# Thesis mixed-method study

*The advantages and disadvantages of start-ups investing in AI chatbot technology for customer service communication: based on an (online) experiment and a semi-structured interview*

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**Content**

***Abstract***

AI technology used in customer service through online chatbots bring significant gains and higher operational and organizational efficiency (Chen et al., 2021; De Andrade & Tumelero, 2022). In order to compete on a large scale, investing in high resource technological innovations is an important expense. This study aims to investigate whether it is beneficial for start-ups to invest in AI chatbots for their customer service communication and whether the quality of the AI ensures start-ups the same beneficial properties as it does for big corporations. This is a mixed method study, based on an (online) experiment with a within-subject design and a semi-structured interview with Obi4one, a company specialized in AI technology including chatbots. The data was acquired using an online questionnaire with 22 participants, examining one's attitudinal evaluation, customer satisfaction, behavioural intention while analysing the perceived usefulness regarding two conversations. Taking the interview information into account, it was concluded that chatbots do not cause a significant enhancement for start-ups However, start-ups with a rapid enhancing customer base can benefit from investing in AI chatbots, as it could improve operational efficiency. This study contributes to investing strategies of start-ups as it provides a detailed analysis which can be put into practical use when AI investments are considered.

# Introduction

The use of Artificial Intelligence (AI) has been growing rapidly over the last decade. People all over the world use AI daily in personal-, business- and social related matters. AI conjures up visions of self-driving vehicles, electronical personal assistants and intelligent robots. Furthermore, AI's effects on big enterprises' operations is no less than transformational. For example, AI applications in call centres can answer calls within 5 seconds on a 24-7-365 basis, while correctly addressing their issue on the first call 90% of the time. Simultaneously, half of these customers talking to this AI application do not know they are talking to a machine. This application of AI is often used in customer services, as it brings certain beneficial aspects. It favourably reduces customer's search time and enhances employees' productivity, who could now focus on more high-level work (Tarafdar et al., 2019).

AI can also be applicable to a deeper level of an enterprise's operation, for example in marketing or management explorations. Systematic evaluations produced by AI can be used to assess customers satisfaction of a corporation's product or service, which can then be altered aiming for enhancement. Furthermore, leveraging on AI in marketing is a way of using customer data to predict and optimize the customer journey. Data can be interpreted by AI exponentially more rapidly than by a human and is therefore an interesting tool to use for big enterprises. Acknowledging your stakeholder's interests and disinterests is beneficial as one can adjust their business strategy to enhance customer satisfaction and loyalty, stated by Tanveer et al. (2021).

One quality that every successful corporation, product or service based, has in common is that they maintain a good customer interaction. As AI is proven to support corporations to interact with customers faster and to optimal their customer service relations (Prabu et al., 2020), it is a wise decision for large company to invest in these effective AI customer service applications. However, these AI investments require a high level of resources, something that start-up business do not always have in their possession. To maintain their competitive position against the larger corporations, who enjoy of fast AI applicated interaction with their large customer base, start-up corporation often consider investing in customer service AI applications. In this research it is explored to what extent an AI customer service application investment can benefit the start-up corporations. The conversations between a large retail corporation and their customers which uses an AI chatbot for their customer service communication will be compared to a conversation of a smaller company and their customers

which uses human customer service assistants for their customer service communication. Therefore the following research question has been realized:

*To what extent is the large corporations' attitudinal evaluation, customer satisfaction and behavioural intention influenced by the perceived usability of the AI applicated customer service assistant compared to smaller companies who use a manual customer service assistant in their customer service communication? And how can this influence the investment strategy for small businesses?*

This research is scientifically and socially relevant as it increases the understanding of the use Artificial Intelligence applications in start-up businesses, which consequently is beneficial for the CEOs of those start-ups who are considering implementing AI applications aiming to enhance customer satisfaction and customer's behavioural intention. It gives a concrete analysis of the advantages and disadvantages of AI chatbot applications in customer service communication of start-up businesses, which can be put into practical use when AI investments are considered by start-up corporations.

## Theoretical framework

### *Social response theory*

This research is partially based on the social response theory. This theory indicates that human-computer interactions (HCIs) contain fundamentally social elements (Adam et al., 2021). According to Adam et al. (2021), this results in the fact that individuals automatically form biased perceptions towards computers, and seeing them as social actors; even when one knows that machines do not hold feelings or intentions. The identified psychological effect underlying the social factors of computers is the evolutionary biased social orientation of human beings. Consequently, through interacting with an anthropomorphized computer system, a user may perceive a sense of social presence. When presented with a technology possessing cues that are normally associated with human behaviour (e.g., language, turn-taking, interactivity), individuals respond by exhibiting social behaviour and making anthropomorphic attributions. Thus, individuals apply the same social norms to computers as they do to humans (Adam et al., 2021).

This theory provides relevant information regarding the examination of AI chatbots applications in this research. By hand of an experiment a comparison is made between AI chatbots and human customer service assistants, regarding attitudinal evaluation, customer satisfaction and behavioural intention. The meaning of these important variables must be specifically defined. In this research attitudinal evaluation is defined as a measurement of one's energy level towards the customer service assistants based on one's attitude and perception. In other words, one's opinions towards AI chatbot based on their social norms. While customer satisfaction refers to a measurement that determines the level of happiness regarding the customer service assistance's capabilities and services (Biesok & Wyród-Wróbel, 2011), not regarding their attitude. Consequently, all motivational factors that influence a given behaviour, for instance attitude and customer satisfaction, influence the behavioural intention. Behavioural intention refers to the customer's actual tendency of purchasing products or services and being loyal to the corporation. The behavioural intention is a crucial element of survival for any starting corporation and can also be influenced by socially desired behaviour.

Since individuals do apply the same social norms to an AI chatbot application as they do to humans, it makes it easier for AI chatbots to succeed in gaining a customer's trust and receiving the same level of appreciation that a human customer service assistant would. In interactions with computers, even few anthropomorphic design cues can trigger social orientation and perceptions of social presence in an individual and, thus, responses in line with socially desirable behaviour (Adam et al., 2021).

***Turing test***

An association can be made between the social response theory and the Turing test. Alan Turing started his work in 1936 and asked the question, 'Can machines think?'. (TURING, 1950). The Turing Test is a method of inquiry in artificial intelligence (AI) for determining whether or not a computer is capable of thinking like a human being (Frankenfield et al., 2022). The test is passed when a computer programme can mislead a human being into believing that it is also a human. However, no AI chatbot has ever passed the Turing Test, but several came close. For example, a paper by Powell & others (2019) discusses that the user-facing AI systems in healthcare, such as chatbots and conversational agents, were tested by hand of the Turing test and failed. It was then argued that medical decisions often required valuable judgement and empathy, for instance when a difficult decision has to be made concerning the treatment of a critically ill patient. The compassionate and insightful attributes that is required in aforementioned situations can only be provided by a good doctor-patient relation. The handling

of uncertainties and taking risks are traits that a human can do severely better than an AI chatbot. Therefore, it can be stated that in the practice of medicine wisdom is more required than intelligence (Powell & others, 2019). Which appoints AI in the field of medicine into a supplementary position instead of into a function of replacement.

Then the question raises: in what extent do AI chatbots need to be capable of thinking like a human being to be a suitable replacement for humans in the context of customer service communication? Is it even a requirement for functional chatbots to think like a human? In other words, to what extent do AI applications need to pass the Turing test to serve as a right replacement for human customer service assistants? This question raises a debate. On one hand it can be argued that the AI chatbots usable for customer communication services only need to pass the Turing test in a fair amount. As, according to the social response theory, even a small number of anthropomorphic cues can trigger the social presence of an actual individual. Which indicates that in theory only a small number of humane traits need to be accommodated by AI chatbot to be an acceptable replacement for human customer service assistants. On the other hand, it might be possible for successful AI chatbots to not be related to humans at all. A good communication AI chatbot which is aimed for the using of simple practicalities can be successful when the quality and usefulness of the tool is efficient and mistake-free. Therefore it can be argued that the necessity of AI chatbot imitating as humans is not a requirement for the technology to be a suitable replacement for customer service assistants. Instead the perceived usefulness of the technology is the key requirement for success. In this thesis experiment the perceived usefulness of the AI chatbot compared to the human customer service assistant is examined and evaluated.

## Literature review

### *Artificial Intelligence in customer service communication*

A sector where AI-driven technologies have been successful is the customer service sector. Today, human chat service agents are frequently replaced by conversational software agents or chatbots. Those software agents are systems designed to communicate with human users by means of natural language often based on AI. However, in spite of the fact that cost- and time-saving opportunities triggered a widespread implementation of AI-based chatbots, they still

frequently fail to meet customer expectations, potentially resulting in users being less inclined to comply with requests made by the chatbot, therefore simultaneously reducing sales (Adam et al., 2021).

The study of Adam et al. (2021) examines through a randomized online experiment how verbal anthropomorphic design cues (social response theory) and the foot-in-the-door technique affects user's request compliance. Anthropomorphism is defined as the interpretation of non-human things or events in terms of human characteristics, as when one senses malice in a computer or hears human voices in the wind. Results of this study demonstrate that both anthropomorphism as well the persistent strategies of the AI chatbot increase the likelihood that users comply with a chatbot's request for service feedback. Therefore it can be implied that AI in customer services can be successful, conceding that the AI chatbot can imply a sufficient number of anthropomorphic cues.

Moreover, whether a customer has a positive experience with an AI chatbot depends on whether the AI chatbot operates adequately. Therefore, for a company to affects one's customer satisfaction level and customer loyalty in order to maintain a competitive advantage among competitors, the sufficient operation of AI chatbots is imperative. When consumers have positive experiences with voice-activated services in the hotel industry, they are more likely to develop favourable attitudes toward hotel services. However, when these services cannot answer consumers' questions sufficiently, customers tend to have less favourable attitudes (Prentice et al., 2020). The study reveals that the AI service quality is significantly related to customer satisfaction. Which consequently affects customer loyalty and additionally indicates that a successful and professionally qualified AI service can directly positively influence customer loyalty.

Nevertheless, ensuring sufficient quality of AI applications in customer service communication is not a guarantee that customers will frequently prefer AI over human customer service. Whether customers prefers AI of human customer service is contingent on one's service usage intention (Xu et al., 2020). In a banking service context, Xu et al (2020) examined whether consumers preferred AI or a Human online customer service application while assisting them with low- and high-complexity tasks. For low-complexity tasks, consumers considered the problem-solving ability of AI to be greater than that of human customer service and were more likely to use AI. However, for high-complexity tasks consumers viewed human customer service as superior and were more likely to use it than AI. Thus, the service quality of AI combined with one's service usage intention influences whether AI applications in customer service communication are perceived as convenient and successful (Prentice et al., 2020; Xu et

al., 2020). In addition, sufficient quality of AI applications does not only increase one's general customer satisfaction level. When AI applications in customer service communication are qualitative sufficient, customer's future purchase intentions can be increased while simultaneously increasing customer loyalty (Yu, 2021).

***The use Artificial Intelligence for start-up corporations***

The rapid evolution in AI has redefined the customer experience and created huge opportunities for companies to interact with customers using chatbots. AI applied in customer service through online chatbots bring significant gains and higher operational and organizational efficiency, regarding customer satisfaction and customer reach (Chen et al., 2021; De Andrade & Tumelero, 2022). In order to compete on a large scale, investing in high resource cutting-edge technological innovations is an important expense. However, can the same conclusion be drawn when one's business is just in the developing phase, referring to start-up corporations, and one is aiming to enhance their customer loyalty in order to expand and compete with the bigger corporations? Start-ups have to take into account whether they have the same capacity in one's financial budget as bigger corporations, which are able to spend higher numbers on AI chatbots with a high level of quality to use in their customer service. Thus, it can be implied that the quality level of AI applications is as equally important as the financial aspects that AI applications requires, when one is aiming to affect its company's customer's satisfaction and loyalty (Prentice et al., 2020; Xu et al., 2020; Yu, 2021).

Although AI-based services have risen dramatically and replaced many service offerings, in reality, start-ups are rarely to implement or evaluate AI services. Even while considering that features of AI services are fundamentally different from the properties of existing services and have a profound influence on the customer's service selection, not many evaluation strategies or critical analyses regarding AI and customer service for start-ups are available. Having more information about AI applications used for customer services communication is a crucial element when one is considering using it, as favourable results for start-ups are not always a given. An example of a AI technology evaluation model that has been developed for start-ups is a quality evaluation model by Baek et al. (2021). This model has identified a set of unexplored characteristics and features relevant to AI that can help start-ups enhance their customer satisfaction level and predict customer's future behaviour. Additionally, it can help start-ups using AI to develop their services and improve their market position and growth. Product or service design can be adjusted after conducting an analytic survey using AI examining their customer satisfaction rate. The new and improved products/services can

increase customer satisfaction and loyalty, which can enhance the chance of start-up's survival an innovative growth (Baek et al., 2021).

The quality evaluation model of Baek et al. (2021) focusses on start-ups and how AI can enhance their production/service strategy to increase customer satisfaction by changing and adapting it's products or services. However, how small start-up businesses can use AI as a smart customer service communication tool is a concept that has barely been researched. It can therefore be assumed that a potential explanation for this could be that new businesses do not have enough information to weigh the favourable factors that an AI chatbot acquires against the additional expenditure; the uncertainty is high. The timing of investment is for both established firms and for start-ups entering firms severely important. "Established firms choose their timing of investment and level of capacity to maximize expected profits, whereas start-ups make those choices maximize the probability of survival" (Swinney et al., 2011). When start-ups in new markets try to compete with established corporations that the level of uncertainty does not decline the probability of investment, stated by Swinney et al. (2011). Therefore, start-up corporations are likely to invest in AI chatbot technology trying to overrule the capacity of established bigger corporations. In addition, deviating from rivals' resource investments can negatively affect the performance of the start-ups. When established bigger corporations are investing in AI technology and increase their customer satisfaction, it is wise for the start-up to follow their lead to prevent their customer base to be affected negatively. Conforming to the norms set by competitors in the same market positively affects performance, under the condition that the investments are focused on innovation (Symeonidou & Nicolaou, 2018). As AI technology is an innovative expenditure for corporations it can be indicated that start-ups can benefit from investing in AI technology, when the sufficient resources and capabilities are accounted for.

This study is aiming to investigate whether it is beneficial for start-up businesses to invest in AI applications for their customer service communication and whether the quality of the AI used in customer services ensures small business owners the same expanding prospects and customer loyalty as it does for big corporations. Additional to the aforementioned research question a variety of hypotheses are realized:

**H1***: Attitudinal evaluation will be higher for a conversation between a customer and an AI chatbot operator compared to a conversation between a customer and a human customer service operator when the AI chatbot is perceived as usable and responsive.*

**H2**: *Customer satisfaction will be higher for a conversation between a customer and an AI chatbot operator compared to a conversation between a customer and a human customer service operator when the AI chatbot is perceived as usable and responsive.*

**H3***: Behavioural intention will be higher for a conversation between a customer and an AI chatbot operator compared to a conversation between a customer and a human customer service operator when the AI chatbot is perceived as usable and responsive*

**H4***: The attitudinal evaluation, customer's satisfaction and behavioural intention will be lower for small retail businesses who applicated AI in customer service compared to small business who use manual customer service communication when the same level of usability and responsiveness is acquired.*

## Methodology

### *Materials*

The objective of this experimental study was to compare the customer's attitudinal evaluation, customer satisfaction, behavioural intention and perceived usefulness between customer service assistants managed by AI chatbots and customer service assistants managed by humans. Participants were asked to fill out an online questionnaire after examining two conversations online conversations.

Both conversations are dialogues held on a social media platform between a customer and a company's customer service assistant. Furthermore, conversation 1 and 2 both aim to solve a customer service issue; a customer approaches the company to ask advice. However, the two conversations are held with different companies, one with customer service assistant operated by an AI chatbot and one with a customer service assistant operated by a human. The companies involved are both retail companies that operate in the food industry. The questions aim to seek recipes for a healthy lifestyle, something both companies claim to promote. Both conversations are real and only realized for the purpose of this experimental study. The full dialogues of both conversation can be found in the Appendices.

Conversation 1 is a dialogue between a customer and a customer service assistant operated by an AI chatbot. The company involved is Unox, a Dutch food retailing company founded in 1937. The conversation is held in the online chat on the company's website. The

chatbot's name is Mark and it sends the first message asking what he can help you with. The customer responds by saying that they are looking for a healthy recipe and require assistance. Mark responds by offering a number of sub-options to help the customer efficiently. At the end of the conversation the customer was given six recipes that suited the right requirements of the customer.

Conversation 2 is a dialogue between a customer and a customer service assistant operated by a human. The company involved 2 is Allerhande, an online Dutch food magazine founded in 2010 managed by a Dutch Supermarket called Albert Heijn. The conversation was held on Instagram and the company was approached by the customer in the chat. The dialogue started with the customer seeking recipes for a holiday family dinner. The customer service assistant then provides four main course recipes, one side dish recipe and three desert recipes. The customer asked a follow-up question on which the assistant responded with their personal advice on what to make.

***Subjects***

This experiment was conducted using 25 participants. However, 3 participants did not completely finish the questionnaire, thus were excluded from the study. This brings the total number of participants to 22, 7 males (31.8%) and 15 females (68,2%). All participants were Dutch natives between the age of 18 and 23 years old ($M$=20.25 $SD$=1.80, range =5). The educational level of the participants varied, the most frequent level of education was WO, with 17 participants (77.3%). The other 3 participants enjoyed an HBO study (13.6%) and 2 participants enjoyed a MBO study (9.1%). The educational level had a range of 3.

Moreover, all participants were asked whether they were familiar with contacting customer service assistants. Only participants who were familiar have been included in the experiment to ensure representational insights. Results showed that 10 participants were familiar with the topic on an average scale. 4 participants were a little familiar, 4 a lot familiar and 4 a great deal. No participants were not familiar with the topic.

***Design***

This experiment used a within-subject design. Participants are shown both conversation 1 (AI/human) and conversation 2 (human/human) and filled out an online questionnaire with questions concerning both conversations. First, conversation 1 was read and the questions were filled out by the participants, then conversation 2 was read and the same questions were filled out by the participants.

***Instruments***

Participants filled in an online questionnaire to measure a variety of independent variables: attitudinal evaluation, customer satisfaction, behavioural intention and perceived usefulness. The questionnaire is divided into five blocks. Before answering any questions the participants read a general introduction, including the purpose of the study and an elaboration of the structure of the questionnaire. Next, the participants were asked if they were certain they wanted to participate in the study. When they declined the survey was not accessible. The questionnaire was accessible in both English and Dutch, however only the Dutch questionnaire was used as all participants were Dutch natives.

*Block 1*

Firstly, the respondents were asked a series of demographic questions; including age, gender, educational level. Participants were also asked how familiar they are with contacting customer service assistants in their daily lives measured on a 5-point Likert scale (1=not at all, 7=a great deal).

*Block 2*

Before the second block of question, participants read conversation 1. To make sure participants read the conversation1, participants were required to answer yes to the question whether they have read conversation in order to continue the questionnaire. It was possible to read the conversation again while answering the questions. The question regarding conversation 1 were divided into four segments: attitudinal evaluation, customer satisfaction, behavioural intention and perceived usefulness.

To examine the attitudinal evaluation, one's personal attitude and conversational attitude were measured separately. Regarding the conversational attitude, participants were asked the sense of the conversation by finishing the statement "this conversation was…", followed by four senses that they would rate on a scale from 1 to 5: stiff, helpful, respectful, uncivil (1=strongly disagree, 5=strongly agree). The reliability of 'conversational attitude' compromising 4 items was bad: $\alpha$=-.18. Consequently, one question was removed from the analysis which led to a more adequate level of reliability: $\alpha$=.65. As a result the mean of the three items was used to calculate the compound variable 'conversational attitude', which was used in the further analysis. The excluded statement was: "this conversation was stiff". Regarding one's personal attitude, participants were asked to finish the following statement "After 'having' this conversation with the customer service assistant if feel…". This statement

is followed by four types of emotions one could feel after imagining having had conversation 1: satisfaction, understanding, frustration, and ridicule. Participants are asked to rate their emotion towards the conversation on a scale from 1 to 5 (1=strongly disagree, 5=strongly agree). The reliability of 'personal attitude' compromising 4 items was bad: α=-1.65. Consequently, two questions were removed from the analysis which led to a more adequate level of reliability: α=.76. As a result the mean of the two items were used to calculate the compound variable 'personal attitude', which was used in the further analysis. The excluded emotions were understanding and satisfaction.

The questions regarding customer satisfaction are as followed: "Based on this conversation do you feel like customer support representatives acted in your best interests?", "Based on this conversation how satisfied are you with the information you gained from the customer service assistant?", "Based on this conversation do you feel like this customer service assistant answered your inquiry promptly?". All three questions would be answered using a 5-point Likert scale (1=not at all, 5=a great deal). The reliability of 'customer satisfaction' compromising 3 items was excellent: α=.93. Consequently, the mean of all three items were used to calculate the compound variable 'customer satisfaction', which was used in the further analysis.

The questions regarding behavioural intention are three endings on a statement, measuring its rate on a 5 point Likert scale: "Based on this conversation, how likely are you to order at this company again?", "…come to the customer service assistant again when you are having questions?", "… recommend this company to a friend?" (1=extremely unlikely, 5=extremely likely). The reliability of 'behavioural intention' compromising items was excellent: α=.90. Consequently, the mean of all three items was used to calculate the compound variable 'behavioural intention', which was used in the further analysis.

The question regarding perceived usefulness of the customer service assistant are as follows: "How useful would you rate this quality of service?", "Was the customer service agent knowledgeable?", "Do you have a clear understanding of the messages send by the customer service assistant?", "How satisfied were you with the length of the conversation? Do you think the question could be resolved easier?". All four questions would be answered using a 5-point Likert scale (1=not at all, 5=a great deal). This ended the second block of the questionnaire. The reliability of 'perceived usefulness' compromising 4 items was fair: α=.56. Consequently, one questions was removed from the analysis which led to a more adequate level of reliability: α=.68. As a result the mean of the three items were used to calculate the compound variable

'personal attitude', which was used in the further analysis. The excluded question was "Do you think the question could be resolved easier?"

*Block 3*

Before the third block of question, participants were asked to read conversation 2. Similar to the procedure of conversation 1, to make sure participants read the conversation, participants were required to answer yes to the question whether they have read conversation in order to continue the questionnaire. It was possible to read the conversation again while answering the questions. Block three consisted of the same questions as block two, divided in the same 4 segments: attitudinal evaluation, customer satisfaction, behavioural intention and perceived usefulness. Participants answer the same questions as in block 2 based on conversation 2.

*Block 4*

The fourth block of questions aims to examine one's ability to identify an AI chatbot and one's familiarity with converting with AI chatbots. The first question is as follows: "According to your opinion, in which conversation(s) was the customer service assistant an AI chatbot?". Participants can choose one of the three answer options: conversation 1, conversation 2, or both conversations. The second question is as follows: "Did you ever had a conversation with an AI chatbot customer service assistant provided by a company or an institution?". Participant can then choose one of the three answer options: yes very often, yes a few times, or not never.

*Block 5*

The last block consist of two open questions; both asking whether participants have any more thoughts about conversation 1 or conversation 2. This gives participants a chance to give honest opinions regarding the conversation that was not covered in the questionnaire. Participants have the opportunity to read both conversations again and then share their thoughts.

*Interview*

A semi-structured post-hoc interview was conducted with a fellow organizer of Obi4one. The purpose of this interview was to increase the understanding about start-ups investing in AI chatbots in a real-life context. A list of nine open questions, that can be found in de appendices, were used as a guidance through the conversation. Some context about the experimental results was given to the interviewee to help them put the questions into context.

### *Procedure*

Participants were asked to participate in this experiment via WhatsApp. In the message it was explained that the questionnaire was part of a bachelor thesis experiment. A link was included that would immediately send the participant to the questionnaire. The first page participants saw included information about the purpose of the study and enlisted the necessary contact information one would need when questions or problems occurred. Participants who agreed to participate in the experimental study could continue the questionnaire. When participants declined one would be sent to the end of the questionnaire, thanking them for their time. Furthermore, participants are not aware in which conversation the customer service assistant is an AI chatbot.

After conducting the experiment and having analysed the results an interview was conducted with a fellow-organizer of Obi4one, a Dutch organization which provides technological AI packages to corporations to support their customer communication services. Obi4one was approached by sending an email to their customer service, explaining the thesis objectives and asking for a small interview with someone from their staff. After having contact with Obi4one for several weeks an interview was realized with one of their employees who, with obi4one's insurance, had the most knowledge on this matter. The interview was conducted via an online video chat platform and caried on for approximately one hour. In this interview several subjects were discussed. The outcomes of the experiment were discussed using a list of questions as guidance for the conversation. Additionally the gained information based on the interviewee's own personal experience a new perspective was created, regarding the valuable use of AI chatbots and its reason for investment. In other words, the reason for this post-hoc interview was to gain a new perspective towards the experimental results and to put the conclusion in a real-life context.

### *Statistical treatment*

A series of paired samples t-tests were conducted to compare the differences in means of all independent variables: attitudinal evaluation, customer satisfaction, behavioural intention and perceived usefulness regarding both conversations. Furthermore, by conducting a critical analysis for each separate conversation, combined with the comparison analysis, a detailed conclusion can be drawn when determining the advantages and disadvantages for start-ups investing AI chatbot applications in their customer service communication.

## Results

### *Attitudinal evaluation*

A paired samples t-test was realized to examine the difference in means of the participants' conversational attitude towards conversation 1 and conversation 2. It shows a significant difference in conversational attitude towards the two conversations ($t$ (20) = 2.23, $p$ = 0.037). The conversational attitude towards conversation 2 ($M$ = 11.05, $SD$ = 0.50) was shown to be higher than conversation 1 ($M$ = 10.24, $SD$ = 1.64), as is presented in table 1.

Another paired samples t-test was realized to examine the difference in means of the participants' personal attitude towards conversation 1 and conversation 2. It shows a significant difference in personal attitude towards the two conversations ($t$ (21) = 7.78, $p$ < 0.001). The personal attitude towards conversation 1 ($M$ = 14.05, $SD$ = 2.40) was shown to be higher than conversation 2 ($M$ = 9.95, $SD$ = 0.21), as presented in table 1.

*Table 1.* *Means and standard deviation for attitudinal evaluation (conversational and personal attitude in terms of conversation 1 and conversation 2 (M maximum = 15)*

| Attitudinal evaluation | | *N* | *M (SD)* |
|---|---|---|---|
| Conversational attitude | Conversation 1 | 21 | 10.24 (1.64)* |
| | Conversation 2 | 21 | 11.05 (.50) * |
| Personal attitude | Conversation 1 | 22 | 14.05 (2.40)* |
| | Conversation 2 | 22 | 9.95 (.21)* |

*Significant difference in Group Means at $p$ < .05

### *Customer satisfaction*

To examine the differences in means of the participants' customer satisfaction towards conversation 1 and conversation 2, a paired samples t-test was conducted. It shows a significant difference in customer satisfaction towards the two conversations ($t$ (21) = 6.38, $p$ < 0.001). As is presented in table 2, the customer satisfaction towards conversation 2 ($M$ = 13.95, $SD$ = 1.29) was shown to be higher than conversation 1 ($M$ = 9.09, $SD$ = 3.16).

Table 2. *Means and standard deviation for customer satisfaction in terms of conversation 1 and conversation 2 (M maximum = 15)*

| | | *N* | *M (SD)* |
|---|---|---|---|
| Customer satisfaction | Conversation 1 | 22 | 9.09 (3.16)* |
| | Conversation 2 | 22 | 13.95 (1.29)* |

*Significant difference in Group Means at $p < .05$

***Behavioural intention***

To examine the differences in means of the participants' behavioural intention towards conversation 1 and conversation 2, a paired samples t-test was conducted. It shows a significant difference in behavioural intention towards the two conversations ($t$ (21) = 6.79, $p < 0.001$). The customer satisfaction towards conversation 2 ($M$ = 13.41, $SD$ = 1.40) was shown to be higher than conversation 1 ($M$ = 8.23, $SD$ = 3.37), as is presented in table 3.

Table 3. *Means and standard deviation for behavioural intention in terms of conversation 1 and conversation 2 (M maximum = 15)*

| | | *N* | *M (SD)* |
|---|---|---|---|
| Behavioural intention | Conversation 1 | 22 | 8.23 (3.37)* |
| | Conversation 2 | 22 | 13.41 (1.40)* |

*Significant difference in Group Means at $p < .05$

***Perceived usefulness***

To examine the differences in means of the perceived usefulness of both conversation 1 and conversation 2, a paired samples t-test was conducted. It shows a significant difference in the perceived usefulness of the two conversations ($t$ (20) = 5.09, $p < 0.001$). The customer satisfaction towards conversation 2 ($M$ = 13.90, $SD$ = 1.26) was shown to be higher than conversation 1 ($M$ = 10.33, $SD$ = 3.04). The results are presented in table 4.

Table 4. *Means and standard deviation for the perceived usefulness in terms of conversation 1 and conversation 2 (M maximum = 15)*

| | | *N* | *M (SD)* |
|---|---|---|---|
| Perceived usefulness | Conversation 1 | 21 | 10.33 (3.04)* |
| | Conversation 2 | 21 | 13.90 (1.26)* |

*Significant difference in Group Means at $p < .05$

***Ability Chatbot identification***

To examine the question "According to your opinion, in which conversation(s) was the customer service assistant an AI chatbot?" to evaluate whether the participants could point out the AI chatbot in the correct conversation, a descriptive analysis was conducted. Results show that 20 participants guessed correctly that the customer service assistant in conversation 1 was an AI chatbot. 2 participants were under the opinion that the customer service assistant in conversation 2 was an AI chatbot, which was incorrect ($M = 1.09$, $SD = .294$). The results are presented in table 5.

Table 5. *Frequency, mean and standard deviation of participants' ability to identify an AI chatbot*

| | | Frequency | Mean | Standard deviation |
|---|---|---|---|---|
| According to your opinion, in which conversation(s) was the customer service assistant an AI chatbot? | Conversation 1 | 20 | 1.09 | .294 |
| | Conversation 2 | 2 | | |
| | | 22 | | |

Furthermore to examine the question "Did you ever had a conversation with an AI chatbot customer service assistant provided by a company or an institution?" to evaluate participants' chatbot familiarity another descriptive analysis was conducted. Results show that the majority of the participants was already familiar with having conversations with AI chatbots (17 participants). Moreover, 4 participants have had conversation with AI chatbots very often and

1 participants revealed that they have never encountered a conversation with an AI chatbot (*M* = 1.91, *SD* = 0.61), as is presented in table 6

Table 6. *Frequency, mean and standard deviation of participants' ability to identify an AI chatbot*

| | | Frequency | Mean | Standard deviation |
|---|---|---|---|---|
| Did you ever had a conversation with an AI chatbot customer service assistant provided by a company or an institution? | Yes, very often | 4 | 1.91 | 0.610 |
| | Yes, a few times | 17 | | |
| | No, never | 1 | | |
| | | 22 | | |

***Open questions***

7 participants responded to the voluntary open question regarding both conversations. In table 7 the responds of the participants for both conversations are presented. The answers were given in Dutch as it is the native language of the participants.

Table 7 *Answers of participants open question in terms of both conversations*

| Participants | Conversation 1 | Conversation 2 |
|---|---|---|
| 1 | De opties maken het makkelijker om een goed overzicht te hebben. | Handig dat je recepten in je handen krijgt geduwd. |
| 2 | Voelt heel onpersoonlijk | Heel sociaal en je voelt je gezien |
| 3 | Goed dat er plaatjes bij zitten | Alle recepten zijn snel op een hoop gegooid. |
| 4 | Onpersoonlijk | Effectief |
| 5 | De AI werkt exact naar behoren en heeft het goed genoeg opgelost in het geval van de input van de klant was de output perfect | Perfecte chv |
| 6 | Chatbot | Webcare medewerker |
| 7 | Erg statisch, niet het idee dat er begrepen werd wat er werd gevraagd door de klant | Voelde open aan, dat de klantenservice medewerker met je meedacht |

***Interview Obi4one***

The full summery of the interview can be found in the appendices and a detailed comparison of the experimental results and the interview outcome can be found in the Discussion section below.

## Discussion

The purpose of this study was to examine the advantages and disadvantages of start-ups investing in AI chatbot applications in use for their customer service communications. A detailed comparison between conversation 1 and conversation 2 was realized, measuring the attitudinal evaluation (conversational/personal), customer satisfaction, behavioural intention and perceived usefulness. First the results are compared with the aforementioned hypothesises. Additionally, an analysis is realized regarding the experimental results compared to the insightful information that was provided during the interview. A complete summary of the interview with Obi4one can be found in the appendices.

It was hypothesized that all measuring attributes would be higher for conversation 1 (with AI chatbot application) than for conversation 2 (with human customer service assistant), when the perceived usefulness for both conversations was equal. Results indicated that the general perceived usefulness is higher for conversation 2 than for conversation 1. However the perceived usefulness for conversation 1 is still considered sufficient. Firstly, H1 is partly proven as the conversational attitude is lower towards conversation 1 compared to conversation 2. However, the human customer service assistant brings out more positive personal attitudes with the participants, which is not in line with H1. Secondly, H2 is rejected as the customer satisfaction was lower for conversation 1 than for conversation 2, even when the perceived usefulness of both conversation were sufficient. Similarly, H3 is rejected as the behavioural intention is lower for conversation 1 than for conversation 2, even when the perceived usefulness of both conversation were sufficient.

Consequently, H4 is only essentially proven, as the customer satisfaction and behavioural intention were lower for the conversation with AI chatbot compared to the conversation with human customer service assistant. To answer the research question it can therefore be concluded that start-ups businesses who are considering investing large amounts

of capital into AI technology to support their customer service communication do not significantly benefit more than companies who use human customer assistants in their customer communication services. Results indicate that AI chatbots who are perceived as sufficient in their usefulness do not create a more positive personal attitude towards the customer service operator, not create an increasement in the customer satisfaction experience nor create a higher behavioural intention compared to human customer service operator. Thus, regarding customer experience and quality of service communication operators, AI chatbots do not cause a significant enhancement for start-up corporations who can handle their customer service operations with human operators. However, start-ups with a rapid enhancing customer base can benefit from investing in AI technology for their customer service communication operation as it could improve operational efficiency (Chen et al., 2021). Additionally, the customer satisfaction and behavioural intention do not significantly decline from implementing AI chatbots.

***Comparison interview information with results***

Firstly, a small summary of relevant information that was acquired during the interview will be provided. Then, the important interview information that was gained, with help of a fellow organizer of Obi4one, is compared to the experimental results.

Obi4one provides AI technology, including chatbots, to small and large corporations to optimize their customer service communication. The AI chatbots are in direct contact with the customer 24/7 answering the most asked questions or conducting every-day tasks of the employees. For instance, for municipalities AI chatbots can realize drivers licence requests and answer easy questions of citizens. Start-ups most often only purchase several components of the technological packages that Obi4one is offering, occasionally including chatbots. Although bigger organizations often require an advanced package, smaller corporations simply do not have the financial means for the aforementioned advanced technology (B. Bart & T. Marèl, persoonlijke communicatie, 4 januari 2023).

Examples of positive impacts that a chatbot can acquire for an organization are: reducing the contact of threshold for customers, improving the corporations accessibility and customer care efficiency, enlarging customer's contact possibilities (after hour contact), and reducing the workload of customer service assistants. As generally human customer service assistants are more capable in providing personal interests and a professional human touch, according to Obi4ione, chatbots are very frequently used by many corporations to ease the workload of employees regarding simple practical concerns. Start-ups however, do not suffer from a too

heavy workload and therefore do not require a chatbot. Only when the workload of customer service employee cannot be assembled, there is need for a chatbot (B. Bart & T. Marèl, persoonlijke communicatie, 4 januari 2023).

The experimental results mostly correspond with information that was acquired during the interview. As results indicated, AI chatbots do not create a more positive personal attitude towards the customer service operator, not create an increasement in the customer satisfaction experience nor create a higher behavioural intention compared to human customer service operator. It was therefore concluded that investing in AI chatbots do not cause a significant enhancement for start-up corporations who can handle their customer service operations with human operators. Additionally the conclusion was drawn that start-ups with a rapid enhancing customer base can benefit from investing in AI technology for their customer service communication operation as it could improve operational efficiency (Chen et al., 2021). This is in line with information that was provided by the interview. Due to these results the following questions was asked: Is it beneficial for start-up to invest in AI chatbot technology, when they are relatively smaller corporations with less financial means and a smaller workload than larger institutions, as hospitals and universities? Obi4one stated that start-ups which want to succeed using AI chatbots need to have financial and practical insights. It can be a simple financial calculation of the salary of the employees who are needed to carry the workload comparing to the financial means of a chatbot to carry the workload. If the chatbot is cheaper compared to the employee's salary, investing in AI chatbots can be an beneficial and efficient investment for start-ups.(B. Bart & T. Marèl, persoonlijke communicatie, 4 januari 2023).

Lastly it was discussed when, according to Obi4one's opinion, it was the most optimal time for start-ups to invest in AI chatbot technology. It was stated that the most optimal time for a corporation to invest in AI chatbot technology is when a start-up is transitioning into a larger corporation. It was explained that a start-up with low traffic and only 10 employees has no need for a AI chatbot. However, when that same corporation is growing till approximately 50 employees, looking for ways to budget long-term and are able to spare the financial means an AI chatbot can be a proper investment to increase revenue and company-customer interaction.

## Limitations and recommendations

Multiple limitations of this study should be discussed. Firstly, the conversation used in this thesis experiment did not endure of the right amount of anthropomorphic cues for chatbot to be perceived as human. This lacking anthropomorphism could have influenced results negatively. Secondly, the conclusion deduced in this thesis study are based on one conversation between a customer and an AI chatbot and one conversation between a customer and an human customer service operator. To attain a more representational conclusion, one would require a more detailed analyses of multiple conversation between a customer and AI chatbots and human customer service operators. Lastly, this study's conclusions are based on conversations between customers and established corporations, which corporate AI chatbots in their customer service communication, while the study aims to examine the advantages and disadvantages of start-ups investing in AI chatbot applications in use for their customer service communications. This does give a detailed analysis between the benefits and drawbacks of using AI chatbot applications in customer service operations. However, it does not provide a representational examination of the developments a start-up company will endorse when AI chatbot are implemented in their service communication operations.

For future research it would be suggested to ensure the number anthropomorphic cues of the AI chatbot used in the experimental study. Furthermore, to establish representational results, it is recommended to analyse multiple conversations between a customer and AI chatbots, between a customer and human customer service operators.

## Conclusion

According to the results, the human customer service assistant obtained significantly higher levels of customer satisfaction and behavioural intention than the AI chatbot customer service assistant. Additionally, the qualitative level of the AI service is directly associated with one's customer satisfaction and one's behavioural intention (Prentice et al., 2020; Xu et al., 2020; Yu, 2021). This, however, does not explain the low levels of customer satisfaction and behavioural intention, as the AI chatbot used in this study did provide a sufficient amount of usefulness. An

explanation for this could be that customers automatically comply on a higher level with human customer service assistants than with chatbots due to the evolutionary biased social orientation of human beings, according to the social response theory. This phenomenon, however, is a human feature that a chatbot could not acquire by self-learning or optimization. This is also presented by the results of the open questions. Participants revealed that the conversation with the AI chatbot was perceived as stiff and unpersonal. Participants did not have the feeling that the chatbot showed sensitivity or a sense of understanding, while participants also revealed that the human customer assistant was perceived as social and open. The human customer service assistant was very involved with the customer and made the participants feel noticed.

The results of this study also showed that 20 participants could identify the chatbot correctly, which indicated that the chatbot used in this experiment did not have a sufficient number of anthropomorphic cues to be perceived as a human. Referring to the Turing test (TURING, 1950), the lacking of anthropomorphism could be a plausible explanation for the fact that the AI chatbot was not more successful as the human service communication operator, regarding customer satisfaction and behavioural intention. This explanation is in line with the implementation of the study of Adam et al. (2021) and the social response theory, stating that anthropomorphism can increase the likelihood that users comply with an customer service AI chatbot.

Furthermore, results indicated that the participants' attitude towards the conversation was more positive when having had a conversation with an AI chatbot customer service assistant. Although, the human customer service assistant brings out more positive personal attitudes with the participants. A plausible explanation for the higher attitudes towards the conversation with an AI chatbot could regard the efficiency and accuracy of the AI chatbot. Participants revealed in the optional open questions in the questionnaire that they were very pleased with the clear overview of recipes that was provided by the AI chatbot, while the provided recipes of the human customer service assistant were cluttered.

This study contributes to investing strategies of start-ups as it provides a detailed analysis of a conversation between a customer and an AI chatbot applications compared to conversations involving human customer service communication operations. The valuable information that was acquired during the interview puts the experimental results in an authentic context regarding strategies of start-ups to invest in AI chatbot technology.

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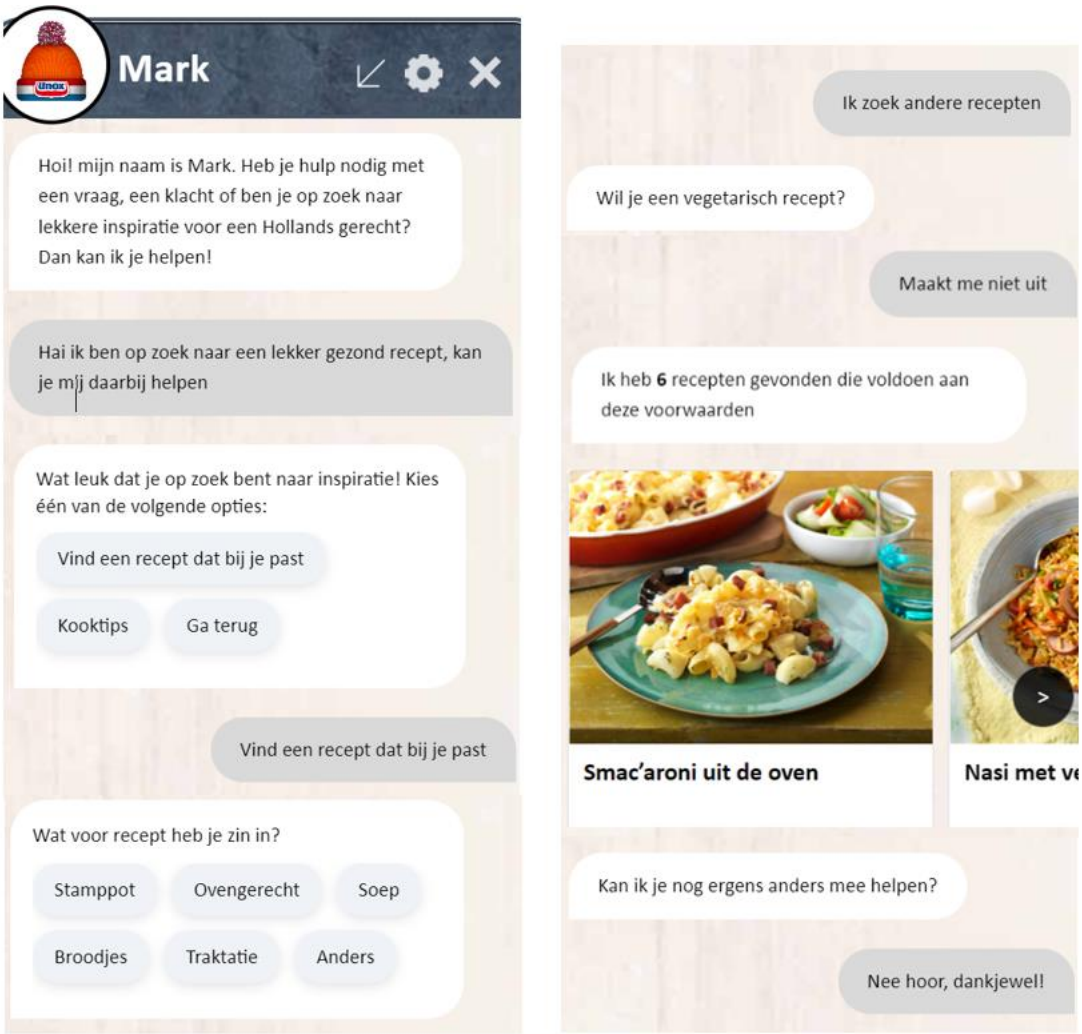
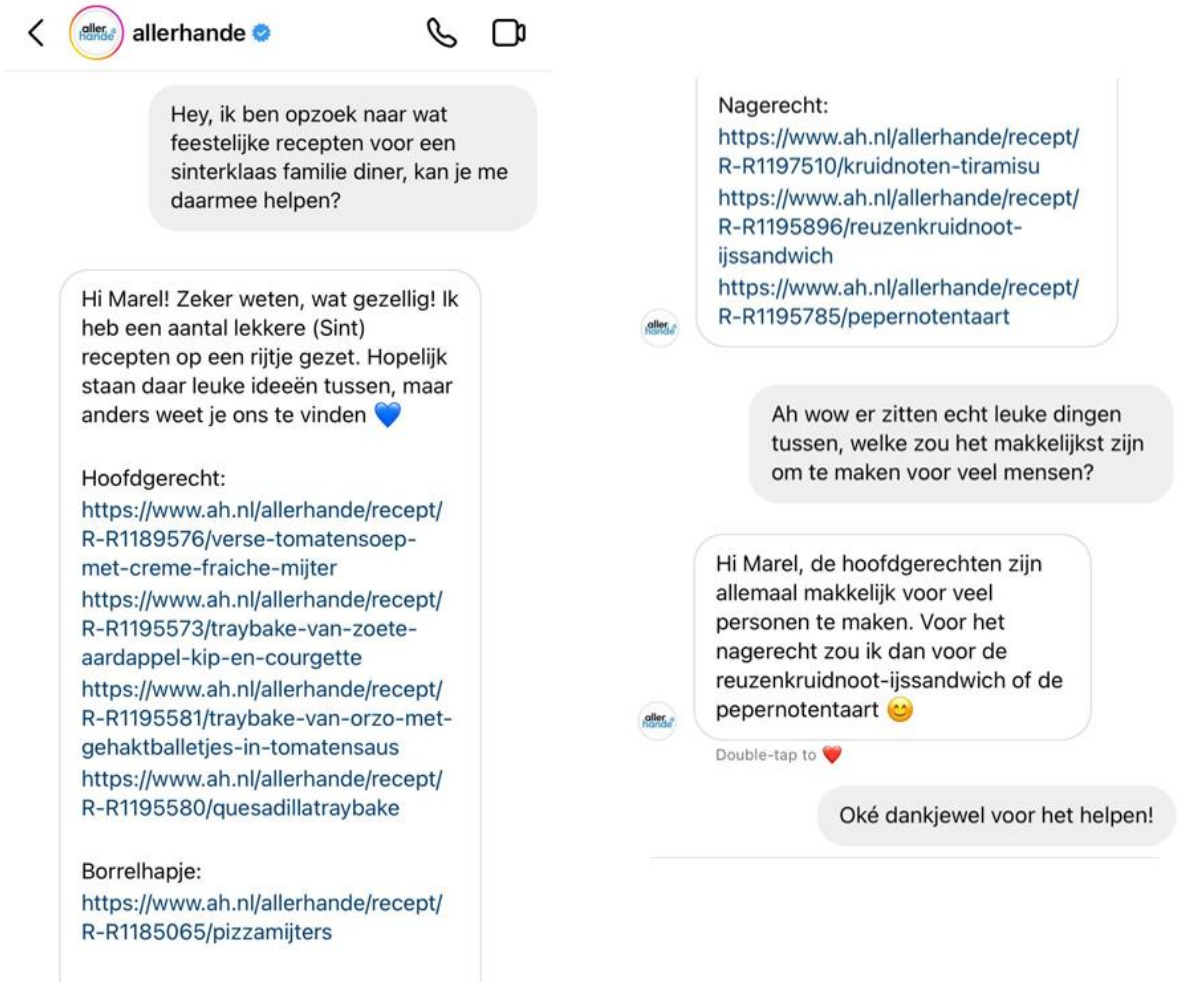
# Appendices

Appendix A: conversation 1 (in Dutch)



Appendix B: conversation 2 (in Dutch)



Appendix C: interview questions

1. Hoe vaak investeren startups in de AI chatbot technologie van Obi4one in vergelijking met grotere organisaties?
2. Wat zijn de redenen voor die kleine bedrijven om te investeren in Obi4one's AI-technologie? Zijn dat vooral redenen met betrekking tot efficiëntie?
3. Heeft Obi4one evaluerend contact met de bedrijven die de AI-chatbots kopen om te praten over hoe de functies door hen worden ervaren?
4. Hoe ervaren die startups de AI-technologie in het algemeen, krijgen ze positieve beoordelingen van hun consumenten?
5. Hoe gaat Obi4one om met de negatieve ervaringen met je AI als ze zich voordoen?
6. Wat zou volgens u een verklaring kunnen zijn voor mijn resultaten van het experiment, wat kan een AI chatbot altijd nog te kort komen in vergelijking met menselijke klantenmedewerkers?
7. Ervan uitgaande dat menselijke klantenservice-assistenten inderdaad positiever worden ontvangen door de klanten, hoe winstgevend denkt u dat AI-chatbots zijn als investering voor startende bedrijven?
8. Denkt u dat het feit dat de bewezen efficiëntie en klantvriendelijkheid van menselijke klantenmedewerkers een belangrijke factor is voor startende bedrijven wanneer zij overwegen te investeren in een AI-chatbot?
9. Wanneer is volgens u het perfecte moment voor een bedrijf om te investeren in een AI-chatbot voor communicatie als klantenservice?

Appendix D: summary interview outcome

***Obi4one customer care efficiency***

In nowadays society people are expecting quick answers and short waiting times, which can be a difficult obstacle for corporations to encounter. Obi4one provides their chatbot technology in a series of models; a series of technological features to make a corporation's customer service more efficient. Institutions that Obi4one is most often cooperating with are Dutch hospitals,

municipalities or universities. The objective of Obi4one is to make customer service contact for those institutions more dynamic and productive. They receive this goal by ensuring quick contact between institutions and recipients, utilizing AI technology.

One of the most efficient tools that Obi4one offers is an automized live chat, in other words AI chatbots. Those AI chatbots are in direct contact with the customer 24/7 answering the most asked questions or conducting every-day tasks of the employees. For instance, for municipalities AI chatbots can realize drivers licence requests and answer easy questions of citizens. Similarly, examples of university's chatbots tasks regard to log-in difficulties or students forgotten passwords. Consequently, employees regain time for doing more difficult tasks, instead of answering calls and emails all day. As AI chatbots are operating continuously they can are functional after the employee's workday is over, increasing the corporations capability to assist on customer issues. Moreover, bigger corporations can use chatbots to replace their customer service employees when they are for example suffering from burnouts causing from overbearing workloads.

***AI chatbot features***

What features an AI chatbot should be consisted of depends on what kind of organization wants to applicate the AI chatbot into their customer service communication. The objectives of the institutions are established beforehand so an efficient technological route of task can be created to reach the company's objectives. The chatbots are adapted and optimized accordingly. Furthermore, it is important to know how many people a month will be approaching the chatbot, how many tasks you want a chatbot to carry out or how many channels you want the chatbot to be active on.

A series of standard different packages are accessible. A basic package manages a chatbot with standard functionalities and approximately a couple hundred contact moments a month. A more advanced package can handle more online traffic, approximately 5000 contact moments a month, and is therefore more accessible for hospitals and universities but not for start-ups. Another possible option is that the chatbot is specifically created for a corporation, based on their personal preferences. This can be done by the software managers of Obi4one or by the corporations itself, with help from a software template that is proved by Obi4one. This last option, however, does require professional knowledge about software creations and is therefore not recommended for Obi4one's predominant customers.

To minimize evaluative conversations and optimize the chatbots consistently, the chatbots consist of a self-learning technological feature. Meaning that based on the conversation

history and keywords the chatbots can improve themselves and avoid making the same mistakes in the future. The key in this self-learning process is repetition. The chatbot will recognize certain sentences and words and figure out the right route towards fixing the problem at hand accordingly. The chatbot itself is evaluated by the hand of customer reviews. Bad reviews, however, are most often directed at the customer service communication of the organization at hand instead of at the chatbot itself. The reason for this is the chatbots are only a small part of the complete customer service communication strategy.

***Corporations chatbot implementation***

It is common protocol for corporations to begin with a one-year contract and have follow-up evaluative conversations with Obi4one. Based on these conversations companies can share difficulties, finetune tasks of the chatbot or potentially switch chatbots when optimization is required. Additionally, Obi4one provides monthly online newsletters to share new updates chatbot features that might be interesting for certain corporations.

Start-ups most often only purchase several components of the technological packages that Obi4one is offering, occasionally including chatbots. Although bigger organizations often require an advanced package, smaller corporations simply do not have the financial means for the aforementioned advanced technology. Examples of positive impacts that a chatbot can acquire for an organization are: reducing the contact of threshold for customers, improving the corporations accessibility and customer care efficiency, enlarging customer's contact possibilities (after hour contact) and reducing the workload of customer service assistants. As generally human customer service assistants are more capable in providing personal interest and a professional human touch, according to Obi4ione, chatbots are very frequently used by many corporations to ease the workload of employees regarding simple practical concerns. Start-ups however, do not suffer from a too heavy workload and therefore do not require the need of a chatbot. Only when the workload of customer service employee cannot be assembled, there is need for a chatbot.

Next to AI chatbots being capable of increasing efficiency, they can also be used as a tool of marketing. Chatbots are very popular with the audience. By creating channels and campaign focussing on the chatbot, the chatbot is able to provide unusual customer care strategies, which are very pleasant for different kind of customers. A corporation must however have a well thought out strategy for this otherwise it will not work.

***Start-up investing in chatbots***

The mean reason for start-up's applicating Obi4one's online chatbots into their customer service communication is that it is simply a popular strategic move to make for a corporation to attract customers. Start-ups wants to compete with bigger organizations by increasing their professional reputation. Investing in AI chatbots is a popular way to accomplish this, as it creates a more mature and developed appearance towards stakeholders; they appear in a more prestige position. This however is not a good ground for corporations to invest in AI chatbots.

Is it beneficial for start-up to invest in AI chatbot technology, when they are relatively smaller corporations with less financial means and smaller workloads than larger institutions, as hospitals and universities? Obi4one stated that start-ups which want to succeed using AI chatbots need to have financial and practical insights. The Obi4one chatbots most frequently provided to smaller corporations can costs approximately €300 a month, adding a €1,500 starting fee. Due to these expenses it should be clear what objectives the start-up aims to achieve with the chatbot and what necessary means are needed to require those objectives. For example, it can be a simple financial calculation of the salary of the employees who are needed to carry the workload comparing to the financial means of a chatbot to carry the workload. If the chatbot is cheaper compared to the employee's salary, investing in AI chatbots can be a beneficial and efficient investment for start-ups. Thus, chatbot can be an financial good decision for start-ups aiming to be more efficient and practical.

However, it must be taken into account that the positive attitude that personal contact provides might be lost as chatbots are only finishing tasks and not gaining anything more. Chatbots introduce themselves as a chatbot, so the customer knows that they are not talking with a human. This can have an negative effect on how the customer perceives the customer service support.

Lastly it was discussed when, according to Obi4one's opinion, it was the most convenient time for start-ups to invest in AI chatbot technology. It was stated that the most optimal time for a corporation to invest in AI chatbot technology is when a start-up is transitioning into a larger corporation. A start-up with low traffic and only 10 employees has no need for a AI chatbot. However, when that same corporation is growing till approximately 50 employees, strategizing to have a professional reputation, looking for ways to budget long-term and are able to spare the financial means an AI chatbot from Obi4one can be a proper investment. Experience has told Obi4one that many start-ups also often choose for cheaper chatbots of other companies. However, after a few months these start-ups would have endured technological mistakes and other difficulties regarding that chatbot, consequently approaching

Obi4one searching for a qualitive better chatbot. It was then asked by the interviewer whether Obi4one has ever considered adding a cheaper technological package including chatbots specifically for start-ups. This, however, could not be realized due to expenses and the fear of losing profits. Out of the approximately 1000 institutions and organizations that have invested in AI chatbot packages of Obi4one, only 20 or 30 consist of start-ups.

Next to AI chatbots being capable of increasing efficiency, they can also be used as a tool of marketing. Chatbots are very popular with the audience. By creating channels and campaign focussing on the chatbot, the chatbot is able to provide unusual customer care strategies, which are very pleasant for different kind of customers. A corporation must however have a well thought out strategy for this, otherwise it will not work.

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Student number: s1042903

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