Ketaki Uma

User Centred design of Conversational UI for Wealth Management Customers

Master’s Thesis
Espoo, July 29, 2019

Supervisors: Professor Antti Oulasvirta, Aalto University
Marie Louise Juul Sondergaard, KTH Royal Institute of Technology

Advisor: Suraj Y Shetty, Primesoft Inc
Conversational UI (CUI) like voice assistant and chatbot are being introduced to provide 24x7 enquiry response, advice and technical support. This study aims at assessing User Experience related factors, which reinforce Trust between Wealth Management customer and the CUI in tasks normally performed by Relationship Managers.

Given the financial and resource constraints of the thesis, semi structured interviews and Wizard of Oz experiments were chosen as the methods of study. These methods helped in delving deep into user issues within limited time period. The study finds that investors were happy to get response in text and graphics mode but not in voice since the information was considered confidential. There were apprehensions in using chatbot for getting investment advice.

Findings of this study may be helpful to wealth management organisations in designing conversation UI strategy. However, the study was conducted with clients in India, hence the findings are more relevant to countries with similar socio-cultural conditions.

Keywords: Trust, Conversational UI, Wealth Management, HCI

Language: English
Konversationsgränsnitt (Conversational UI, CUI) som röstassistent och chatbot tas i bruk för att ge 24x7 svar, råd och teknisk support. Denna studie syftar till att bedöma användarupplevelse-relaterade faktorer som förstärker förtroendet mellan förmögenhetsförvaltningskunder och CUI i uppgifter som normalt utförs av kundansvariga.

Med tanke på de finansiella och resursbegränsningarna i avhandlingen, valdes halvstrukturerade intervjuer och Wizard of Oz-experiment som studiemetoder. Dessa metoder bidrog till att gräva djupt in i användarproblem inom en begränsad tidsperiod. Studien konstaterar att investerare var nöjda att få svar i text och grafik, men inte i röst eftersom informationen ansågs konfidentiell. Det fanns en oro för att använda chatbot för att få investeringsrådgivning.

Nyckelord: förtroende, Conversational UI, Wealth Management, HCI
Språk: Engelska
Acknowledgements

Firstly, I would like to thank my supervisor Marie Louise Juul Søndergaard for her constant support and help throughout the realisation of the thesis.

I would also like to thank PrimeSoft Technology and my company supervisor Suraj Y Shetty for giving me the opportunity to work with them and providing me the necessary information and knowledge regarding the financial domain.

A huge shout out to all the participants for being patient and providing such insightful data throughout the experiments. Lastly, I would like to dedicate this thesis to my father without whom I would not have embarked on such a beautiful journey.

Espoo, July 29, 2019

Ketaki Uma
## Contents

1 Introduction 7  
  1.1 Trust in CUI 8

2 Background 9  
  2.1 Understanding the Conversation Paradigm 9  
  2.2 Trust 10  
  2.3 Growth of CUI 10  
  2.4 Chatbots in Wealth Management in Asia 11

3 Method(s) 13  
  3.1 Participants 13  
  3.2 Interviews 14  
    3.2.1 Wizard Of OZ Experiment 14  
    3.2.2 Task(s) 15  
    3.2.3 Voice Assistant 15  
      3.2.3.1 Setup 15  
    3.2.4 Textual Conversation (Chat-bot) 16  
      3.2.4.1 Setup 16

4 Result(s) 18  
  4.1 Trust 18  
    4.1.1 Communication Channel 19  
    4.1.2 Lack of Knowledge and Time 20  
    4.1.3 Comfort 20  
  4.2 Testing Possible Conversational UI 21  
    4.2.1 Conversing with Alexa 21  
    4.2.2 Informative Chatbot 21  
    4.2.3 Improved Chat-bot Experience 23  
      4.2.3.1 Setup 23  
      4.2.3.2 Participants 24
5 Discussion
5.1 Result Analysis ............................................. 27
5.2 Future Studies .............................................. 29
5.3 Limitation .................................................... 30
6 Conclusions ...................................................... 31
Chapter 1

Introduction

Conversational User Interface (CUI) is a platform with which a person interacts with the machine using natural language to get information and advice [11]. It is an interface that the humans can interact with through speech, text or both [11]. CUI are becoming more human and social with time. It was estimated that around 600 million people used voice assistant and text-based conversational agents in 2017 [20]. In recent years, CUI has become a trend with various business verticals and they are trying to make it an integral part of their services [28]. CUI can be seen answering questions inside a website, in Alexa, guiding a purchase on Google home and taking orders for a coffee in Starbucks [1].

Apart from answering and accomplishing basic tasks like setting an alarm or reminder, CUI has been developed as domain experts to help customers with their queries. For instance, in retail banking chat-bots perform some of the human-like tasks like balance enquiry, transaction history and providing financing or credit options [6]. However, the rapid growth of CUI in retail banking has led to an apprehension that eventually it may replace human Relationship Managers (RM) [6].

A quick survey of wealth management chat bots shows that its use is less common and are not yet an integral part of the customer support and experience. At present, only a handful of companies like UBS and TD Ameritrade offer chat-bot service to customers [1].

In Asia, in recent years the technological advancements in the field of Finance and Wealth Management have taken place at an exponential pace. Efforts are being made for enhancing the chat-bot capabilities by combining knowledge from different investment domains and by providing better-personalized experience [6].

Still, Wealth Management business has been one among the slowest to embrace digital transformation due to the challenges of data privacy and
security. Also it is a widely held belief in the business that affluent customers must be served in person by relationship managers.

1.1 Trust in CUI

While natural language processing and other technological capabilities have increased, adoption by users is still not as desired because Users’ perspective on the subject of trust and comfort has not attracted adequate attention.

Trust is an essential bond that encourages humans to take the risk with another human or entity with their decisions and risks [8]. When building a relationship of trust with CUI, the humans must believe in the caring intentions and decision-making skills of the chat-bot. In financial conversations creating trust and comfort is even more difficult.

This thesis aims at exploring the perspective of mass affluent customers\(^1\) and identification and assessment of factors influencing their trust and comfort with CUI while obtaining financial advice and investment information. My study was limited to Wealth Management clients who are affluent. It is possible that poorer people may be more likely to use CUI, but that could not be studied within the scope of this project.

Main objective of the paper was to find if Wealth Management customers trusted a CUI for obtaining financial information and advice which they normally got only from a designated Relationship Manager. Impact of risk and knowledge profile of investors on adoption and preference for conversation medium - text, graphics or voice were also studied.

In order to contain the scope of the study, experiments were conducted with Wealth Management customers in India.

---

\(^1\)In financial sector individuals with Rs. 7.5 million to Rs. 10 million of liquid financial assets and household income are termed as the high end of the mass market.
Chapter 2

Background

This section describes the related research in trust, CUI and wealth management. The aim is to understand the relations of trust, conversational UI and wealth management.

2.1 Understanding the Conversation Paradigm

Conversation is more than just exchange of information. We as humans use conversation as a medium to collaborate, socialise, share knowledge and insights [13]. In a study conducted in 2009, the concept of cooperative principle was introduced. Here, it argues that any human would participate in a conversation which would have a shared goal or purpose [14].

Over the years, computers started conversing like humans. Broadly defined, a conversational agent is a powerful conversational interface used to interact with computer software by means of text and now also speech. The idea of having a program that would enable conversation with a human was first conceptualised in 1950. Alan Turing was one of the first to propose in his paper popularly known as the 'Turing Test' [27]. The proposed test aims at determining if the computer program can pass as a human while conversing with another human. Another example of a CUI was ELIZA. In 1966, ELIZA, created by Weizenbaum [29] was designed as a therapist to answer users’ generic questions. ELIZA laid the foundation of conversational bots that could help users with specific tasks.

Human-system conversation happens between the customer (the inquirer) and the system (information provider). The conversation can be initiated and/ or led by either the system or the customer [23].

As McTear describes in his paper that it is important to understand the pattern and behaviour in conversation between the human user and the
system for designing and testing the chatbots [12]. He mentions that conversation design should consider both text and voice-based conversation and the structure, sequence, language and emotions of these conversation [23].

2.2 Trust

In the design of CUI Trust is another key factor. Botsman has noted that Trust is essential to an exclusive and confident relationship with another person or entity [19]. Level of trust changes based on memory of past interactions and the context [30].

There is no tool that measures the specific signals required by both parties to form mutual trust. However, the researcher often uses three trust beliefs viz. Capability, Goodwill and Ethics to understand the mechanics of trust [25] [21]. Capability is the belief that the counterpart in conversation has the skills and the expertise to suggest or perform the given task in the domain. Goodwill is the belief that the outcome of the expert’s action is to provide benefit and care. And, Ethics is the belief that the expert follows set guidelines such as honesty, privacy and data security.

A conversational agent would also need to demonstrate capability to respond to various queries, earn goodwill by providing required help and demonstrate ethics by providing consistently correct data in conversation with human actors [14]. Furthermore, gaining initial trust is necessary for making users want to continue using conversational agents [31]. Beer has noted in his paper that a human like small talk builds trust, rapport and credibility with the CUI [5].

Consideration for the aforementioned factors in the design of CUI in Wealth Management domain is likely to enhance the user experience and its adoption rate.

2.3 Growth of CUI

Post, following the Eliza approach for several decades, a similar pattern was identified and mentioned in 2015, ‘computers as social actors’. According to this, humans tend to react to technologies which inherit human like behaviour [14].

CUI have evolved dramatically in their capabilities over the past few years and opened new doors for businesses to provide better customer services and generate revenues. As shown in figure 2.1, the conversational agents have evolved from being a simple digital tool that answered a specific query in
CHAPTER 2. BACKGROUND

2010 to becoming a digital assistant by 2017 which can perform more complex tasks like providing guidance [6].

![Figure 2.1: Evolution of the chatbot over years [1]](image)

With the increasing demand of chatbot globally, many firms and entrepreneurs have started offering unique services which are built using artificial intelligence [17] [19]. Chatbots also help firms in collecting data on usage of various features which enables them to understand customer behaviour patterns and needs much better [22]. Chatbots from global brands like Anna of Ikea [9], Bluebot of KLM, and those from Sephora and Fandango have shown promising results [18].

These chatbots help us understand the characteristics of a well-designed chatbot. As shown in Figure 2.2, chatbots play the role of a 24x7 agent designed to perform either a single or multiple tasks for its customers [6].

2.4 Chatbots in Wealth Management in Asia

There has been an explosion of AI solutions and chatbots in the field of finance and wealth management over the past few years [15]. Chatbots were one of the central pieces of AI enabled solutions [24]. K2 Bank’s chatbot is a text-based chatbot which helps customer check their balance, view transaction history and make transactions [4]. Kai is another chatbot which is linked to Amazon Alexa and is presented as a conversational banking app. This voice assistant helps its customers know the bank balance, make transfers and set reminders [2]. Many other banks and financial institutions in Asia are now seeking the help of chatbots to provide a wide range of services and improve customer experience.
Figure 2.2: Characteristics of Chatbot [1]
Chapter 3

Method(s)

This section presents the different stages of the qualitative study that was performed to understand and explore potential customers’ trust and comfort in using CUI for everyday financial needs. This includes interviews and Wizard of Oz experiments with voice assistants and chatbots.

3.1 Participants

Five participants aged between 27 and 40 years of age were interviewed. All participants were of Indian origin and consisted of four men and one woman. The participants were loyal customers of an Indian bank for five or more years and were selected randomly based on age and availability.

All the participants belonged to the mass affluent segment. The bank defined mass affluent segment as investors having investible surplus between Rs. 7 million (USD 100,000) and Rs. 70 million (USD 1,000,000). All of this need not be necessarily invested with the bank. They all had a bachelor’s degree and two had a master’s degree in business. Two of the participants were entrepreneurs and three were salaried executives.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Education</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>35</td>
<td>M</td>
<td>Bachelors</td>
<td>Employee</td>
</tr>
<tr>
<td>P2</td>
<td>40</td>
<td>M</td>
<td>Masters</td>
<td>Entrepreneur</td>
</tr>
<tr>
<td>P3</td>
<td>27</td>
<td>M</td>
<td>Masters</td>
<td>Entrepreneur</td>
</tr>
<tr>
<td>P4</td>
<td>32</td>
<td>F</td>
<td>Masters</td>
<td>Employee</td>
</tr>
<tr>
<td>P5</td>
<td>38</td>
<td>M</td>
<td>Masters</td>
<td>Employee</td>
</tr>
</tbody>
</table>

Table 3.1: Participant Demographics
3.2 Interviews

Individual interviews were conducted to understand user’s behaviour, habits and motivational blocks while making financial decisions.

Choice of semi-structured Interview was made because it provides a rich and in-depth information about the participants experiences [10]. It helped in delving deep into the participants social and personal choices and thought process [10]. The interview was audio recorded and notes were taken during the interview. The interviews were later transcribed.

Before beginning the interview, the participants were briefed and asked to sign a consent form. The interview consisted of open-ended questions and took about an hour for each participant. The interviews were conducted in meeting rooms of the bank as it gave the participants a sense of security keeping in mind the sensitivity of the data.

The questions covered information about participant’s past investment choices, experience in interacting with Alexa/ Google Home and/ or other chat-bots, mediums they used for interacting with the bank, factors they considered before making financial decisions, people they involved in their financial decisions and sources they referred to for making financial decisions. Specific questions were asked about the types of transactions or information exchange they would consider doing with a CUI; which medium - text, graphics or voice would be their preferred medium of interaction for the financial enquiries and reasons thereof. Towards the end of the interview, the participants were also given a scenario of what they would do if they were given INR 3 million (approx. USD 50,000). This was to test if they would seek advice from the CUI.

3.2.1 Wizard Of OZ Experiment

Given the paucity of time to build a functional prototype and the need to make changes to the prototypes during the course of the experiment, Wizard of Oz method of experiment was chosen as it is a quick and easy way to test a design concept with the potential users without having to build functional prototypes [16]. This method can be successfully executed in a controlled environment with the participants [3]. Using this method also gave the flexibility of quickly re-shaping the experiments several times without having to create several different prototypes.

One of the key characteristics of a CUI is to behave and make conversations appear to be natural and as human-like as possible. Therefore, role play where using human as stand it for the assistant was an optimal choice to
quickly extract information and assess participant’s comfort when conversing with a CUI.

The experiments were task-based and were conducted on two types of CUI - voice Assistant and chat-bot. For the experiments, a human was simulating the part of the system. Due to the data security and other constraints, the experiments were performed in one of the meeting rooms of the bank.

The aim of the experiment was to test the overall experience of the participant while making financial decisions using CUI. Also, the plan was to investigate how the communication flow between the user and the system took place. All the experiments were followed by an informal discussion with the participant to elicit his/her views and experience.

3.2.2 Task(s)

There are various tasks that can be performed by the CUI in response to queries or anticipating a query from the user, in this case, related to financial decisions. To identify which tasks would be relevant for the experiments, common task and information pattern were derived from the semi-structured interviews that were conducted. The tasks identified were -

- Look up Portfolio performance.
- Know details on the transaction history.
- View the top stocks of the portfolio.

3.2.3 Voice Assistant

The first experiment that was conducted was with a voice assistant. For this experiment, Amazon Alexa was used due to its availability and each experiment lasted for about an hour. The aim of this experiment was to understand users comfort and trust in sharing financial information with a voice assistant.

3.2.3.1 Setup

For this experiment, we had a Relationship Advisor (RA) playing the role of an Alexa. We had designed a loose script around each task for the RA to follow. Alexa was connected through the Bluetooth of a Mac Laptop. For the change of voice, an open source GitHub command-line for the test was modified and used [7]. The RA was required to enter the data and the command line would say it in the Alexa female tone to the end participant.
As aforementioned the experiment was conducted in a meeting room of an Indian bank. Hence, photography and video recording the experiment was prohibited. The entire experiment was audio recorded and notes were also taken during the discussion phase of the experiment.

3.2.4 Textual Conversation (Chat-bot)

Investment banking is data intensive. Therefore, a need was felt to have another experiment with textual input and text-based conversation after the Alexa experiment was conducted.

To test the overall experience and the difference in participant behaviour while interacting with a chat-bot as compared to the voice assistant, an experiment using the chat-bot was performed.

![Figure 3.1: Room where the experiment took place](image)

3.2.4.1 Setup

For the experiment, a simple chat program slack was used. The RA was playing the role of the chat-bot and a semi-structured script was written for anticipating the direction of the conversation for the given tasks. The participant and the RA (chat-bot) were sitting in different rooms. Also, the
facilitator was in the room making observational notes and documenting the whole process. A short discussion with the participant was conducted after completion of the given task.

Figure 3.2: P2 performing the experiment
Chapter 4

Result(s)

In the following sections, findings from the interviews and the experiments are presented [26].

4.1 Trust

One of the dimensions of the analysis was to assess the level of trust users demonstrate while using the CUI for performing tasks related to financial decision making. During the interviews, it emerged that the participants were comfortable using a bot to get information but would not trust a bot when it came to accepting advice. This tendency was more pronounced among investors who considered themselves conservative i.e. those who preferred making safe investments and avoided investments with uncertain outcomes.

Participants P1, P2 and P5 described themselves as ‘conservative’ investors. They felt that they didn’t have much knowledge about various types of investment options available and therefore they invested mostly in safer instruments like deposits and mutual funds. Participant P1 mentioned "We are new investors and are not sure if we should take the risk of investing money at once just because an expert suggested so. After all the losses would be mine". When asked about the bot providing advice he was even more reluctant. His disbelieve he said "I am cautious in entrusting my money to the Relationship Manager. I would not do so until I have spoken to someone I know to get the idea validated." The opinion of other two conservative investors was not very different.

Two of the participants who felt that they were seasoned investors were aware of the dynamics of various types of investment options. They were able to assess risk better and admitted that they took calculated risk in their investment choices. In addition to investing in deposits and mutual funds
they also invested in shares and financial derivatives.

When asked about the bot providing advice, many participants felt that it was a good idea. It gave them the flexibility to get advice any time of the day especially in the evening when they had some free time but was late to call the Relationship Manager. Still, they felt that they would not act on such advice without consulting their Relationship Manager the next day. Participant P2 during the interview said "Advice is available on various websites and people sent advice through newsletter and email. Advice through bot would be one more channel. But how would this be different? I would still follow the same process of evaluation and consultation with my friends and the Relationship Manager before making an investment. I would not say I will listen to the bot but would definitely not act on the advice just because it is coming from a bot." However, just like the conservative investors, even though they were happy to engage and experiment with the CUI or a bot for getting frequently asked information such as portfolio value, whether orders placed were executed or not, if executed then order details, payment and settlement details, returns on investment etc.

CUI led interaction was found to be helpful especially since information can be obtained at any time of the day. It removes the dependency on Relationship Manager or the Call Centre. While CUI led interaction was acceptable for getting information about investments, transaction and investment performance, it was NOT found to be useful when it came to advise. Knowledgeable and seasoned investors were indifferent to the advice provided but relatively new investors were highly reluctant to use the advice function.

4.1.1 Communication Channel

Relationship managers (RM) usually alternate between calling and meeting their customers once a month. Participants felt that while a scheduled meeting once a month was acceptable, they must have access to the Relationship Manager whenever they wanted. At many occasions, the RM was either travelling or in meeting with other customers. And in his/her absence, the participants felt that just a dashboard on the website provided by the bank to view their investment data was not sufficient.

Given this background, participants were receptive to the idea of getting another interactive and 24x7 channel for getting data on their personal investments.

It was explained that the new channel of chat-bot could provide the information both through speech and text and graphics. Experiments were done to test both of these. During the interview, all the participants mentioned that they had used voice assistants like Alexa and google home. Hence they
were familiar with how voice assistants worked.

4.1.2 Lack of Knowledge and Time

Gaining adequate financial knowledge was not a priority of the participants. Also, it was mentioned that financial matters were rarely discussed with family members. Most of the participants found it boring to go through the information available on different mediums. They felt that investment was a very time-consuming process. "There are so many options available, it is boring and very stressful going through everything. I would like someone to give me filtered data according to my needs", mentioned P3 during the interview.

Since all the participants were either entrepreneurs or salaried employees they expressed the need to have a quick and less time-consuming solution that could answer their queries and give suggestions.

It became clear that a conversational chat-bot would be helpful since information could be accessed easily at any time of the day and on any device. Most of the participants were happy to learn that with CUI they did not need to learn how to navigate through the bank website to get the required information. In short, the features of providing investment information through CUI meets a latent market need for busy investors.

4.1.3 Comfort

The participants had experience with using voice assistant for fun activities and experiments at home. The idea of using the same medium for financial activities and suggestion was not received well. P2 mentioned during the interview, "They speak out, I don't think I would want anyone else to know of my investment plans". The participants were intrigued with the concept of a financial voice assistant but they strongly expressed problems of privacy and comfort through such a medium.

Through the discussions post the experiments the participants expressed discomfort using voice assistants. Participants were not comfortable when their personal and private financial data could be heard by someone else. Written form was tested later in the experiment phase and emerged as the preferred mode of communication for financial data’
CHAPTER 4. RESULT(S)

4.2 Testing Possible Conversational UI

In this section, the findings of participants behaviour and interaction with the different tools like Alexa and a textual chat-bot that was used during the experiments are shown.

4.2.1 Conversing with Alexa

Participants found that it was very difficult to understand and remember financial data when spoken. It turned out to be one of the biggest challenges when conversing with Alexa. They also mentioned that privacy and secrecy were the main concerns with voice assistants in wealth management. P4 during the discussion expressed, "the idea is fascinating, however, I would not be comfortable because I don't know who else might overhear the info". The experiment brought to light other aspects of using a voice assistant as a tool. All the participants when asked expressed having more trust in a male voice as compared to a female voice. They relate more with a male stereotype when it came to money management and therefore trusted a male voice more. Also, a few of the participants expressed the idea of having a supporting application along with the voice assistant that would aid in switching between different tools based on the needs of the data or information.

The participants were not able to retain any part of the data and found the conversation mechanical. Through the experiment, a drop in comfort level was observed when CUI started reading a long series of numbers in response to a transaction and holding queries. Overall, the participants exhibited a lack of trust in Alexa. The conversation with Alexa for financial updates and advice confirmed the feedback received during the interviews. Multimodal possibilities - voice, text and graphics were also explored during the study and graphics along with short text was found to be most effective. The same has been presented in the results section.

4.2.2 Informative Chatbot

The informative chat-bot was designed through iterating the conversational flows for the given tasks along with the Relationship Manager who played the role of the chat-bot. After the Alexa experiment, the participants were quite receptive towards the chat-bot.

While having a conversation on slack with the chat-bot the participants felt more confident and at ease compared to their interaction with Alexa.
Discussions held with the participants after the exercise revealed that the information received from the chat-bot was clear and to the point. However, they felt that the amount of information and number shared on the screen was a bit overwhelming for them to understand through the conversation. The participants expressed the need for visualisation of data. It the text and make information absorption much easier. Furthermore, the Relationship Manager (RM) made a note that few of the users were trying to be funny and having fun. Therefore adding some emojis and quirky response without losing the trust and the seriousness of the platform would be a good add on.

Some of the key takeaways for improvement are listed below -

*Usefulness.* The participants felt that the data being presented was useful and important. However, the data could be more concise and be supported by visuals.

*Satisfaction.* The participants felt that the information presented by the
chat-bot was accurate and therefore they were able to trust the bot. Also, interestingly the chat-bot not behaving very human-like was one of the factors behind higher level of trust. Participants believed that if it were machines in the back end, the level of error would be less compared to a person chatting. And the bot would be more patient with repetitive and silly questions.

Fun. A few of the participants felt that it would have been nice to have situations where they could steer the conversation as much as the bot did and make the conversation light at times. For instance, P4’s conversation flow was -

Bot: Hey Padma! It’s a good day to talk Money!
Padma: Everyday is a good day to talk money! haha

The participant to the conversation mentioned above felt that there could be more entertainment and fun added, where the bot responded back as well.

Deep Insights. Participants wanted the chatbot to dig deeper and be more suggestive. They wanted the bot to be proactive in providing information such as providing portfolio value and transaction summary without being asked for rather than just answering related queries.

Motivation. The participants were happy with the chat-bot acting as a relationship manager. However, they desired to have an additional incentive like better data visualisation, some proactive responses and some fun from the bot in order to use the bot more frequently.

4.2.3 Improved Chat-bot Experience

Based on the feedback and responses received from the participant and the RM, another experiment with the chat-bot was conducted. The aim of the second round of the experiment with the chat-bot was to see the participants response after incorporating their feedback.

4.2.3.1 Setup

The follow-up experiment was performed identical to the previous chatbot experiment. The experiment was performed on Slack, a threaded discussion tool that the participants had experienced working with before. The RM played the role of the chatbot and the experiment was performed in the same meeting from the consultant company.
4.2.3.2 Participants

The plan was to perform the experiment with the same 5 participants who had been a part of Alexa experiments earlier. However, after experimenting with 3 participants it was observed that the participants were well versed with the system and the tasks and possibly because of that enthusiasm and interest in performing the experiment was low. Hence, the insights being generated was not conclusive and reliable. Therefore, 3 new participants were recruited to be a part of the experiment. The new participant as shown in table 4.1, were all entrepreneurs and had been a customer with the bank for 5 or more years. All the participants were between 35 - 40 years of age. Out of all the participants two were female and one was male.

The participants were taken through the same on-boarding process of

Table 4.1: New Participant Demographics

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Education</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6</td>
<td>35</td>
<td>M</td>
<td>Bachelors</td>
<td>Entrepreneur</td>
</tr>
<tr>
<td>P7</td>
<td>40</td>
<td>F</td>
<td>Masters</td>
<td>Entrepreneur</td>
</tr>
<tr>
<td>P8</td>
<td>38</td>
<td>F</td>
<td>Masters</td>
<td>Entrepreneur</td>
</tr>
</tbody>
</table>
signing a consent form and then they were briefed about the experiment. The experiment was performed in English as the participants were well versed and comfortable with written and spoken English.

As in the earlier interview, the participants expressed their desire to have a proactive chat-bot to guide them in their quest to seek financial information and make financial decisions. The participants also discussed how it was important to keep track of the change in prices that affected their portfolio performance. It is a challenge to keep track of these prices and it would help if the bot could send alerts on mail and phone.

When discussing the conversation style of the chat-bot, the participants were very satisfied. The participants felt that the emojis and the quirky response was great. They felt it added an extra touch of friendliness to the bot and they could connect more with it like a personal buddy. The participants also liked the functionality where the bot greeted them first and not wait for them to start the conversation. Another interesting factor was how the participant liked the communication style and concise answers provided by the bot. Majority of the participants felt that the chat-bot had a positive impact on them and they would consider it to be their go-to assistant in need to review, advice and information.
The main key information noted during the discussion with the participants were -

**Mixed Initiative.** The participant received the visual data along with the text very positively. They felt having information displayed with visual data helped them understand and grasp the information better. However, the visual data provided to them were in the form of images. Interactive visuals could make the interaction even easier and more informative. If the chat-bot could lead the participant to the particular screen of the web site or the application from where the information is procured, it would be even better.

The participants expressed the need of having visuals which could help them dig deeper. Few of the participants mentioned that the chat-bot could possibly be combined with the bank’s application where they are authorised to login and view their financial portfolios. Hence, the application itself could become chat-bot driven whereby the participant could use the application itself when required.

**Motivation.** Participants felt motivated using the chat-bot because of the visual feature and the trust it built through conversations.

**Language.** A few of the participants felt the need of having a multilingual chat-bot. Though they were all well versed with they felt conversing in their own language would add to their comfort while using the chat-bot.

**Entertainment.** Participants felt happier when natural conversations and emojis were used. The participants expressed the positivity towards how the chatbot was able to strike a balance between the seriousness of the topic and keeping it light at the same time.
Chapter 5

Discussion

The purpose of this thesis was to explore if trust can be established in mass affluent customers with CUI in wealth management domain in the absence of relationship manager. Interviews and Wizard of Oz experiments were designed to understand user psyche and behaviour in the context of using CUI and chat-bots.

In the following sections, the analysis of the results is discussed. Same is followed by proposed future studies when designing the chat-bot for investment portfolio management and advice.

5.1 Result Analysis

The results from the interviews and the experiments gave a clear representation of how users trust the chat-bot and if they were comfortable using chat-bots. Trust was evaluated on the three dimensions of capability, goodwill and ethics [25] [21]. Capability of the CUI to answer a wide range of questions was essential to build trust. Unless this basic purpose is served users have no reason to use the CUI. However, it emerged clearly during the study that capability was a necessary feature but not sufficient to build trust. Second dimension of trust was goodwill. Goodwill was established when users felt that CUI cared for them and made the process easy for them. Ability to respond with voice was considered more hi-tech but not friendly to users in the context of presenting financial data. Text and graphical data representation delighted the users as it made it easy to comprehend financial data and earned more goodwill with users. Informality and fun during the conversation enhanced the joy of interaction and enhanced goodwill. Ethics emerged as a clear third dimension of trust. A strong need for privacy and data security was expressed by the participants. A system high on capability and
usability would still not be acceptable unless user felt that standards of privacy and data security were met. In short, to establish trust all three aspects of technological capability, goodwill created by higher degree of usability and ethical values of data privacy and secrecy are must.

It was found that the participants were comfortable using the text and graphics chat-bot and unwilling to use a voice assistant. The semi-structured interviews helped in getting an insight into how well-versed users were with technology and it also helped in identifying information retrieval patterns they used when needing help in making financial decisions and understanding their current financial status. The information collected from the interviews helped in identifying simple and complex tasks which created the base of the conversational flow for the experiments.

From the results of the Alexa experiment, it was concluded that though it was fun to have Alexa help in finances, it was not an appropriate medium since it was not secure or private. A visual context was a must to understand and retain financial data. From the interviews, it was evident that participants did not trust and feel comfortable sharing information with Alexa on their investment matters because they felt spoken words could be heard by others even if not in sight. For financial information exchange, privacy and secrecy were found to be of highest priority.

Overall, a clear preference for text and visual option over a voice-based option emerged. On further investigation, it was found that response to investment enquiries such as transaction enquiry contained plenty of numerical data e.g. price of transaction, number of order units, number transacted units, fees, total transaction value and total net value payable or receivable. Participants were not able to remember these numbers as the voice assistant moved from one transaction to another.

This problem was even more pronounced when it came to performance data. Participants found it much easier to see a graphical representation than to hear several numbers being spoken. In this case, an image was worth hundreds of words. While seeing this data people wanted to refer back and drill down at several places. This feature cannot be provided in voice-based service.

In summary, participants showed a clear preference for chat-bot which could present financial data in textual and graphical form over voice. All of them used voice assistants at home for various purposes and enjoyed doing so. But in the context of using voice in a chat-bot for getting financial data, participants preferred text and graphics.

Afterwards, during the initial informative chat-bot experiment, the users mentioned the need for more than just facts to feel motivated. It is critical to keep the balance between keeping the user informed and entertained at the
same time. Although most of the participants mentioned that the content was informative. After some elements of entertainment were included in the second round of the chat-bot experiment the users expressed more trust towards the bot, mentioning it to be more like a buddy they could rely on in the absence of the Relationship Manager for their financial needs. The added feature gave them more motivation to keep coming back to using the chat-bot.

In the second phase of the chat-bot experiment, an increase in the interest towards the chat-bot was seen. The presentation of the data with visuals was very well received by the users. This was also clear with the interviews where the participants mentioned that they understood the information better with the visual context. However, they also expressed the need for integrating the bot with the bank’s customer application. With the added entertainment value and visual content, the users started getting more comfortable with the chat-bot.

Though the thesis cannot show any statistical data on the build of trust and comfort users had towards the chat-bot, it became clear through the interviews and observation that the users did not trust just a voice assistant for their financial needs. The users were more comfortable trusting a chat-bot and accepting it as a replacement or an extended hand of the Relationship Manager.

5.2 Future Studies

In the thesis, many ideas emerged through discussions with the participants that could help in extending the productivity and usefulness of the CUI in wealth management.

As expressed by the participant, additional regional languages could be trained to add more personalisation the chat-bot.

More research could be done in the usefulness of creating a holistic experience with a voice assistant like Alexa and Google Home. As discovered in the discussion with participants research on extending the voice assistant to a mobile application and for helping and guiding with finances could be explored. Also, further studies on making heavy financial data more human-like while conversing with voice assistant could be done.

Multi-modal CUI could be developed to drive financial decisions. The conversations could be made more proactive and suggestion oriented to be able to guide the users through their decision-making process. The existing customer financial portal could be made bot-driven.
5.3 Limitation

Due to time constraints, some limitation emerged. The primary basis for analysis is qualitative. The data collected from the interviews and experiments have been analysed and conclusions therefrom were drawn by analysis of the data collected by the author. Therefore, the conclusions may have been influenced by the perceptions and biases of the author.

As mentioned in the method section, role-playing was also used for the experiments, which eliminated the limitation of natural language processing. However, since experts were asked to play the role of the chat-bot their actions may be biased and influenced by other factors such as the reaction of participants and urge to be creative.

The same participants were used in all the experiments which affected the novelty of the experiments and thus towards the end new participants needed to be recruited for the experiments. Also, experiments with larger number of participants could be conducted to derive a more conclusive result.
Chapter 6

Conclusions

With the increasing need for introducing CUI in the evolving financial sector, it is important to find ways to increase adoption of these tools. In this thesis, the trust and comfort using CUI in replacing relationship managers to perform certain tasks were explored. Through the semi-structured interviews and Wizard of Oz experiments, it was observed that voice assistant like Alexa was not trusted for financial enquiries due to the user’s need for privacy and secrecy. However, small nuances like textual bot’s response rate, conversation style helped in building the trust and comfort within the users to perform certain financial tasks.

Though, the need for building conversational agents for high stake contexts like healthcare and finance are increasing they have a long way to go before they can be used completely unsupervised.

Nevertheless, the future of CUI holds promising results in banking and financial domain. In conclusion, this thesis has shown while technological improvements create the possibility of expanding the use of chat-bot in wealth management, the acceptance of the chat-bot however would require significant user experience interventions in order to create trust between user and chat-bot. These usability features include visualisation of data, ensuring the privacy of data and use of informality and some degree of fun in conversations. At the same time, there are certain inhibiting factors like voice assistant which may be heard by others and speaking out lots of numbers which is difficult to comprehend may turn away customers from using the CUI.
Bibliography


[22] Metz., C. A new chatbot would like to help you with your bank account., June 2017.


