies that if an individual has had a chatbot

interaction that improved their user experience, they are more likely to believe that chatbots possess the ability to replace humans in some tasks in the future.

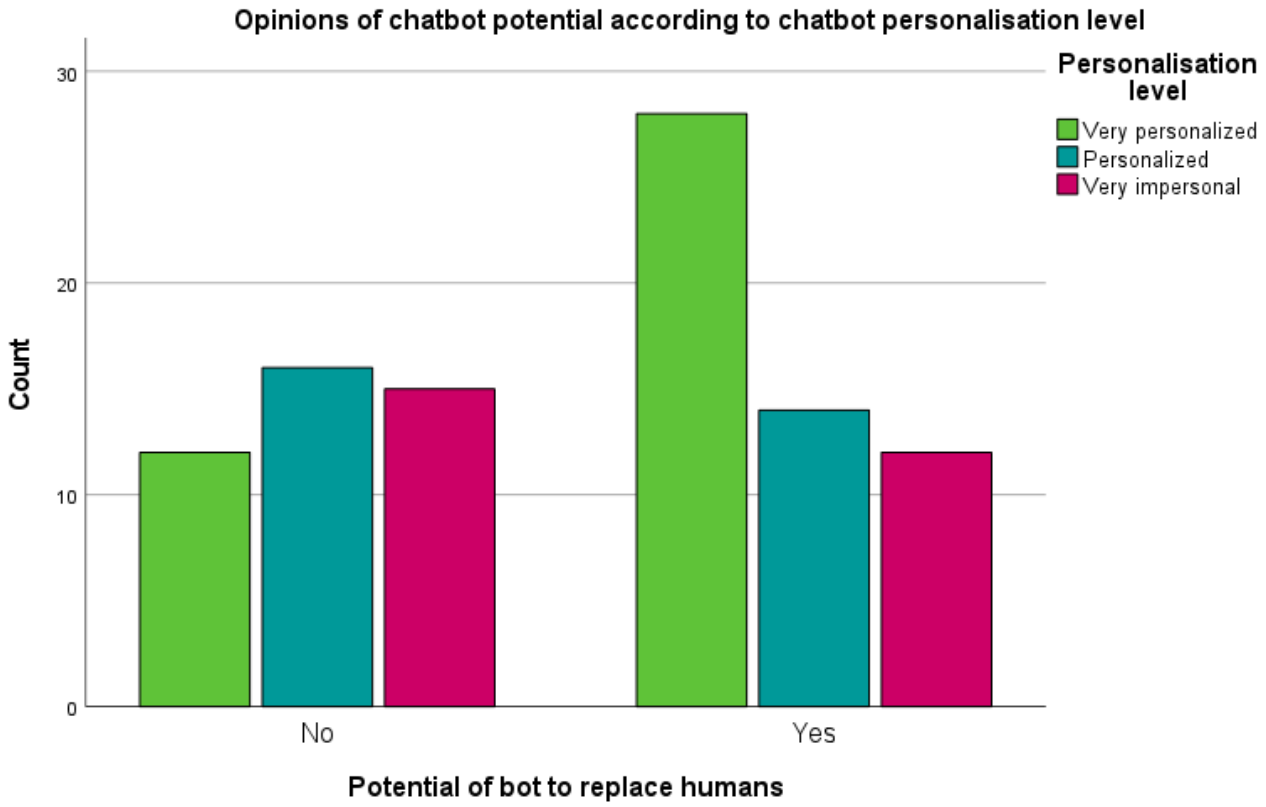
8. Bot Potential and Personalisation Level: This hypothesis is used to check whether there is an association between chatbot personalisation level and the chatbot potential. It is conducted to test whether a chatbot's level of personalisation while conversing has any association on people's opinion of chatbot capabilities.

H_0: There is no association between personalisation level and bot potential.

H_1: There is an association between personalisation level and bot potential.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	5.692	2	.058
Likelihood Ratio	5.800	2	.055
Linear-by-Linear Association	4.719	1	.030
N of Valid Cases	97		

Table 10: Chi-square Test – Bot Potential and Personalisation Level



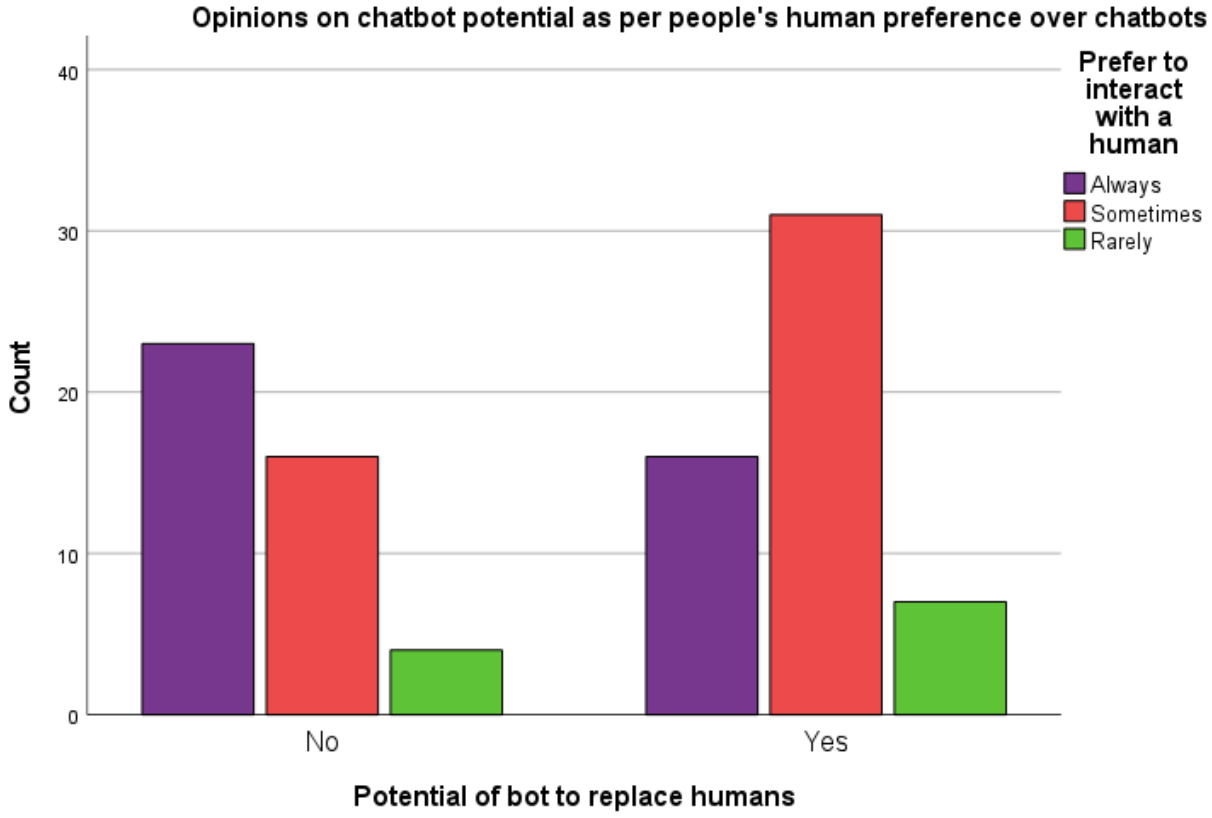
According to observed values – X^2= 4.719, p=0.030, there is a significant association between personalisation level and bot potential. It can be deduced that there is a significant

relationship between the degree of personalisation and the ability of chatbots to replace people. As the degree of personalisation improves, so does the possibility of people approving the concept of chatbots replacing humans. It indicates that higher personalisation level in chatbot interactions might play a role in creating good attitudes towards chatbot-human interactions.

9. Bot Potential and Human Preference: This hypothesis is used to check whether there is an association between people's human preference over a chatbot service and the chatbot potential. It is conducted to test whether people's human preference has any association on people's opinion of chatbot capabilities.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-square	5.688	2	.058
Likelihood Ratio	5.714	2	.057
Linear-by-Linear Association	4.152	1	.042
N of Valid Cases	97		

Table 11: Chi-square Test – Bot Potential and Human Preference



The "minimum expected cell frequency," which is a requirement for the chi-square test's validity, must be 5 or above. Unfortunately, the variable Human Preference does not meet

this criterion. As a result of this constraint, the presence or lack of an association between human preference and bot potential remains questionable.

4.3 Logistic Regression

Binary Logistic regression is used to evaluate how much each factor impacts people's opinion of chatbot's identity revelation. Identity Disclosure is the dependent variable considered in the logistic regression. The hypothesis for regression is considered as follows:

H_0: There is no association between chatbot identity disclosure opinion and other factors.

H_1: There is an association between chatbot identity disclosure opinion and other factors.

	Chi-square	df	Sig.
Step	37.235	13	<.001
Block	37.235	13	<.001
Model	37.235	13	<.001

Table 12: Omnibus Tests of Model Coefficients

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
68.480	.321	.482

Table 13: Model Summary

The Omnibus Test of Model Coefficients indicates how well the model performs over and above the results obtained for Block 0, with none of the predictors entered into the model. (Pallant, 2013b). This is the Chi-square goodness of fit test, where the Chi-square coefficient= 37.235 with 13 degrees of freedom and the p-value obtained is <.001. Hence this model is significant.

The Nagelkerke R2 indicates that the predictor variables explain 48% of the variation in the outcome variable. The parameter coding for the explanatory variables is shown in Table 14 below. The first value for each variable has been used as the reference value.

			Parameter Coding	
		Frequency	(1)	(2)
Comfort Level	Comfortable	34	.000	.000
	Moderately comfortable	42	1.000	.000
	Uncomfortable	20	.000	1.000
Prefer to interact with a human	Always	38	.000	.000
	Sometimes	47	1.000	.000
	Rarely	11	.000	1.000
Personalisation level	Very personalised	39	.000	.000
	Personalised	30	1.000	.000
	Very impersonal	27	.000	1.000
Ease of use	Easy to use	37	.000	.000
	Moderately easy to use	42	1.000	.000
	Difficult to use	17	.000	1.000
Potential of bot to replace humans	No	42	.000	
	Yes	54	1.000	
Privacy Concerns	Unconcerned	23	.000	
	Concerned	73	1.000	
Gender	Female	39	.000	
	Male	57	1.000	
Has a chatbot enhanced overall experience	No	28	.000	
	Yes	68	1.000	
Age Groups	Age 18 to 25	68	.000	
	Age 26 and above	28	1.000	

Table 14: Variable's Coding

							95% C.I. for Exp(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Age Groups (1)	.887	.805	1.215	1	.270	2.428	.502	11.751
Comfort Level			2.077	2	.354			
Comfort Level (1)	-.844	.746	1.280	1	.258	.430	.100	1.855
Comfort Level (2)	.407	1.288	.100	1	.752	1.502	.120	18.742
Privacy Concerns (1)	.271	.809	.112	1	.737	1.311	.269	6.397
Ease of use			1.089	2	.580			
Ease of use (1)	.208	.704	.088	1	.767	1.232	.310	4.900
Ease of use (2)	1.265	1.217	1.080	1	.299	3.542	.326	38.480
Gender (1)	.344	.728	.223	1	.636	1.411	.339	5.875
Personalisation level			7.835	2	.020			
Personalisation level (1)	-2.294	.827	7.694	1	.006	.101	.020	.510
Personalisation level (2)	-1.270	.937	1.836	1	.175	.281	.045	1.763
Prefer to interact with a human			11.999	2	.002			
Prefer to interact with a human (1)	-3.072	.888	11.978	1	<.001	.046	.008	.264
Prefer to interact with a human (2)	-2.460	1.282	3.680	1	.055	.085	.007	1.055
Has a chatbot enhanced overall experience (1)	1.965	.940	4.367	1	.037	7.133	1.130	45.036
Potential of bot to replace humans (1)	1.152	663	3.020	1	.082	3.164	.863	11.600
Constant	2.079	1.576	1.739	1	.187	7.993		

Table 15: Variables in the Equation

The p-value for most of the variables is greater than 0.05, therefore H_0 is accepted and H_1 is rejected for those variables. Hence those predictor variables are considered insignificant. However, some individual dummy variables are significant and hence their Exp(B) values are used for deducing an analysis of these variables with respect to chatbot Identity Disclosure.

Variable	Exp(B)	Analysis
Age Groups – Age 18 to 25		Reference Category
Age Category (1) – Age 26 above	2.428	Result is not significant since p>0.05
Comfort Level – Very comfortable		Reference Category
Comfort Level (1) – Moderately comfortable	.430	Result is not significant since p>0.05
Comfort Level (2) – Very uncomfortable	1.502	Result is not significant since p>0.05
Privacy Concerns - Unconcerned		Reference Category
Privacy Concerns (1) - Concerned	1.311	Result is not significant since p>0.05
Ease of use – Easy to use		Reference Category
Ease of use (1) – Moderately easy to use	1.232	Result is not significant since p>0.05
Ease of use (2) – Difficult to use	3.542	Result is not significant since p>0.05
Gender - Female		Reference Category
Gender (1) - Male	1.411	Result is not significant since p>0.05
Personalisation level – Very personalised		Reference Category
Personalisation level (1) - Personalised	.101	People who report that they need a P**ersonalised** chatbot are 0.101 times less likely to want a chatbot to disclose its identity as compared to those who report a wanting a **Very personalised** chatbot conversation (p=0.006).
Personalisation level (2) – Very impersonal	.281	Result is not significant since p>0.05
Prefer to interact with a human - Always		Reference Category
Prefer to interact with a human (1) - Sometimes	.046	People who report that they **Sometimes** prefer to interact with a human representative are 0.046 times less likely to want a chatbot to disclose its identity as compared to those who report that they **Always** prefer to interact with a human representative than a chatbot (p<0.001).
Prefer to interact with a human (2) - Rarely	.085	Result is not significant since p>0.05
Has a chatbot enhanced overall experience - No		Reference Category
Has a chatbot enhanced overall experience (1) - Yes	7.133	People who report that a chatbot **has enhanced their overall user experience** are 7.133 times more likely to want a chatbot to disclose its identity as compared to those who report that **no chatbot has enhanced their user experience** (p=0.037).
Potential of bot to replace humans – No		Reference Category
Potential of bot to replace humans (1) - Yes	3.164	Result is not significant since p>0.05

Table 16: Results of Analysis

In summary, one can state the following about the attributes and their relation with chatbot identity disclosure-

(1) Compared to individuals who want a highly personalised chatbot interaction, people who express a preference for a moderately personalised chatbot experience are noticeably less likely to want the chatbot to expose its non-human identity. This implies that the level of personalisation the user requests affects the chatbot's inclination to reveal its non-human identity. The higher the personalisation, more the people's desire to know the chatbot's identity.

(2) In comparison to those who always prefer interacting with a human representative over a chatbot, individuals who indicate a preference for occasional interaction with a human representative are significantly less inclined to want a chatbot to reveal its non-human identity. A chatbot's propensity to expose its identity may be influenced by the degree of human preference, which implies that those who prefer human customer representatives over chatbots always desire that the chatbots reveal their machine-like nature before conversation.

(3) When compared to people who claim that their experience with chatbots did not result in user experience improvements, those individuals who acknowledge that a chatbot has positively impacted their overall user experience are noticeably more likely to express a desire for the chatbot to identify itself as non-human. This demonstrates that users prefer chatbots that expose their non-human origin when they perceive a chatbot to have a favourable impact on their user experience.

4.4 Overview of Open-ended responses

The questionnaire responses from participants on their experiences and factors changing their perspectives about their use indicated a wide variety of interactions and attitudes. Some participants reported dissatisfaction with chatbot functions, citing occasions when the technology failed to grasp their questions or delivered irrelevant replies. These negative encounters were frequently caused by limits in the chatbots' capacity to address challenging or unusual inquiries. On the other hand, several individuals recounted pleasant experiences with chatbots that changed their perspective on them positively. These favourable experiences were frequently connected to situations in which chatbots addressed specific difficulties successfully, exhibiting a high degree of knowledge and providing smooth interactions. Participants frequently noted the ease of utilising chatbots for activities such as order tracking, troubleshooting, and getting rapid responses to simple questions.

One of the participants emphasised that, while chatbots have not always been effective for answering subjective questions or offering accurate responses, they have had a favourable experience in educational situations, notably when utilising chatbots as search engines to obtain knowledge. The participant acknowledged the limitations of chatbot scalability, meaning that the technology may struggle to successfully handle an extensive range of inquiries.

Organisations that use chatbots for assistance and service navigation appear to be more advanced than those that do not use chatbots. This finding supports the assumption that chatbot technology is connected with perceived organisational development, indicating alignment with modern customer service practices and technological innovation.

One respondent described a poor experience with a customer service chatbot during online shopping. Due to the lack of a dedicated FAQ area, the chatbot failed to give meaningful answers when asked about the shipping process. This participant found the encounter annoying and proposed that the chatbot admit its limits and give contact information as an alternative. Due to technical issues with the ‘contact us’ link, the participant was forced to use the chatbot, regardless of its ineffectiveness. It was observed that participants detest keyword-based chatbots that lack response flexibility. In shopping and banking apps, predefined questions with FAQ-like replies are unpleasant. They favour AI such as Bard, Bing, or ChatGPT for more user-friendly interactions. While the chatbot handled yet another participant’s initial queries and provided a suitable solution, it fell short of delving further into the participant’s questions and addressing multiple variations of the same problem in more detail. From all the responses recorded, participants prefer to actually read through any FAQs and expect chatbots to answer more complex questions not included in FAQs.

A participant’s contact with a financial chatbot revealed a significant weakness in the bot’s performance. The participant was dissatisfied with the chatbot’s reliance on a predefined list of problems and options. Because of this rigidity, participants believe that chatbots are incapable of dealing with unusual or unexpected challenges. As a result, the participant argued for human agents’ superiority, emphasising their ability to grasp complicated difficulties and give practical answers, even if the process takes longer. The participant’s point of view highlighted chatbots’ inability to grasp intricate challenges fully. Another respondent describes an unpleasant encounter with an Uber chatbot, where the participant had to pay twice due to a technical glitch. Despite attempting to handle the double payment issue using the chatbot, the predetermined solutions supplied did not adequately address this specific problem as it was unique and not predefined for the chatbot.

In general, it has been repeatedly observed from the responses that a chatbot's inability to respond to participant queries stems from its lack of knowledge about the subject, as it seems only to know the generic information. When asked the same question demanding a more detailed response, the chatbot fails to perform, making humans more efficient in solving complex problems. In summary, participants preferred chatbots for everyday and essential enquiries. However, when presented with significant or complex issues, the participant's preference skewed towards interacting with human customer support professionals.

While this participant typically opposes chatbots and refrains from employing them, their prevalence in the internet and mobile world demands their use. According to this responder, chatbots follow established protocols, so they had to acclimatise to their framework before the chatbot could answer any questions. This instance indicates a concern regarding familiarity with the technology as well as the knowledge to ask the right questions to receive an accurate solution. Subsequently, concerns about data security and privacy also prevail among the participants. This participant still prefers human interaction over machine interaction. The central idea represents conflicted feelings about chatbots in an increasingly digital era. People have concerns about chatbots not understanding their issues, even though they have clearly communicated them, which makes them think that chatbots are not efficient enough yet. They feel that chatbots lack in adding value to the solutions they have already gathered from elsewhere. A participant described how their encounter with a chatbot led to a loop of failure with no way to communicate with a human agent. This event demonstrates a restriction in the chatbot's capacity, resulting in dissatisfaction due to the lack of a human involvement channel. When confronted with unusual or complex requests, this inability of chatbots to provide an escape route to human support may lead to a sense of discontent among users. This event emphasises the significance of incorporating methods for seamless shifting between automated and human help in order to provide a more compelling user experience.

Another participant described an interaction with an e-commerce website's chatbot while seeking assistance with a delivery issue. This encounter improved the participant's previously mixed thoughts about chatbots, which stemmed from unsatisfactory replies. The AI-powered e-commerce chatbot efficiently answered their question, providing appropriate alternatives such as monitoring the item delivery and calling support. Real-time updates were supplied on time, demonstrating human-like comprehension and seamless conversational engagement. This efficient and sophisticated episode significantly improved

the participant's view of chatbots. It emphasised AI's potential to improve customer service and simplify complicated operations.

Chatbots are transforming client interactions and service delivery in the financial and banking industries. Account enquiries, transaction histories, and even financial counselling are all managed by chatbots. These AI-powered solutions are available 24/7 and decrease human error. Chatbots are critical in offering personalised, efficient, and secure services as the banking industry embraces digital transformation. Consequently, a participant mentioned a banking chatbot experience praising it for quickly providing the requested account information, bypassing the need for in-person human contact. The convenience and effectiveness of the service boosted their opinion of it.

A participant had a positive experience using ChatGPT. Compared to other chatbots, they observed its promptness and accuracy in answers as remarkable. However, limits such as knowledge cut-offs and subscription prices may impede access, particularly for students or individuals interested in the technology. However, on the other hand, ChatGPT was also used by another participant to review an essay. They expressed concern about the tool's ability to produce false references that seem real, raising the frightening prospect of manufactured work being indistinguishable from trustworthy sources in academic situations.

While several participants recognised the chatbots' potential for providing quick service, others emphasised the need for development, particularly in terms of grasping contextual subtleties and resolving complex challenges. Overall, the participant replies revealed that chatbot interactions considerably influenced people's attitudes, ranging from increasing faith in the technology's capabilities to confirming scepticism about its limits.

Chapter Five

5. Conclusion

5.1 Summary of findings

The study's objectives focus on investigating multiple factors that influence people's opinions of chatbot potential and acceptability. The test results imply that people's perceptions of chatbots' ability to replace humans are unaffected by their level of comfort with them. This suggests that user comfort has little influence on their perception of chatbot potential. Furthermore, it is noted that as personalisation level in chatbot interactions increases, so does the likelihood of people favouring the concept of chatbots possibly replacing humans. This suggests that increasing levels of personalisation in chatbot interactions may help to create favourable views about the possible replacement of human interactions with chatbot interfaces. This somewhat aligns with the research conducted by Angeli et al. (2001) (Refer Chapter Two) where the ability of forming a personal relationship with users was crucial in chatbot development.

Although chatbot identity disclosure does not have any significant impact on the chatbot potential opinion, it is evident from the graphical representation that, among the group of people who are okay with the ambiguity of whether they are having an encounter with a chatbot or a human, the majority are inclined to conclude that chatbots have little chance of replacing tasks performed by humans.

While addressing the usability of chatbots, the graph analysis reveals a clear pattern: the simpler a chatbot is to operate, the more people trust in its eventual ability to replace humans. This demonstration, along with the statistical test results show that user impression of simplicity of chatbot use has a direct impact on their trust in chatbots' ability to assume human functions. The investigations also suggest that if a person has had a favourable chatbot communication that has improved their overall user experience, they are more likely to trust in chatbots' future ability to replace people in certain activities, which indicates strong association between the two aspects.

The graph and test results show that people's attitudes of chatbot potential are unaffected by privacy concerns. However, it is clear from the entire sample that individuals are concerned about their privacy, even if it has little bearing on their view of future chatbot potential. Lastly, because of the low cell frequency, the relationship between human preference and bot potential is unknown.

Further, people's opinions about chatbot identity disclosure in the context of multiple influencing factors was investigated. This research suggests a clear link between the amount of personalisation desired by a user and their preference for the chatbot to reveal its identity. According to the findings, higher personalisation elicits an increased desire to know if the conversation partner is human or automated, influencing user opinions. The study also reveals that human preferences have a major effect on the proclivity for chatbot identity revelation. Those who prefer human customer service agents appear to regularly urge for chatbots to expose their non-human origins, adding to the understanding that the comfort of human-like interactions extends to the expectation of chatbot transparency. This contradicts Luo et al.'s (2019) research (Refer Chapter Two) where productivity and purchase rates declined on disclosure of chatbot identity. Moreover, the findings illustrate a complicated relationship between positive user experiences and a demand for transparency in chatbot interactions. Users who believe chatbots improve all aspects of their interaction appear to value transparency, indicating a possible aspect of trust-building in these conversations.

In summary, these statistical findings address the research objective of analysing people's opinions about chatbot identity disclosure in relation to a number of aspects. They highlight the complex interaction of customization, human choice, and user experience in impacting user views regarding chatbot identity disclosure. This information broadens our understanding of the intricate dynamics in human-chatbot interactions and sheds light on the factors that influence users' expectations and perceptions. The study adds to a more comprehensive understanding of how chatbots might better fit with user preferences and expectations in terms of identity transparency by identifying the elements that influence this feature.

Participants' open-ended responses reveal an array of encounters and views regarding chatbots. Negative encounters were frequently linked to chatbot inadequacies in interpreting complicated inquiries. The responses highlight the relationship between chatbots and user expectations and emphasise human agents' superiority in dealing with nuanced obstacles. While chatbots are useful for routine questions and activities, users prefer human engagement for serious or difficult issues. This choice focuses on the need of human support experts in dealing with complicated situations that may be beyond the capability of chatbots. This aligned with the study conducted by Leah (2022) (Refer Chapter Two) where it was observed that users felt that many of their issues required human attention, and the bot conversations led to dead ends. Furthermore, the study found that expertise with chatbot

technology has a substantial influence on user experiences. Participants frequently have to acclimatise to chatbot methods before receiving appropriate replies. Some of the respondents prioritised human engagement for sensitive subjects due to concerns about data security and privacy. Positive experiences, on the other hand, were associated with chatbots that efficiently addressed specific concerns and provided easy interactions. Such favourable interactions were notably connected with circumstances in which chatbots successfully dealt with problems, demonstrating a high degree of knowledge and seamless participation.

5.2 Limitations and Implications

While the study provides useful insights regarding chatbot technology perspectives, it is not without limits. The possible imbalance in respondent demographics, particularly in terms of age and gender, is a significant factor to consider. Because the sample may not entirely represent a wider population's different viewpoints on chatbot potential, this imbalance may have an impact on the generalizability of the findings. Future studies should strive to close this gap by assuring an unbiased sample of age and gender groupings.

Furthermore, the study detected instances where some tests failed to produce statistically significant findings. While non-significant results may imply the absence of an association between variables, they may also be impacted by the research methodology, sample size, or other unknown factors. As a result, these data should be interpreted cautiously, and any methodological implications should be taken into account when conducting future investigations.

Moreover, in the way the questionnaire was formulated might create some implications. The form and language of questions can have an influence on participants' comprehension and replies. The questionnaire's design may not have adequately captured the intricacies of participants' perceptions, thus reducing answer accuracy and depth. In future studies, the questionnaire might be refined to elicit more nuanced ideas, and qualitative approaches like in-depth interviews or focus groups could give a fuller knowledge of participants' opinions.

The outcome of this research paves the way for further investigation into previously unexplored subjects. Investigating how cultural differences impact chatbot perceptions might give insights into the adoption of cross-cultural technologies. Longitudinal research might also look at how people's impressions alter over time as chatbot technology advances. In practice, these results might help organisations develop chatbot strategies that correspond

with consumers' interests and expectations and make policies adhering to data and privacy concerns.

To summarise, while the study provides useful insights on chatbot views, it is critical to recognise its limits, assess potential methodological implications, and propose future research paths. The findings set the groundwork for both academic and practical applications, offering light on the intricate interaction between user perceptions, technological design, and practical ramifications.

5.3 Conclusion

In conclusion, the research's targets offer a thorough grasp of the complex web of factors impacting people's judgements of chatbot potential, transparency, and acceptability. The study adds to the understanding of the interplay of these components, giving vital insights into the future of chatbot technology and its incorporation into human relationships. Moreover, the findings shed insight into the complex environment of user interactions with chatbots, ranging from pleasant interactions that improve perceptions to unfavourable encounters that expose drawbacks. Personalisation, human preference, technical familiarity, and chatbot skills all play important roles in determining users' opinions towards chatbot technology acceptance, according to the study. These insights add to a more comprehensive knowledge of how people perceive and interact with chatbots, eventually guiding strategies for improving user experiences and promoting technology acceptability in an increasingly digital society.

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APPENDIX 1

Ethics Application

Application 055635

Section A: Applicant details

Date application started:
Thu 29 June 2023 at 15:40

First name:
Janhavi

Last name:
Jathar

Email:
jgjathar1@sheffield.ac.uk

Programme name:
MSc Data Science

Module name:
Dissertation
Last updated:
04/07/2023

Department:
Information School

Applying as:
Undergraduate / Postgraduate taught

Research project title:
Public perceptions of Chatbot technology

Has your research project undergone academic review, in accordance with the appropriate process?
Yes

Similar applications:
- not entered -

Section B: Basic information

Supervisor

Name	Email
Laura Sbaffi	l.sbaffi@sheffield.ac.uk

Proposed project duration

Start date (of data collection):
Wed 5 July 2023

Anticipated end date (of project)
Tue 29 August 2023

3: Project code (where applicable)

Project externally funded?
No

Project code
- not entered -

Suitability

Takes place outside UK?
No

Involves NHS?
No

Health and/or social care human-interventional study?
No

ESRC funded?
No

Likely to lead to publication in a peer-reviewed journal?
Yes

Led by another UK institution?
No

Involves human tissue?
No

Clinical trial or a medical device study?
No

Involves social care services provided by a local authority?
No

Is social care research requiring review via the University Research Ethics Procedure
No

Involves adults who lack the capacity to consent?
No

Involves research on groups that are on the Home Office list of 'Proscribed terrorist groups or organisations?
No

Indicators of risk

Involves potentially vulnerable participants?
No

Involves potentially highly sensitive topics?
No

Section C: Summary of research

1. Aims & Objectives

This research aims to evaluate how chatbot technology is perceived in today's world. Chatbots are widely used to perform a number of tasks in daily life, sometimes even without realising it. Chatbots can mimic human behaviour and interactions to enhance the quality of the conversation and consequently the user experience. The primary goal of the study is to investigate people's perceptions regarding chatbot technology. Understanding user requirements and motivations is necessary to create successful automated interaction systems. Moreover, user expectations constantly change according to technological innovations creating new demands in the Human-AI field. Hence, understanding peoples' viewpoints on chatbot technology has become necessary. The objective of the project is to better comprehend user perspectives and experiences with chatbot technology. This involves studying people's comfort levels and openness to communicate with chatbots, as well as understanding their concerns and inhibitions, evaluating their ability to recognise chatbots, and investigating how chatbot interactions impact their overall user experience.

2. Methodology

This study aims to investigate and evaluate people's opinions regarding the use of chatbots in their daily lives, their thoughts on the privacy and transparency of chatbots and their experiences through a quantitative online questionnaire. The questionnaire created using Google Forms will contain multiple choice questions and a few open-ended ones, where people can write their responses or select one or more options available. The data collected will be analysed using SPSS and a mix of descriptive and inferential statistics will be applied to address the research objectives. The responses to the questionnaires will be anonymous, and no personal information will be asked to the participants. The participants' informed consent will be obtained at the start of the questionnaire before their responses are gathered. No questions regarding sensitive topics like mental health, sexuality, ethnicity or personal problems will be included in the questionnaire.

3. Personal Safety

Have you completed your departmental risk assessment procedures, if appropriate?

Not applicable

Raises personal safety issues?

No

The participants will not be asked to share any kind of personal or identifiable or sensitive information.

Section D: About the participants

1. Potential Participants

The participants for this research will predominantly be students and young people aged 18 years and above. People of this age group are more likely to use chatbots for a number of tasks in their daily lives. They are aware of the technology, are curious and willing to learn more about it and may have more experience of chatbot usage than older people.

2. Recruiting Potential Participants

The questionnaire will be distributed as a Google Forms link via The University of Sheffield official email as well as the social media application 'WhatsApp', to personal contacts initially, followed by referrals from existing participants as snowball sampling will be employed in the data collection process. The questionnaire will start with a clear explanation of the project, the procedure, important considerations and how the participant data will be recorded and utilised. Once the participants are aware of how their responses will be used, they will be presented with a consent question before the actual questionnaire. The questionnaire logic will direct participants to the end of the survey if they do not agree to participate. However, they will be also given the freedom to withdraw themselves from the survey at any given point. All the responses recorded will be confidential and anonymous. The participants will not be subjected to any kind of potential harms including physical, psychological or emotional, social, economic or reputational harms during the entire course of this study. It will be ensured that no question will unintentionally harm participant sentiments in any way.

2.1. Advertising methods

Will the study be advertised using the volunteer lists for staff or students maintained by IT Services? Yes

I will be using the volunteer mailing lists as well as distributing the Google forms via WhatsApp. This will be followed by referrals from existing participants to recruit more participants.

3. Consent

Will informed consent be obtained from the participants? (i.e. the proposed process) Yes

Participants will be provided with a detailed information sheet and consent point to agree upon at the start of the questionnaire.

4. Payment

Will financial/in kind payments be offered to participants? No

5. Potential Harm to Participants

What is the potential for physical and/or psychological harm/distress to the participants?

The risks of participating are the same as those experienced in everyday life. The participants will not be subjected to any kind of potential harm, including physical, psychological or emotional, social, economic or reputational harm during the entire course of this study. It will be ensured that no question will unintentionally harm participant sentiments in any way.

How will this be managed to ensure appropriate protection and well-being of the participants?

The participants will not be subjected to any kind of potential harms including physical, psychological or emotional, social, economic or reputational harms during the entire course of this study. It will be ensured that no question will unintentionally harm participant sentiments

in any way.

6. Potential harm to others who may be affected by the research activities

Which other people, if any, may be affected by the research activities, beyond the participants and the research team?

NA

What is the potential for harm to these people?

NA

How will this be managed to ensure appropriate safeguarding of these people?

NA

7. Reporting of safeguarding concerns or incidents

What arrangements will be in place for participants, and any other people external to the University who are involved in, or affected by, the research, to enable reporting of incidents or concerns?

Participants will be able to contact the main researcher via email. This research' supervisor, Dr. Laura Sbaffi (l.sbaffi@sheffield.ac.uk) will also be able to be a point of contact if participants do not wish to speak to the researcher in relation to their concerns. If the above-named individuals are unable to handle the complaint and/or if the participant wishes to escalate the complaint, then they will be able to contact the School's Head of School (Prof. Val Gillet). They will also be able to contact the Information School Ethics Team (ischool_ethics@sheffield.ac.uk).

Who will be the Designated Safeguarding Contact(s)?

Research supervisor, Dr. Laura Sbaffi

How will reported incidents or concerns be handled and escalated?

In the first instance, the participant will bring the concern to the researcher. If this is not sufficient or if the complaint is about the researcher, then the Designated Safeguarding Contact will receive the complaint who will get in touch with the participant to collect as much information is possible and needed so as to assess the issue. If needed, the issue will be escalated to the Head of School and if the Head of School feels that the issue needs further escalation, they will then contact the Information School Ethics Team to be consulted or possibly intervene.

Section E: Personal data

1. Use of personal data

Will any personal data be processed or accessed as part of the project?
No

Are you sure that no personal data will be processed or accessed during your project?
Yes

Section F: Supporting documentation

Information & Consent

Participant information sheets relevant to project?
Yes

Document 1125415 (Version 1) — All versions
Participant Information Sheet

Consent forms relevant to project?
Yes

Document 1125416 (Version 1) — All versions
Consent form

Additional Documentation

External Documentation

- not entered -

Section G: Declaration

Signed by:
Janhavi Jathar
Date signed:
Sat 1 July 2023 at 14:20

Offical notes

- not entered -

APPENDIX 2

Ethics Approval

The University Of Sheffield.

Downloaded: 04/07/2023
Approved: 04/07/2023

Janhavi Jathar
Registration number: 220202248
Information School
Programme: MSc Data Science

Dear Janhavi

PROJECT TITLE: Public perceptions of Chatbot technology
APPLICATION: Reference Number 055635

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 04/07/2023 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 055635 (form submission date: 01/07/2023); (expected project end date: 29/08/2023).
- Participant information sheet 1125415 version 1 (29/06/2023).
- Participant consent form 1125416 version 1 (29/06/2023).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Peter Bath
Ethics Administrator
Information School

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: https://www.sheffield.ac.uk/research-services/ethics-integrity/policy
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

APPENDIX 3

Participant Information Sheet: Public Perceptions of Chatbot Technology

You are being invited to take part in a research project. Before you decide whether or not to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

1. What is the project's purpose?

As a part of my Masters in Data Science degree, this study is being conducted with the aim of exploring people's motivation, willingness/hesitation while using chatbots and whether chatbots enhance or degrade user experience. It will also investigate any concerns that the public has regarding chatbots and their efficiency to complete a given task. I would like to invite you to complete this questionnaire and share your chatbot usage experience.

2. Why have I been chosen?

You are being chosen as a participant as you fulfil the following criteria required for the research project:

• Aged 18 years and above

• Have enough knowledge about the chatbot technology and its usage

• Have experience of using a chatbot at least once

3. Do I have to take part?

This survey is completely anonymous. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet and be asked to sign a consent form and you can still withdraw before you submit the questionnaire without any negative consequences. You do not have to give a reason. Please note that choosing to participate in this research will not create a legally binding agreement, nor is it intended to create an employment relationship between you and the University of Sheffield.

4. What will happen to me if I take part? What do I have to do?

This survey will take only 10 minutes of your time, your answers to each question will be recorded for further analysis. This questionnaire will not contain any personal detail

questions except your gender, age and current level of education which is crucial for the analysis. You should answer the questions by choosing the item on the scale that best applies to you. There will be a few open-ended questions which will require you to describe a scenario and any personal details mentioned in the answer will be discarded to ensure anonymity.

5. Confidentiality and Concerns

To comply with General Data Protection Regulations (GDPR) we are required to inform you that the University of Sheffield will be the data controller for this study. This means that the University is responsible for looking after your information and using it properly. All the information that we collect about you during the course of the research will be kept strictly confidential and will only be accessible to members of the research team and will not be shared with any third party.

This project is supervised by Dr. Laura Sbaffi, l.sbaffi@sheffield.ac.uk. If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, please contact Professor Peter Bath & Dr. Kate Miltner, Research Ethics Coordinators, Information School, The University of Sheffield (ischool_ethics@sheffield.ac.uk).

Should you wish to make a report of concern or incident relating to potential exploitation, abuse, or harm resulting from your involvement in this project, please contact the Designated Safeguarding Contact [Dr. Laura Sbaffi, l.sbaffi@sheffield.ac.uk].

If the concern or incident relates to the Designated Safeguarding Contact, or if you feel a report you have made to this contact has not been handled in a satisfactory way, please contact the University's Research Ethics & Integrity Manager (Lindsay Unwin; l.v.unwin@sheffield.ac.uk).

Project contact details for further information:

Janhavi Jathar: jgjathar1@sheffield.ac.uk

Thank you for taking the time to read this Participant Information Sheet and contributing to the survey.

APPENDIX 4

The University of Sheffield Information School Consent Form

Taking Part in the Project

- I have read and understood the project information sheet dated 05/07/2023. (If you will answer No to this question, please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)
- I have been given the opportunity to ask questions about the project.
- I agree to take part in the project. I understand that taking part in the project will include completing an anonymous questionnaire.
- I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.
- I understand that my taking part is voluntary and that I can withdraw from the study before submitting the questionnaire; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.

How my information will be used during and after the project

- I understand and agree that other authorized researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.
- I understand and agree that other authorized researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.

So that the information you provide can be used legally by the researchers

- I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.

I agree to take part in the research project as described above.

Further information, including details about how and why the University processes your personal information, how we keep your information secure, and your legal rights (including how to complain if you feel that your personal information has not been handled correctly), can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

This project is supervised by Dr. Laura Sbaffi, l.sbaffi@sheffield.ac.uk. If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, please contact Professor Peter Bath & Dr Kate Miltner, Research Ethics Coordinators, Information School, The University of Sheffield (ischool_ethics@sheffield.ac.uk).

APPENDIX 5

Online Questionnaire: Public Perceptions of Chatbot Technology

1) Specify your age:

2) Specify your gender:

a. Male

b. Female

c. Prefer not to say

3) What is your current level of education?

a. GCSE or equivalent

b. A-level or Diploma

c. Bachelor's degree

d. Master's degree

e. Doctorate or professional degree

f. Other (Please specify)

g. Prefer not to say

4) How often do you interact with a chatbot?

a. Daily

b. Weekly

c. Monthly

d. Rarely

e. Never

5) In which situations have you used a chatbot the most? (Select all that apply)

a. Customer support regarding product or service queries

b. Online purchases, tracking orders, product recommendations

c. Travel and booking (flights, rentals, travel information)

d. Banking and finance (checking account balances, transferring funds, financial advice)

e. Healthcare information and advice

f. Personal assistance/ information

g. Food ordering services

h. Education (learning materials, study resources)

i. Social media

j. Entertainment

h. Other (Please specify)

6) How comfortable are you with using chatbots?

a. Very comfortable

b. Somewhat comfortable

c. Neutral

d. Somewhat uncomfortable

e. Very uncomfortable

7) How would you define the ease of use of chatbots?

a. Very easy to use

b. Somewhat easy to use

c. Neutral

d. Somewhat difficult to use

e. Very difficult to use

8) How satisfied are you with the accuracy or usefulness of the chatbot responses/solutions?

a. Very satisfied

b. Somewhat satisfied

c. Neutral

d. Somewhat dissatisfied

e. Very dissatisfied

9) How would you rate the speed/timely assistance of chatbot responses as compared to human responses?

a. Very fast

b. Fast

c. Neutral

d. Slow

e. Very slow

10) How often do you prefer to interact with a human customer service representative instead of a chatbot?

a. Always

b. Sometimes

c. Rarely

d. Never

11) How would you rate the level of personalisation of chatbot responses?

a. Very personalized

b. Somewhat personalized

c. Neutral

d. Somewhat impersonal

e. Very impersonal

12) What do you prefer: chatbots with more of a human element or chatbots acting more like machines during any conversation?

a. Human-like conversation

b. Machine-like conversation

c. Doesn’t matter to me as long as I get my answer

13) At what extent do you find chatbot solutions to be reliable?

a. Very reliable

b. Somewhat reliable

c. Neutral

d. Somewhat unreliable

e. Very unreliable

14) What concerns or inhibitions do you have while using chatbots? (Select all that apply)

a. Data privacy and security concerns

b. Lack of human-like conversation

c. Lack of trust in chatbot solutions

d. Difficulty in expressing the query/ understanding the chatbot responses

e. Preference to human interactions for sensitive topics

f. Fear of getting misleading information

g. Lack of personalisation

h. Unfamiliarity with the technology

i. Others (Please specify)

15) How concerned are you about your personal information being shared with third parties when interacting with chatbots?

a. Very concerned

b. Somewhat concerned

c. Neutral

d. Somewhat unconcerned

e. Very unconcerned

16) Can you typically recognize whether you are conversing with a chatbot or a human?

a. Yes, always

b. Sometimes, it can be challenging

c. No, I cannot differentiate between a chatbot and a human

17) How important is it for you to know if you are conversing with a chatbot or a human?

a. Yes, it is very important

b. It is somewhat important

c. Depends on the circumstance

d. Not important, it doesn't matter to me

18) Would you prefer chatbots to disclose that they are not human at the beginning of a conversation?

a. Yes, it is important to know at the beginning

b. No, it doesn't matter to me

19) Have you ever had a chatbot experience that enhanced your overall user experience about a product or service?

a. Yes, definitely

b. Yes, to some extent

c. No, it made no difference

d. No, it degraded my experience

20) How would you rate an overall user experience of a chatbot interaction? (consider how satisfied you were with the solution/advice, responsiveness, personal touch and how reliable and useful it was to solve the problem at hand)

a. Very positive

b. Somewhat positive

c. Neutral

d. Somewhat negative

e. Very negative

21) How likely are you to recommend a well-functioning chatbot to others?

a. Very likely

b. Somewhat likely

c. Neutral

d. Somewhat unlikely

e. Very unlikely

22) How likely are you to continue using chatbots in the future?

a. Very likely

b. Somewhat likely

c. Neutral

d. Somewhat unlikely

e. Very unlikely

23) In your opinion, do chatbots have the potential to replace human customer service representatives entirely?

a. Yes, absolutely

b. Yes, to a large extent

c. No, only in certain situations

d. No, not at all

24) In your own words, describe an incident where you had a good or bad experience of using a chatbot which changed your opinion about their usage.

APPENDIX 6

Results

Frequencies

Statistics

		Age Groups	Potential of bot to replace humans	Comfort Level	Privacy Concerns	Should the bot disclose that it is not human before the conversation?
N	Valid	97	97	97	97	97
	Missing	0	0	0	0	0
Mode		1.00	1.00	2.00	1.00	1.00
Minimum		1.00	.00	1.00	.00	.00
Maximum		2.00	1.00	3.00	1.00	1.00

Statistics

		Ease of Use	Has a chatbot enhanced overall experience	Gender	Personalization level
N	Valid	97	97	96	97
	Missing	0	0	1	0
Mode		2.00	1.00	1.00	1.00
Minimum		1.00	.00	.00	1.00
Maximum		3.00	1.00	1.00	3.00

Frequency Table

Age Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Age 18 to 25	69	71.1	71.1	71.1
	Age 26 and above	28	28.9	28.9	100.0
	Total	97	100.0	100.0	

Potential of bot to replace humans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	43	44.3	44.3	44.3
	Yes	54	55.7	55.7	100.0
	Total	97	100.0	100.0	

Comfort Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Comfortable	34	35.1	35.1	35.1
	Moderately comfortable	42	43.3	43.3	78.4
	Uncomfortable	21	21.6	21.6	100.0
	Total	97	100.0	100.0	

Privacy Concerns

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unconcerned	23	23.7	23.7	23.7
	Concerned	74	76.3	76.3	100.0
	Total	97	100.0	100.0	

Should the bot disclose that it is not human before the conversation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	23.7	23.7	23.7
	Yes	74	76.3	76.3	100.0
	Total	97	100.0	100.0	

Ease of Use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Easy to use	37	38.1	38.1	38.1
	Moderately easy to use	42	43.3	43.3	81.4
	Difficult to use	18	18.6	18.6	100.0
	Total	97	100.0	100.0	

Has a chatbot enhanced overall experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	29	29.9	29.9	29.9
	Yes	68	70.1	70.1	100.0
	Total	97	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	39	40.2	40.6	40.6
	Male	57	58.8	59.4	100.0
	Total	96	99.0	100.0	
Missing	System	1	1.0		
Total		97	100.0		

Personalization level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very personalized	40	41.2	41.2	41.2
	Personalized	30	30.9	30.9	72.2
	Very impersonal	27	27.8	27.8	100.0
	Total	97	100.0	100.0	

Chi-square tests

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Potential of bot to replace humans * Age Groups	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Comfort Level	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Privacy Concerns	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Should the bot disclose that it is not human before the conversation?	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Ease of Use	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Has a chatbot enhanced overall experience	97	100.0%	0	0.0%	97	100.0%
Potential of bot to replace humans * Gender	96	99.0%	1	1.0%	97	100.0%
Potential of bot to replace humans * Personalisation level	97	100.0%	0	0.0%	97	100.0%

Potential of bot to replace humans * Age Groups

Crosstab

			Age Groups	
			Age 18 to 25	Age 26 and above
Potential of bot to replace humans	No	Count	31	12
		% within Potential of bot to replace humans	72.1%	27.9%
	Yes	Count	38	16
		% within Potential of bot to replace humans	70.4%	29.6%
Total		Count	69	28
		% within Potential of bot to replace humans	71.1%	28.9%

Crosstab

			Total
Potential of bot to replace humans	No	Count	43
		% within Potential of bot to replace humans	100.0%
	Yes	Count	54
		% within Potential of bot to replace humans	100.0%
Total		Count	97
		% within Potential of bot to replace humans	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.035[a]	1	.852		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.035	1	.852		
Fisher's Exact Test				1.000	.517
Linear-by-Linear Association	.034	1	.853		
N of Valid Cases	97				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.41.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.019	.852
	Cramer's V	.019	.852
N of Valid Cases		97	

Potential of bot to replace humans * Comfort Level

Crosstab

			Comfort Level	
			Comfortable	Moderately comfortable
Potential of bot to replace humans	No	Count	13	17
		% within Potential of bot to replace humans	30.2%	39.5%
	Yes	Count	21	25

		% within Potential of bot to replace humans	38.9%	46.3%
Total		Count	34	42
		% within Potential of bot to replace humans	35.1%	43.3%

Crosstab

			Comfort Level	
			Uncomfortable	Total
Potential of bot to replace humans	No	Count	13	43
		% within Potential of bot to replace humans	30.2%	100.0%
	Yes	Count	8	54
		% within Potential of bot to replace humans	14.8%	100.0%
Total		Count	21	97
		% within Potential of bot to replace humans	21.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.393[a]	2	.183
Likelihood Ratio	3.385	2	.184
Linear-by-Linear Association	2.501	1	.114
N of Valid Cases	97		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.31.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.187	.183
	Cramer's V	.187	.183
N of Valid Cases		97	

Potential of bot to replace humans * Privacy Concerns

Crosstab

			Privacy Concerns	
			Unconcerned	Concerned
Potential of bot to replace humans	No	Count	13	30
		% within Potential of bot to replace humans	30.2%	69.8%
	Yes	Count	10	44
		% within Potential of bot to replace humans	18.5%	81.5%

Total	Count	23	74
	% within Potential of bot to replace humans	23.7%	76.3%

Crosstab

			Total
Potential of bot to replace humans	No	Count	43
		% within Potential of bot to replace humans	100.0%
	Yes	Count	54
		% within Potential of bot to replace humans	100.0%
Total		Count	97
		% within Potential of bot to replace humans	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.816[a]	1	.178		
Continuity Correction[b]	1.226	1	.268		
Likelihood Ratio	1.807	1	.179		
Fisher's Exact Test				.231	.134
Linear-by-Linear Association	1.797	1	.180		
N of Valid Cases	97				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.20.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.137	.178
	Cramer's V	.137	.178
N of Valid Cases		97	

Potential of bot to replace humans * Should the bot disclose that it is not human before the conversation?

Crosstab

		Should the bot disclose that it is not human before the conversation?

			No	Yes
Potential of bot to replace humans	No	Count	14	29
		% within Potential of bot to replace humans	32.6%	67.4%
	Yes	Count	9	45
		% within Potential of bot to replace humans	16.7%	83.3%
Total		Count	23	74
		% within Potential of bot to replace humans	23.7%	76.3%

Crosstab

			Total
Potential of bot to replace humans	No	Count	43
		% within Potential of bot to replace humans	100.0%
	Yes	Count	54
		% within Potential of bot to replace humans	100.0%
Total		Count	97
		% within Potential of bot to replace humans	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.342[a]	1	.068		
Continuity Correction[b]	2.521	1	.112		
Likelihood Ratio	3.333	1	.068		
Fisher's Exact Test				.093	.056
Linear-by-Linear Association	3.308	1	.069		
N of Valid Cases	97				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.20.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.186	.068
	Cramer's V	.186	.068
N of Valid Cases		97	

Potential of bot to replace humans * Ease of Use

Crosstab

			Ease of Use	
			Easy to use	Moderately easy to use
Potential of bot to replace humans	No	Count	13	17
		% within Potential of bot to replace humans	30.2%	39.5%
	Yes	Count	24	25
		% within Potential of bot to replace humans	44.4%	46.3%
Total		Count	37	42
		% within Potential of bot to replace humans	38.1%	43.3%

Crosstab

			Ease of Use	
			Difficult to use	Total
Potential of bot to replace humans	No	Count	13	43
		% within Potential of bot to replace humans	30.2%	100.0%
	Yes	Count	5	54
		% within Potential of bot to replace humans	9.3%	100.0%
Total		Count	18	97
		% within Potential of bot to replace humans	18.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.195[a]	2	.027
Likelihood Ratio	7.286	2	.026
Linear-by-Linear Association	5.548	1	.019
N of Valid Cases	97		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.98.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.272	.027
	Cramer's V	.272	.027
N of Valid Cases		97	

Potential of bot to replace humans * Has a chatbot enhanced overall experience

Crosstab

			Has a chatbot enhanced overall experience	
			No	Yes
Potential of bot to replace humans	No	Count	18	25
		% within Potential of bot to replace humans	41.9%	58.1%
	Yes	Count	11	43
		% within Potential of bot to replace humans	20.4%	79.6%
Total		Count	29	68
		% within Potential of bot to replace humans	29.9%	70.1%

Crosstab

			Total
Potential of bot to replace humans	No	Count	43
		% within Potential of bot to replace humans	100.0%
	Yes	Count	54
		% within Potential of bot to replace humans	100.0%
Total		Count	97
		% within Potential of bot to replace humans	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.275[a]	1	.022		
Continuity Correction[b]	4.299	1	.038		
Likelihood Ratio	5.278	1	.022		
Fisher's Exact Test				.027	.019
Linear-by-Linear Association	5.220	1	.022		
N of Valid Cases	97				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.86.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.233	.022
	Cramer's V	.233	.022
N of Valid Cases		97	

Potential of bot to replace humans * Gender

Crosstab

			Gender		
			Female	Male	Total
Potential of bot to replace humans	No	Count	21	21	42
		% within Potential of bot to replace humans	50.0%	50.0%	100.0%
	Yes	Count	18	36	54
		% within Potential of bot to replace humans	33.3%	66.7%	100.0%
Total		Count	39	57	96
		% within Potential of bot to replace humans	40.6%	59.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.721[a]	1	.099		
Continuity Correction[b]	2.074	1	.150		
Likelihood Ratio	2.721	1	.099		
Fisher's Exact Test				.142	.075
Linear-by-Linear Association	2.692	1	.101		
N of Valid Cases	96				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.06.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.168	.099
	Cramer's V	.168	.099
N of Valid Cases		96	

Potential of bot to replace humans * Personalisation level

Crosstab

			Personalisation level	
			Very personalized	Personalized
	No	Count	12	16

Potential of bot to replace humans		% within Potential of bot to replace humans	27.9%	37.2%
	Yes	Count	28	14
		% within Potential of bot to replace humans	51.9%	25.9%
Total		Count	40	30
		% within Potential of bot to replace humans	41.2%	30.9%

Crosstab

			Personalisation level	
			Very impersonal	Total
Potential of bot to replace humans	No	Count	15	43
		% within Potential of bot to replace humans	34.9%	100.0%
	Yes	Count	12	54
		% within Potential of bot to replace humans	22.2%	100.0%
Total		Count	27	97
		% within Potential of bot to replace humans	27.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.692[a]	2	.058
Likelihood Ratio	5.800	2	.055
Linear-by-Linear Association	4.719	1	.030
N of Valid Cases	97		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.97.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.242	.058
	Cramer's V	.242	.058
N of Valid Cases		97	

Crosstabs

Notes

Output Created	27-AUG-2023 00:00:40
Comments	

Input	Data	C:\Users\janha\OneDrive\Desktop\DISSERTATION\DATA\Chatbot data.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	97
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=BotH BY Humn /FORMAT=AVALUE TABLES /STATISTICS=CHISQ PHI /CELLS=COUNT ROW /COUNT ROUND CELL /BARCHART.
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.30
	Dimensions Requested	2
	Cells Available	524245

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Potential of bot to replace humans * Prefer to interact with a human	97	100.0%	0	0.0%	97	100.0%

Potential of bot to replace humans * Prefer to interact with a human Crosstabulation

			Prefer to interact with a human		
			Always	Sometimes	Rarely
Potential of bot to replace humans	No	Count	23	16	4
		% within Potential of bot to replace humans	53.5%	37.2%	9.3%
	Yes	Count	16	31	7
		% within Potential of bot to replace humans	29.6%	57.4%	13.0%
Total		Count	39	47	11
		% within Potential of bot to replace humans	40.2%	48.5%	11.3%

Potential of bot to replace humans * Prefer to interact with a human Crosstabulation

			Total
	No	Count	43

Potential of bot to replace humans		% within Potential of bot to replace humans	100.0%
	Yes	Count	54
		% within Potential of bot to replace humans	100.0%
Total		Count	97
		% within Potential of bot to replace humans	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.688[a]	2	.058
Likelihood Ratio	5.714	2	.057
Linear-by-Linear Association	4.152	1	.042
N of Valid Cases	97		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 4.88.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.242	.058
	Cramer's V	.242	.058
N of Valid Cases		97	

Notes

Output Created		27-AUG-2023 00:07:00
Comments		
Input	Data	C:\Users\janha\OneDrive\Desktop\DISSERTATION\DATA\Chatbot data.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	97
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=Concern BY Person /FORMAT=AVALUE TABLES /STATISTICS=CHISQ PHI /CELLS=COUNT ROW /COUNT ROUND CELL

		/BARCHART.
Resources	Processor Time	00:00:00.09
	Elapsed Time	00:00:00.21
	Dimensions Requested	2
	Cells Available	524245

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	96	99.0
	Missing Cases	1	1.0
	Total	97	100.0
Unselected Cases		0	.0
Total		97	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Categorical Variables Codings

			Parameter coding	
		Frequency	(1)	(2)
Comfort Level	Comfortable	34	.000	.000
	Moderately comfortable	42	1.000	.000
	Uncomfortable	20	.000	1.000
Prefer to interact with a human	Always	38	.000	.000
	Sometimes	47	1.000	.000
	Rarely	11	.000	1.000
Personalisation level	Very personalized	39	.000	.000
	Personalized	30	1.000	.000
	Very impersonal	27	.000	1.000
Ease of Use	Easy to use	37	.000	.000
	Moderately easy to use	42	1.000	.000
	Difficult to use	17	.000	1.000
Potential of bot to replace humans	No	42	.000	
	Yes	54	1.000	
Privacy Concerns	Unconcerned	23	.000	
	Concerned	73	1.000	
Gender	Female	39	.000	
	Male	57	1.000	

Has a chatbot enhanced overall experience	No	28	.000	
	Yes	68	1.000	
Age Groups	Age 18 to 25	68	.000	
	Age 26 and above	28	1.000	

Block 0: Beginning Block

Classification Table[a,b]

			Predicted		
			Should the bot disclose that it is not human before the conversation?		Percentage Correct
	Observed		No	Yes	
Step 0	Should the bot disclose that it is not human before the conversation?	No	0	23	.0
		Yes	0	73	100.0
	Overall Percentage				76.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	1.155	.239	23.330	1	<.001	3.174

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Age Groups(1)	.139	1	.709
		Comfort Level	.875	2	.646
		Comfort Level(1)	.872	1	.350
		Comfort Level(2)	.217	1	.641
		Privacy Concerns(1)	.075	1	.784
		Ease of Use	.489	2	.783
		Ease of Use(1)	.204	1	.651
		Ease of Use(2)	.452	1	.502
		Gender(1)	1.672	1	.196
		Personalisation level	10.245	2	.006
		Personalisation level(1)	8.991	1	.003
		Personalisation level(2)	.062	1	.803
		Prefer to interact with a human	10.888	2	.004
		Prefer to interact with a human(1)	10.393	1	.001
		Prefer to interact with a human(2)	.228	1	.633
		Has a chatbot enhanced overall experience(1)	2.999	1	.083

	Potential of bot to replace humans(1)	3.602	1	.058
	Overall Statistics	30.636	13	.004

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	37.235	13	<.001
	Block	37.235	13	<.001
	Model	37.235	13	<.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	68.480[a]	.321	.482

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Should the bot disclose that it is not human before the conversation?		
	Observed		No	Yes	Percentage Correct
Step 1	Should the bot disclose that it is not human before the conversation?	No	14	9	60.9
		Yes	4	69	94.5
	Overall Percentage				86.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.
Step 1[a]	Age Groups(1)	.887	.805	1.215	1	.270
	Comfort Level			2.077	2	.354
	Comfort Level(1)	-.844	.746	1.280	1	.258
	Comfort Level(2)	.407	1.288	.100	1	.752
	Privacy Concerns(1)	.271	.809	.112	1	.737
	Ease of Use			1.089	2	.580
	Ease of Use(1)	.208	.704	.088	1	.767
	Ease of Use(2)	1.265	1.217	1.080	1	.299
	Gender(1)	.344	.728	.223	1	.636
	Personalisation level			7.835	2	.020
	Personalisation level(1)	-2.294	.827	7.694	1	.006
	Personalisation level(2)	-1.270	.937	1.836	1	.175

	Prefer to interact with a human			11.999	2	.002
	Prefer to interact with a human(1)	-3.072	.888	11.978	1	<.001
	Prefer to interact with a human(2)	-2.460	1.282	3.680	1	.055
	Has a chatbot enhanced overall experience(1)	1.965	.940	4.367	1	.037
	Potential of bot to replace humans(1)	1.152	.663	3.020	1	.082
	Constant	2.079	1.576	1.739	1	.187

Variables in the Equation

			95% C.I.for EXP(B)	
		Exp(B)	Lower	Upper
Step 1[a]	Age Groups(1)	2.428	.502	11.751
	Comfort Level			
	Comfort Level(1)	.430	.100	1.855
	Comfort Level(2)	1.502	.120	18.742
	Privacy Concerns(1)	1.311	.269	6.397
	Ease of Use			
	Ease of Use(1)	1.232	.310	4.900
	Ease of Use(2)	3.542	.326	38.480
	Gender(1)	1.411	.339	5.875
	Personalisation level			
	Personalisation level(1)	.101	.020	.510
	Personalisation level(2)	.281	.045	1.763
	Prefer to interact with a human			
	Prefer to interact with a human(1)	.046	.008	.264
	Prefer to interact with a human(2)	.085	.007	1.055
	Has a chatbot enhanced overall experience(1)	7.133	1.130	45.036
	Potential of bot to replace humans(1)	3.164	.863	11.600
	Constant	7.993		

a. Variable(s) entered on step 1: Age Groups, Comfort Level, Privacy Concerns, Ease of Use, Gender, Personalisation level, Prefer to interact with a human, Has a chatbot enhanced overall experience, Potential of bot to replace humans.