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# MDDDM

Master's Degree Program in  
**Data-Driven Marketing**

**Users' perception of conversational AI according to their age  
and origin**

Nikola Popovski

Master Thesis

presented as partial requirement for obtaining a Master's Degree in Data-Driven Marketing

**NOVA Information Management School**  
**Instituto Superior de Estatística e Gestão de Informação**  
Universidade Nova de Lisboa

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by

Nikola Popovski

Master Thesis presented as partial requirement for obtaining the Master's degree in Data-Driven Marketing, with a specialization in Digital Marketing and Analytics

**Supervised by**

Professor Marlon Dalmoro

February, 2024

## **STATEMENT OF INTEGRITY**

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

*[Lisbon, 28.02.2024]*

## ABSTRACT

As chatbots and voice assistants are getting more advanced each day, many industries have adopted this technology to make their lives easier. Because of this, it comes as no surprise that the number of people that use conversational AI such as voice assistants and chatbots is seeing a steady increase each year. Conversational AI may have found its use in many industries, but there is a lack of studies about how users perceive it and how they affect the lives of its users. This translates to that it is far from clear how to determine the true power and importance of this technology. This research will assess how voice assistants and chatbots are perceived by the users, if they have any effect on the customers, and exactly how well accepted are they in today's world. There are three guiding research questions of this study that we want to prove, the first one being 'Are younger generations more open to AI involvement in everyday life?', where we demonstrate that the younger generations, can be more open to new changes and advancements in the world of AI. With the second one 'Do users prefer AIs that can and do mimic human personalities?', we are determining that personification of conversational AI is seen as a positive thing and that can positively affect the interactions and perceptions of the users. And with the third 'Are responsiveness and simplicity the key reasons why voice assistants are widely accepted?' we show that besides many new qualities in chatbots and voice assistants, the simplicity of use and the responsiveness of the AIs are still a top priority for a better user experience. The final question in this thesis 'Is there a meaningful difference between the responses of North Macedonia and the rest of the world?' we define that although different, North Macedonia doesn't differentiate from other countries from their knowledge, understandings, visions, and responses. In this research, we have conducted a quantitative study, via a questionnaire done using Qualtrics, to people who have used or are using any form of conversational AI such as chatbots and/or voice assistants, later we analyzed the data gathered from this questionnaire through SPSS and provided graphs and tables from both tools. Ultimately, we provided some new, and some up to date insights into the people's perception of conversational AIs is, what characteristics bring relevance to the AIs, and how accepted they are today.

## KEYWORDS

Conversational artificial intelligence; Artificial intelligence; Chatbot; Voice assistant; Users perception

## Sustainable Development Goals (SDG):



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## **LIST OF ABBREVIATIONS AND ACRONYMS**

|            |  |
|------------|--|
| <b>AI</b>  | Artificial intelligence                |
| <b>CAI</b> | Conversational artificial intelligence |
| <b>CB</b>  | Chatbot                                |
| <b>UX</b>  | User experience                        |
| <b>VA</b>  | Voice assistant                        |

# 1. INTRODUCTION

As chatbots (CB) and voice assistants (VA) are getting increasingly more advanced each day, many companies across different industries have adopted this technology to make their lives and the lives of their consumers better and easier. Conversational artificial intelligence (CAI) is all around us nowadays, thanks to the many companies that have developed their own VAs such as Amazon's Alexa, Google's Google Assistant, Apple's Siri, and Microsoft's Cortana and have expanded their use from smartphones and personal computers to now being used in and with smart cars, smart speakers, smartwatches (Hoy, 2018). As more 'smart' devices are being created it is only expected of them to integrate some of these VAs in their essence. The global VA market is expected to grow from \$2.8 billion in 2021 and reach \$11.2 billion by 2026 (Research and Markets, 2021). It is because of adaptations like these that people can see happening each day that it comes as no surprise to see a significant increase in the number of consumers who come across chatbots and who are using voice assistants. Today, they play a big part in their lives (Poushneh, 2021), and this brings us to an important question: How do consumers perceive conversational AIs like chatbots and voice assistants? Digging a bit deeper, we ask another question, is there any connection between the age and the origin of the users with how they use and perceive a conversational AI?

There is some research done about different VAs and the experience of using them (de Oliveira et al., 2023; Hoy, 2018) and about how consumers perceive chatbots (Ruane et al., 2021; Shumanov & Johnson, 2021), but also like us, humans, these AIs have their characters, and each can impact a person in a different way. Since this technology changes and evolves every day, it is important that we keep track and be up to date with all the changes happening with the consumers' perceptions and satisfaction as well.

Moreover, this research brings new insights and understandings of a market that hasn't been explored before. North Macedonia, the country with the most participants in this survey, aims to prove that even though it is of different culture, the understandings and the knowledge about conversational artificial intelligence is not that different from countries like Portugal (second with most respondents) and other countries from around the globe. North Macedonia is a small country in the center of the Balkan Peninsula, part of Europe, but not in the EU, it is a new and interesting market for old, as well as new, investors that are looking for young talents that aspire to be at the very top of their fields. As more companies are still trying to implement their new technologies in this country, it is no wonder that the use of conversational AI is still undeveloped and in desperate need for market research.

With this research, we hope to provide good insights and understandings into this market and hope to see and inspire more technological advancements and changes implemented in it.

## 2. LITERATURE REVIEW

To understand the dynamic landscape of user's perceptions towards conversational artificial intelligence (CAI), it is important to review some existing literature that explores different aspects of this ever-evolving technology. While the adoption of voice assistants is on the rise, there is a noticeable gap between studies regarding user perceptions and the broader implications on the lives of the users (Seymour & van Kleek, 2021). This thesis is aiming to fill this gap by examining relevant research and to clarify the complex relationship between users and CAIs.

Besides filling the existing gap, this analysis aims to inform future research in the domain of conversational artificial intelligence. Identifying knowledge gaps, methodological questions, and areas that require further exploration will contribute to a strong research agenda. By understanding the current state of knowledge, researchers can build on the existing foundations and can address the emerging questions that shape the future of CAI.

In the end, this thesis aspires to unravel the dynamic landscape of the users' perceptions toward conversational AIs. By looking at existing research, we are aiming to provide an overall understanding of the complicated relationship between users and the said technology, by contributing to the development of CAIs.

*Hypothesis 1: Are younger generations more open to AI involvement in everyday life?*

The first hypothesis posits that younger generations may exhibit a greater openness to AI integration into daily routines. Existing studies, such as those conducted by Wang & Hsiao (2012) and Poushneh (2021), suggest a positive correlation between age and the acceptance of AI technologies. Here we are also trying to prove the trend that newer generations will much more easily adapt to the new changes and findings in the world of technology. The idea that younger individuals are more inclined to be early adopters of technological innovations is well supported by historical trends. Throughout the evolution of technology, from the appearance of personal computers to the increase in popularity of smartphones, younger generations have consistently embraced and adapted to these innovations at a faster rate than their older counterparts.

As Thormundsson (2022) proves, customers are increasingly using AI-based systems to interact with organizations. As of 2020, 54 percent of customers have daily AI-enabled interactions with organizations, including using technologies such as chatbots, digital assistants, facial recognition or biometric scanners. Of the customers having daily AI-enabled interactions, 63 percent come from the age group between 26 and 35.

A similar study in Germany by Davies (2023) with an age group 18-60 years shows, perhaps unsurprisingly, the age group with the most active users of AI in daily life was Gen Z with 41 percent of people responding that they were active users.

This pattern of early adoption suggests that as technology continues to advance, younger individuals are likely to play a pivotal role in shaping the acceptance and integration of emerging technologies, including conversational AIs. As individuals belonging to younger age groups are more likely to be early adopters of technological innovations, understanding their perspectives becomes crucial in gauging the widespread acceptance of conversational AIs.

By investigating the relationship between age and openness to AI, we are not only examining the current landscape but also aiming to forecast future trends. The hypothesis implies that as newer generations emerge, they will more readily adapt to the evolving technological landscape. Understanding the perspectives of these younger groups becomes crucial for anticipating and preparing for shifts in consumer behavior and preferences. As conversational AIs become increasingly involved in daily life, this research seeks to contribute to a forward-looking understanding of how technology will be embraced by future generations. If the hypothesis holds, it implies that the seamless integration of conversational AIs into daily routines may be more pronounced among younger users. This insight carries significant implications for developers, businesses, and policymakers involved in the design and regulation of conversational AI technologies.

#### *Hypothesis 2: Do users prefer AIs that can and do mimic human personalities?*

The second hypothesis delves into the realm of user preferences concerning the personalities of conversational AIs. Research by de Oliveira et al. (2023) and Hoy (2018) indicates that the human-like characteristics of voice assistants contribute significantly to user satisfaction. Exploring the extent to which users prefer AIs with human-like qualities will provide insights into the design considerations for future conversational AI interfaces. The literature indicates a growing acknowledgment that imbuing conversational AIs with human-like qualities can positively influence user satisfaction. De Oliveira et al. (2023) and Hoy (2018) both emphasize that users tend to engage more positively with AIs that exhibit traits reminiscent of human personalities. This connection between human-like characteristics and user satisfaction underscores the importance of understanding the psychological and emotional factors that influence user interactions with conversational AIs.

The exploration of user preferences for human-like AI personalities holds significant implications for the design of future conversational AI interfaces. If users indeed exhibit a preference for AIs that can mimic human traits, developers and designers may need to prioritize the incorporation of personality features in their creations. This involves not only refining the linguistic capabilities of AIs but also considering aspects such as empathy, humor, and adaptability in their interactions. Insights gathered from this research may guide the

development of conversational AIs that align more closely with user expectations and preferences. Beyond user satisfaction, the second hypothesis prompts an exploration of the psychological impact of conversational AIs with human-like personalities.

Understanding how users respond to AIs that emulate human traits provides valuable insights into the potential for forming emotional connections with these technologies. This aspect becomes particularly relevant as conversational AIs increasingly become companions in various aspects of users' lives, ranging from personal assistants to healthcare companions.

Technology analysts proclaim that chatbots are rapidly becoming “a critical technology component of a service organization's self-service strategy” (Gartner, Inc. 2023). At the same time, industry surveys reveal that consumers generally prefer service by human representatives. The recent study of Huang et al. (2024) confirms this preference. Compared with equivalent service provided by a chatbot, their research participants reported higher satisfaction with human customer service.

Much research demonstrates that words and language are important factors that can enhance customer satisfaction and influence purchasing behavior ([Packard, Moore, & McFerran, 2019](#)). The research suggests that firm agents should emphasize how “we” (the firm) serve “you” (the customer), while de-emphasizing “I” (the agent) in these customer–firm interactions. Firm agents who refer to themselves using “I” rather than “we” pronouns increase customers’ perceptions that the agent feels and acts on their behalf. In turn, these positive perceptions of empathy and agency lead to increased customer satisfaction, purchase intentions, and purchase behavior. Furthermore, the authors find that customer-referencing “you” pronouns have little impact on these outcomes and can sometimes have negative consequences. These findings enhance understanding of how, when, and why language use affects social perception and behavior and provide valuable insights for marketers.

*Hypothesis 3: Are responsiveness and simplicity the key reasons why voice assistants are widely accepted?*

The third hypothesis centers on the proposition that the widespread acceptance of voice assistants can be traced back to two key factors: responsiveness and simplicity. While direct studies on this specific hypothesis may be limited, the broader literature on user experience (UX) and technology acceptance offers valuable insights into the critical roles played by ease of use and responsiveness in shaping positive user perceptions (Ruane et al., 2021; Shumanov & Johnson, 2021). This exploration aims to unravel the nuanced relationship between these factors and the overall acceptance of voice assistants.

The hypothesis posits that the user-friendly nature of voice assistants, characterized by responsiveness and simplicity, contributes significantly to their widespread acceptance. Existing research within the broader field of technology acceptance supports this notion. Studies by Ruane et al. (2021) and Shumanov & Johnson (2021) suggest that users are more inclined to adopt and embrace technologies that are easy to use and exhibit a high level of responsiveness. These factors enhance the overall user experience and contribute to the positive perception of the technology. Voice assistants, with their responsive and straightforward interfaces, seamlessly integrate into users' daily lives. The simplicity of issuing voice commands and receiving prompt responses aligns with users' expectations for technology to be intuitive and minimally disruptive. This seamless integration fosters positive experiences and encourages users to incorporate voice assistants into various aspects of their routines, from managing schedules to controlling smart home devices.

Most of the benefits associated with chatbots relate to improvements in efficiency such as a reduction in costs for the company, lower wait times for customers, and alignment to customer preferences for digital rather than voice-based communications. Despite this, consumer satisfaction with chatbots is mixed. Consumers report frustration with chatbots arising from misunderstood questions, irrelevant responses, and poor integration with human service agents.

Haas et al. (2022) studied the user's satisfaction depending on the way of responding of voice assistants. By analyzing and mapping out the response behavior of current voice assistants, they found that they almost always utilize full sentences as responses, even for commands where no verbal feedback would be necessary at all. They implemented a VA that handles requests in three response styles: two differing short keyword-based response styles and a full-sentence baseline. In a user study, results show that the short responses were perceived similarly useful and likable while being perceived as more efficient, especially for commands, and sometimes better to comprehend than the baseline. It is highlighted the conflict between the current implementation of VAs that only use whole sentences and their perceived efficiency. For instance, in home automation requests, the preference for the full-sentence responses was as low as 21%. It is also found that younger participants more often preferred the shorter response styles, and the keyword response style were perceived as equally useful, likeable, and sometimes even more comprehensible. Designing the response of a VA with a human-sounding voice but without using whole sentences opens up the design space and contributes to a successful and human-centered interaction. With such responses, users only receive the information from the device they have requested, and the VA is not imposed on them as an equal partner. The researchers say that the current trend towards humanizing and personifying assistants limits the design options and has clear negative implications for efficiency. Because of a narrow focus on the personification of the VAs, other properties currently receive little attention. Also, people have diverse needs and preferences and the design of VAs should reflect these needs and preferences and give users the option to adapt their digital assistant to their very own personal needs. To achieve widespread adoption, they

suggest that VAs should be customizable and adapt to users instead of always responding in full sentences. Keep it short, is conclusion of the study.

In summary, the exploration of the third hypothesis provides valuable insights into the factors influencing the broad acceptance of voice assistants. The roles of responsiveness and simplicity, as highlighted by the broader literature on technology acceptance, shed light on the user-centric aspects that contribute to the seamless integration of voice assistants into contemporary lifestyles.

The online survey conducted on a representative sample of CAI users will form the basis of data collection. Targeted questionnaires will allow for obtaining in-depth answers on users' interaction with CAIs. Furthermore, the inclusion of demographic and behavioral variables will allow analysis of differences in responses based on different contexts and user profiles.

*Hypothesis 4: Is there a meaningful difference between the responses of North Macedonia and the rest of the world?*

This last hypothesis tries to combine all of the previous questions into one, but from a different perspective, are there meaningful and noticeable differences in the answers between people from North Macedonia and the rest of the world.

A country with very little data about how its market works, what changes affect it and how do they affect it. We hope to shine light on this problem and resolve some or most of the struggles it has and we hope to provide a strong foundation for businesses that are involved with this matter, as well as giving a basis for new future research related to this topic for the said market/country.

In this research, the highest number of respondents comes from North Macedonia, and we have noticed, or more precisely, we haven't noticed any significant difference between the responses compared to other places of origin.

Analyzing the responses from North Macedonia in comparison to the rest of the world can offer valuable insights into market dynamics and potential differences in perspectives or experiences. Hypothesis 4 delves into this comparative analysis, aiming to uncover meaningful distinctions that could guide strategic decisions and further research efforts.

One of the primary motivations behind this hypothesis is to address the relative lack of data regarding North Macedonia's market behavior and its responsiveness to changes. By scrutinizing the responses from this region alongside global data, we aim to contribute to a more comprehensive understanding of market dynamics and potentially resolve existing challenges.

Understanding the nuances of how markets operate in different regions is crucial for businesses seeking to expand or establish a presence in new territories. By identifying differences or similarities in responses, we can provide a solid foundation for businesses navigating the North Macedonian market or contemplating entry into this region.

Additionally, the findings from Hypothesis 4 can serve as a springboard for future research endeavors focused on North Macedonia's market dynamics. By establishing a strong empirical

foundation, we encourage ongoing exploration and analysis to continuously refine our understanding and strategies in this market.

In conclusion, while initial observations suggest a lack of significant differences between responses from North Macedonia and the rest of the world, further analysis and interpretation are necessary to draw robust conclusions. The insights gained from this comparative analysis can inform strategic decision-making, support businesses operating in or entering the North Macedonian market, and inspire future research initiatives.

### 3. METHODOLOGY

This study consists of a quantitative study, conducted via a questionnaire through Qualtrics with 179 participants that we reached via e-mail, WhatsApp, Facebook, and LinkedIn. All of the 179 participants in this questionnaire have been in some form of contact, have used in the past, or are currently using some type of conversational artificial intelligence, such as chatbot and voice assistant. Because of this, all the information provided from the questionnaire was useful for our study, and we carefully looked at the results and cross-examined them to see how they correlated.

Furthermore, the questionnaire consisted of thirty questions, including demographic questions, and questions regarding the topic equally balanced between the two types of CAI (chatbots and voice assistants). With the questionnaire we aimed to see how different generational groups and groups of different origin perceive, respond, understand, and interact with the fairly new tech of conversational AI. The questions were divided in two main groups, beside the demographic questions, there were questions regarding voice assistants and questions about chatbots. Even though this two types can be combined and categorized under one name, conversational AI, they are different from each other and find different purpose and use among the consumers. Chatbots, for example, are hard to implement in call service centers, as their name suggest 'call' service is required a voice automated response rather than a written message, therefore the voice assistants are the most commonly used substitute for this type of jobs. The opposite is true for emails, SMS, and other forms of strictly written messages, so the most common tools used are chatbots. It is because of differences like these that we divided the questions into two groups, hoping to see where each sits, and then combining them together in order to pain the bigger picture. Today, there are many companies that have emerged on the market that provide a chatbot service, even in the form of 'do-it-yourself' using drag-and-drop methods or more advanced methods by coding your very own chatbot. On the other hand, other companies are using this service and are making their own chatbots in order to appear more modern, progressive, forward-thinking, and maybe even more sophisticated to their clients. Therefore, many chatbots exist, with many different names and purposes, that surround us in our daily lives, so we weren't specific with company names, whereas for voice assistants it is a bit of a different case. We asked about the voice assistants that are the most popular among users from companies like Apple, Microsoft, Google, and Amazon, as well as voice assistants via phone calls.

Later, we analyzed all the data gathered from the survey in SPSS, finding correlations between different questions, and how each age group differentiates from one another. In the SPSS program, we filtered all the answers thoroughly and selected the data relevant to us for each hypothesis. Some more information on how we filtered the data is available in the next section, 'findings', where we elaborate a little more on what we had to get rid of and what we rephrased. Moreover, we used methods like the Pearson Chi-square test and the Kruskal-Wallis test, also known as one-way ANOVA analysis, where possible in order to determine the

significance of the answers and prove the thesis we have come up with. Moreover, we also compared the statistics between the respondents according to their origin, providing new insights for certain markets.

## 4. RESULTS AND DISCUSSION

Further, we will explore all the questions one by one, explain some of them, and elaborate a little bit on the results. For the sake of ease of analyzing, readability, and compactness, we eliminated (where possible) some of the answers with zero responses, used percentages instead of total number of responses, and rounded up the answers to one decimal. Also, there are several questions with 'other' as a possible answer, where the participants are requested to specify an answer in a textbox shown in the questionnaire, but many times this was left without a specified answer, so we excluded it from the analysis where it was possible to do so, without changing the overall results of this research.

Question 1: 'What is your age?'

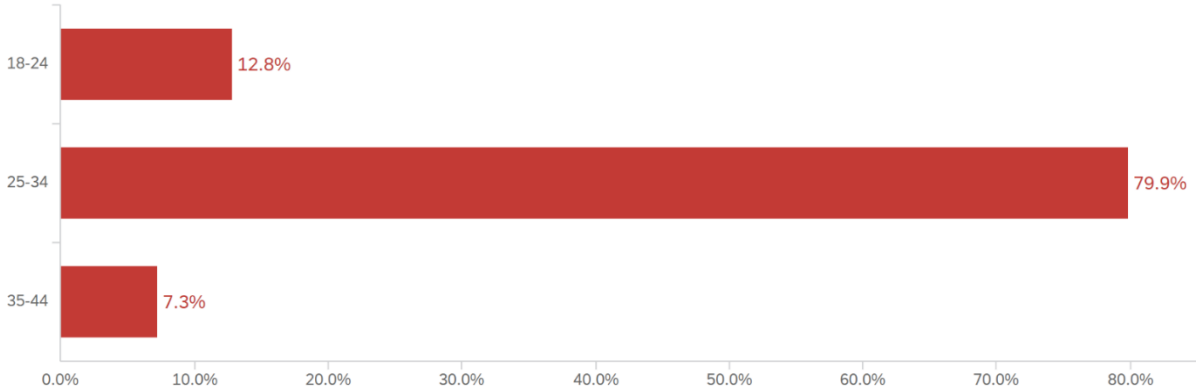


Figure 4.1 - Q1

We start of with the demographic questions, so the first question was: 'What is your age'. The majority of the participants (79.9% to be exact) belong in the age group of 25 to 34 years, while the group with the fewest responses was 35 to 44 years of age with a total of 7.3%.

Question 2: 'What is your gender?'

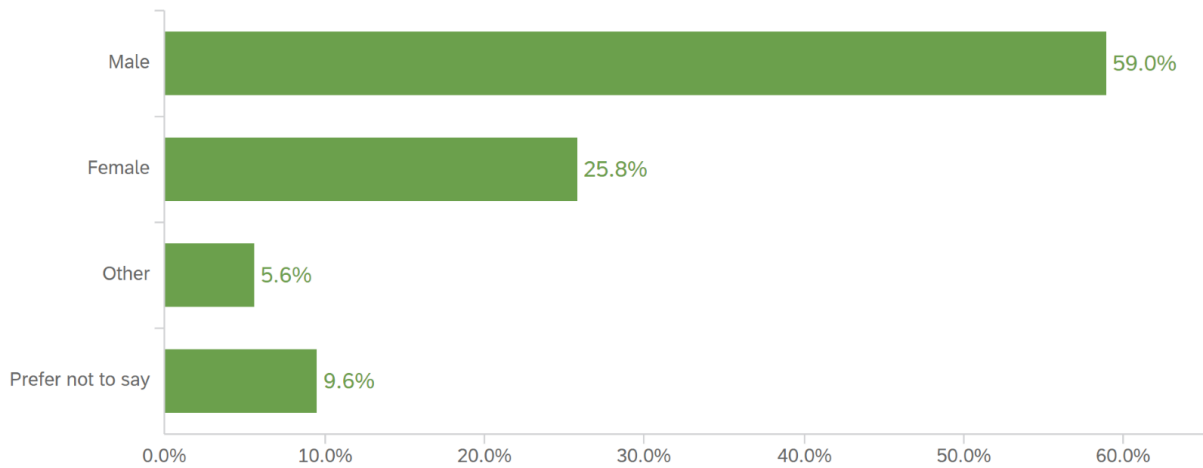


Figure 4.2 - Q2

As seen from the graph, 59% of the participants are male, 25.8% are female, other 5.6%, and 9.6% of the participants preferred not to say.

Question 3: 'What is your country of origin?'

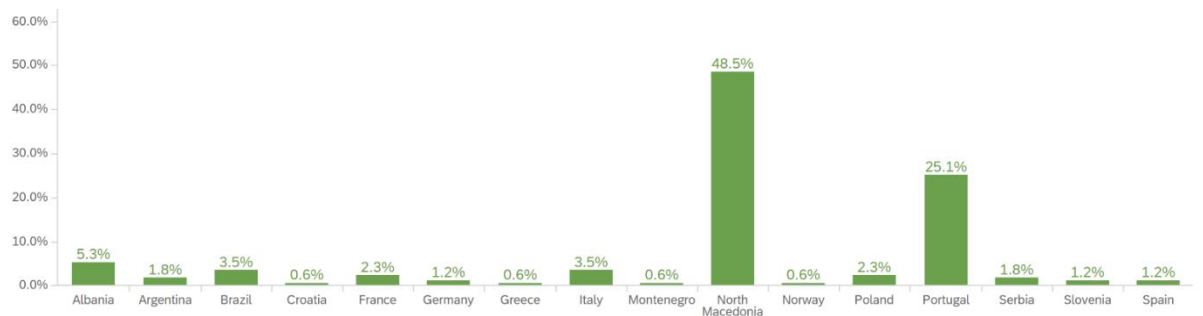


Figure 4.3 - Q3

The third question was regarding the country of origin of each of the participants. Here we immediately see two countries stand out, the most responses belong to North Macedonia with 48.5% and in second place Portugal with 25.1%. There are participants from 14 more countries as seen from the graph with a percentage between 5.3% (Albania) and the lowest of 0.6% (Croatia, Greece, Montenegro, and Norway). This will be the basis for further analysis in this thesis from the point of two groups, Group 1 – North Macedonia; Group 2 - Other countries (from Europe and South America).

Question 4: 'What is the highest level of education you have completed?'

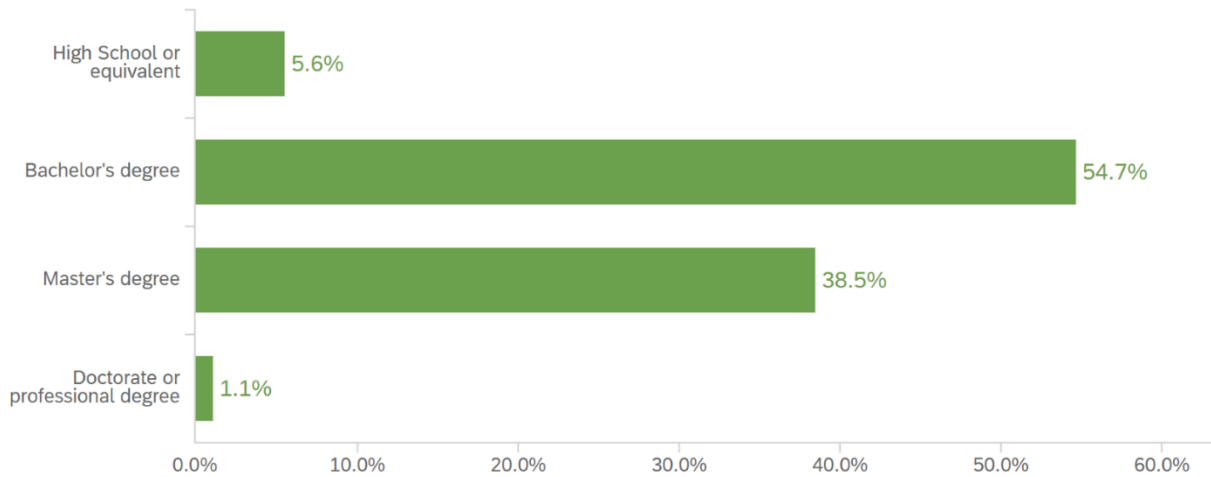


Figure 4.4 - Q4

The majority of the respondents had a bachelor's degree or a master's degree with 54.7% and 38.5% respectively, while those with a doctorate or a professional degree were the fewest with 1.1%, and those with a high school diploma or an equivalent were 5.6%.

Question 5: 'Have you recently used a form of conversational AI (chatbot or a voice assistant)?'

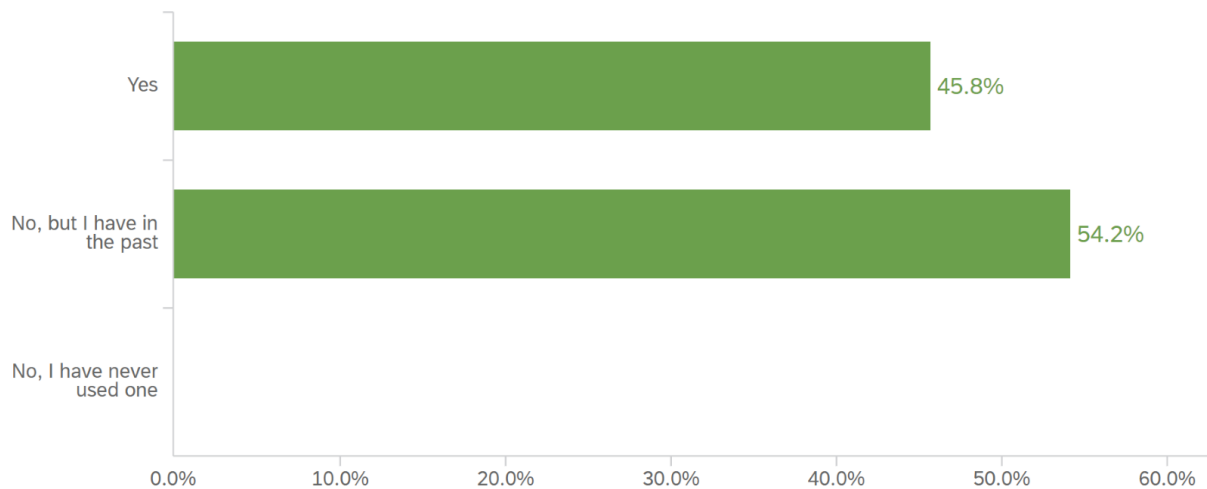


Figure 4.5 - Q5

45.8% of the users have used a chatbot and/or a voice assistant recently, 54.2% of them haven't used one recently but have used it/them before, while no participants have said that they haven't used a chatbot and/or a voice assistant in the past.

Question 6: 'How frequently do you interact with conversational AIs (chatbots or voice assistants)?'

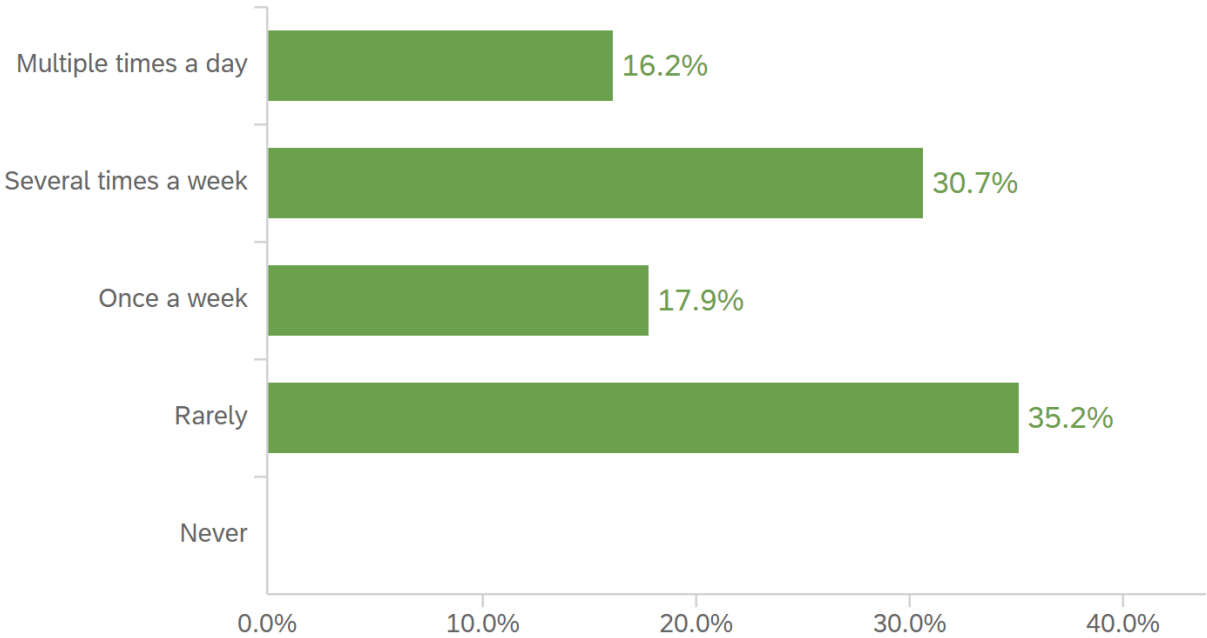


Figure 4.6 - Q6

None of the participants responded with 'never' to this question, but the majority responded with 'several times a week' with 30.7% and 'rarely' with 35.2%. Following them, very close one to another are 'once a week' with 17.9% and 'multiple times a day' with 16.2%.

Question 7: 'Which chatbot or voice assistant have you used most recently?'

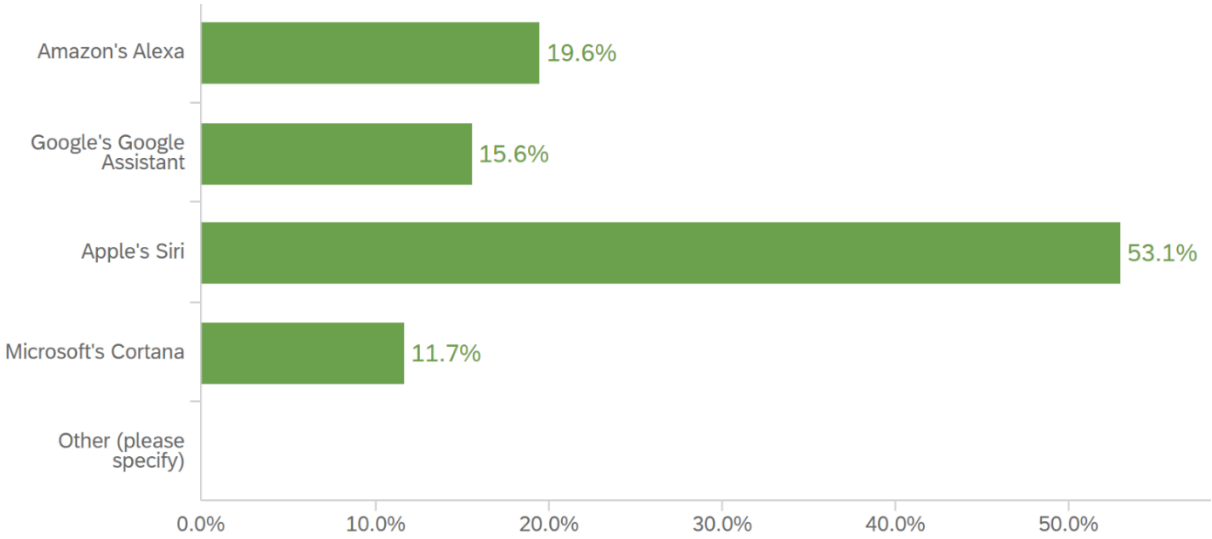


Figure 4.7 -Q7

Apple’s Siri was the number one choice for more than half of the participants, or 53.1% exactly. The rest were far behind: Alexa, Google Assistant, and Cortana had 19.6%, 15.6%, and 11.7% respectively.

Question 8: ‘Which one of them do you prefer using?’

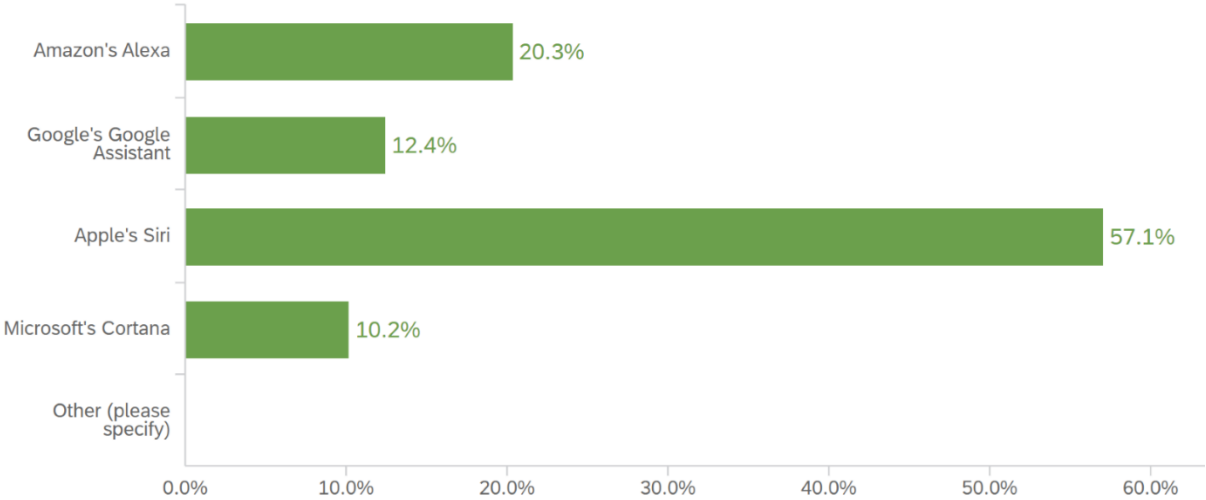


Figure 4.8 - Q8

Again, Siri with more than half of the responses (57.1%) is the preferred option for the participants, while Amazon’s Alexa had 20.3%, Google Assistant 12.4%, and Cortana from Microsoft 10.2%.

Question 9: ‘On a scale of 1 to 5, how satisfied are you with the conversational AI that you have used?’

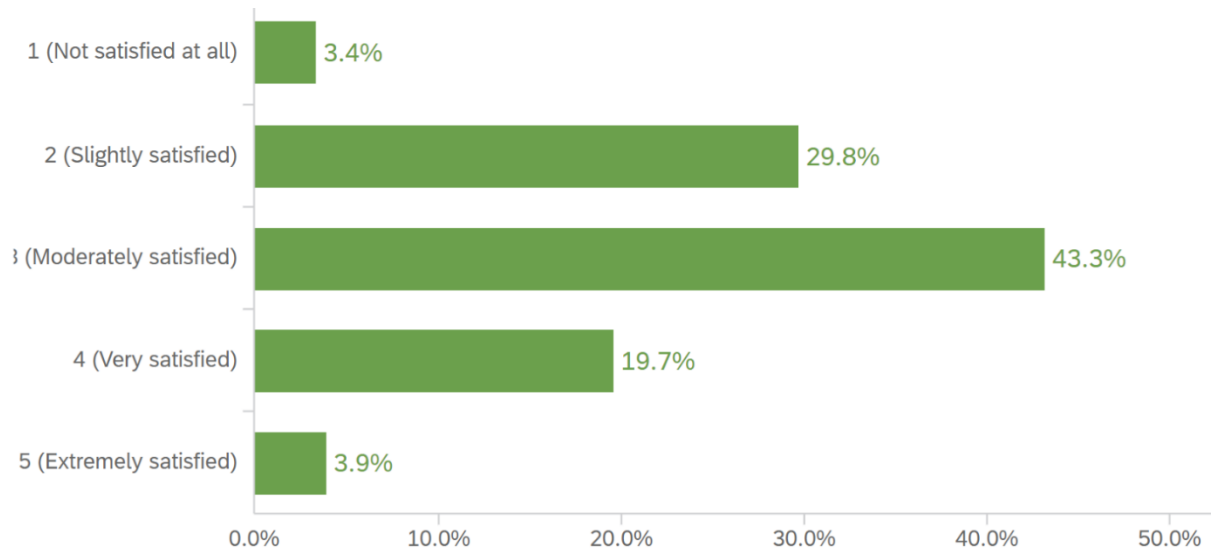


Figure 4.9 - Q9

Overall, for this question, the responses were not in the extremes, meaning that very few of the participants weren't satisfied at all with the conversational AIs (3.4%), or extremely satisfied with them (3.9%). The majority of the respondents were moderately satisfied, 43.3% to be exact. Slightly satisfied were 29.8%, and very satisfied 19.7%.

Question 10: 'Have you ever abandoned the use of a conversational AI due to dissatisfaction?'

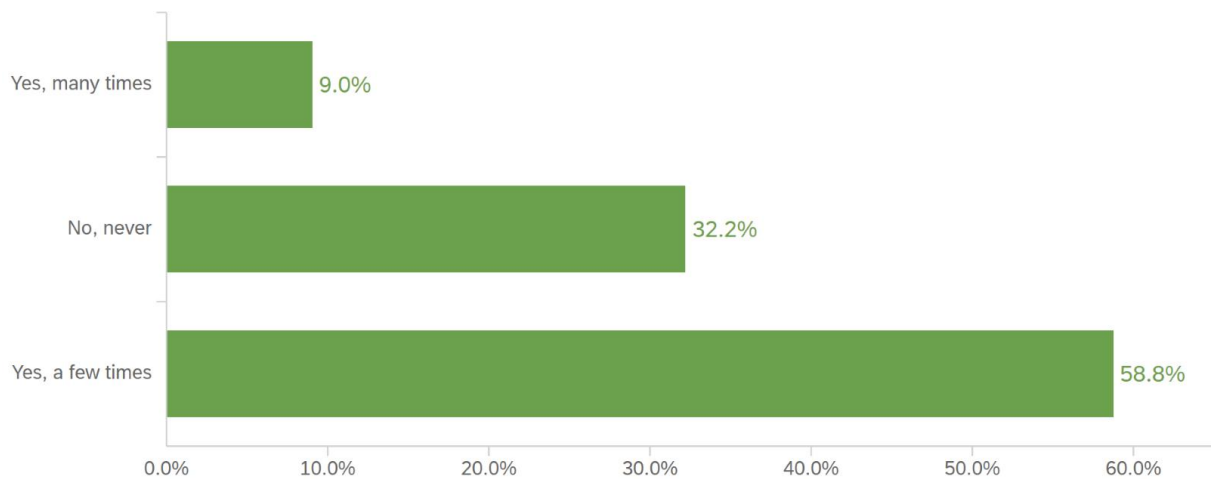


Figure 4.10 -Q10

58.8% of the participants admitted that they have abandoned using a chatbot or a voice assistant due to dissatisfaction a few times in their past, while 9% have had this experience many times before. 32.2% have never had this happened.

Question 11: 'How important is the speed of response from conversational AIs (chatbots or voice assistants) to you?'

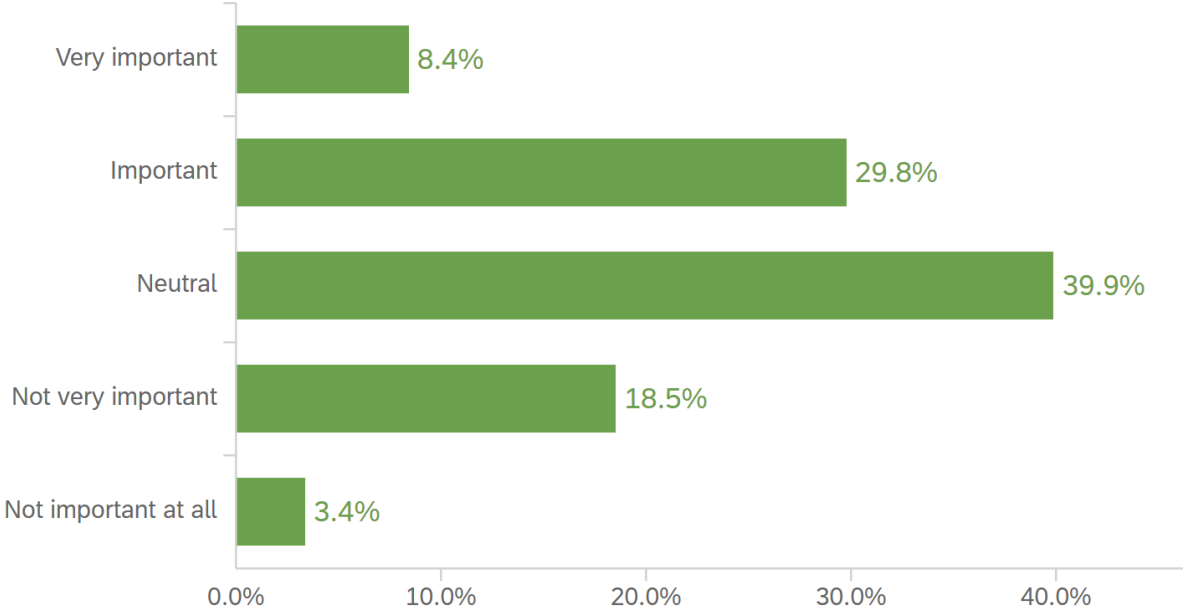


Figure 4.11 - Q11

8.4% of the participants found the speed of response to be very important to them, 29.8% found it important, on the number one spot 39.9% were neutral about it, 18.5% did not found it to be very important, and finally 3.4% did not found it to be important at all.

Question 12: 'How do you perceive the personality of conversational AIs?'

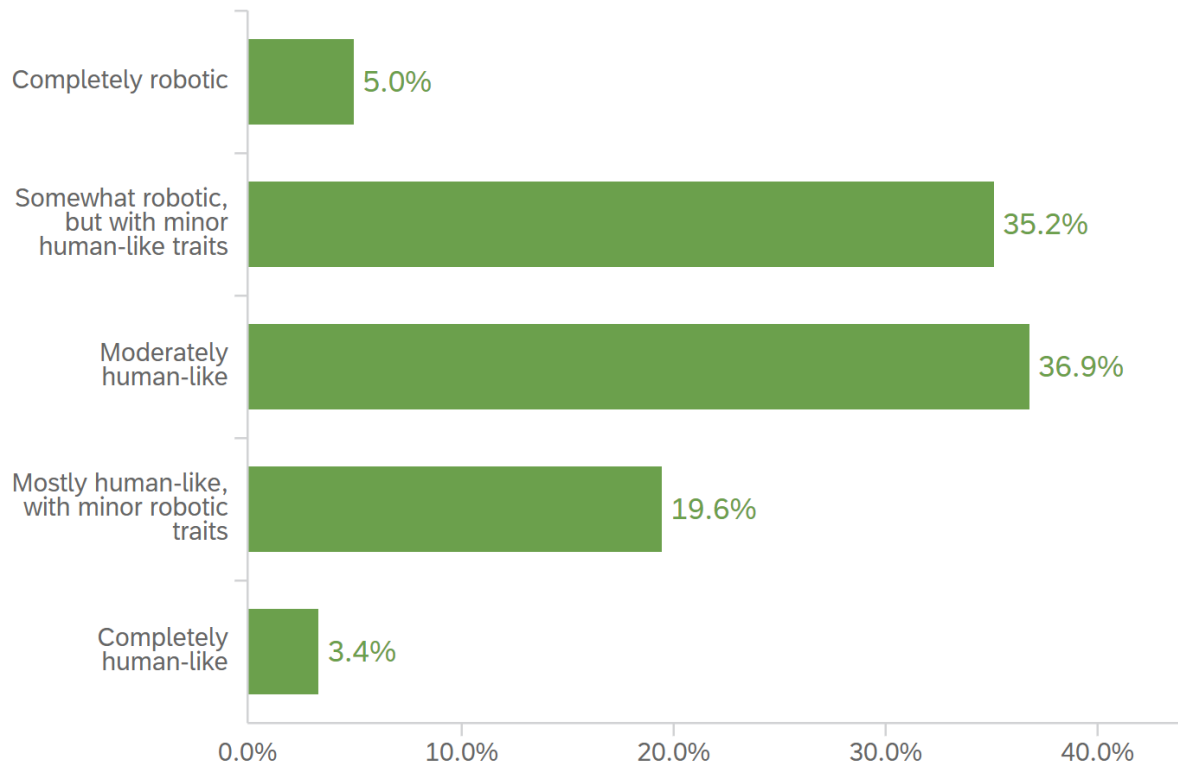


Figure 4.12 - Q12

Again, in this question, the extremes were had the very least responses, 'completely robotic' had 5%, and 'completely human-like' had only 3.4%. 'Moderately human-like' was the number one answer with 36.9%, 'somewhat robotic, but with minor human-like traits' had 35.2%, and 'mostly human-like, with minor robotic traits' 19.6%.

Question 13: 'Do you believe conversational AIs can replicate human personality traits?'

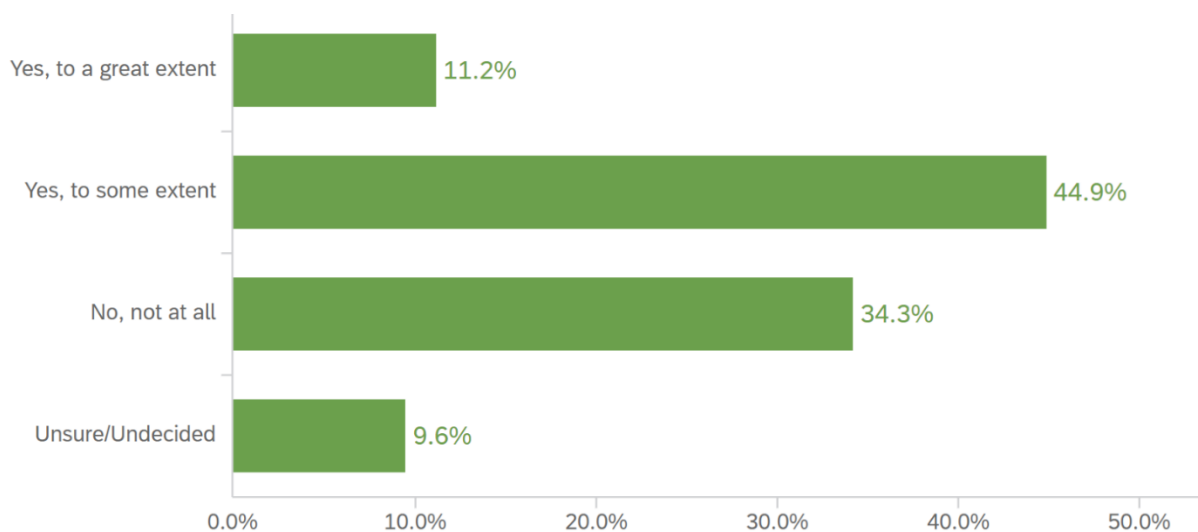


Figure 4.13 - Q13

11.2% of the participants believe to a great extent that conversational AIs can replicate human personality traits, 44.9% believe that this is possible only to some extent, 34.3% do not believe that this is possible, and 9.6% were unsure or undecided about answering this question.

Question 14: 'Do you prefer interacting with a human or a chatbot when seeking assistance?'

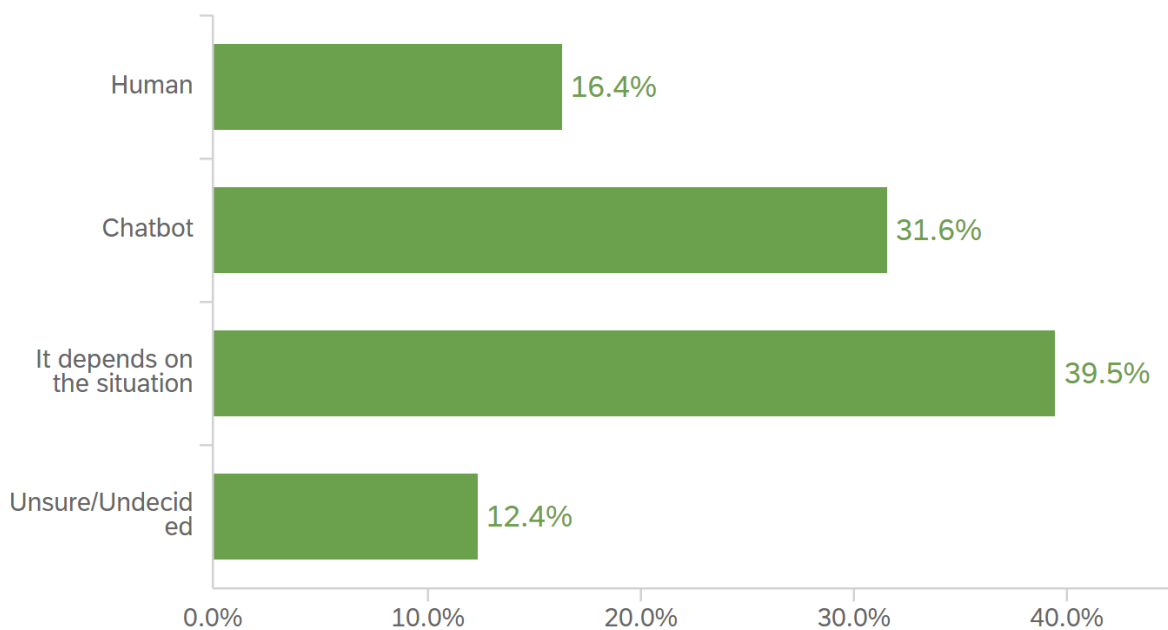


Figure 4.14 - Q14

16.4% of the respondents prefer a human over a chatbot when they need assistance, 31.6% prefer a chatbot, 39.5% answered that it depends on the situation that they are in, 12.4% were unsure or undecided.

Question 15: 'What characteristics of a conversational AI would make you more likely to choose it over a human assistant?' (More than one possible answer)

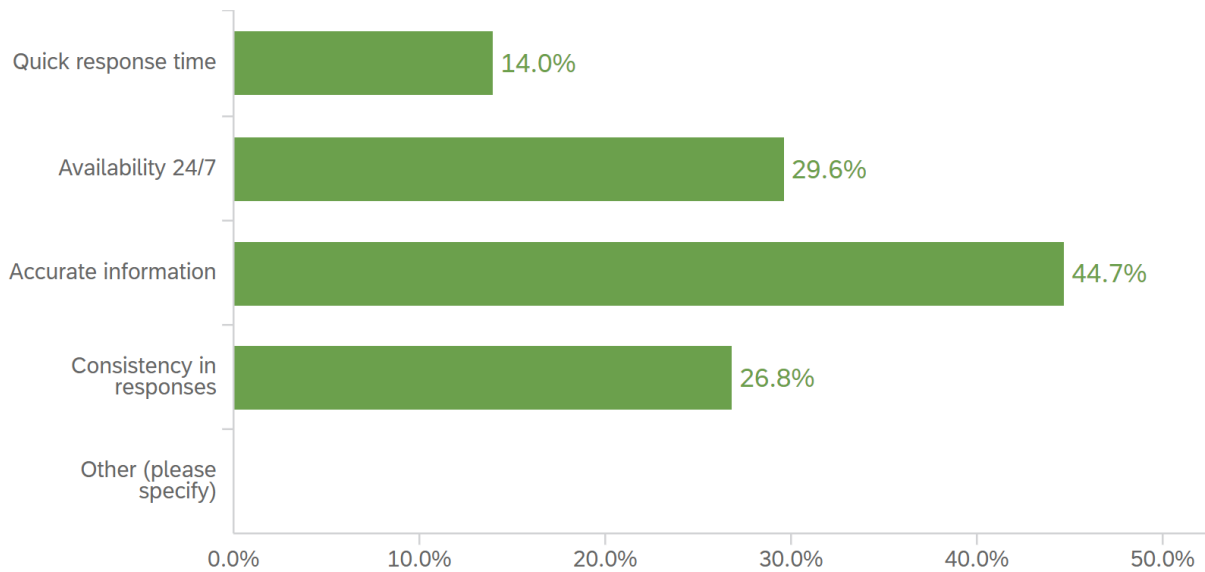


Figure 4.15 - Q15

Accurate information was the number one answer (44.7%) of all responses when asked what are the characteristics of a conversational AI that would make them more likely to be chosen over a human assistant. In second place was 24/7 availability (29.6%), in third was consistency in the responses (26.8%), and in fourth quick response time (14%).

Question 16: 'What characteristics of a human assistant would make you more likely to choose them over a conversational AI?' (More than one possible answer)

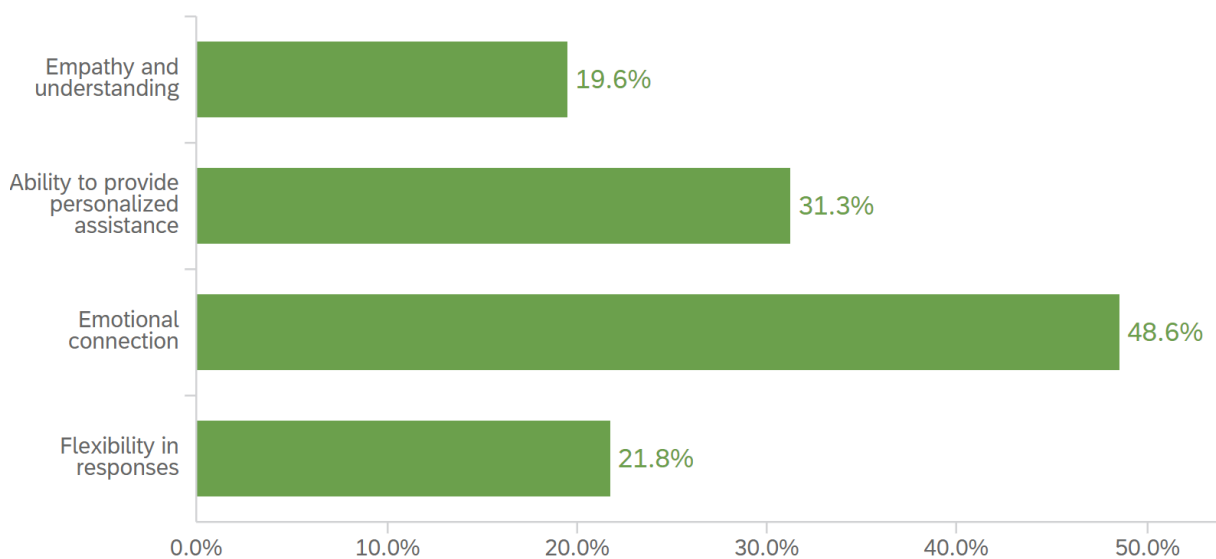


Figure 4.16 - Q16

With 48.6%, emotional connection was the number one characteristic that the respondents would pick a human over a chatbot or a voice assistant, 'ability to provide personalized assistance' was second with 31.3%. Following them is 'flexibility in responses' (21.8%), and very close, in the fourth place, 'empathy and understanding' (19.6%).

Question 17: 'Have you ever used a voice assistant for call support?'

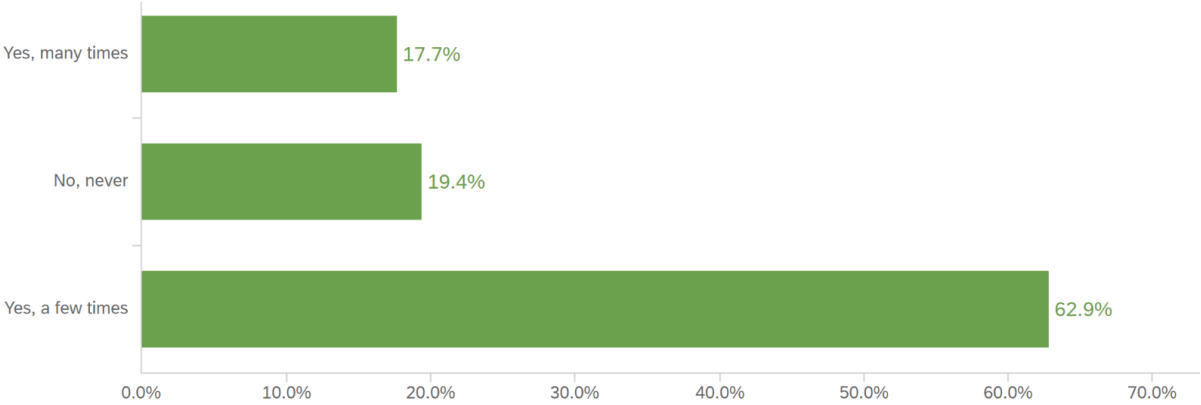


Figure 4.17 - Q17

62.9% of the respondents have used a voice assistant for call support a few times, 19.4% have never used one, and 17.7% have used it many times.

Question 18: 'What are the advantages of using a voice assistant for call support, according to your experience?' (More than one possible answer)

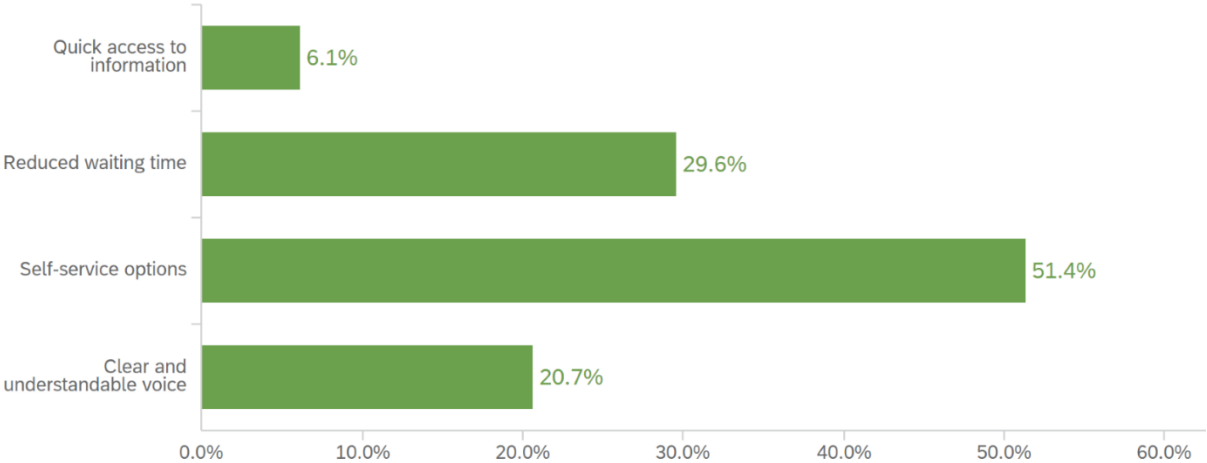


Figure 4.18 - Q18

With the most responses (51.4%), 'self-service options' is in the first place, less waiting time and clear and understandable voice are in the second and third place with 29.6% and 20.7% respectively, and fast access to information taking the last place (6.1%).

Question 19: 'What are the disadvantages of using a voice assistant for call support, according to your experience?' (More than one possible answer)

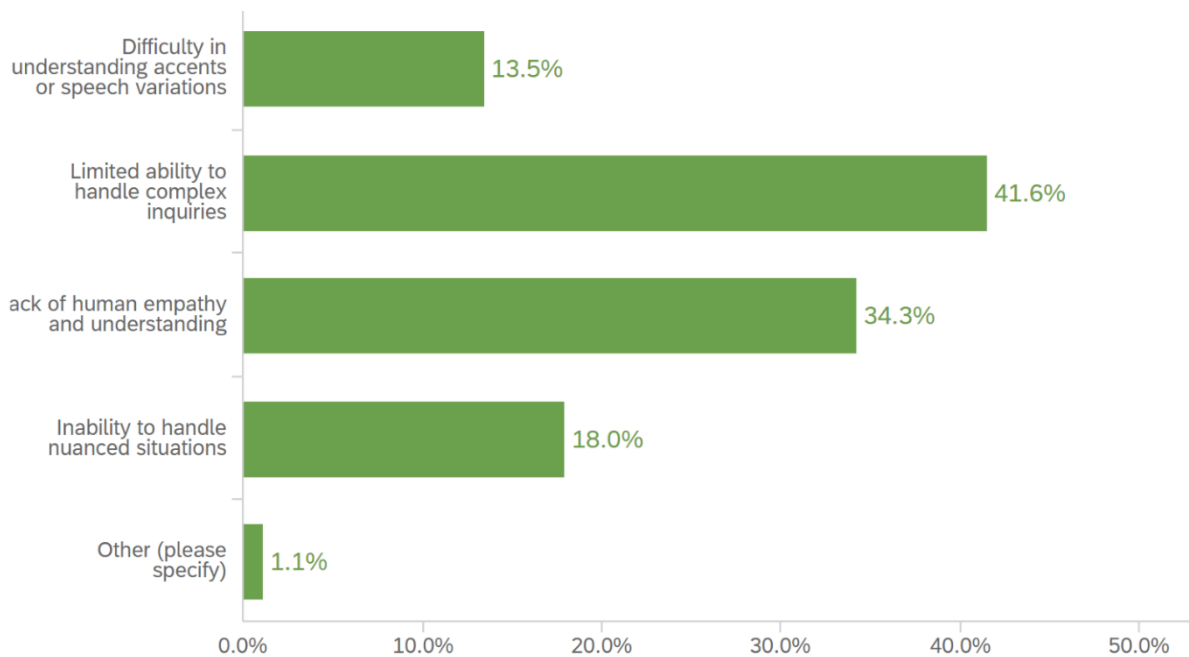


Figure 4.19 - Q19

41.6% of the answers were for limited ability to handle complex inquiries, 34.3 for lack of human empathy and understanding, 18% for inability to handle nuanced situations, 13.5% for difficulty in understanding accents or speech variations. In this question there were 1.1% of answers for some other disadvantage however, they were not specified.

Question 20: 'How do you think the characteristics of a voice assistant influence your choice between a voice assistant and a human assistant for call support?' (More than one possible answer)

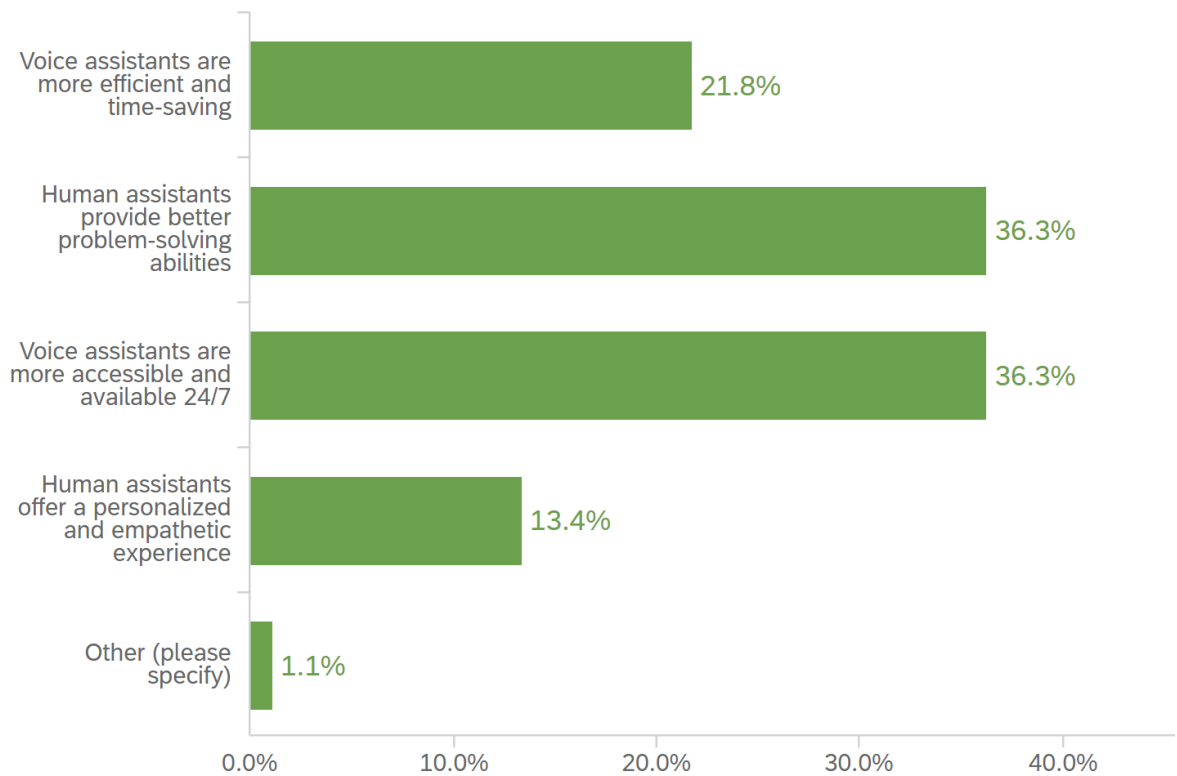


Figure 4.20 - Q20

At 36.3%, both answers share the first place. Better problem-solving abilities in humans, and 24/7 availability in voice assistants are an equally important characteristic for the participants. Efficiency in voice assistants was second to them with 21.8%, personalized experience from humans had the third highest number of responses (13.4%), and 'other' (1.1%) again, was left out without any specific answers.

Question 21: 'How important is personalization in the interactions with conversational AIs (chatbots or voice assistants)?'

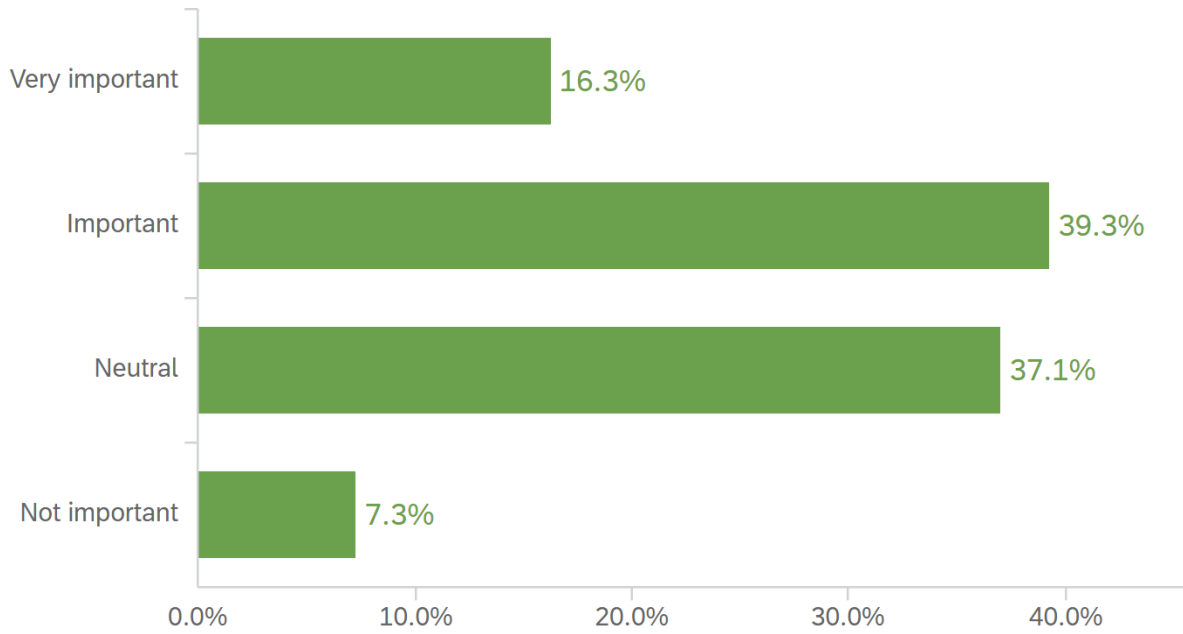


Figure 4.21 - Q21

Very important (16.3%), important (39.3%), neutral (37.1%), and not important (7.3%).

Question 22: 'To what extent do you trust the information provided by chatbots or voice assistants, especially in critical situations?'

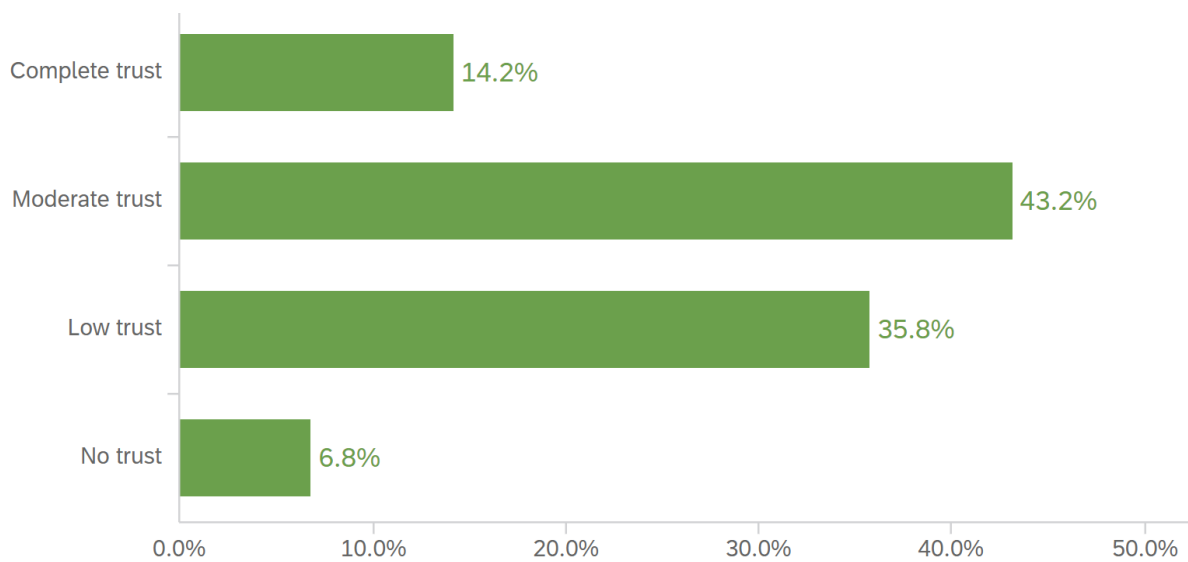


Figure 4.22 - Q22

14.2% have complete trust to the response of a conversational artificial intelligence when it comes to critical situations, 43.2% moderately trust it, 35.8% have low trust, and 6.8% dont trust it at all.

Question 23: 'On a scale of 1 to 5, how confident are you in the conversational AIs' ability to respond accurately to your needs?'

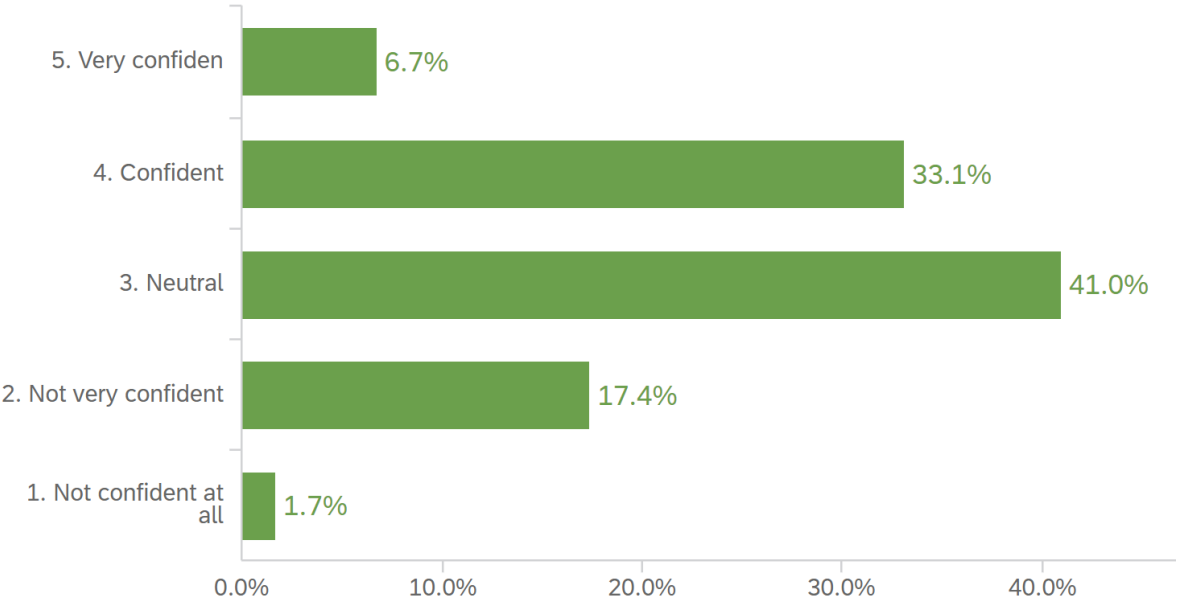


Figure 4.23 - Q23

When asked how confident the participants are in the ability of a VA or a chatbot to respond accurately, 41% were neutral about it, very confident and confident were 6.7% and 33.1% respectively, while not very confident and not confident at all were 17.4% and 1.7% respectively.

Question 24: 'Do you believe the personality of a conversational AI (chatbot or voice assistant) can have a similar impact on your mood as of that from a human's personality?'

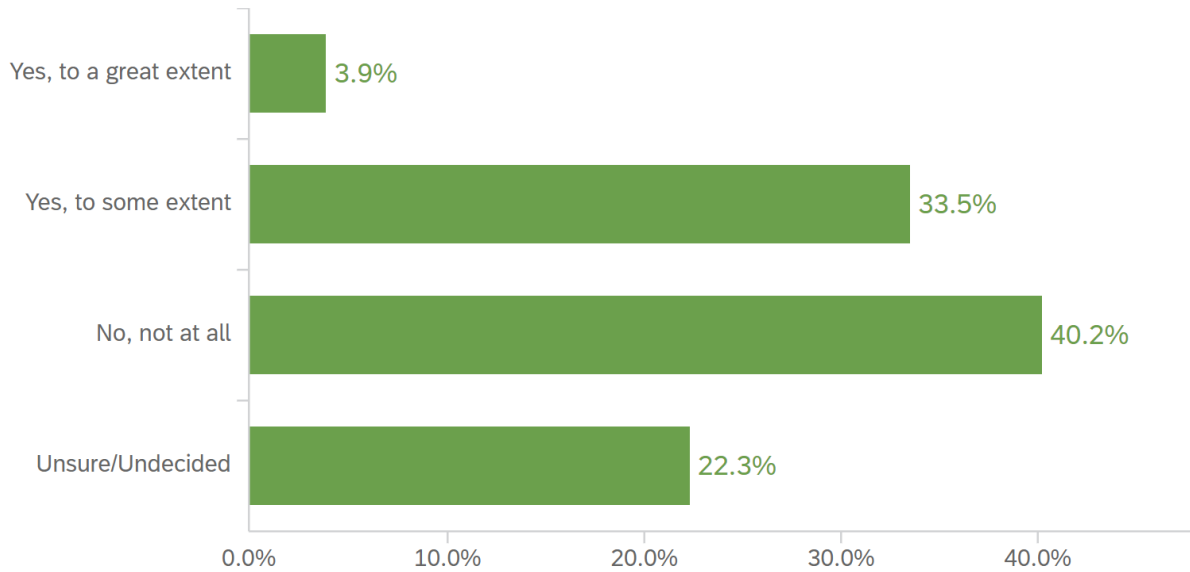


Figure 4.24 - Q24

The responses were very much divided between the opposites for this question, 40.2% don't believe that a CAIs personality can have the same impact on them as a human's personality, and 33.5% believe it to be possible to some extent, while 3.9% do believe to a great extent. 22.3% were unsure or undecided about this question.

Question 25: 'Based on your experience, what changes have you observed in your mood after engaging with a conversational AI?'

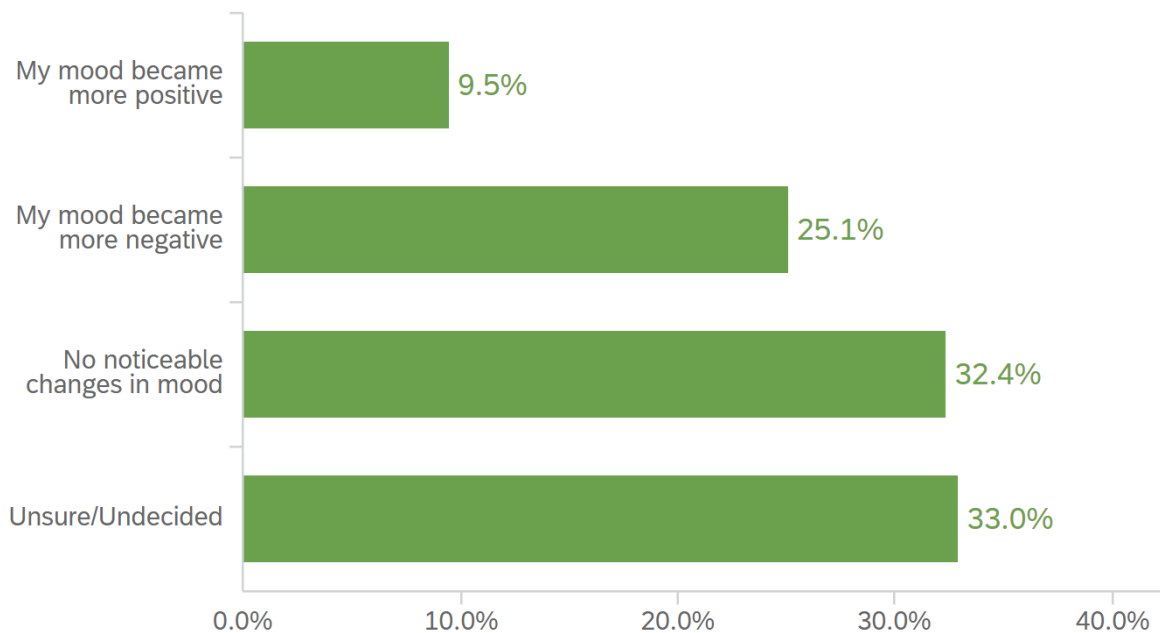


Figure 4.25 - Q25

Participants were asked to observe and think about how their mood (if at all) was affected when they engaged with a conversational AI such as chatbot or a voice assistant, 33% were undecided/unsure, close after (32.4%) no noticeable changes. 25.1% saw a negative change in their mood, while 9.5% saw a more positive change.

Question 26: 'Do you believe the personality of a conversational AI can have a similar impact on your attitude as of that from a human's personality?'

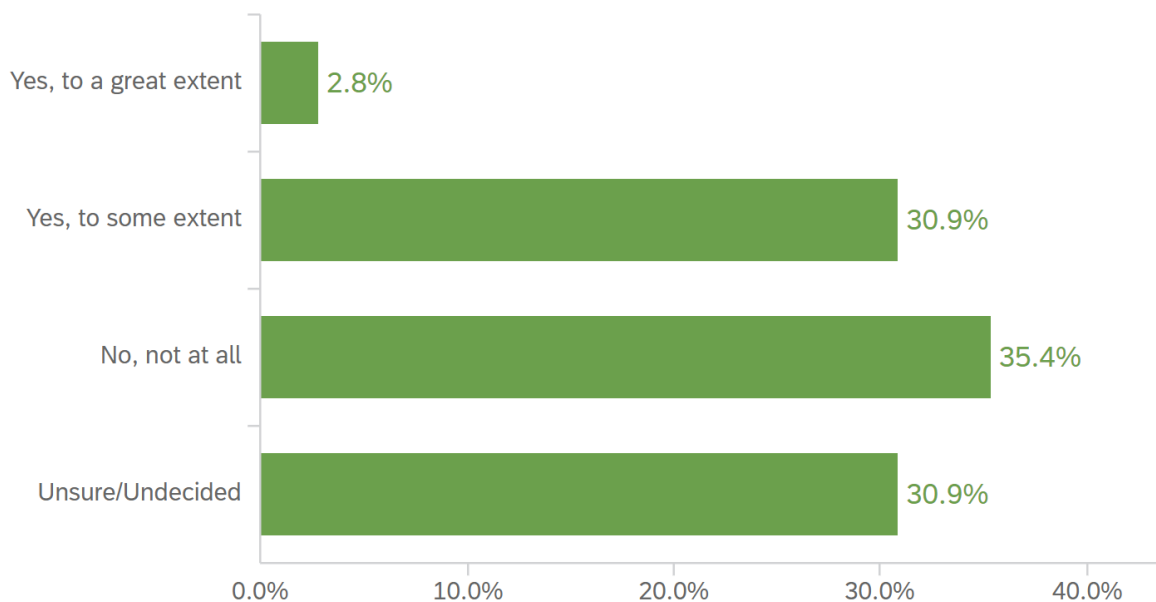


Figure 4.26 - Q26

30.9% are unsure, 35.4% don't think there is a similar effect between both personalities, 30.9% think there is a similarity to some extent, 2.8% think there is a similarity to a great extent.

Question 27: 'Based on your experience, what changes have you observed in your attitude after engaging with a conversational AI?'

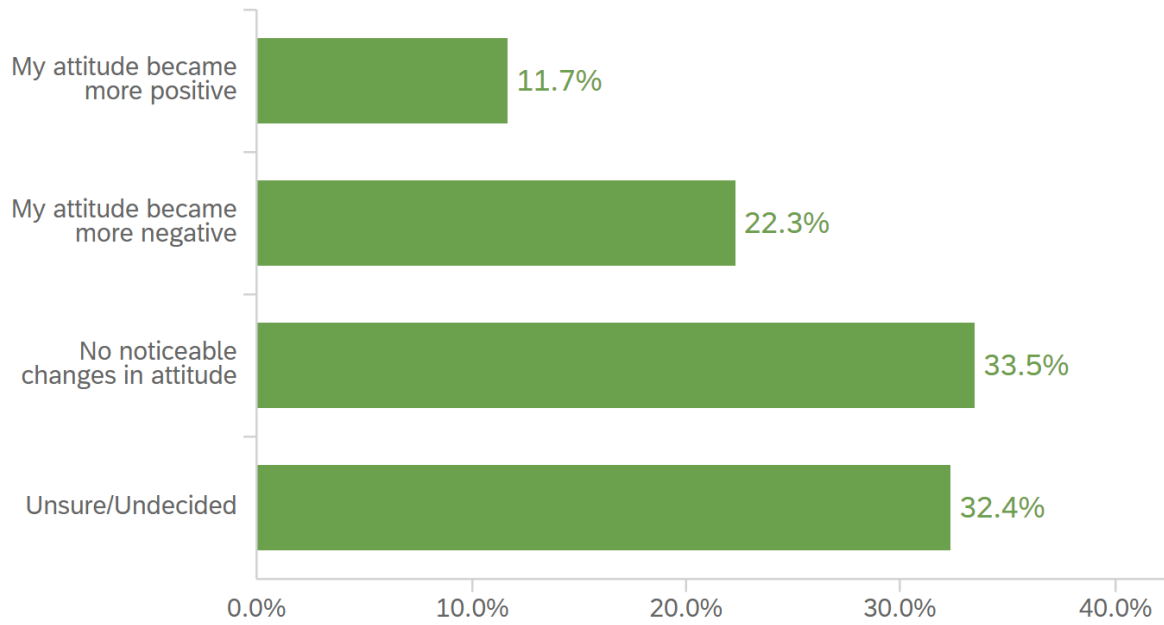


Figure 4.27 - Q27

Very similar to the answers in question 25, unsure are 32.4% 33.5% saw no noticeable change, 22.3% saw a negative change, and 11.7% saw a positive change in their attitude.

Question 28: 'When interacting with chatbots, do you prefer a:'

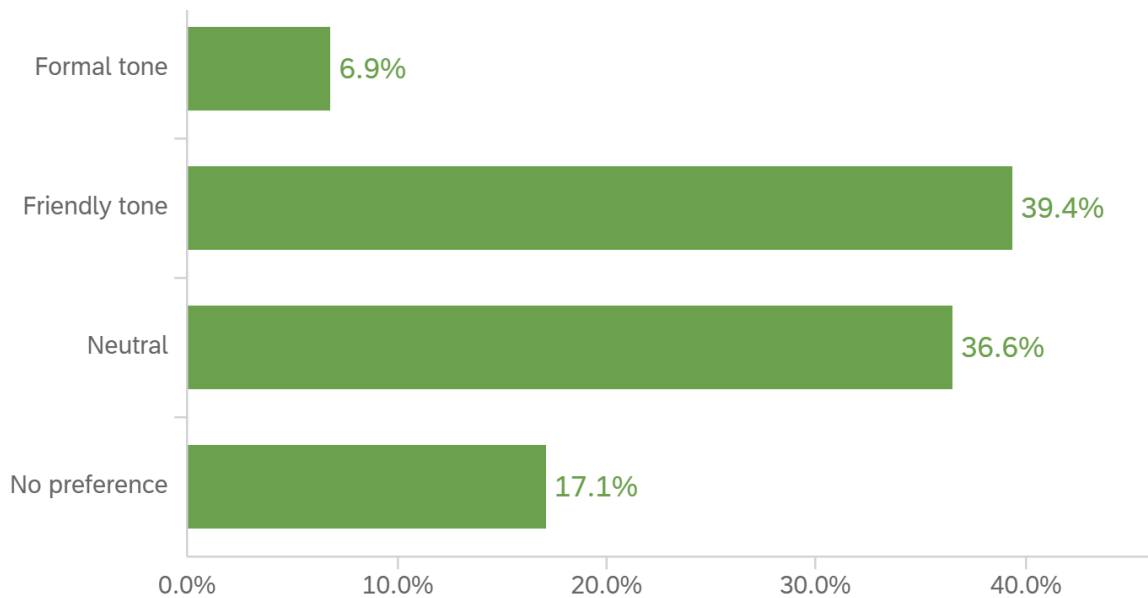


Figure 4.28 - Q28

The majority preferred a more friendly tone from a chatbot (39.4%), while a formal tone preferred only 6.9% of the participants, 17.1% had no preference. The second answer with the most votes was for a neutral tone (36.6%).

Question 29: 'Would you prioritize a chatbots friendly personality over its effectiveness in completing accurate tasks?'

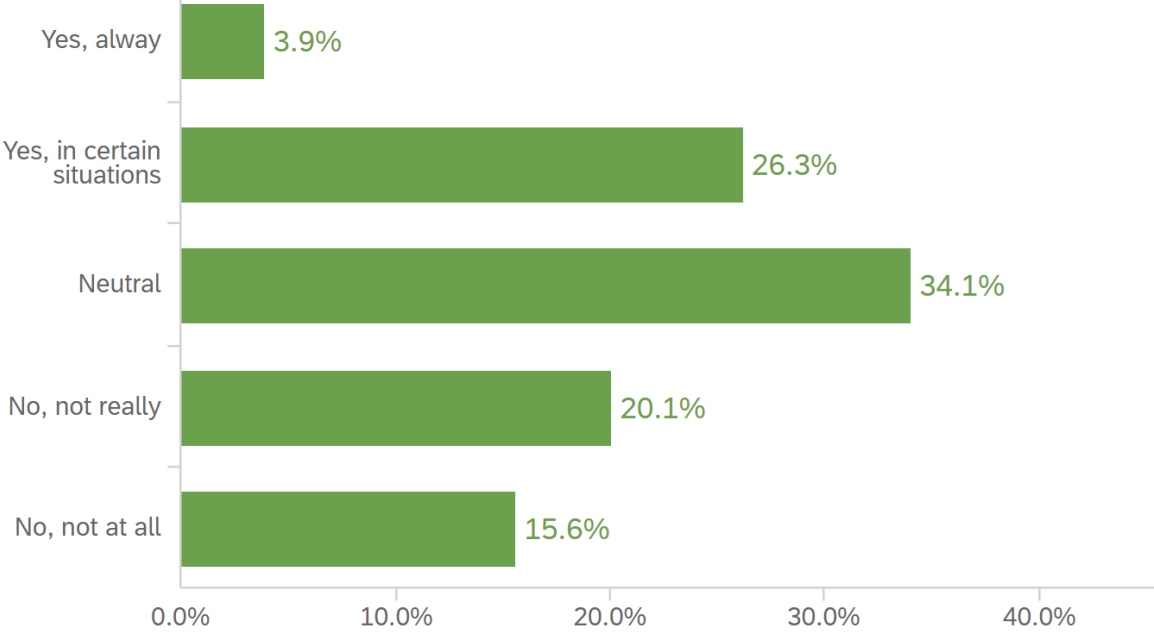


Figure 4.29 - Q29

3.9% answered with 'yes, always', 26.3% answered with 'yes, in certain situations', 34.1% were neutral about it, 20.1% answered with 'no, not really', and 15.6% answered with 'no, not at all'.

Question 30: 'Should conversational AIs adapt their responses based on the user's current mood?'

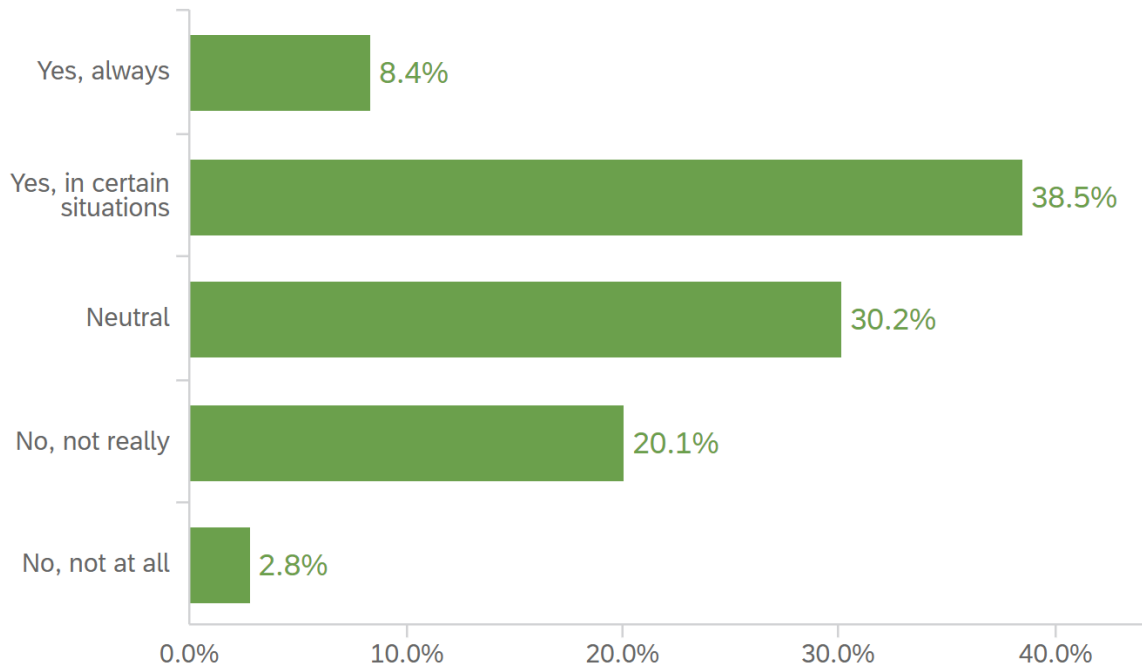


Figure 4.30 - Q30

8.4% and 38.5% responded positively with 'yes, always' and 'yes, in certain situations' respectively, while 20.1% and 2.8% had the opposite opinion with 'no, not really' and 'no, not at all' respectively. 30.2% were in the middle.

#### 4.1. CROSS ANALYSIS

##### 4.1.1. YOUTH FOR THE AI

The results of the use of conversational AI are closely related to the age of the users. From the questionnaire's general results, we see that we have respondents from three age groups (18 to 24; 25 to 34; 35 to 44). 68.2% of younger participants aged 18 to 24 are using chatbots and voice assistants, and 34.8% of them are using CAIs daily, which is two times more than those aged 25 to 34 (14%), and more than four times than those aged 35 to 44 (7.7%).

Table 4.1.1.1 - T1

|  | 1. What is your age? |       |       | Total |
|--|----------------------|-------|-------|-------|
|  | 18-24                | 25-34 | 35-44 |       |
|  |                      |       |       |       |

|   |                            |        |        |        |        |
|---|----------------------------|--------|--------|--------|--------|
| 5. Have you recently used a chatbot or voice assistant? | No, but I have in the past | 31.8%  | 59.2%  | 38.5%  | 54.2%  |
|   | Yes                        | 68.2%  | 40.8%  | 61.5%  | 45.8%  |
| Total   |                            | 100.0% | 100.0% | 100.0% | 100.0% |

Table 4.1.1.2 - T2

2Chi-Square Tests

|                              | Value  | Df | Asymptotic Significance (2-sided) |
|------------------------------|--------|----|-----------------------------------|
| Pearson Chi-Square           | 7.142a | 2  | .028                              |
| Likelihood Ratio             | 7.190  | 2  | .027                              |
| Linear-by-Linear Association | .963   | 1  | .326                              |
| N of Valid Cases             | 177    |    |                                   |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.95.

Furthermore, more than half of the participants aged 18 to 24 (60.9%) use a chatbot or a voice assistant at least once a week, compared to the other groups (30.8% and 34.1%). The Chi-square test didn't show any statistical relation. However, the Kruskal-Wallis mean rank test shows a relation between them.

Table 4.1.1.3 - T3

|  |                      | 1. What is your age? |       |       | Total |
|--|----------------------|----------------------|-------|-------|-------|
|  |                      | 18-24                | 25-34 | 35-44 |       |
| 6. How frequently do you interact with | Multiple times a day | 34.8%                | 14.0% | 7.7%  | 16.2% |
|  | Once a week          | 26.1%                | 16.1% | 23.1% | 17.9% |

|                                     |                      |        |        |        |        |
|-------------------------------------|----------------------|--------|--------|--------|--------|
| chatbots or voice assistants?       | Rarely               | 21.7%  | 37.8%  | 30.8%  | 35.2%  |
|                                     | Several times a week | 17.4%  | 32.2%  | 38.5%  | 30.7%  |
| Total                               |                      | 100.0% | 100.0% | 100.0% | 100.0% |
| Multiple times a day or once a week |                      | 60.9%  | 30.1%  | 30.8%  | 34.1%  |

Table 4.1.1.4 - T4

Chi-Square Tests

|                              | Value   | Df | Asymptotic Significance (2-sided) |
|------------------------------|---------|----|-----------------------------------|
| Pearson Chi-Square           | 10.441a | 6  | .107                              |
| Likelihood Ratio             | 9.678   | 6  | .139                              |
| Linear-by-Linear Association | 6.591   | 1  | .010                              |
| N of Valid Cases             | 179     |    |                                   |

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is 2.11.

Table 4.1.1.5 - T5

|   |                | Sum of Squares | Df  | Mean Square | F     | Sig. |
|---|----------------|----------------|-----|-------------|-------|------|
| 5. Have you recently used a chatbot or voice assistant? | Between Groups | 1.773          | 2   | .886        | 3.658 | .028 |
|   | Within Groups  | 42.160         | 174 | .242        |       |      |
|   | Total          | 43.932         | 176 |             |       |      |

|  |                |         |     |       |       |      |
|--|----------------|---------|-----|-------|-------|------|
| 6. How frequently do you interact with chatbots or voice assistants? | Between Groups | 9.264   | 2   | 4.632 | 4.362 | .014 |
|  | Within Groups  | 186.892 | 176 | 1.062 |       |      |
|  | Total          | 196.156 | 178 |       |       |      |

There is a high number of participants that show high or extremely high satisfaction (23.6%) from using conversational AIs (chatbots and voice assistants), from which 27.3% are participants aged 18 to 24, and those aged 35 to 44 only 7.7%. The newer generations put big importance on the speed of response from the AIs, with 60.9% respondents, the highest among the three age groups.

Table 4.1.1.6 - T6

|   | 1. What is your age? |        |        | Total  |
|---|----------------------|--------|--------|--------|
|   | 18-24                | 25-34  | 35-44  |        |
| 9. On a scale of 1 to 5, how satisfied are you with the chatbot or voice assistant you have used? |                      |        |        |        |
| 1 (Not satisfied at all)  | 4.5%                 | 3.5%   |        | 3.4%   |
| 2 (Slightly satisfied)  | 22.7%                | 30.1%  | 38.5%  | 29.8%  |
| 3 (Moderately satisfied)  | 45.5%                | 42.0%  | 53.8%  | 43.3%  |
| 4 (Very satisfied)  | 22.7%                | 20.3%  | 7.7%   | 19.7%  |
| 5 (Extremely satisfied)   | 4.5%                 | 4.2%   |        | 3.9%   |
| Total   | 100.0%               | 100.0% | 100.0% | 100.0% |

Very or extremely satisfied

27.3%

24.5%

7.7%

23.6%

|  | 1. What is your age? |       |       | Total |
|--|----------------------|-------|-------|-------|
|  | 18-24                | 25-34 | 35-44 |       |
|  |                      |       |       |       |

|   |                       |        |        |        |        |
|---|-----------------------|--------|--------|--------|--------|
| 11. How important is the speed of responses from chatbots or voice assistants to you? | Important             | 26.1%  | 29.6%  | 38.5%  | 29.8%  |
|   | Neutral               | 34.8%  | 39.4%  | 53.8%  | 39.9%  |
|   | Not important at all  | 4.3%   | 3.5%   |        | 3.4%   |
|   | Not very important    | 34.8%  | 16.9%  | 7.7%   | 18.5%  |
|   | Very important        |        | 10.6%  |        | 8.4%   |
|   | Total                 | 100.0% | 100.0% | 100.0% | 100.0% |
|   | Important on some way | 60.9%  | 57.0%  | 46.2%  | 56.7%  |

When asked if the participants have used a voice assistant for call support, all age groups are very similar to one another, almost 80% of them have used it a few times or more. However, when asked if they prefer communicating with a chatbot or a human assistant, those aged 18 to 24 answered that they prefer the chatbot more than the human with a notable difference (60.9% / 8.7%). This ratio significantly changes with the increase of age, 15.4% of those aged 34 to 44 chose the chatbot, compared to 46.2% that chose the human assistant.

Table 4.1.1.7 - T7

|  |                             | 1. What is your age? |       |       | Total |
|--|-----------------------------|----------------------|-------|-------|-------|
|  |                             | 18-24                | 25-34 | 35-44 |       |
| 14. Do you prefer interacting with a human or a chatbot when seeking assistance? | Chatbot                     | 60.9%                | 28.4% | 15.4% | 31.6% |
|  | Human                       | 8.7%                 | 14.9% | 46.2% | 16.4% |
|  | It depends on the situation | 21.7%                | 43.3% | 30.8% | 39.5% |

|   |        |        |        |        |
|---|--------|--------|--------|--------|
| Unsure/Undecided                                  | 8.7%   | 13.5%  | 7.7%   | 12.4%  |
| Total   | 100.0% | 100.0% | 100.0% | 100.0% |
| ratio interaction<br>Human/Chatboot<br>assistance | 7.00   | 1.90   | 0.33   | 1.93   |

Table 4.1.1.8 - T8

Chi-Square Tests

|                              | Value   | Df | Asymptotic Significance (2-sided) |
|------------------------------|---------|----|-----------------------------------|
| Pearson Chi-Square           | 19.033a | 6  | .004                              |
| Likelihood Ratio             | 16.240  | 6  | .013                              |
| Linear-by-Linear Association | 3.839   | 1  | .050                              |
| N of Valid Cases             | 177     |    |                                   |

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is 1.62.

Even though, when asked if the participants trusted the responses from conversational AIs, there were no significant differences in the answers of the three age groups, those aged 18 to 24 had the highest percentage (17.4%) that completely trusted the responses from the chatbots and voice assistants. These results also show a declining trend with the increase in age.

Table 4.1.1.9 - T9

|  | 1. What is your age? |       |       | Total |
|--|----------------------|-------|-------|-------|
|  | 18-24                | 25-34 | 35-44 |       |
|  |                      |       |       |       |

|   |                |        |        |        |        |
|---|----------------|--------|--------|--------|--------|
| 22. To what extent do you trust the information provided by chatbots or voice assistants, especially in critical or sensitive situations? | Complete trust | 17.4%  | 14.3%  | 7.7%   | 14.2%  |
|   | Low trust      | 26.1%  | 37.1%  | 38.5%  | 35.8%  |
|   | Moderate trust | 43.5%  | 43.6%  | 38.5%  | 43.2%  |
|   | No trust       | 13.0%  | 5.0%   | 15.4%  | 6.8%   |
|   | Total          | 100.0% | 100.0% | 100.0% | 100.0% |

This is demonstrated with another question, where only 4.3% of the youngest group (18 to 24) completely do not trust, or don't trust as much, in the ability of a CAI to understand the user and respond to their needs.

Table 4.1.1.10 - T10

|   |                         | 1. What is your age? |        |        | Total  |
|---|-------------------------|----------------------|--------|--------|--------|
|   |                         | 18-24                | 25-34  | 35-44  |        |
| 23. On a scale of 1 to 5, how confident are you in the ability of chatbots and voice assistants to understand and respond accurately to your needs? | 1. Not confident at all | 4.3%                 | 1.4%   |        | 1.7%   |
|   | 2. Not very confident   |                      | 19.0%  | 30.8%  | 17.4%  |
|   | 3. Neutral              | 52.2%                | 40.1%  | 30.8%  | 41.0%  |
|   | 4. Confident            | 30.4%                | 33.8%  | 30.8%  | 33.1%  |
|   | 5. Very confident       | 13.0%                | 5.6%   | 7.7%   | 6.7%   |
| Total   |                         | 100.0%               | 100.0% | 100.0% | 100.0% |

Very confident or confident      43.5%      39.4%      38.5%      39.9%

Not confident at all or not very confident      4.3%      20.4%      30.8%      19.1%

Most of the participants preferred the friendly tone of chatbots (39.4%), of which almost every other is aged 18 to 24 (52.2%). The formal tone, on the other hand, was preferred by only 6.9% of the participants, with none of them being from the group aged 18 to 24.

Table 4.1.1.11 - T11

|  |               | 1. What is your age? |        |        | Total  |
|--|---------------|----------------------|--------|--------|--------|
|  |               | 18-24                | 25-34  | 35-44  |        |
| 28. When interacting with chatbots, do you prefer a: | Formal tone   |                      | 6.4%   | 25.0%  | 6.9%   |
|  | Friendly tone | 52.2%                | 37.1%  | 41.7%  | 39.4%  |
|  | Neutral       | 39.1%                | 37.1%  | 25.0%  | 36.6%  |
|  | No preference | 8.7%                 | 19.3%  | 8.3%   | 17.1%  |
| Total  |               | 100.0%               | 100.0% | 100.0% | 100.0% |

Like before, the same trend seems to exist, whereas the age increases or decreases, the answers proportionally increase or decrease as well. 39.1% of those who answered that they prefer a friendly attitude over the effectiveness of a chatbot in providing accurate information and completing tasks were aged 18 to 24. This number decreases to 23.1% with those aged 35 to 44. The situation with 'no' as the answer is the opposite, the youngest group has the smallest percentage (30.4%), and with the oldest group (35 to 44) is the highest (46.2%).

Table 4.1.1.12 - T12

|  |  | 1. What is your age? |       |       | Total |
|--|--|----------------------|-------|-------|-------|
|  |  | 18-24                | 25-34 | 35-44 |       |

|  |                            |        |        |        |        |
|--|----------------------------|--------|--------|--------|--------|
| 29. Would you prioritize a chatbot's friendly attitude over its effectiveness in providing accurate information or completing tasks? | Neutral                    | 30.4%  | 35.0%  | 30.8%  | 34.1%  |
|  | No, not at all             | 21.7%  | 13.3%  | 30.8%  | 15.6%  |
|  | No, not really             | 8.7%   | 22.4%  | 15.4%  | 20.1%  |
|  | Yes, always                | 13.0%  | 2.1%   | 7.7%   | 3.9%   |
|  | Yes, in certain situations | 26.1%  | 27.3%  | 15.4%  | 26.3%  |
|  | Total                      | 100.0% | 100.0% | 100.0% | 100.0% |

|                                    |       |       |       |       |
|------------------------------------|-------|-------|-------|-------|
| Yes always or in certain situation | 39.1% | 29.4% | 23.1% | 30.2% |
| No not at all or not really        | 30.4% | 35.7% | 46.2% | 35.8% |

All these results and statistics are proof that younger generations are in fact more open to conversational AIs involvement in their everyday life, therefore we prove our first research question.

#### 4.1.2. HUMANIZING THE AI

As the previous research question has taught us, we can see a significant difference in the answers when they are divided by age, so here we can again see the results compared by the age of the participants. The same three age groups exist: 18 to 24; 25 to 34; 35 to 44.

All the participants perceive the personality of conversational AIs (chatbots and voice assistants) very similar, around 60% of the groups recognize the dominance of the human personalities in the AI, and 40% recognize more the robotic personalities. Moreover, more than half of the participants (56%) believe that human personality traits can be replicated by the chatbots and the voice assistants.

Again, repeating the same question from the previous hypothesis, do users prefer interaction with a human assistant or a chatbot for assistance, the youngest generation is almost seven times more open to communicate with a chatbot instead of a human (60% / 9%). The opposite is true for the oldest generation, only 15% prefer a chatbot, and 46% would rather communicate with a human assistant. This significant statistical difference between the age groups has been proven with the Chi-square test and the ANOVA analysis.

Table 4.1.2.1 - T13

Chi-Square Tests

|                              | Value   | Df | Asymptotic Significance (2-sided) |
|------------------------------|---------|----|-----------------------------------|
| Pearson Chi-Square           | 19.033a | 6  | .004                              |
| Likelihood Ratio             | 16.240  | 6  | .013                              |
| Linear-by-Linear Association | 3.839   | 1  | .050                              |
| N of Valid Cases             | 177     |    |                                   |

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is 1.62.

|  |                |         |     |       |       |      |
|--|----------------|---------|-----|-------|-------|------|
| 14. Do you prefer interacting with a human or a chatbot when seeking assistance? | Between Groups | 8.000   | 2   | 4.000 | 3.722 | .026 |
|  | Within Groups  | 186.994 | 174 | 1.075 |       |      |
|  | Total          | 194.994 | 176 |       |       |      |

On the question of how important personalization in the interaction with conversational AIs is, there is no significant statistical difference between the age groups. Almost 56% have said that personalization is important, or very important, but still there is some difference in the ratio between 'important' and 'very important' between each of the age groups: 1.2 ratio for ages 18 to 24; 2.8 for ages 25 to 34; 2.5 for ages 35 to 44.

Table 4.1.2.2 - T14

|   |                | 1. What is your age? |        |        | Total  |
|---|----------------|----------------------|--------|--------|--------|
|   |                | 18-24                | 25-34  | 35-44  |        |
| 21. How important is personalization in the interactions with chatbots or voice assistants? | Important      | 30.4%                | 40.8%  | 38.5%  | 39.3%  |
|   | Neutral        | 39.1%                | 37.3%  | 30.8%  | 37.1%  |
|   | Not important  | 4.3%                 | 7.0%   | 15.4%  | 7.3%   |
|   | Very important | 26.1%                | 14.8%  | 15.4%  | 16.3%  |
|   | Total          | 100.0%               | 100.0% | 100.0% | 100.0% |

|                              |       |       |       |       |
|------------------------------|-------|-------|-------|-------|
| Important and very important | 56.5% | 55.6% | 53.8% | 55.6% |
| important/very important     | 1.2   | 2.8   | 2.5   | 2.41  |

Same goes for the question on how confident the participants in the ability of a conversational AI are to understand and respond accurately, there is no significant difference in the answers between the age groups. However, only 4% of the youngest generation (18 to 24) does not believe in the ability of the AI to understand their requests and needs, and this number increases with age, 20% for 25 to 34, and 31% for 35 to 44. The opposite is true for those that believe in the AIs ability, 44% of the youngest generation and 39% for the older generations.

On most questions, we can see that most of the answers are positive, the users accept the AIs, and they have no significant problems using them, but there is a trend with almost all the questions where the youngest generation (18 to 24) is the one that is most positive about the changes, interactions, and general use of conversational AIs, whereas with the older groups, as the age increases, the number of the respondents that answer positively decreases, and in some cases it is a significant difference. For example, when asked what, if any, changes were noticed in the mood and attitude (questions 25 and 27) after interacting with a conversational AI, with the youngest generation (18 to 24), only 13% felt negative changes in their mood, and only 8.7% have seen negative changes in their attitude. As the age increases, this percentage also increases, so for the oldest group (35 to 44) 46.2% have noticed a negative change in both mood and attitude. The case is opposite for positive changes, among the youngest group, the percentage of the participants that have positive change is the highest for both mood and attitude, while for the oldest group this percentage is equal to 0, the group aged 25 to 34 is very close to this with 4.9% and 8.4% respectively.

Table 4.1.2.3 - T15

|   |                               | 1. What is your age? |        |        | Total  |
|---|-------------------------------|----------------------|--------|--------|--------|
|   |                               | 18-24                | 25-34  | 35-44  |        |
| 25. Based on your experience, what changes have you observed in your mood after engaging with a chatbot or voice assistant? | My mood became more negative  | 13.0%                | 25.2%  | 46.2%  | 25.1%  |
|   | My mood became more positive  | 43.5%                | 4.9%   |        | 9.5%   |
|   | No noticeable changes in mood | 26.1%                | 34.3%  | 23.1%  | 32.4%  |
|   | Unsure/Undecided              | 17.4%                | 35.7%  | 30.8%  | 33.0%  |
|   | Total                         | 100.0%               | 100.0% | 100.0% | 100.0% |

Table 4.1.2.4 - T16

|   |                                  | 1. What is your age? |       |       | Total |
|---|----------------------------------|----------------------|-------|-------|-------|
|   |                                  | 18-24                | 25-34 | 35-44 |       |
| 27. Based on your experience, what changes have you observed in your attitude after engaging with a chatbot or voice assistant? | My attitude became more negative | 8.7%                 | 22.4% | 46.2% | 22.3% |
|   | My attitude became more positive | 39.1%                | 8.4%  |       | 11.7% |

|                                   |        |        |        |        |
|-----------------------------------|--------|--------|--------|--------|
| No noticeable changes in attitude | 39.1%  | 32.9%  | 30.8%  | 33.5%  |
| Unsure/Undecided                  | 13.0%  | 36.4%  | 23.1%  | 32.4%  |
| Total                             | 100.0% | 100.0% | 100.0% | 100.0% |

When interacting with a chatbot, 40% of the participants prefer a friendly tone, and only 7% prefer a more formal tone of which 0% are aged 18 to 24 and 25% are aged 35 to 44. 36% of the participants were neutral or undecided on this question, it is probable to say that they haven't thought about this idea before.

With these statistics and results, we can say that even though there are significant differences in some of the answers between the generations, most of the users prefer a more friendly, open, and 'human-like' conversational AI. Even though this may not be the case for most of the participants from the oldest generation, we can see that the youngest generations are more sensitive to these topics, so we can presume that future generations are going to be more and more so.

#### 4.1.3. SPEED AND SIMPLICITY FOR THE WIN

From the total number of participants in the questionnaire, 54% said that they are using a form of conversational AI, such as chatbots or voice assistants, and 45% have answered negatively to the same question. Also, between 30% and 60% of the participants use them at least once a week. Around 80% have used a voice assistant for call support. Like in the previous thesis, the youngest groups are more open to the AI revolution, so they have the highest number of participants that trust CAIs to provide accurate and trustworthy information, the percentage is lower as the age gets higher.

56.7% of the total respondents find the speed of response to be of at least some importance, of which 60.9% are aged 18 to 24, 57% are aged 25 to 34, and 46.2% are aged 35 to 44.

Table 4.1.3.1 - T17

|  |                      |       |
|--|----------------------|-------|
|  | 1. What is your age? | Total |
|--|----------------------|-------|

|   |                      | 18-24  | 25-34  | 35-44  |        |
|---|----------------------|--------|--------|--------|--------|
| 11. How important is the speed of responses from chatbots or voice assistants to you? | Important            | 26.1%  | 29.6%  | 38.5%  | 29.8%  |
|   | Neutral              | 34.8%  | 39.4%  | 53.8%  | 39.9%  |
|   | Not important at all | 4.3%   | 3.5%   |        | 3.4%   |
|   | Not very important   | 34.8%  | 16.9%  | 7.7%   | 18.5%  |
|   | Very important       |        | 10.6%  |        | 8.4%   |
|   | Total                | 100.0% | 100.0% | 100.0% | 100.0% |
| Important on some way   |                      | 60.9%  | 57.0%  | 46.2%  | 56.7%  |

‘Accurate information’ was the top answer with 38% of the total number of responses, with 41.3% of them coming from the middle group, aged 25 to 34. 38.5% of votes from the group aged 35 to 44 for ‘consistency in responses’, and 43.5% of votes from the group aged 18 to 24 for ‘24/7 availability’ made the top answers from each age group. The option with the least number of votes was ‘quick response time’ with only 14% of the total responses, and the lowest response rate from all three groups (13%; 14%; 15.4%).

Table 4.1.3.2 - T18

|   |                      | 1. What is your age? |       |       | Total |
|---|----------------------|----------------------|-------|-------|-------|
|   |                      | 18-24                | 25-34 | 35-44 |       |
| 15_1. What characteristics of a chatbot or a voice assistant would make you more likely to choose it over a | Accurate information | 26.1%                | 41.3% | 23.1% | 38.0% |

|  |                             |        |        |        |        |
|--|-----------------------------|--------|--------|--------|--------|
| human assistant?<br>(You can select<br>more than one<br>answer) - Selected<br>Choice | Availability 24/7           | 43.5%  | 24.5%  | 23.1%  | 26.8%  |
|  | Consistency in<br>responses | 17.4%  | 20.3%  | 38.5%  | 21.2%  |
|  | Quick response<br>time      | 13.0%  | 14.0%  | 15.4%  | 14.0%  |
|  | Total                       | 100.0% | 100.0% | 100.0% | 100.0% |

38% of the total number of responses are that the emotional connection is the most likely characteristic for them to choose the human assistant over the conversational AI, of which 56.5% are from the youngest group. The oldest group however, had the most votes for 'the ability to provide personalized assistance' (46.2%), with the total number for this answer being 27.4%, putting it in second place, right after 'emotional connection'. The least important characteristic seems to be 'flexibility in responses' with only 14.5% of the total number of responses, of which 0% was from the oldest group.

Table 4.1.3.3 - T19

|   |  | 1. What is your age? |       |       | Total |
|---|--|----------------------|-------|-------|-------|
|   |  | 18-24                | 25-34 | 35-44 |       |
| 16_1. What characteristics of a human assistant would make you more likely to choose them over a chatbot or a voice assistant?<br>(You can select more than one answer) - Selected Choice | Ability to provide personalized assistance | 21.7%                | 26.6% | 46.2% | 27.4% |
|   | Emotional connection                       | 56.5%                | 35.7% | 30.8% | 38.0% |
|   | Empathy and understanding                  | 17.4%                | 19.6% | 23.1% | 19.6% |
|   | Flexibility in responses                   | 4.3%                 | 17.5% |       | 14.5% |
|   | Other                                      |                      | .7%   |       | .6%   |

|       |        |        |        |        |
|-------|--------|--------|--------|--------|
| Total | 100.0% | 100.0% | 100.0% | 100.0% |
|-------|--------|--------|--------|--------|

#### 4.1.4. NOT SO DIFFERENT AFTER ALL

While analyzing the data from the questionnaire done for this research, we have noticed another interesting moment that may have been a fourth research question or hypothesis, that is that the numbers weren't pronouncedly different between the answers in the participants from North Macedonia, which was the country with the most respondents (48.5%), and those from the other participating countries. Here are just a few examples that demonstrate this:

The number of people that have recently used conversational AI is very similar.

Table 4.1.4.1 - T20

|   |                            | 3. What is your country of origin? - 1 |                 | Total  |
|---|----------------------------|--|-----------------|--------|
|   |                            | North Macedonia                        | Other countries |        |
| 5. Have you recently used a chatbot or voice assistant? | No, but I have in the past | 57.8%                                  | 51.1%           | 54.2%  |
|   | Yes                        | 42.2%                                  | 48.9%           | 45.8%  |
| Total   |                            | 100.0%                                 | 100.0%          | 100.0% |

Same goes for the frequency of use, no significant differences between the two groups.

Table 4.1.4.2 - T21

|  |  | 3. What is your country of origin? - 1 |                 | Total |
|--|--|--|-----------------|-------|
|  |  | North Macedonia                        | Other countries |       |
|  |  |  |                 |       |

|  |                      |        |        |        |
|--|----------------------|--------|--------|--------|
| 6. How frequently do you interact with chatbots or voice assistants? | Multiple times a day | 16.9%  | 15.6%  | 16.2%  |
|  | Once a week          | 15.7%  | 19.8%  | 17.9%  |
|  | Rarely               | 38.6%  | 32.3%  | 35.2%  |
|  | Several times a week | 28.9%  | 32.3%  | 30.7%  |
|  | Total                | 100.0% | 100.0% | 100.0% |

The name of recently used conversational artificial intelligence has no significant difference.

Table 4.1.4.3 - T22

|  |                           | 3. What is your country of origin? - 1 |                 | Total  |
|--|---------------------------|--|-----------------|--------|
|  |                           | North Macedonia                        | Other countries |        |
| 7. Which chatbot or voice assistant have you used most recently? - Selected Choice | Amazon's Alexa            | 16.9%                                  | 21.9%           | 19.6%  |
|  | Apple's Siri              | 55.4%                                  | 51.0%           | 53.1%  |
|  | Google's Google Assistant | 16.9%                                  | 14.6%           | 15.6%  |
|  | Microsoft's Cortana       | 10.8%                                  | 12.5%           | 11.7%  |
|  | Total                     | 100.0%                                 | 100.0%          | 100.0% |

Both groups believe in the same ideas, for example, that conversational AI can replicate human personality traits or not.

Table 4.1.4.4 - T23

|   |                        | 3. What is your country of origin? - 1 |                 | Total  |
|---|------------------------|--|-----------------|--------|
|   |                        | North Macedonia                        | Other countries |        |
| 13. Do you believe chatbots or voice assistants can replicate human personality traits? | No, not at all         | 35.4%                                  | 33.3%           | 34.3%  |
|   | Unsure/Undecided       | 8.5%                                   | 10.4%           | 9.6%   |
|   | Yes, to a great extent | 8.5%                                   | 13.5%           | 11.2%  |
|   | Yes, to some extent    | 47.6%                                  | 42.7%           | 44.9%  |
|   | Total                  | 100.0%                                 | 100.0%          | 100.0% |

## 5. DISCUSSIONS AND IMPLICATIONS

The analysis of responses from North Macedonia in comparison to the rest of the world offers valuable insights into market dynamics and potential differences in perspectives or experiences related to conversational artificial intelligence (CAI). While initial observations suggest a lack of significant differences between responses from North Macedonia and other regions, further analysis is necessary to draw robust conclusions.

This comparative analysis highlights the need for ongoing research and exploration into the North Macedonian market. The findings provide a foundation for understanding market behaviors and responsiveness to changes, particularly in the context of CAI. By scrutinizing responses from this region alongside global data, this research contributes to a more comprehensive understanding of market dynamics and potential challenges or opportunities.

The insights gained from this study refine and enhance our understanding of the following research questions:

1. How do different generational groups perceive and interact with conversational AI?
2. Do users prefer conversational AIs that exhibit human-like personalities?
3. What factors contribute to the widespread acceptance of voice assistants, and how do these factors vary across different user groups?
4. Is there a meaningful difference between the responses of North Macedonia and the rest of the world regarding conversational AI?

By addressing these questions, this research aims to guide strategic decision-making, support businesses operating in or entering the North Macedonian market, and inspire future research initiatives focused on CAI and market dynamics.

### 5.1. THEORETICAL IMPLICATIONS

The findings of this study have several theoretical implications that contribute to the broader discourse on user perceptions and interactions with conversational AIs, particularly in the context of diverse geographic regions such as North Macedonia.

Previous studies in the literature have primarily focused on user perceptions and preferences in Western contexts or more developed markets. The inclusion of North Macedonia in this study offers a unique perspective and highlights the importance of considering cultural, economic, and technological factors in understanding user behaviors and market dynamics. One theoretical implication is the notion of technological adaptation and acceptance in emerging markets. The lack of significant differences between responses from North Macedonia and other regions suggests a level of universality in user perceptions and interactions with CAI. This challenges previous assumptions that market behaviors and

preferences may vary significantly based on geographic or cultural factors alone. Moreover, the comparative analysis sheds light on the potential for cross-cultural similarities in user preferences for AI personalities, responsiveness, and simplicity. Understanding these shared preferences can inform the design and implementation of conversational AIs that resonate with diverse user groups globally. The findings also underscore the importance of ongoing research and data collection in emerging markets such as North Macedonia. As these markets evolve and adopt new technologies, continuous monitoring and analysis are crucial for identifying trends, challenges, and opportunities that can guide strategic decision-making for businesses and policymakers.

## **5.2. PRACTICAL IMPLICATIONS**

As we said from the very beginning, this field has seen a massive progress in development and new findings are popping up if not daily, then weekly, so from the start of the idea for this thesis, and while gathering the necessary data, some things have changed, some revolutionary ideas have emerged on the market, some things have disappeared. Unfortunately, we weren't able to include these changes in the thesis as they happened at a time where it was already late to make updates, or they were still not relevant enough.

### **5.2.1. AN ASTOUNDING REVELATION THAT EVERYONE TALKS ABOUT**

Of course, we must mention ChatGPT, an extraordinary tool first introduced at the end of November 2022 by a company called OpenAI, but that peaked around January and end of February 2023. This amazing tool just proves to the world what AI is capable of and brings conversational AI to a whole new level. This tool unfortunately gained its popularity in the world while this thesis was at its finishing stages, but it is important to mention that the capabilities of ChatGPT deserve separate research on its own.

### **5.2.2. MAKING WAY FOR NEW GENERATIONS**

We are aware of the disappearance of Cortana, sadly this voice assistant/chatbot has been shut down by their creators at Microsoft later in 2023 and was ultimately replaced by a more advanced technology called Microsoft Copilot, that is supposed to rival OpenAI's ChatGPT. Even though the discontinuation of Cortana was announced long before, we decided to include Cortana in this thesis as it was still available and functional, plus many of us have some knowledge of this tool, also it was a big deal for Microsoft.

Everything else that we have not mentioned was simply not important enough to make a difference for this research or was just emerging on the market and users still haven't found

its purpose. As we said again and again, this is a market that sees a constant change and it chaotic to follow at some points, that is why keeping up to date research like this one are important in knowing how the trends have changed and how the users are affected by these changes.

## 6. CONCLUSIONS AND FUTURE RESEARCH

Many companies from a wide specter of industries have started to adopt modern technology into their daily routines, from production, marketing, advertisement, acquiring new customers, customer satisfaction, finance, even in their final products and/or services, and many more, a big number of people became in constant interaction with those technological advancements. This situation might have posed a problem for the new and the already existing clients as a form of a steep learning curve. But as technology continues to advance and it's gaining more popularity, today, being more present in all parts of our lives, we learned to adapt more easily to the upcoming technological advancements of the world.

One revolutionary technology that emerged in our lives was artificial intelligence. Now, we can find many companies that use AI to communicate and interact with users, providing faster and more convenient answers, 24/7 services, and ultimately cutting costs connected with new employees. Conversational AIs are super advanced nowadays, and many people have started to wonder how to make them better and more attractive to the customers, what characteristics are important for a good AI, what people look for when interacting with them, why do people use them, and so on.

This research started as an idea to see and to show what aspects of conversational artificial intelligence, such as voice assistants and chatbots, play an important role when interacting with human users. By no means is this the first research of its kind, but as this technology changes and evolves every day, it is meant to update old information, and discover new facts, eventually filling the gap between studies regarding user perceptions and the broader implications on their lives.

A quantitative study was conducted with a total of 30 questions (of which 4 were demographic), seeking answers to how people used CBs and VAs, what were their preferences when interacting with some of them, which ones they use the most, which ones they preferred, how (and if) they noticed some changes in their behavior, they were asked to rate the experience when interacting with the CAIs, etc. The survey that was conducted on the Qualtrics platform, had a total of 179 respondents that were reached via email, WhatsApp, Facebook, and other means of communication. Three main research questions were analyzed and proven.

With the first one 'Are younger generations more open to AI involvement in everyday life?', we managed to prove it with the fact that young generations are using conversational AIs, such as chatbots and voice assistants, more than their older counterparts. They also used CAIs more regularly and had a deeper connection with them as they were more sensitive to changes in their mood and attitude compared to the two older groups.

The second research question showed that people expect to see similar, if not the same, characteristics in the conversational AIs as their human equivalents. The possibility of having personalized interactions and the feeling of empathy were among the top answers that the users preferred when communicating with a real human, things that AI is still missing or is weak at.

For the final question, 'Are responsiveness and simplicity the key reasons why voice assistants are widely accepted?', the data were close, but we could not prove our hypothesis. To our

surprise, of the characteristics we proposed as answers to what makes people more likely to pick a chatbot or a voice assistant over a human assistant, the option with the least number of votes was the speed of response. But pretty convincing results came from the question that asked how important the speed of response to the users from CAIs is: 56.7% of the total number of responses said that it was important to some extent. With this data, we couldn't prove the last research question in its whole meaning. But we can freely conclude that responsiveness and simplicity are important elements to the users when they choose to use voice assistants.

Analyzing data, we divided the participants by their origin into two groups. The country with the most participants was North Macedonia, so that was group number one, and the second group consisted of the second country with the most participants (Portugal) and all the other participating countries as well (14 other countries). We have found out that the answers given by the two groups were very similar, so we have concluded that the origin of the users wasn't important in this matter.

In conclusion, this topic is something that needs to be researched regularly to see and be up to date with the changes in the use and perceptions of artificial intelligence, and we hope that this can give some further insight into this topic for future research and references.

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## APPENDIX - ETHICS COMMITTEE APPROVAL



This is to certify that

Project No.: **STAT2024-2-291643**

Project Title: **Users' perception of conversational AI according to their age**

Principal Researcher: **Nikola Popovski**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 2/29/2024.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of

- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 2/29/2024

NOVA IMS Ethics Committee  
ethicscommittee@novaims.unl.pt

## ANNEXES – QUESTIONNAIRE

0. The purpose of this survey is to understand the impact of conversational AI's (such as voice assistants and chatbots) with regard to a consumer's mood and attitude. It consists of **purely multiple-choice questions that can be accomplished within five minutes**. Rest assured that no personal information will be requested.

Your response is valuable for the completion of the researcher's master's thesis. Thank you in advance for your contribution.

### Consent form

I declare that I am 18 years of age or older, and I agree to participate in this research survey. I declare that I was informed that my participation in this study is voluntary and that I can leave this survey at any time without penalty, and that all data is confidential.

I agree

I disagree

End of Block: Consent message

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Start of Block: Default Question Block

1. 1. What is your age?

18-24

25-34

35-44

45-54

55 and above

2. 2. What is your gender?

- Male
  - Female
  - Other
  - Prefer not to say
- 

3. 3. What is your country of origin?

1

▼ Afghanistan ... Zimbabwe

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4. 4. What is the highest level of education you have completed?

- High School or equivalent
- Bachelor's degree
- Master's degree
- Doctorate or professional degree
- Other (please specify) \_\_\_\_\_

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5. 5. Have you recently used a chatbot or voice assistant?

- Yes
  - No, but I have in the past
  - No, I have never used one
- 

6. 6. How frequently do you interact with chatbots or voice assistants?

- Multiple times a day
  - Several times a week
  - Once a week
  - Rarely
  - Never
-

7. 7. Which chatbot or voice assistant have you used most recently?

- Amazon's Alexa
  - Google's Google Assistant
  - Apple's Siri
  - Microsoft's Cortana
  - Other (please specify) \_\_\_\_\_
- 

8. 8. Which of them do you prefer using?

- Amazon's Alexa
  - Google's Google Assistant
  - Apple's Siri
  - Microsoft's Cortana
  - Other (please specify) \_\_\_\_\_
-

9. 9. On a scale of 1 to 5, how satisfied are you with the chatbot or voice assistant you have used?

- 1 (Not satisfied at all)
  - 2 (Slightly satisfied)
  - 3 (Moderately satisfied)
  - 4 (Very satisfied)
  - 5 (Extremely satisfied)
- 

10. 10. Have you ever abandoned the use of a chatbot or voice assistant due to frustration or dissatisfaction?

- Yes, many times
  - Yes, a few times
  - No, never
-

11. 11. How important is the speed of responses from chatbots or voice assistants to you?

- Very important
  - Important
  - Neutral
  - Not very important
  - Not important at all
- 

12. 12. How do you perceive the personality of chatbots or voice assistants?

- Completely robotic
  - Somewhat robotic, but with minor human-like traits
  - Moderately human-like
  - Mostly human-like, with minor robotic traits
  - Completely human-like
-

13. 13. Do you believe chatbots or voice assistants can replicate human personality traits?

- Yes, to a great extent
  - Yes, to some extent
  - No, not at all
  - Unsure/Undecided
- 

14. 14. Do you prefer interacting with a human or a chatbot when seeking assistance?

- Human
  - Chatbot
  - It depends on the situation
  - Unsure/Undecided
-

15. 15. What characteristics of a chatbot or a voice assistant would make you more likely to choose it over a human assistant? (You can select more than one answer)

Quick response time

Availability 24/7

Accurate information

Consistency in responses

Other (please specify) \_\_\_\_\_

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16. 16. What characteristics of a human assistant would make you more likely to choose them over a chatbot or a voice assistant? (You can select more than one answer)

Empathy and understanding

Ability to provide personalized assistance

Emotional connection

Flexibility in responses

Other (please specify) \_\_\_\_\_

---

17. 17. Have you ever used a voice assistant for call support or customer service?

- Yes, many times
  - Yes, a few times
  - No, never
- 

18. 18. What are the advantages of using a voice assistant for call support, according to your experience? (You can select more than one answer)

- Quick access to information
  - Reduced waiting time
  - Self-service options
  - Clear and understandable voice
  - Other (please specify) \_\_\_\_\_
-

19. 19. What are the disadvantages of using a voice assistant for call support, according to your experience? (You can select more than one answer)

- Difficulty in understanding accents or speech variations
  - Limited ability to handle complex inquiries
  - Lack of human empathy and understanding
  - Inability to handle nuanced situations
  - Other (please specify) \_\_\_\_\_
- 

20. 20. How do you think the characteristics of a voice assistant influence your choice between a voice assistant and a human assistant for call support? (You can select more than one answer)

- Voice assistants are more efficient and time-saving
  - Human assistants provide better problem-solving abilities
  - Voice assistants are more accessible and available 24/7
  - Human assistants offer a personalized and empathetic experience
  - Other (please specify) \_\_\_\_\_
-

21. 21. How important is personalization in the interactions with chatbots or voice assistants?

- Very important
  - Important
  - Neutral
  - Not important
- 

22. 22. To what extent do you trust the information provided by chatbots or voice assistants, especially in critical or sensitive situations?

- Complete trust
  - Moderate trust
  - Low trust
  - No trust
-

23. 23. On a scale of 1 to 5, how confident are you in the ability of chatbots and voice assistants to understand and respond accurately to your needs?

- 5. Very confident
  - 4. Confident
  - 3. Neutral
  - 2. Not very confident
  - 1. Not confident at all
- 

24. 24. Do you believe the personality of a chatbot or voice assistant can have a similar impact on your **mood** as a human's personality?

- Yes, to a great extent
  - Yes, to some extent
  - No, not at all
  - Unsure/Undecided
-

25. 25. Based on your experience, what changes have you observed in your **mood** after engaging with a chatbot or voice assistant?

- My mood became more positive
  - My mood became more negative
  - No noticeable changes in mood
  - Unsure/Undecided
- 

26. 26. Do you believe the personality of a chatbot or voice assistant can have a similar impact on your **attitude** as a human's personality?

- Yes, to a great extent
  - Yes, to some extent
  - No, not at all
  - Unsure/Undecided
-

27. 27. Based on your experience, what changes have you observed in your **attitude** after engaging with a chatbot or voice assistant?

- My attitude became more positive
  - My attitude became more negative
  - No noticeable changes in attitude
  - Unsure/Undecided
- 

28. 28. When interacting with chatbots, do you prefer a:

- Formal tone
  - Friendly tone
  - Neutral
  - No preference
-

29. 29. Would you prioritize a chatbot's friendly attitude over its effectiveness in providing accurate information or completing tasks?

- Yes, always
  - Yes, in certain situations
  - Neutral
  - No, not really
  - No, not at all
- 

30. 30. Should chatbots or voice assistants adapt their responses based on the user's current mood or emotional state?

- Yes, always
- Yes, in certain situations
- Neutral
- No, not really
- No, not at all

End of Block: Default Question Block

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