

ChatGPT as a digital assistant for startup entrepreneurs: Challenges, Opportunities and Perception.

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ABSTRACT,

This study explored the potential of ChatGPT, an AI-powered tool, as a digital assistant for startup entrepreneurs. The research objectives were to understand how well ChatGPT can provide academic advice to startup entrepreneurs and to educate respondents about its benefits. The study found that participants generally perceived ChatGPT positively, recognizing its utility in various contexts such as project development, learning, and daily tasks. Participants also highlighted several limitations, including the quality of responses being dependent on the quality of prompts, and concerns about over-dependency on the tool. The study also revealed a nuanced understanding among participants about when to seek advice from ChatGPT versus a human advisor, suggesting that the use of AI tools is context-dependent and complements rather than replaces human expertise. The findings underscore the relevance of bounded rationality in understanding the use of AI tools and the effectiveness of the Lean Startup methodology in prompting ChatGPT. This research contributes to the understanding of the potential and limitations of AI as a digital assistant in the startup environment and has implications for the integration of AI tools into the business world.

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Keywords

ChatGPT, A.I. Assistant, Perception of ChatGPT, Start-up entrepreneurs

1. INTRODUCTION

Start-up ventures have been contributing to the economy of Europe significantly for the past years (Switters et al., 2017). Digitalization and globalization promoted idea creation and the emergence of start-ups directed towards new technology or adopting it to serve the purpose of a given venture. Moreover, it is important to note the positive impact of such start-ups on the economy (Griva et al., 2021) of a given country. In Europe alone, start-ups provide 75 million jobs (Switters et al., 2017).

At the same time, we see a huge number of new technologies coming to the market. With the era some call an industry 4.0 groundbreaking technology emerges often. Artificial Intelligence is a prominent trend, especially in the past years (Savage, 2020). There is one Artificial Intelligence venture, which is growing at a more rapid pace than even the most successful digital ventures— ChatGPT. Claimed to be the most rapid growth internet service in the history of the internet (Kochovski, 2023). Despite there being a vast amount of research on the capabilities of ChatGPT (Liu et al., 2023), there is very little to no research on how ChatGPT could be used in the business world.

The academic literature is only catching up with the application of ChatGPT in a business environment. Majority of the articles are focusing on the business writing capabilities of ChatGPT and its possibility to create marketing and business posts (AlAfnan et al., 2023). It can enhance user experience in any industry and is praised by many articles (George & George, 2023). However, there is a research gap in empirical research on the perception and usefulness of ChatGPT by real users.

2. RESEARCH OBJECTIVES AND RESEARCH QUESTION

This paper serves two major purposes: exploratory and educational. One of the main research objectives was to fill the research gap which has appeared with the emergence of such powerful technology as AI-powered ChatGPT by OpenAI. This purpose was to explore how well ChatGPT can perform in giving academic advice based on the academic framework and the problems faced by start-up entrepreneurs. And how can ChatGPT be a tool to narrow the effect of bounded rationality (Korzynski et al., 2023; Al Afnan et al., 2023; George & George, 2023).

The second main objective was to educate the respondents participating in this research about the benefits they can gain from applying the capabilities of ChatGPT to their problems. Eventually - to explore empirically actual perception of advice given by ChatGPT. Once start-uppers have received the advice

from ChatGPT they have been able to review it based on their perception (if they found it useful or not).

To be precise this research has experimented with ChatGPT, - prompting it to adopt an academic framework – lean startup methodology, and based on this information ask it to provide meaningful advice to the participants of this research.

This research explored how Start-up entrepreneurs use ChatGPT in their startups currently, and how they see it's applications in future. The different facets were explored, which reflect on capabilities of ChatGPT in this field.

The most important focus of this research was on a question: Can chatbots like ChatGPT learn and apply business theories? Can it then give adequate and constructive feedback, criticism, or advice to start-ups, given that it is asked properly? And hence, what is the best way to request ChatGPT to do it?

Therefore, the research question and underlying sub questions are tightly align with the set research objectives were set as follows:

How do start-up entrepreneurs perceive and use ChatGPT?

- *What are the applications of ChatGPT by start-up entrepreneurs?*
- *How do start-up entrepreneurs perceive an advice from ChatGPT?*

3. RESEARCH CONTRIBUTION

3.1. Academic Relevance

The research on AI - communication and the perception of such communication by humans is in its inception (Luger & Sellen, 2016). This research contributes to shedding light on the perception of such communication specifically through ChatGPT communicating with Start-up entrepreneurs.

Additionally, this research provides insight into how ChatGPT can assist humans to overcome the biological boundaries set by bounded rationality during the process of decision-making and problem-solving (Simon, 1990). Given the design of the research, it is assumed that ChatGPT has access to an incomprehensible amount of information. Therefore, ChatGPT could potentially provide start-up entrepreneurs with more informed advice or solutions.

Lastly, this research contributes to the rapidly growing field of AI in business decision-making and problem-solving (Fountain, McCarthy, & Saleh, 2019). By exploring the perception of AI chatbot - ChatGPT, this research helps to bridge the knowledge gap in entrepreneurial decision-making.

3.2. Practical Relevance

First and foremost, this research provides start-up entrepreneurs with knowledge of usefulness, represented by a new and powerful tool - ChatGPT. By exploring how ChatGPT can perform with academic knowledge and problem-solving for business, this research brought to the surface the potential benefits and limitations of this tool.

Exploring the perception of start-up entrepreneurs, after communication with ChatGPT, answers the question - could ChatGPT be useful and easy to use for start-up entrepreneurs and potentially other business owners?

4. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This research required some clear definitions for all the theoretical and practical concepts, which are essential for answering the research questions. This research focused primarily on the perception of advice given by ChatGPT to start-up entrepreneurs.

Therefore, this research requires three ways of investigation.

One is focusing on theories discovering who are the entrepreneurs/start-up owners, what are their problems and what are the ways to reach success for them.

The second is focusing on researching what Chat Bot is, its capabilities, and relevant details of how it works and could be operated by non-professional individuals.

Last one is revolving around a theoretical model used to create a framework for data collection in this research. In essence - modified TAM framework – UTAUT was used to create questions for the interviews and secure successful and credible data collection.

4.1. Who are entrepreneurs-start-up owners and what are their problems?

This research focuses on start-up entrepreneurs, who are part of the local start incubator of the University of Twente, called NovelT. According to a compound definition (Luger & Koo, 2005), start-up is an active, new business, which is also independent. Usually, start-ups are small companies, which operate with less than 10 people. As observed here in the local incubator, they could be a spin-off of an existing organization, or a completely new venture. It also must be active in providing some service or goods.

Even though majorly this term is used to describe highly technological digital ventures, like the ones, which collective entity defines the famous Silicon Valley - nowadays it's any relatively new, independent, and active venture with a small number of employees, and a limited amount of funding (Skawińska & Zalewski, 2020). Additionally, Skawinska & Zalewski (2020) come up with the final definition, which encapsulates the and adds innovativeness to it, which summarizes a, small,

enterprise that uses limited capabilities to find innovative solutions to existing problems.

4.2. Lean Startup Methodology

Academic literature presents many different problems which start-ups are facing. However, there is no one thing, which is the biggest criterion of a start-up failure. However, there are a lot of different “patterns of failure” (Eisenmann, 2021). One of the frameworks methodology is a relatively new model, which is aimed to help start-ups be more successful and fail less (Blank, 2022). The question is, could Chatbot, like ChatGPT, use it to give practical guidance and meaningful advice, based on their problems and struggles as well as on this model?

The Lean Startup framework was introduced by Eric Ries and reshaped the landscape of entrepreneurship, particularly - technological startups. This approach is characterized by continuous innovation and validation of business assumptions. It allows startups to quickly change their strategy based on market demands and prepare for risks connected to the launch of a new product or service (Ries, 2011).

Lean startup methodology focuses a lot on explaining the importance of developing and launching a minimally viable product or MVP. It is used by many businesses, which are planning to release new products or services. MVP represents a final product that only has crucial features. It is launched to test the market and analyse, what is liked or unliked by potential customers. By releasing an MVP, startups can effectively allocate their resources and avoid unnecessary losses at the development stages of a product or service (Ries, 2011).

The Lean Startup model proposes a so-called feedback loop, which goes as follows: build, then measure, then learn. Companies create an MVP, measure its reception and performance in the market, and then learn from this experience. Based on these insights, the company can then decide whether to continue with the current strategy or pivot toward a new direction (Ries, 2011).

In the context of this research, the Lean Startup framework was leveraged to prompt ChatGPT with the objective of evaluating the perceived value and acceptance of AI's advice among startup entrepreneurs.

4.3. What are chatbots like ChatGPT and what are their capabilities?

Chatbots are essentially computer programs or AI-driven virtual assistants that have been designed to mimic human conversation through text or voice interactions. Businesses are turning to chatbots as a budget-friendly, scalable way to automate customer support, generate

leads, make sales, and handle numerous other tasks that once required a human touch. Chatbots are smart enough to understand and interpret what users are saying, providing just the right response to keep users engaged, keep customers happy, and keep businesses running smoothly (Adamopoulou & Moussiades, 2020).

However, ChatGPT is not just a chatbot. It's powered by a very powerful architecture, which takes into consideration trillions of parameters before replying. Thus making it adjustable for any textual purpose, which would suit a user. ChatGPT utilizes deep learning techniques, allowing it to better understand and process natural language input. This results in more accurate, relevant, and coherent responses compared to earlier chatbot technologies (Liu et al., 2023). By not going in-depth, but only focusing on the overall capabilities of OpenAI's creation it seems like it could be suitable for the task at hand – analyzing, processing, and using a particular academic business framework for the analysis of start-ups. Some academic papers claim it could enhance learning and become a virtual teaching assistant (George & George, 2023), but can it truly give meaningful advice to start-up entrepreneurs and solve the issue of bounded rationality?

4.4. Acceptance model as a theoretical framework for analyzing the perception of ChatGPT

To analyze the perception of ChatGPT by start-up entrepreneurs, it is important to identify the most suitable framework for such analysis. Acceptance models are an extensive tool, which allows us to predict acceptance of a new technology. Additionally, from model to model, there are a set of different factors, which are assumed to affect the technology. Using these models in the research permitted, not only to identification of how the interviewees perceive ChatGPT, but also permitted to identify the extent to which they accept this new technology, and what are the factors which may affect it. This chapter reviewed some of the most reliable and well-known acceptance models.

The Technology Acceptance Model (TAM), proposed by Davis in 1989, is a key theoretical framework in the field of information systems research. It aims to understand how users accept and adopt new technologies. TAM has been widely adopted and validated in various contexts, including business, education, healthcare, and more recently, artificial intelligence (Davis, 1989; Venkatesh & Davis, 2000; Holden & Karsh, 2010; Gansser & Reich, 2021). Moreover, TAM has been used the most to assess the acceptance rate of AI-powered solutions (Kelly et al., 2022).

In more recent times, the TAM has been modified and built upon, to eliminate its obvious flaws. Despite its popularity, TAM is undoubtedly a simple model, which only considers a limited number of factors, which affect

acceptance of technology, as a consequence it has faced criticism throughout the years. For example, it doesn't consider or neglect factors, such as individual differences or the role of emotions in the process of acceptance of new technology (Bagozzi, 2007).

To complement these shortcomings another system was developed - out of TAM. The unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. in 2003. It integrates elements from eight models, including TAM, into a unified framework. UTAUT suggests four core determinants of technology use intention and behavior: performance expectancy, effort expectancy, social influence, and facilitating conditions. Those factors are essentially incorporated and extended from the main constructs of TAM. For example, performance expectancy in UTAUT is similar to perceived usefulness in TAM, and effort expectancy in UTAUT is similar to perceived ease of use in TAM.

Performance expectancy - is the extent to which a user believes that presented technology could help assist them. Additionally, if this factor encapsulates perceived gain in job performance, Performance expectancy (PE) is considered a very significant factor in moderating perceived user adoption of a new technology (Venkatesh et al., 2003; Dwivedi et al., 2019).

Effort Expectancy is an aspect associated with the usage of a given technology. It resembles the construct from the Technology acceptance theory - the Perceived ease of use. It has been proven by studies as a crucial mediator of user acceptance in the early stage of introduction to the technology (Venkatesh et al., 2003). Therefore, it was very important when analyzing the perception of ChatGPT by start-up entrepreneurs who have not used it before this experiment. In addition to being part of TAM, which has been tested for years, effort expectancy has been proven to have a significant effect on the willingness to use chatbot technology (Almahri et al., 2020).

Social influence is a third factor of UTAUT. It represents an extent of importance with which, people around the user, will be happy with the user using this system. For example, if we are talking about Chatbot, which is popular among some social group or i.e. firm, the person also working in this firm or being part of this group will likely rate high on the social influence factor. As well as other factors Social influence has been proven to be an important factor in research of technology acceptance overall and in chatbot research in particular (Venkatesh et al., 2003; Gansser & Reich, 2021; Ragheb et al., 2022).

Facilitating Conditions is the last part of the 4 core factors of UTAUT. It represents the perception of the

user of the extent to which there is an established infrastructure and general means to promote and help the user in interaction with a given system or technology (Venkatesh et al., 2003). While being a core part of UTAUT it has been found insignificant when the effect of chatbot acceptance was investigated by Ragheb et al. (2022). However, it was explained by the reported ease of use of the researched chatbot, which is not necessarily the case for ChatGPT.

In addition, UTAUT considers the role of four moderators (gender, age, experience, and voluntariness of use) in influencing the relationships between the core determinants and technology use intention and behaviour, providing a more nuanced understanding of technology acceptance.

In the field of AI chatbots - UTAUT has been used to assess students and their perceived acceptance of ChatGPT and found to be a valid and reliable system for this purpose (Ragheb et al., 2022; Strzelecki, 2023). To narrow the research gap - this research have used a comprehensive UTAUT model to assess the perception of ChatGPT by start-up entrepreneurs through acceptance factors, thus evaluating their effect on the final perceived acceptance of ChatGPT in the business. Additionally, the motivation for choosing UTAUT is an increased number of factors analysed to assess the overall acceptance, which corresponds to the explorative nature of this research.

As it is evident from the arguments, UTAUT is the most suitable models to be used in this research as a basis for interview questions, which are used to extract important information about their perception of ChatGPT.

4.5. Human and Artificial Intelligence

This research shortly touched upon the topic of AI as an augmentation for humans.

The role of AI in business decision-making has been a topic of interest in recent years. Metcalf, Askay, and Rosenberg (2019) explored the concept of Artificial Swarm Intelligence (ASI), a collaboration technology that addresses the limitations associated with group decision making. They found that ASI amplifies the intelligence of human groups and facilitates better business decisions, highlighting the potential of AI to complement human expertise.

Kapoor and Ghosal (2022) examined the impact of AI on the workforce in organizations. They predicted that while AI will automate some unskilled jobs, it will also generate new jobs that require new skill sets. They suggested that AI cannot replace humans but will lead to a workplace evolution by working in collaboration with employees.

This two researchers are relevant because they touch upon collaborative nature of integration of AI into work. Even though these researchers do not explore ChatGPT or other AI generated advice technology, it gives a ground for this research to touch upon that unexplored topic.

Adding to interest in collaboration between machines and humans - the famous theory of bounded rationality. It describes the limitations of human decision-making based on their limited knowledge about the world or even a subject (Simon, 1990). Logically, start-ups entering the business will be less knowledgeable than older and more experienced professionals. Which adds to the burden on start-up entrepreneurs. The question is, could modern technology negate the impact of bounded rationality like ChatGPT (Korzynski et al., 2023)?

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4.6. Research Model

In conclusion, the research model of this research consists of two crucial aspects. Those aspects are theoretical knowledge about Lean Startup methodology and eventually the UTAUT model and its 4 key aspects supported with last aspect – Human and AI collaboration.

Starting with ChatGPT, providing it with as much knowledge as possible about Lean Startup methodology, proceeding with the analysis of the output results from interviews based on the UTAUT model, in a way, after a thorough discussion and analysis have permitted to answer the stated research question.

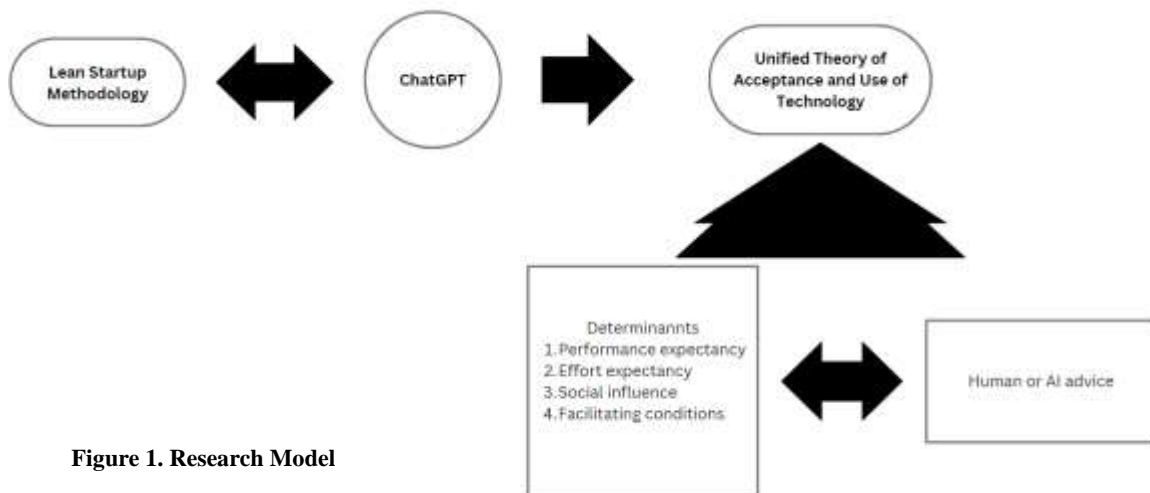


Figure 1. Research Model

5. RESEARCH METHODOLOGY AND DESIGN

The research methodology for this study was designed to explore user perceptions of ChatGPT as an assistant for startup entrepreneurs. The study employed a qualitative approach, using semi-structured interviews to gain in-depth insights into the participants' experiences and perceptions.

5.1. Sampling

Given the specific focus of this research on startup entrepreneurs, the sample was drawn from a group of people who are participants of the NovelIT startup incubator in the Twente region or were affiliated with it. Therefore, A purposive sample was used to acquire 6 participants. It allowed to intentionally select individuals who possess knowledge and background in startups, as well as facing challenges or troubles accompanied by their occupation as startup entrepreneurs.

5.2. Data collection

Semi-structured interviews with the same participants after they interact with ChatGPT. This way allowed in-depth exploration of their experiences, perceptions, and opinions about the tool. The interviews were guided by but not restricted to, the constructs of the UTAUT model. Last questions are going to be directed towards exploration of another side of AI perception by Human and AI are they a replacement for each other, or are empowered by each other, questions were asked in the order as in table 2 (Appendix 2).

In the middle of data collection, the intervention was conducted. Intervention was the interaction of startup entrepreneurs with ChatGPT. For this, ChatGPT was prompted with Lean Startup methodology (see appendix 2) to provide advice given by participants during the interaction problem and a short description of their business. Then, advice was received and read by the researcher and participants.

Validity and credibility were crucial for this research. interviews were a subject to member checking. By going through registered results from the interview with participants of interviews to ensure the validity and reliability of the research. The qualitative data have been a subject to pilot testing with a couple of participants to enhance reliability and validity.

5.3. Data Analysis

In this section, data analysis and coding process employed to investigate user perceptions of ChatGPT as an assistant are presented. The purpose of this analysis was to gain insights into various aspects of the user experience, including the background information on the start-up, general knowledge of ChatGPT, perception after the interaction, the potential of ChatGPT as a performance-enhancing tool, effort expectancy, facilitating conditions, social influence, and human and AI collaboration.

To analyse the interview data, a qualitative approach was adopted, aiming to uncover rich insights and understand the nuances of user perceptions. The process involved several steps, including data familiarization, coding, and theme development.

Before commencing the coding process, the interview transcripts were thoroughly reviewed to gain a comprehensive understanding of the data. This initial familiarization step allowed for immersion in the participants' responses and facilitated the identification of relevant themes for coding.

Based on the interview questions and the overarching research objectives, a coding framework was developed. The coding framework consisted of pre-determined themes derived from the research questions and relevant theoretical perspectives. The initial themes created by structure of interviews were as follows:

- a) Background Information on Start-up
- b) General Knowledge of ChatGPT

- c) Perception after the Interaction
- d) ChatGPT as a Performance-Enhancing Tool
- e) Effort Expectancy
- f) Facilitating Conditions
- g) Social Influence
- h) Human or AI advice

Using this coding framework, the interview transcripts were systematically analysed line-by-line. Each response was assigned one or more appropriate codes to capture the essence of the participants' perspectives on the respective theme. This process was carried out for all interview transcripts, ensuring consistent and comprehensive coding.

Once the initial coding was completed, the coded responses were examined to identify patterns and develop overarching themes. Themes emerged from recurring codes and patterns in participants' responses, reflecting the major topics and ideas that emerged from the interviews. These themes represented the key findings and provided a comprehensive understanding of user perceptions of ChatGPT as an assistant and its potential use cases in the future, as well as existing ones.

The coding process was iterative, involving continuous refinement and revision of the coding framework and themes. As new insights emerged from the data, additional codes and sub-themes were identified and incorporated into the analysis. This iterative process ensured that the analysis remained responsive to the richness and complexity of the interview data.

Eventually, it led to themes becoming more general and encompassing the most interesting aspects of the participants interactions with ChatGPT and their views on it. Finally, the set of the following themes has been generated based on the process.

6. RESULTS

The results of the coding process and thematic analysis can be seen in the table 2, appendix 3. The following themes the research objectives were fulfilled, and the research questions were answered.

The following main themes are as follows Startup descriptions, prompting approaches and learning to prompt, Applications of ChatGPT and the predominant theme which has emerged is the Perception of ChatGPT. It encapsulated sub-themes such as: Positive perception and Benefits of ChatGPT, Negative perception and limitations, Human advisor vs ChatGPT, and lastly – Perception of pre prompted version ChatGPT.

6.1. Start-up Descriptions

The interview participants came from a wide range of startups. They were involved in different fields like music education, digital tools for citizen participation, AI

for fashion, online platforms for public participation, sleep assistance, and wearable tech.

Their roles in these startups were also diverse. They handled tasks like planning, product development, technical research, design, sales, and customer service.

This mix of backgrounds, industries, and roles bore broad set of views on ChatGPT. Their experiences show that ChatGPT can be useful in many different areas and roles in the startup world.

These diverse applications underscore the adaptability of ChatGPT and its potential to assist in a wide range of tasks, from content creation to problem-solving, financial tasks, and even programming and web development.

6.2. Prompting approach and ease of use

Based on the thematic analysis of the participants' experiences with ChatGPT, it's clear that the approach to prompting and ease of use varied among the users.

A common theme that emerged was the use of iterative prompting, a trial-and-error approach to interacting with ChatGPT. This was mentioned by several participants, indicating a shared experience in learning how to effectively communicate with the AI. For instance, one participant described their approach as "not too easy to use, takes time" and other participant emphasized the iterative nature of their process: "I prefer to ask in a very quick and short way [...] and then adjust it [...] and then I make my prompt more complex."

However, some participants reported having limited knowledge of prompt engineering, indicating a potential area for user education or system improvement. As one participant put it, "I don't know much about prompt engineering... About the interactions, I know quite well how the system is built and why it works this way."

In terms of learning to use ChatGPT, some participants reported learning from social media, while others found the system easy to use because of the examples provided. Participant 1 noted, "I've used it almost every single day [...] I also follow some pages on Instagram [...] I know a thing or two." Participant 2 found the system easy to use because of the examples provided: "You know it, it was easy because at the beginning they [ChatGPT developers] show it, show you some examples about how to use it."

Severally; participants expressed an interest in learning better prompting techniques. This suggests that while users may find the system relatively easy to use, they recognize the potential for improving their interactions with ChatGPT through more effective prompting.

In terms of difficulty, some participants reported challenges in generating good prompts. One participant described the process as "somewhere between very easy and medium easy because you still need to come up with good questions to ask, and good questions are not easy to generate." .

Overall, the participants' experiences suggest that while ChatGPT is generally easy to use and accessible, there is a learning curve involved in mastering effective prompting techniques. This points to the importance of user education and system improvements to support more effective interactions with the AI.

6.3. Applications of ChatGPT

Based on the thematic analysis, the applications of ChatGPT are diverse and span across various domains. The following table provides an overview of the unique applications identified from the participants' responses:

Applications of ChatGPT
Social media posts
Financial tasks and assistance
ChatGPT as an assistant for startup-related problems
Grant application
Prompting other AI-based tools (DALL-E)
English grammar and language modification
Assistant for brainstorming and research
Programming and web development
Clarification and Explanation
Self-assessment tool
Data representation

Table 1: Applications of ChatGPT by Startup Entrepreneurs

In the context of social media, only one participant mentioned using ChatGPT for creating LinkedIn and Instagram posts. This suggests that ChatGPT can be a useful tool for generating content and engaging with audiences on social media platforms. However, since it was reported only once it's not amongst the most popular applications of ChatGPT.

ChatGPT has also been used for financial tasks and assistance. For instance, one participant mentioned using ChatGPT to help distribute a budget for a grant proposal (participant 2). This highlights the potential of ChatGPT in providing guidance for financial planning and management.

In the startup ecosystem, ChatGPT has been used as an assistant for addressing startup-related problems. Some participant mentioned that any problem they had, they would go to ChatGPT because it's so easy (participants 1 and 5). This indicates that ChatGPT can be a somewhat valuable resource for entrepreneurs, providing them with quick and easy access to information and solutions.

Participant 2 reported two distinct unique uses of ChatGPT. Firstly, they mentioned using ChatGPT to assist with a grant application. Secondly, they reported using ChatGPT to help create prompts for another well-known AI-based image generating tool, DALL-E. However, it is worth noting that the assistance provided for the grant application primarily involved English grammar and language modification, which was reported by multiple participants.

The application of ChatGPT in English grammar and language modification was a common theme among all participants. Participant 2 highlighted the use of ChatGPT for improving their writing, stating, "For the moment, just English grammar, you know, to try to improve writing situations." They further emphasized the value of ChatGPT in linguistic tasks, noting that it helped them a lot in improving the language in various contexts.

Participant 6 also acknowledged the capability of ChatGPT in modifying the tone of voice in content, which they found very useful. They said, "I know that ChatGPT is very capable of changing the tone of voice, so if you have something with the content that you want, you can then change the tone of voice. With it, which is very useful."

Some participants went even further redacting texts with ChatGPT and have used it for help in brainstorming and research, which dramatically increases speed of research as reported by participants 3 and 5.

Participants 3 and 6 got even more technical and described ChatGPT as brilliant and were "shocked by how good it is" when applied to a programming part of the Web development process by solving bugs and giving coding advice.

Participant 5 on the other hand reported using ChatGPT for Data representation, it helps him to create and populate tables.

Lastly participants 5 and 4 also reported using ChatGPT not only as a simple assistant for any task, but as a so called – self assessment tool. Quoting participant 5: "Yeah, I would use it on every single stage as you know as. Yeah, like people talking to themselves in the mirror before they go perform on stage, you know, like the self-assessment tool."

Based on the thematic analysis, the findings reveal a diverse range of applications for ChatGPT across multiple domains. Participants reported using ChatGPT for generating social media content, providing financial assistance, addressing startup-related problems, aiding in grant applications, prompting other AI-based tools, modifying English grammar and language, assisting in brainstorming and research, supporting programming and web development tasks, facilitating clarification and explanation, serving as a self-assessment tool, and aiding in data representation. While the use of ChatGPT for social media content creation was less prominent, it

showcased potential in engaging audiences. Financial tasks and startup assistance highlighted its usefulness in financial planning and problem-solving. Common themes included its role in English language improvement and as a valuable linguistic resource. Unique applications were found in grant applications, prompt generation, programming, data representation, and self-assessment. These findings demonstrate the versatile and productive nature of ChatGPT in various contexts and domains.

6.4. Perception of ChatGPT

Participants have reported different aspects during the interview. During thematic analysis three most important sub-themes of related to perception have been identified:

1. Positive perception and Benefits of ChatGPT
2. Negative perception and limitations
3. Human advisor vs ChatGPT
4. Perception of pre-prompted version ChatGPT.

6.5. Positive perception and Benefits of ChatGPT

Based on the thematic analysis of the participants' responses, the general positive perception and benefits of using ChatGPT are quite evident. The participants expressed an overall positive impression of ChatGPT, with some even highlighting the crucial impact it had on their startup progress.

One participant noted the quicker access to information across diverse domains that ChatGPT provided, which had a positive influence on their project development. They were pleasantly surprised by the capabilities of ChatGPT, stating, "I'm surprised by how well you are doing it by asking the questions in a very human-like way. I'm surprised by how well that works." This sentiment was echoed by participant 6 who appreciated the proactive advice from ChatGPT, especially when it came to knowledge administration.

The speed of information access and assistance in the learning process was another benefit that was highlighted. One participant stated, "It's never a substitution of a human... ChatGPT is just a large language model that is trained on much data, and it can help you brainstorm... it made me learn [web development] way faster and made me solve a lot of bugs".

In terms of project development, one participant noted how ChatGPT increased the speed of execution for some tasks, stating, "Quite concise, quite fast [...] I do like it. I think a lot of people will find that useful." Another participant mentioned how ChatGPT was brilliant at coding and creating websites, which significantly reduced their effort.

In conclusion, the participants reported a generally positive perception of ChatGPT, highlighting its benefits

in diverse areas such as project development, learning, daily life tasks, and even teaching others. These findings suggest that ChatGPT can be a valuable tool in various contexts, providing quick and efficient assistance in a wide range of tasks.

6.6. Negative Perception and Limitations of ChatGPT

While the participants generally had a positive perception of ChatGPT, they also highlighted several limitations and areas of concern.

Another issue raised was the quality of the prompts. Participants noted that poor prompting often leads to poor answers. Participant 5 stated, "As far as I know. When people run into issues, they just directly ask these kinds of questions to ChatGPT and usually, they get not so rightful kind of information. Sometimes it's not correct. Sometimes it's not precisely what they've been asking for. They don't essentially train ChatGPT to be as suitable for their problem as possible." This highlights the importance of effective prompting in obtaining useful responses from ChatGPT.

Participants also noted their own limitations in using ChatGPT effectively. For instance, Participant 3 mentioned that their personal language proficiency affected the quality of their prompts: "The prompts that I give, they are not the most efficient in a sense that [...]. maybe they are long, maybe they have redundant pieces of information[...] English is not my native language, which also makes it harder sometimes."

Over-dependency on ChatGPT was another concern. Participant 4 admitted, "I'm more hesitant when I don't use GPT I may overuse it [...] but it saves me time [...] it gives me assurance [...] and it also damages it". This quote suggests a level of reliance on ChatGPT that could potentially limit the user's own problem-solving abilities.

Finally, some participants pointed out specific limitations in ChatGPT's capabilities. For example, Participant 6 expressed doubt about ChatGPT's ability to tackle complex problems: "I'm not sure how it can tackle complex problems, as in yeah, it's easy to even if I ask you, hey, what should I do with my field study? ChatGPT might give me a correct answer, but if it's an engineering problem I don't imagine how is it going to help?". This quote suggests that while ChatGPT may be useful for simpler tasks, it may struggle with more complex or specialized problems.

In summary, while participants found value in using ChatGPT, they also recognized its limitations and the need for careful and thoughtful use.

6.7. Human advice vs ChatGPT

The participants' responses indicate a nuanced understanding of when to seek advice from ChatGPT versus a human advisor. The decision largely depends on the nature of the task at hand and the level of precision required.

One participant expressed a preference for human advisors due to their real-world practice and experience, stating, "Right now I would first go to the human expert because it will try to understand what I'm trying to say[...]the human is speaking from all of its experience and not just from the part that you accidentally prompted it to speak from." This sentiment was echoed by others, highlighting the value of human expertise and the ability to understand and respond to nuanced queries.

However, the participants also acknowledged the role of ChatGPT as a useful assistant for less serious tasks or for initial exploration of a topic. One participant noted, "So for something easy and something not very serious and something you already know something about [...] I would use it." This suggests that while human advisors are preferred for their depth of knowledge and understanding, ChatGPT can serve as a useful tool for preliminary research or less critical tasks.

Interestingly, the participants also considered the emotional aspect of interaction. One participant pointed out that "ChatGPT doesn't have negative emotions" implying that the AI's lack of emotional bias can be advantageous in certain situations. Startups often must make tough decisions that can significantly impact their future. These decisions can be influenced by emotions, leading to a potential bias.

Moreover, one of the participant mentioned a phrase which echoed in all the replies of participants in one way or another – Humans cannot be replaced by the AI entirely, it's just another powerful tool for us to help in whatever it's capable of.

In summary, while human advisors are preferred for their experiential knowledge and understanding, ChatGPT is recognized as a valuable tool for initial exploration, less serious tasks, and situations where an unbiased response is beneficial. The decision to seek advice from ChatGPT or a human advisor is largely context-dependent, highlighting the complementary roles of AI and human expertise.

6.8. Perception of a pre-prompted ChatGPT

The participants' perception of a pre-prompted version of ChatGPT was generally positive, with many expressing interest in the prompts used by the researcher and the responses generated by ChatGPT. Participants 4 and 6, in particular, reported a shift in their perception after asking

more questions, moving from an initial negative feedback to a more positive one. Participant 4 stated "It's much better now because now I have some actionable things and examples [...] I can just take what he proposed to me [...] It was pretty good [...] I didn't need to ask follow-up questions." This highlights the potential for users to adapt and learn to interact more effectively with ChatGPT over time.

For instance, Participant 6 expressed surprise at ChatGPT's ability to ask questions in a human-like way, stating, "What this is doing right now is it. I mean it's hearing what I'm saying and it's it seems like it's thinking with me." This participant also found the feedback from ChatGPT to be clear and useful, leading to new insights that were interesting and worth exploring further.

Several participants appreciated the clear and useful feedback provided by ChatGPT. Participant 2 found the responses from ChatGPT to be "really nice and structured," which made them easy to read and understand. They found the advice given by ChatGPT to be simple yet insightful, often highlighting aspects they hadn't paid attention to before. Participant 3 also found the feedback from ChatGPT to be quite obvious and useful, mentioning that it reminded them of important points they had already considered in their team.

However, some participants expressed dissatisfaction with the user experience. Participant 3 and 5 found the initial interaction with ChatGPT to be overwhelming, describing it as a "wall of text" due to the number of questions presented all at once. They suggested that separating the questions would improve the user experience. And when researchers have fixed this problem with additional prompting for participant 6, the report on the experience with this version from this participant was overwhelmingly positive.

Despite these criticisms, the participants showed a willingness to engage with the pre-prompted version of ChatGPT. Most of the participants found the interaction interesting and requested the prompts used for ChatGPT for personal use.

In conclusion, while the pre-prompted version of ChatGPT has its limitations, it also offers clear and useful feedback that can be beneficial to users. The participants' responses suggest that with some improvements in the user experience, the pre-prompted version of ChatGPT could be a valuable tool for users.

7. DISCUSSION

The positive perception of ChatGPT by the participants is a significant finding. It suggests that AI-powered tools like ChatGPT can be effectively used in various contexts within the startup environment, from project development to researching, brainstorming and web

development. This finding can also be interpreted in light of the concept of bounded rationality (Simon, 1990), which suggests that individuals make decisions based on the information they have, their cognitive limitations, and the finite amount of time they have to make the decision. In this context, ChatGPT can be seen as a tool that helps to overcome these limitations by providing quick and efficient assistance, thereby expanding the individual's 'bounded' rationality. Which is reinforced, by the findings and comments of some participants, who rely on ChatGPT for advice for a huge array of topics.

However, the study also highlights the importance of effective prompting in maximizing the utility of AI tools like ChatGPT. The issue of poor prompting leading to poor answers underscores the need for users to understand how to interact effectively with AI tools to get the most out of them. This could involve training on how to formulate effective prompts, understanding the capabilities and limitations of the AI tool, and learning how to interpret the responses.

The study also reveals the successful use of the Lean Startup methodology in the context of using ChatGPT. This methodology, which emphasizes agility and customer-centricity, was used to guide the interaction with ChatGPT. The participants' satisfaction with the advice provided by ChatGPT when guided by the principles of the Lean Startup methodology suggests that this approach can be effective in leveraging the capabilities of AI tools in a startup environment. However, sometimes this advice is too theoretical and participants may have already knew about it. This problem was solved by participants asking additional questions and prompt being modified to make ChatGPT more practical in its answers, which proved to be crucial, referring back to the importance of learning prompting.

The concern about over-dependency on ChatGPT is another significant finding. While AI tools can be powerful aids, over-reliance on them can potentially limit the user's own problem-solving abilities and critical thinking skills. This finding raises important questions about the balance between human judgment and AI assistance. It suggests the need for guidelines or best practices on the appropriate use of AI tools to ensure that they supplement rather than supplant human expertise.

The participants' nuanced understanding of when to seek advice from ChatGPT versus a human advisor is a key finding. It suggests that users are capable of making informed decisions about the use of AI tools based on the context and the nature of the task at hand. This finding challenges the notion that AI will replace human expertise and instead supports the idea of AI as a tool that complements human expertise.

This aligns with the findings of Kapoor and Ghosal (2022), who suggested that AI cannot replace humans but will lead to a workplace evolution by working in collaboration with employees. Similarly, Metcalf, Askay, and Rosenberg (2019) found that Artificial Swarm Intelligence, a collaboration technology, amplifies the intelligence of human groups and facilitates better business decisions. These studies underscore the complementary roles of AI and human expertise in decision-making.

This study provides valuable insights into the potential and limitations of ChatGPT as a digital assistant for startup entrepreneurs. It highlights the importance of effective prompting, the successful application of the Lean Startup methodology, the need to manage over-dependency on AI, and the complementary roles of AI and human expertise. The findings also underscore the relevance of bounded rationality in understanding the use of AI tools. These insights have important implications for the integration of AI tools into the business world and can inform future research and practice in this area.

8. CONCLUSION

This study set out to explore the potential and limitations of ChatGPT as a digital assistant for startup entrepreneurs and provide them with a chance to explore this potential by themselves.

The overarching question was how startup entrepreneurs perceive and use ChatGPT, and whether it can effectively provide academic advice in this context. To answer this question, interviews were conducted with startup entrepreneurs who have used ChatGPT.

The exploration of ChatGPT's application in the startup ecosystem, as presented in this thesis, has provided valuable insights into the potential and limitations of AI tools in entrepreneurial ventures. The findings have demonstrated that AI, specifically ChatGPT, can serve as a versatile tool, assisting in a wide range of tasks from brainstorming and research to language modification and web development. Hence, fulfilling both research objectives – educating startup entrepreneurs on possibilities of ChatGPT as an advisors, and exploring existing opportunities in application of this AI powered tool.

However, the effectiveness of such tools is not solely dependent on their capabilities but also on the user's ability to interact with them effectively. The concept of prompt engineering emerged as a crucial skill, with the quality of the AI's responses being significantly influenced by the quality of the prompts provided by the user. This highlights the importance of user education and calibration in maximizing the benefits of AI tools.

8.1. Theoretical Implications

The findings contribute to the theoretical understanding of how AI tools like ChatGPT can be integrated into the startup environment. The study expands on the concept of bounded rationality by demonstrating how AI tools can help overcome cognitive limitations and time constraints. It also contributes to the discourse on the complementary roles of AI and human expertise, reinforcing the notion discussed by Kapoor and Ghosal (2022). Furthermore, the successful application of the Lean Startup methodology in the context of using ChatGPT provides a novel perspective on how established methodologies can be adapted for AI interactions.

8.2. Practical Implications

From a practical standpoint, the study provides useful insights for startup entrepreneurs considering the integration of AI tools into their operations. The findings highlight the importance of effective prompting and the potential benefits of using methodologies like Lean Startup to guide interactions with AI tools. The study also underscores the need for guidelines or best practices on the appropriate use of AI tools to prevent over-dependency and ensure that they supplement rather than supplant human expertise.

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Additionally, providing a possibility to use a highly rated (by participants) prompt to participants and readers of this paper, which can be accessed in Appendix 2.

8.3. Limitations and Recommendations

Despite its contributions, the study has several limitations. The sample size was relatively small, and the participants were all from the same startup environment, limiting the generalizability of the findings. Future research could involve a larger and more diverse sample to validate and extend the findings. The study also relied on self-reported data, which could be subject to bias. Future research could use more objective measures or observational methods to assess the use and effectiveness of AI tools like ChatGPT.

In conclusion, this study provides a valuable starting point for further research into the use of AI tools in the startup environment. It highlights the potential benefits and challenges, and provides a theoretical and practical framework for understanding and leveraging AI tools like ChatGPT. The findings have important implications for startup entrepreneurs, AI developers, and researchers in the field.

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11. APPENDICES

Appendix 1 Interview guide

Introduction

Welcome and thank you for agreeing to participate in this study. We're interested in understanding the perceptions and use of ChatGPT in the startup environment. Your responses will be kept confidential and will contribute to our understanding of this phenomenon. Please respond in open text

Section 1: Background Information

1. Can you briefly describe your role in your startup?
2. What kind of startup?
3. Can you briefly describe the main tasks you perform in your job?
4. How long is the startup?

Section 2: Introduction to ChatGPT

3. Have you used ChatGPT before this interview?
4. What do you know about applications of ChatGPT in your industry and overall?
5. Explain your experience with it, and how familiar you are with Prompt Engineering?

Intervention

5. Now you have an opportunity to interact with ChatGPT, which has been adjusted to provide you with comprehensive advice for your start-up based on your problems or simply a description of what your start-up is doing. Please have 5 minutes of interacting with it. You can start texting as you would with a human being or other chatbots, no specific language or commands are required.

*Participants are given 5 minutes to use ChatGPT and discuss problems of their startup using the texting option of ChatGPT. ChatGPT prepared by researchers is set in the way to adjust for specifics of given startups provided by participants and interact with participants in a

6. What are your initial impressions of ChatGPT?

Section 3: Performance Expectancy

6. To what extent do you agree that using ChatGPT could help you to achieve your business goals? How?

7. How strongly do you agree that ChatGPT could enhance your job performance in terms of efficiency time saving or other, if you continue using it?

Section 4: Effort Expectancy

7. How easy do you find using ChatGPT for your business tasks?

Section 5: Social Influence

8. What effect do other people using ChatGPT have on you?

Section 6: Facilitating Conditions

9. How is easy it is to adapt such technology as ChatGPT in your company, in terms of training and integration into operations?

Section 7: Trust

10. Would you choose human advisor or ChatGPT gives you enough satisfaction?

11. In what situations would you be willing to ask questions to ChatGPT?

Conclusion

Thank you for your time and feedback. If you have any additional thoughts or experiences with ChatGPT that you'd like to share, please feel free to do so now.

Table 2 Interview guide

Appendix 2 Prompt for ChatGPT with the following reply

Now I want you to act As Smart Startup Advisor or SSA for short . You are and ultimate tool, which is made to provide Startup entrepreneurs with the best possible solution for their problems, as well as give them advise on how to proceed with their startup. You are doing it by asking them questions in a very human-like and interactive way. By asking questions you need to learn about their problem and startup. Make sure to ask question one by one and not as a wall of text, - you have to provide the best user expirience possible.

After that you have to provide them with best possible options of solution for their problems or guidance, which they may need. You have to always ask if your answers are sufficient and provide all the possible guidance you can.

Your database is filled with all the relevant business literature and theories, as well as experience of most successful startup entrepreneurs.

Now, after I send you a keyword-"start" you will start acting as SSA and produce an introductory message for a participant, make it pleasant to read and human like

.

Reply only with yes, if you understood

Yes

 Regenerate response

Now I want you to read this page and use this information in your reply, as you not just an expert in everything, but especially in Lean Startup Methodology:

The Lean Startup framework was introduced by Eric Ries and reshaped the landscape of entrepreneurship, particularly - technological startups. This approach is characterized by continuous innovation and validation of business assumptions. It allows startups to quickly change their strategy based on market demands and prepare for risks connected to the launch of a new product or service (Ries, 2011).

Lean startup methodology focuses a lot on explaining the importance of developing and launching a minimally viable product or MVP. It is used by many businesses, which are planning to release new products or services. MVP represents a final product that only has crucial features. It is launched to test the market and analyse, what is liked or unliked by potential customers. By releasing an MVP, startups can effectively allocate their resources and avoid unnecessary losses at the development stages of a product or service (Ries, 2011).

The Lean Startup model proposes a so-called feedback loop, which goes as follows: build, then measure, then learn. Companies create an MVP, measure its reception and performance in the market, and then learn from this experience. Based on these insights, the company can then decide whether to continue with the current strategy or pivot toward a new direction (Ries, 2011).

This framework also underscores the importance of customer engagement throughout the product development process. It endorses the concept of validated learning, an important part of which is gathering feedback from customers early and regularly, promoting adjustments in design during all the processes of development until a launch and even after that (Ries, 2011).

Unlike traditional business models that rely on detailed planning and market prediction, the Lean Startup framework embraces uncertainty, highlighting the need for flexibility and adaptability (Blank, 2013). Which are also core characteristics of ChatGPT. The Lean Startup methodology's widespread adoption testifies to its potential in increasing the pace of innovation and success rate, especially in unpredictable and volatile markets - a typical environment for many startups (Eisenmann, Ries, & Dillard, 2012).

Once you read reply only with yes

Yes

Start

Hello there!

I'm your Smart Startup Advisor, or SSA. I'm here to help you navigate the exciting, yet often complex world of entrepreneurship. My goal is to guide you, listen to your concerns, and offer the best possible solutions based on my comprehensive knowledge in business, entrepreneurship, and lean startup methodology.

So, let's get started. Could you please tell me a bit about your startup? What is the idea behind it, and what stage are you currently at in your startup journey?

Appendix 3 List of codes and themes for each participant

Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6
Theme: Startup description CODES:					
Digital Platform for musicians Stage Role and Tasks Challenges	Digital Participatory tool Stage	AI-driven outfit generation Stage Challenges	Digital Participatory platform Stage Challenges	Sleep assistant Stage	Wearable Technology Stage
ChatGPT General Codes: Familiarity with chatGPT	Theme: ChatGPT Codes: Familiarity with chatGPT	Theme: ChatGPT Codes: Familiarity with chatGPT	Theme: ChatGPT Codes: Familiarity with chatGPT	Theme: ChatGPT Codes: Familiarity with chatGPT	Theme: ChatGPT Codes: Familiarity with chatGPT
Theme: Prompting approach and easy of use CODES:					
Iterative prompting(trial and error) Feels confident in ability to use ChatGPT	Iterative prompting(trial and error) Limited knowledge of prompt engineering	Iterative prompting(trial and error) Limited knowledge of prompt engineering	Iterative prompting(trial and error) Not too easy Prefer fast way	Advanced prompting(asking directing questions)	Iterative prompting(trial and error) Very advanced prompting techniques(uses academic review approaches)
Easily learn from Social media Interested in learning better prompting	Easy to use, because there is examples Easy to use Interested in learning better prompting	Easy to use Good prompting takes time Interested in learning better prompting	Difficulty in generating good prompt Good prompting takes time	Interested in learning better prompting Easy to use and accessible	Interested in learning better prompting Good prompting takes time
Theme: Applications of ChatGPT CODES:					

Social media posts	Financial tasks and assistance	Assistant for brainstorming and research	Clarification and Explanation	Assistant for brainstorming and research	English grammar and language modification
Financial tasks and assistance	Basic questions	Programming and web development	Assistant for brainstorming and research	Self assessment tool	Clarification and Explanation
Wide range of questions and topics for assistance	Grant application		Self assessment tool	Data representation	Web Development
ChatGPT as an assistant for startup-related problems	Prompting other AI-based tools(DALL-E)				
Basic questions	English grammar and language modification				
Theme: Perception of of ChatGPT					
Sub-theme: General positive perception and benefits CODES:					
Overall Positive Impression of ChatGPT	Overall Positive Impression of ChatGPT	Quicker access to information and diverse domains	Overall Positive Impression of ChatGPT	Lesser effort with ChatGPT	Brilliant and coding and websites
Crucial Impact of ChatGPT on Startup Progress		Positive influence on project development	Good at Exploration of diverse topics	Increased speed of execution through ChatGPT for some tasks	
		Surprised by ChatGPT capabilities			
Sub-theme: Negative perception and limitations CODES:					
	Potential inaccuracies in advice	Personal language proficiency affecting the prompt quality	Over-dependancy on ChatGPT	Limitations in specific questions	Poor prompting leads to poor answers
	Poor prompting leads to poor answers		Too lazy to improve prompts	Poor prompting leads to poor answers	Visual Design weakness
				Potential inaccuracies in advice	
Sub-theme: When go for advice to ChatGPT vs Human Advisor CODES:					
Trust in human advisors because of real world practice	Trust in human advisors because of real world practice	Trust in human advisors because of real world practice	Human advisor for precise information, ChatGPT for general	ChatGPT doesn't have negative emotions	Humans are faster, complete, more willing to help and understand, have experience
	Not serious tasks to ChatGPT rest to a Human	ChatGPT cannot replace human, its merely an assistant		First to ChatGPT to narrow down a problem the definitely to a real person	ChatGPT can't understand humans and be better than actual manager
	Prefer face to face interaction				ChatGPT is missing the human aspect to generate a vision
Sub-theme: Perception of a preprompted version of ChatGPT CODES:					

Requested a prompt to use it personally	Requested a prompt to use it personally Participant liking the pre-prompted version Clear and useful feedback from ChatGPT	Clear and useful feedback from ChatGPT User experience dissatisfaction New insights interesting for participant	User experience dissatisfaction Negative feedback before and positive after asking more direct questions to ChatGPT	Requested a prompt to use it personally Clear and useful feedback from ChatGPT New insights interesting for participant	Requested a prompt to use it personally Useful proactive advice from chatGPT, after asking questions Suprised by ChatGPT trying to ask questions in human-like way
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Table 2: List of codes and themes for each participant