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Valuing and Scripting AI: The Effects of Generative Artificial Intelligence on  
Qualitative Research

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David Würflinger BA

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## **About AI usage within this thesis**

I acknowledge the use of generative AI tools in the creation of this work. These tools were used for tasks such as summarization, outline creation, finding literature and re-writing of text blocks in various parts of the thesis. The use of these tools has been an integral part of my research and writing process, and their impact on the final product is acknowledged. I have taken care to confirm the accuracy and validity of the results obtained through the use of AI tools to ensure that this thesis is in line with AI usage guidelines from the university of Vienna ([KI in Studium und Lehre univie.ac.at](https://www.ki.institut.ac.at/)), as of January 2024) and standards for academic research overall.

During the writing process, I myself have gained extensive experience with generative AI tools and have reflected on my own experiences throughout the thesis, primarily in a separated chapter in section 8 and are to be seen as an addition to enrich the overall insight into the topic, but not as part of the empirical work.

## **Abstract**

This thesis embarks on an exploratory journey into the realm of generative AI tools within qualitative social science research, anchored by the frameworks of valuation studies and user studies. Aiming to answer the question: *How does the usage of generative Artificial Intelligence impact qualitative research in the social sciences?* it delves into how these advanced technologies impact academic research, exploring their potential, challenges, and ethical implications in academic contexts, balancing the promise of innovation with the practicalities of academia. Through a mixed-methods approach combining document analysis and experimental intervention, the study examines the adoption, utilization, and ethical challenges of AI in research through the experiences created by an experimental setup with two researchers. It reveals that within the scope of this study, social science researchers often prioritize efficiency, gravitating towards tools that offer immediate results with minimal learning investment, reflecting the competitive pressures of academic work. The findings suggest a nuanced understanding of AI's role, highlighting its potential for enhancing research processes while also necessitating careful integration considering its limitations and revealing that researchers prioritize efficiency over innovation in tool usage. This thesis underscores the complexities of integrating AI in academic research, offering insights into the dynamic interplay between technological advancements and the evolving landscape of social science research.

## Contents

|                                                                                    |    |
|------------------------------------------------------------------------------------|----|
| <b>Acknowledgements</b> .....                                                      | 0  |
| <b>About AI usage within this thesis</b> .....                                     | 1  |
| <b>Abstract</b> .....                                                              | 2  |
| <b>1 Introduction</b> .....                                                        | 5  |
| <b>2 State of the Art</b> .....                                                    | 8  |
| <b>2.1 Discussing the Social Sciences and qualitative research</b> .....           | 8  |
| <b>2.2 Defining the technical Terminology</b> .....                                | 9  |
| <b>2.3 The role of technologies in knowledge production</b> .....                  | 10 |
| 2.4 STS Viewpoints on ML and AI.....                                               | 11 |
| 2.5 Algorithms, Digital Tools, and ML/AI in knowledge production .....             | 15 |
| 2.6 Using Large Language Models for qualitative research. ....                     | 18 |
| 2.7 Reflecting the reviewed literature.....                                        | 21 |
| <b>3 Research Questions</b> .....                                                  | 23 |
| <b>4 Sensitizing Concepts</b> .....                                                | 25 |
| 4.1 Valuation Studies .....                                                        | 26 |
| 4.2 User Studies .....                                                             | 28 |
| <b>5 Material and Methods</b> .....                                                | 32 |
| 5.1 Document Analysis.....                                                         | 32 |
| 5.2 Experimenting .....                                                            | 34 |
| 5.2.1 Phase 1: Recruitment and Onboarding.....                                     | 36 |
| 5.2.1.1 Initial survey:.....                                                       | 38 |
| 5.2.2 Phase 2: Task Execution.....                                                 | 39 |
| 5.2.3 Phase 3: Ex-post Interviews .....                                            | 40 |
| 5.2.3.1 Interview Questionnaire: .....                                             | 40 |
| 5.2.4 Analysis .....                                                               | 41 |
| 5.2.5 AI Tools Used in the Experiment: .....                                       | 42 |
| <b>6 Analysing Documents</b> .....                                                 | 45 |
| 6.1 Documents describing the usage of generative AI .....                          | 45 |
| 6.1.1 The GPT-4 Technical Report .....                                             | 45 |
| 6.1.2 “How ChatGPT could transform higher education” .....                         | 47 |
| 6.1.3 “How to use ChatGPT in social science research” .....                        | 48 |
| 6.2 Documents describing implementation of generative AI into software tools ..... | 50 |
| 6.2.1 “AtlasTI” .....                                                              | 50 |

|                                                                            |     |
|----------------------------------------------------------------------------|-----|
| 6.2.2 “MAXQDA” .....                                                       | 51  |
| 6.2.3 “Consensus” .....                                                    | 53  |
| 6.3 Discussion .....                                                       | 54  |
| <b>7 Experimenting</b> .....                                               | 57  |
| 7.1 Participant A .....                                                    | 57  |
| 7.2 Participant B .....                                                    | 62  |
| 7.3 Discussion.....                                                        | 69  |
| 7.3.1 Differences in Background and Experience with AI.....                | 69  |
| 7.3.2 Reflecting Different Priorities and Varied Experiences .....         | 69  |
| 7.3.3 Similarities: Common Struggles and Perspectives.....                 | 70  |
| 7.3.4 Putting the findings into the context of Document Analysis.....      | 71  |
| <b>8 Discussing the overall Results</b> .....                              | 74  |
| 8.1 Reflecting on my own experience with AI in light of the findings ..... | 74  |
| 8.2 How the findings relate to the literature .....                        | 78  |
| 8.2.1 Relating to the state of the Art.....                                | 78  |
| 8.2.2 Situating the Results with sensitizing concepts.....                 | 79  |
| <b>9 Conclusion</b> .....                                                  | 82  |
| <b>References</b> .....                                                    | 86  |
| <b>Appendix</b> .....                                                      | 93  |
| Abstract German.....                                                       | 93  |
| Consent Form .....                                                         | 94  |
| Participant Onboarding.....                                                | 95  |
| Original Quotes.....                                                       | 101 |
| Participant A .....                                                        | 101 |
| Participant B .....                                                        | 102 |

## 1 Introduction

Artificial intelligence (AI), especially in the field of natural language processing (NLP), has attracted considerable attention from different domains. The development of generative AI technologies, based on large language models (LLMs), has changed the capabilities of artificial intelligence significantly, as pioneered by Vaswani et al., (2017) leading to faster training and improved performance of such AI models. As generative AI continues to evolve, it is being integrated into an increasing number of tools and platforms, reshaping our interaction with technology. In academia, the potential of AI and NLPs is being realized through supposed enhanced access to data, “innovative” research methodologies, and assistance in scientific writing. As these technologies advance, they offer the potential to aid in the creation of new scientific knowledge, while also changing knowledge production in yet unforeseen ways (*Work Trend Index | Will AI Fix Work?*, n.d.). The implications of these advancements are particularly profound for the qualitative social sciences, a field where reading and writing are fundamental skills. Generative AI, with its main skill in language processing, can significantly augment these duties. Whether it's conducting a quick literature review, formulating research questions, or performing basic document analysis, generative AI tools are becoming increasingly capable of assisting in these tasks. And to add, many of the most popular tools for qualitative work are getting equipped with generative AI such as MAXQDA and AtlasTI.

However, the adoption of these technologies is not without concerns. The usage of generative AI technologies in academic research brings nuanced debates concerning academic integrity and the nature of scholarly inquiry to the forefront. The way in which these technologies can generate texts prompts a broader reflection on the concepts of authenticity and originality in research outputs. Concerns arise over the potential for these tools to streamline processes in ways that might bypass the rigorous engagement traditionally associated with academic work. This evolving landscape triggers a discourse on the role of AI in research which encompasses a range of issues, from the reinforcement of biases inherent in the data these models are trained on, to the possible diminution of critical thinking and analytical skills that are central to the investigative rigor of the sciences. The current competitive academic landscape, as described among others by Falkenberg & Fochler (2022), may push researchers towards the quick adoption of novel technologies like generative AI to stand out and increase their productivity. Yet, this rush towards innovation could potentially compromise the quality of knowledge produced, leading to a lack of critical thinking and

potential errors in research. With this concept in mind, this thesis aims to delve deeper into the effects of generative AI on the social sciences, with a specific focus on how AI tools based on large language models are used in research methodologies and scientific writing and how they might thereby change the process and outcomes of knowledge production. Drawing on the theoretical framework of valuation studies and concepts such as the “script” from the field of user studies, this study will explore how these technologies are valued, utilized, and potentially *de-scribed* by social science researchers through combining document analysis and experimental intervention. I aim to provide a comprehensive exploration and offer a nuanced understanding of the role of generative AI tools in qualitative social science research.

This thesis is structured in the following:

I start with a review of relevant literature, where the focus lies on the evolving role of technology in knowledge production, particularly within social sciences and STS, narrowing in on artificial intelligence. This section delves into the transformative effects of algorithms, machine learning, and AI on research methodologies and knowledge dissemination, offering an understanding of the current academic landscape.

Following this, Chapter 3 introduces the core research questions, articulating the central themes and inquiries that guide the study. These questions aim to uncover the nuances of how generative AI impacts qualitative methods in social sciences and the broader implications of such technological integration.

Chapter 4 presents the sensitizing concepts, laying out the theoretical base that supports the analysis. This section discusses critical theories and conceptual frameworks which guide us in dissecting the complexities of AI's role in research.

The methodology, detailed in Chapter 5, outlines the mixed-methods approach, encompassing both document analysis and experimental intervention in detail.

In Chapter 6, the focus shifts to a thorough analysis of various documents related to the use of generative AI. This includes an examination of technical reports, academic articles, and other relevant texts, offering insights into the practical applications and theoretical discussions surrounding AI in academia and social sciences.

Chapter 7 delves into the experimental aspect of the study, where the experiences of participants engaging with AI tools are presented. This chapter provides insight into how these tools are used in practice and their effects on research processes.

The second to last chapter, Chapter 8, synthesizes the findings from both the document analysis and experimental phases. It reflects on the implications of these findings for the field of social science research, discussing how generative AI is reshaping research methodologies and the production of knowledge, as well as reflecting on my own experiences.

The thesis culminates in Chapter 9 with a conclusion that succinctly summarizes the key findings. It discusses the broader implications of these findings for the future of generative AI in qualitative social science research, offering prospects for further research.

## 2 State of the Art

The role of technology in research and knowledge production has been a subject of interest in various fields, social sciences and in particular, STS, being among them. The advent of new technologies has transformed the ways in which knowledge is produced, disseminated, and consumed. After discussing a working definition for the social sciences in combination with qualitative research for this thesis and defining the relevant technical terms, this chapter aims to provide an overview of the literature from the wider social sciences in this area, going over the role of algorithms, machine learning (ML), and artificial intelligence (AI) in (social science) research and knowledge production, then closing in on generative AI in social science research.

The literature that I have chosen to review in this chapter reflects the main themes and questions that inform my research: how does generative AI affect the social sciences, especially qualitative methods, and what are the implications of using certain technologies for research and knowledge production? I have selected sources that provide relevant insights, perspectives, and critiques relating to these topics, drawing from various disciplines. However, the literature that I have reviewed is not exhaustive, nor is it representative of all the possible views and debates that exist on these topics. There are gaps and limitations that I acknowledge and address in this chapter and throughout this thesis. Furthermore, the literature is constantly evolving and expanding, as new technologies, methods, and applications emerge and challenge the existing ones – especially in the field of AI. Therefore, the literature that I have reviewed should be seen as a snapshot of the current state of the art, rather than a definitive or comprehensive account of the whole field.

### 2.1 Discussing the Social Sciences and qualitative research

Creating a general and overarching definition of the social sciences that grasps every aspect of it is a near-impossible task in my view. One possible definition would be “Any branch of science that systematically studies the social world, investigating how humans interact with each other and their environment” (*Social Science Definition | Open Education Sociology Dictionary*, n.d.) or put shortly, “the scientific study of human society and social relationships” (*Oxford Languages and Google - English | Oxford Languages*, n.d.) But they are not a strictly homogeneous field, with many different disciplines within them like sociology, political science, anthropology, science and technology studies, and the list goes on. What they mostly have in common though, is the methodological divide between quantitative and qualitative methods, with the latter being defined by Stanford as “[...] the

naturalistic study of social meanings and processes, using interviews, observations, and the analysis of texts and images. In contrast to quantitative researchers, whose statistical methods enable broad generalizations about populations [...], qualitative researchers use in-depth studies of the social world to analyse how and why groups think and act in particular ways [...].” (*Definition - Qualitative Research - Guides at Stanford University*, n.d.) But even this definition is not complete, as qualitative methods in itself are an ever-changing field themselves, with new methods being created, others updated, and some discarded (Brinkmann et al., 2020)

With all this in mind, I may take a dynamic approach to defining these categories. For defining qualitative methods, I will loosely follow the Stanford definition, meaning that I look at methods that are not trying to produce generalizable output and are in addition deployed to research the social. A subset of those methods would then be all of those that get combined with generative AI, which this research is interested in. The exact methods that I then focus on are uncovered through the empirical strategy of this thesis, the combination of document analysis and intervention through experimentation.

With this research itself being of a qualitative nature, it has to be kept in mind that even though it may give us valuable insight into how a particular set of researchers from the social sciences use a particular set of methods for qualitative research and how AI affects this, the results of this thesis will not apply to all of the social sciences nor all of the qualitative research processes out there, merely allowing us a glimpse into the ongoing developments regarding the interaction between generative AI and qualitative research.

## **2.2 Defining the technical Terminology**

Similar to discussing my working definition of the social sciences and its methods, defining key technical terms used in this research is crucial. As these definitions are a lot less debated than the ones in the social sciences, I mainly lean on the excellent explanation series by Google Cloud Tech. Here, Artificial Intelligence (AI) is described as the overarching field focused on imitating intelligent behaviour in machines, with its applications spanning various sectors, such as healthcare and finance (Google Cloud Tech, 2023). Natural Language Processing (NLP) then bridges human language and machine understanding, laying the groundwork for machines to interpret and generate human language in a contextually relevant manner.

Large Language Models (LLM), including Generative Pre-trained Transformers (GPT), represent the current technology of AI systems in language processing. These models are trained on vast datasets to understand and generate human language and are mostly summarized under the umbrella of generative AI. Generative AI, as discussed in the Google Cloud Tech video, embodies AI's ability to create new content from learned data, using deep learning to produce text, images, and sounds (Google Cloud Tech, 2023).

Lastly, Machine Learning is the backbone of AI, enabling machines to learn from data and make decisions, thereby driving the functionalities of both generative AI and more precisely LLMs. These definitions build the foundation for the understanding of AI in this thesis.

### **2.3 The role of technologies in knowledge production**

The relationship between technology and knowledge production and further how technology shapes the pursuit and dissemination of knowledge lies at the start of this literature review. This broad topic has been researched by many different disciplines, even extending beyond the social sciences. Teodoridis (2018) for example offers a viewpoint from management sciences of how technological access influences team formation in knowledge production, finding that reductions in technology costs can lead to more diverse team expertise by facilitating collaboration between specialists and generalists. This showcases technology's role not just as a tool but as a strategic asset that may be leveraged to enhance creativity and innovation across different knowledge domains.

With a more nuanced approach coming from the social sciences, Bruno Latour's "Science in Action," a classic in the field of Science and Technology Studies, delves into the processes through which scientific facts and technological artefacts are constructed. Latour's work vividly captures the collaborative, contested, and materially entangled nature of scientific practice, revealing how technologies—from laboratory instruments to computational models—play a central role in stabilizing and disseminating scientific knowledge. Through concepts like "black boxing," Latour illustrates the transformation of complex scientific processes into taken-for-granted facts, highlighting the essential but often invisible role of technology in making science "work". In a more recent publication, Fochler (2016) offers an insightful exploration into the cultural dynamics of high-tech startups at the academia-business interface. His work illustrates how technology-driven companies serve as unique spaces for knowledge production, where researchers motivated by the limitations of traditional academic and industry settings find new avenues for epistemic work.

Birch (2020) introduces the concept of "technoscience rent" within technoscientific capitalism, highlighting how technology and knowledge are transformed into assets through mechanisms like intellectual property rights. Birch's analysis emphasizes the political economy of knowledge production, where technology facilitates the extraction of value from knowledge, thereby shaping the conditions under which knowledge is produced and circulated. This perspective sheds light on the increasingly proprietary nature of knowledge and technology in contemporary capitalism, raising critical questions about access, equity, and the public good.

These texts serve as a peek into the different ways in which the influence of technology on knowledge production is being explored. From facilitating new forms of collaboration and creating alternative spaces for research to reconfiguring the political economy of knowledge and playing a critical role in the construction of scientific facts, technology emerges as a key actor in the landscape of knowledge production.

## **2.4 STS Viewpoints on ML and AI**

When looking for STS literature on generative AI, it becomes very clear, that as of the writing of this thesis, this is a topic that has not been explored in depth, but more so artificial intelligence in general. Richard Barbrook writes in his article "New York Prophecies: The Imaginary Future of Artificial Intelligence" about the imaginary of AI and how it evolved over time. He concludes that "[o]ur own personal frustrations with computer technology should demonstrate the improbability of its transformation into the Silicon Messiah [...] artificial intelligence has become an imaginary future from the distant past. What is needed instead is a much more sophisticated analysis of the potential of computing." (Barbrook, 2007, p. 165)

In a more recent article by Debra Benita Shaw, they review an exhibition called AI: More Than Human, which explores the idea of artificial intelligence and its implications for humanity. The author criticizes the exhibition for reinforcing the myth of autonomous thinking machines, without addressing the ethical and social issues of data accumulation and surveillance. The author also questions the assumption that human intelligence can be separated from the body and the world and argues that artificial intelligence is always dependent on human intervention and interpretation. They suggest that instead of focusing on creating new forms of life, we should pay more attention to how we coexist with technology and other living beings (Shaw, 2020). In current times, this is particularly interesting, because

while they criticize how such AI exhibitions and products reinforce the myth of autonomous thinking machines, now, many companies, especially the ones working on LLMs, have to emphasize repeatedly that their AI is not capable of autonomous thinking, and many if not all of those Systems even tell the user themselves that they are not, in fact, conscious, as emphasized by Colomé, (2022).

The thought that artificial intelligence is always dependent on human intervention and interpretation on the other hand aligns somewhat with the currently developing notion that generative AI can only be as good as the human prompt given to them. For instance, Felicitas Hesselmann provides an article that examines how journal editors use automatic screening tools to identify and stop violations of research integrity in academic publishing. It claims that these tools are not just neutral technologies, but “normatively charged instruments” (Hesselmann, 2023) for governance. It uses the concept of digital imaginaries to analyse how editors explain their (non-)use of automatic screening tools based on two contrasting visions of academic publishing: one that sees it as a small and secure community, and one that sees it as a large and risky space. These imaginaries reflect the features and cultures of different academic fields and involve different forms of control and power for editors (Hesselmann, 2023). It is worth mentioning again that the developments of generative AI are very recent. Therefore, existing research on this technology from the social sciences and especially STS is relatively sparse, but relating literature still enables us to gain an orientation within STS.

Delving into a “classic” from the STS perspective, the research by Allhutter et al. (2020) on algorithmic profiling in the Austrian job market reveals the profound implications of algorithms in societal structures. Their analysis of the AMS algorithm, employed by Austria's public employment service, uncovers how such algorithms are not only influenced by technical affordances but also deeply entrenched in social values, norms, and goals. This study underscores the co-production of automated managerial practices and the enactment of austerity politics, offering a critical lens on how algorithms mirror and reinforce existing societal structures and biases. While their research does not directly link algorithms to knowledge production, the implications of their findings resonate profoundly with the use of technology in research processes. The biases and value-laden choices inherent in algorithm design raise pertinent questions about the neutrality and “objectivity” of digital tools in research.

Looking at a pre-print from the field of Technology Assessment (TA), I find a close relationship with the research interests of this proposal: Steffen Albrecht (2023) argues that the use of AI systems like ChatGPT in scientific research presents both opportunities and risks. He argues that AI-based applications can support scientific work, for example, by extracting data from publications or summarizing study results. In particular, AI language processing models can be helpful in creating scientific texts, such as journal articles or grant proposals, the author finds. In the future, they could also assist in the review process. Positive aspects of using AI systems include in their findings accelerating research, development, and innovation by reducing the time it takes to publish research results as well as relieving researchers of routine tasks, allowing them to focus on new discoveries, and reducing the disadvantages faced by researchers who are not proficient in English for example when publishing in international journals. AI models could also be useful in designing scientific experiments or interpreting data, as well as analysing text or speech data. However, Albrecht points out that there are also risks associated with using AI models in scientific work. Inaccuracies and potential biases in the models can be problematic. Another issue is the lack of attribution of information to a source, which is important for contextualizing ideas and proving a connection to specific ways of thinking. This connection is lost in the training and parameterization process of AI models. A risk that Albrecht highlights about the interaction between science and the public is the low level of factualness in AI models. They could exacerbate disinformation and erode trust in science. Researchers could be tempted to prioritize plausibility over verified knowledge in their publications. The rapid publication of research results could be accelerated by systems like ChatGPT, causing the number of scientific publications to continue growing. This makes it difficult to carefully review publications and maintain an overview of the state of research. On the one hand, there is hope that the use of ChatGPT will expose problematic aspects of academic research. On the other hand, the workload and competitive pressure may increase with the use of AI-assisted tools, forcing researchers to rely on such tools, and perpetuating the cycle (Albrecht, 2023).

Relating to Albrecht's findings, in a recent contribution to this emerging field, Bail (2023) discusses the potential and limitations of generative AI for social science research. He argues that generative AI, defined by them as a type of artificial intelligence that can produce realistic text, images, and other creative outputs, has the potential to simulate human behaviour, improve simulation-based research, serve as a virtual research assistant, help social scientists acquire programming skills, and generate research questions and hypotheses. However, Bail also emphasises the ethical and practical challenges of using generative AI,

such as the risk of bias, misinformation, and lack of transparency. He concludes by calling for more collaboration between social scientists and AI researchers to ensure the “safe and effective use of generative AI” (Bail, 2023). This aligns with the broader call for responsible AI development and use in the field.

Some voices in the field are starting to dissect the terminology around AI itself, we see Jatón and Sormani (2023) for instance critically examine the notion of 'artificial intelligence' from an STS perspective. Their work challenges the binary approach to AI and advocates for empirical, field-based investigations into the practical formation or dissolution of AI as a recognizable phenomenon. This approach tries to record the instances where AI becomes visible or invisible in certain circumstances, thus improving the knowledge of AI in social settings. This aligns with the direction of this thesis, underlining that AI has to be treated as many different implementations and technologies and not as one homogenous phenomenon.

In the latest and newest wave of research from within STS, we are starting to see a focus in research on the implications of AI usage and connecting fields such as AI robotics and especially healthcare. Incorporating these insights into this literature review enriches our understanding of AI's multifaceted involvement and brings forth the complexities of AI integration in areas like the role of human mediation in AI-assisted care, the political and organizational dimensions of AI systems in public sectors, and the nuanced processes of establishing AI as a credible scientific tool in personalized medicine. These studies collectively highlight the dynamic interplay between AI technologies and social practices, emphasizing the need for a critical and empirically grounded approach to understanding AI in the social sciences.

The advent of AI in medical diagnostics, particularly in pathology, has been a source of significant epistemic disruption. Carboni et al. (2023) discuss how the datafication and digitalization of diagnostic processes have already led to profound changes within academic pathology departments, even before the widespread implementation of AI. The anticipation and narratives surrounding AI-assisted diagnostics are reshaping organizational structures, influencing epistemic practices, and introducing new uncertainties such as sensorial, intra-active, and *fauxtomated* (a blend of automation and its narrative presentation) uncertainties. They explore the epistemic disruptions caused by AI in medicine, particularly in diagnostic processes. Their study highlights the changes in pathologists' work processes due to digitization, emphasizing the emergence of three types of uncertainty: sensorial, intra-active, and *fauxtomated*. They argue that the promissory discourses around AI, even in its absence,

encourage datafication and digitalization that fundamentally alter diagnostic methodologies and produce new forms of uncertainty and responsibility in medical practice.

In a related field, Henriksen and Blond (2023) analyse two AI systems developed for public sector accounting and healthcare. They highlight the political and managerial interests driving these systems, designed primarily for cost-efficiency and enforced in a top-down manner. Their findings question the realization of human-centred AI design, suggesting a divergence from the original vision of intelligence augmentation (Henriksen & Blond, 2023).

Staying within the medical realm, Jatón (2023) investigates the “Tumor neoantigen Selection Alliance (TESLA)”, a ground-truthing project in personalized cancer immunotherapy. The study shows how TESLA's efforts to establish a reference for immunogenic neoantigens influence the field of personalized cancer immunotherapy. It illustrates how ground truths, while contestable, become instituted within scientific and industrial communities, shaping the development and application of AI technologies in personalized medicine.

Lastly, showcasing an example from the related field of care, Chevallier (2023) examines the deployment of Paro, a baby seal robot, in a French public nursing home, focusing on the robot's psychosocial effects and its integration into care routines. The study reveals that despite Paro's AI capabilities, significant human effort and mediation by care staff are required to facilitate patient-robot interactions. This research underscores the ontological flexibility of the robot and the complexities involved in integrating AI in care settings.

In summary, STS literature has addressed AI in a broad way and is just now in its early stages of setting a specific focus on specific technologies within the realm of Artificial Intelligence such as generative AI. However, existing discussions on digital tools, algorithms, machine learning and artificial intelligence provide a valuable base that can help to inform this research on the specific impacts of generative AI in social science research. As generative AI technologies continue to evolve and become more integrated into research, education, and society, STS scholars must engage in more in-depth and specific investigations of these technologies and their implications.

## **2.5 Algorithms, Digital Tools, and ML/AI in knowledge production**

In the realm of STS, the intersection of AI with research methodology, though broadly considered, has yielded key insights into the role of digital tools in shaping knowledge production. The work of Marres & Gerlitz (2016) is worth noting in this context. They

introduced the concept of "interface methods" as a novel approach to developing methods in digital social research. Their argument hinges on the “dynamism and under-determinacy” of digital methods, emphasizing how these methods transcend traditional methodological boundaries through the introduction of the digital.

Further probing the role of algorithms in knowledge production, the work of Lee and Helgesson (2020) delves into the nuanced roles algorithms play in high-throughput bioscience, challenging the simplistic notion of algorithms as mere tools for data processing. They uncover the complex interplay between algorithms and human agency, illustrating how algorithms actively participate in scientific practices and are subject to various styles of valuation by laboratory personnel. This dynamic relationship significantly impacts the production of scientific knowledge, as algorithms influence both the organization of experimental procedures and the interpretation of data. A key theme in their research is the concept of "styles of valuation," which refers to the different ways in which laboratory actors value and engage with algorithms. Lee and Helgesson observe that algorithms are not uniformly appreciated or utilized across the lab; instead, their integration into scientific work is contingent upon specific situational valuations. These valuations are informed by the perceived benefits and drawbacks of algorithmic automation, such as the ability to minimize nonbiological variation in data processing versus the risk of obscuring meaningful biological signals through over-normalization.

Relating to STS exploration of algorithms more generally, Nick Seaver's exploration in "Knowing Algorithms" delves into the multifaceted roles of algorithms within digital cultures, challenging the perception of algorithms as mere technical entities by highlighting their sociotechnical nature. Seaver proposes that understanding algorithms extends beyond their technical design to consider the social, cultural, and ethical dimensions shaping and shaped by algorithmic practices. He critiques the opacity and complexity of algorithms, arguing that these features, coupled with corporate secrecy, complicate their study and understanding. Through a constructivist approach, Seaver advocates for a nuanced analysis that sees algorithms as social constructions, emphasizing the need for ethnographic studies to unravel the intricate relationships between algorithms, human agency, and knowledge production. This perspective shifts the focus from algorithms as isolated objects to their broader implications in mediating human interactions and cultural processes, which of course also has to be kept in mind when involving them into research processes, offering insightful critiques on the accountability and transparency of algorithmic systems.

By examining the role of algorithms and digital tools in knowledge production through an STS lens, this section of the thesis aims to further contextualise the complexities and nuances of technological integration in research processes. This exploration is not only crucial in understanding the current landscape of digital tool usage in research but also in anticipating the future trajectories and ethical considerations of such integrations.

The advent of AI and ML in the realm of research methodology spans a broad spectrum of fields, each experiencing a unique transformation under their influence. The foray into biological and biomedical sciences by AI and ML technologies, as discussed by Leonelli (2012), exemplifies the shift towards data-driven research. This movement highlights a paradigmatic change in scientific inquiry, where data is not merely a byproduct of research but the central focus, driving hypotheses and experimental designs. Leonelli's insights show for how long this topic has been on the horizon and it aids in understanding the possibility of AI and ML to transform traditional research methodologies, heralding a new era of empirical inquiry driven by large-scale data analysis.

Williamson and Eynon (2020) illuminate the evolving role of AI in the field of learning science, particularly highlighting the emergence of digital laboratories as new epicentres for experimental knowledge production. Their work suggests a reimagining of the research environment itself, where digital spaces become integral to the discovery process. This development underscores the broader trend of digitalization in research, where AI technologies not only serve as tools but also fundamentally redefine the context and conduct of scientific exploration. Taking a broader look, Sarker's (2021) comprehensive overview of machine learning algorithms and their varied applications provides a wider lens through which to view the potential of these technologies across different domains of research and knowledge production. Sarker's work is instrumental in situating the specific applications of AI and ML in the social sciences within a wider technological and methodological context, underscoring the diversity and adaptability of these technologies in diverse research settings.

Adding a critical dimension to this discourse, Andrew Balmer (2023) reflects on his interactions with ChatGPT, raising pertinent concerns about the implications of AI in the education and research sectors. Balmer's critique centres on the nuanced and often understated effects of AI's communicative style, which poses significant challenges for academic research and education. His observations highlight the complex interplay between AI's content and its presentation, urging a deeper consideration of the scientific, social, and ethical consequences embedded in AI's mode of communication. Balmer's analysis extends to

the cultural and political underpinnings of AI design and usage. He adeptly points out that the mechanisms governing the retrieval and prioritization of information by AI are rooted in a set of values and priorities encoded into its algorithms and data models. This non-neutrality of AI raises profound questions about the objectivity and impartiality of AI-assisted research and calls for a critical assessment of the ethical and societal implications of deploying AI in knowledge production. Furthermore, Balmer's insights resonate with broader concerns in the field of STS regarding the influence of technology on the epistemology of research. This perspective emphasizes the need for a nuanced understanding of AI's role in social science research, not only as a technological advancement but also as a cultural and political artefact that shapes and is shaped by societal norms and values.

This section has explored the complex connection between technology and knowledge creation, emphasizing the changing role of algorithms, digital tools, and machine learning/artificial intelligence within this setting. The contributions from scholars across different fields provide a multifaceted view, underscoring the complexity of integrating these technologies into research methodologies. By examining various perspectives on how technology influences the processes of scientific inquiry and data interpretation, we gain insights into both the opportunities and challenges presented by digital advancements.

## **2.6 Using Large Language Models for qualitative research.**

The integration of generative AI into qualitative research in the social sciences has been a topic of significant interest and extensive study. This integration marks a new era in research methodologies, characterized by a blend of technological advancements and complex challenges and is primarily seen in the coding of interviews and other material. The following literature aims to offer a comprehensive understanding of this integration's implications, opportunities, and challenges.

Crowston et al. (2012) are among the first to examine the application of natural language processing and machine learning in automating the coding of qualitative data in social science research. The study contrasts human-developed NLP rules with those inferred by ML algorithms, focusing on the extraction of coded text. They explore both manual rule development and ML approaches, assessing their performance and limitations. Crowston et al. report that both approaches have potential, but they also encounter difficulties such as requiring an NLP expert to create rules by hand or enough training instances for ML. The

paper serves as a base for the ongoing discussion of automating qualitative data coding and its potential to enhance research efficiency and accuracy.

Marathe and Toyama (2018), in their exploration of semi-automated coding in qualitative research, reveal that researchers across various disciplines exhibit a strong interest in automation, especially after the development of a codebook and the initial coding of data. Their findings suggest a widespread desire among researchers to extend coding to unanalysed data, highlighting the potential of natural language processing techniques in partially automating this process. The study underlines the necessity for assistive tools to be transparent in how they work and suggest things, pointing towards a future where AI not only aids but also aligns with the methodological rigour of qualitative research (Marathe & Toyama, 2018).

Chen et al. (2018) bring an important perspective to the discussion by focusing further on the challenges of applying ML to the practice of coding in social sciences. They identify a critical gap between machine learning and traditional qualitative methods, particularly in the context of analysing social data, which is often complex and laden with subjective nuances. The researchers emphasize the need for more human-centred machine-learning methods that can support the unique requirements of qualitative research. Chen et al. suggest ways to research how machine learning applications can be based on social science by focusing on the aspects of vagueness and unpredictability in qualitative data, as part of the move toward more human-oriented methods.

Rietz and Maedche (2021) contribute to this evolving landscape by introducing Cody, an “AI-based system designed to support semi-automated coding in qualitative research” (Rietz and Maedche, 2021). Cody employs a combination of code rules and supervised machine learning to enhance the coding process. The system aims to provide structured and transparent suggestions to researchers, thereby increasing the intercoder reliability. Evaluations with qualitative researchers underscore the potential benefits of AI-assisted systems in reducing workload and aiding the coding process. However, they also highlight the importance of user control and understanding of automated suggestions, ensuring that AI tools are used as aids rather than replacements for human expertise.

Costa (2023) highlights the enhanced recognition and efficacy of qualitative research methods owing to the incorporation of digital tools, notably AI. These tools, especially the ones based on NLP, have revolutionized the analysis of large volumes of unstructured data. In

their findings, these tools significantly reduce subjectivity and improve efficiency in data processing. However, Costa warns of potential risks associated with these advancements, such as issues concerning data privacy and algorithmic biases. The research highlights the need to match these digital tools with the research's theoretical-conceptual and methodological frameworks, stressing the crucial role of researchers in upholding the integrity and ethics (Universidade de Aveiro & Costa, 2023).

Hamilton et al. (2023) investigate the potential of generative AI, specifically ChatGPT, in supporting qualitative research analysis through a comparative study. They analyse interviews with recipients of a guaranteed income pilot, comparing themes identified by human coders and ChatGPT. The study reveals both similarities and differences in the themes identified by humans and AI, suggesting that AI tools like ChatGPT can be valuable in augmenting complex human-centred tasks. This research expects that these AI tools will be additional help to support certain tasks in the future, highlighting the potential of merging “AI-generated themes” with broader research discussions to identify gaps and biases (Hamilton et al., 2023). This publication by Hamilton et al. brings us into the present, where generative AI is booming, and its impact is to be seen everywhere.

The exploration of Large Language Models (LLMs) for qualitative research within the social sciences reveals a landscape rich with potential for innovation and efficiency. The studies highlighted here have shown promising applications of generative AI in automating and enhancing qualitative data analysis. These advancements suggest a future where AI tools not only augment research processes but also align with the rigour and complexity of qualitative inquiry. However, this techno-optimistic view often overlooks the profound implications these technologies have on the quality and nature of research. The integration of LLMs and other AI tools into qualitative research raises critical questions about the alteration of research quality, the potential for loss of depth in human understanding, and the ethical considerations surrounding data privacy and algorithmic biases. As I conclude this section, it is essential to acknowledge that while the integration of LLMs into qualitative research shows exciting possibilities, it also necessitates a reflective pause. We must consider how these technologies alter the foundational aspects of qualitative research, potentially shifting its quality and epistemological underpinnings. The challenge ahead lies not just in harnessing these technologies for efficiency but in critically examining their impact on the essence of qualitative inquiry. Only a deeply reflective approach will ensure that technological

advancements serve to enhance, rather than diminish, the rich tapestry of qualitative research in the social sciences.

## **2.7 Reflecting on the reviewed literature**

The literature review presents a nuanced landscape of the role of AI and ML in many different areas as well as the social sciences, marked by transformative changes and significant gaps. The advent of these technologies hints at a paradigm shift in research methodologies, characterized by a move towards data-centric approaches and the potential for AI to significantly augment complex human-centred tasks.

One notable assumption is the inherent benefit of AI and ML that is shown in many of the reviewed publications for advancements in social sciences, primarily from publications outside of STS that focus on coding. This techno-optimistic perspective risks oversimplifying the integration of AI, potentially overlooking the depth and authenticity of insights AI tools can generate. The emphasis on efficiency and novelty might eclipse important questions about the true enhancement these tools bring to the complexity of social phenomena. This literature tends to focus on the positives, especially from disciplines apart from STS, occasionally sidelining critical issues like the reinforcement of existing biases and ethical dilemmas. AI-driven research, particularly in the social sciences, must confront the biases embedded in large datasets and the ethical considerations around data privacy and consent. These factors are crucial when dealing with sensitive and complex social issues.

The literature also notes the non-neutrality of AI technologies, embedded with cultural and political values, challenging the traditional notions of objectivity and impartiality in research. This calls for a critical assessment of AI's role in knowledge production, highlighting the importance of considering AI not only as a technological advancement but also as a cultural and political artefact that shapes and is shaped by societal norms and values.

A significant gap in the literature is the limited focus on generative AI in STS. While substantial literature addresses AI and ML in general, there is a notable scarcity of in-depth studies specifically focusing on generative AI in social science research. This area is ripe for exploration, particularly in the context of STS, where the implications of AI integration in knowledge production are still unfolding.

Lastly, a significant limitation in the literature is the predominance of Western and Anglophone perspectives, which narrows the research scope and potentially alienates non-Western methodologies and viewpoints. In conclusion, the literature underscores the

transformative role of AI in social sciences, but it also exposes several gaps and ethical concerns. These include potential oversimplifications of AI's benefits, the overlooking of critical ethical and societal issues, and the predominance of Western perspectives. This highlights the need for a more nuanced, inclusive, and critical approach to AI research in social sciences, considering both its potential benefits and broader societal implications, pathing a way for the questions that guide this research, detailed in the next chapter.

### 3 Research Questions

This section introduces the research questions central to this thesis, focusing on the impact of generative AI on qualitative research in the social sciences. Building on the analysis presented in the literature review, these questions are formulated to investigate the nuanced ways in which generative AI tools influence research methodologies, ethical considerations, and knowledge production within this field. The literature review has provided a foundational understanding of the historical, ethical, and practical dimensions in which AI in academia has been researched as well as connected publications. Drawing from this background, the research questions aim to critically examine the integration, challenges, and potentials of generative AI in qualitative social science research, filling a gap in research that has shown itself form examining the state of the art.

*MQ: How does the usage of generative Artificial Intelligence impact the practices of qualitative researchers in the social sciences?*

This question seeks to investigate the implications of generative AI on qualitative research within the context of social sciences. By exploring this question, my aim is to gain insight into how the advancements in generative AI technologies, such as language models and natural language processing, influence and potentially transform the research practices, and outcomes of qualitative research in the social sciences. The research will examine how researchers perceive the utilization of generative AI tools, the challenges and opportunities they present, and their view on the potential impact on the validity and reliability of qualitative research. To answer this question, I will employ the learnings of document analysis in combination with the method of experimental intervention in the work of qualitative social science researchers.

*SQ1: How do social science researchers perceive the influence of generative AI tools on academic output generally?*

Through this sub-question, I want to explore how generative AI tools may impact the productivity and publication quality of social science researchers through the use of experimental intervention and by inquiring about their views in the ex-post interviews. Does the use of these tools act as a way to produce more research in less time, or might they lead to a decrease in the quality of their work? Are there concerns about overreliance on AI for research output?

*SQ2: How do qualitative social science researchers perceive the impact of generative AI tools on their own work?*

With this question, I want to explore how social science researchers view the use of generative AI tools in their qualitative research. Specifically, I want to gain insight into their perceptions of the potential benefits and drawbacks of using such tools, and how it may impact the validity and reliability of their research. Additionally, I am interested in understanding any concerns or reservations they may have regarding the use of these tools, and how they navigate potential ethical considerations. This question will be answered through experimental intervention in combination with ex-post interviews of the participants.

To answer the questions I pose here, I make use of the guide that certain concepts within the theory of STS provide. I outline those ideas and notions and how to use them in the following.

## 4 Sensitizing Concepts

This thesis makes use of the following sensitizing concepts introduced below: the notion of the script within user studies, and the marketization of knowledge production embedded within valuation studies. These concepts help me to analyse how and why generative AI tools are used by social science researchers, and how they may influence their research practices and outcomes.

I use valuation studies as a theoretical lens to understand how the generative AI tools are valued and evaluated by the social science researchers, and how they relate to the broader dynamics of the marketization of knowledge production. I will draw on the notion of the marketization of knowledge production as a way of describing the increasing influence of market logic and economic criteria on the production and dissemination of academic knowledge (Kjellberg & Mallard, 2013). I will argue that the generative AI tools are part of the marketization of knowledge production, as they offer new ways of generating, analysing, and presenting data that may enhance the efficiency, productivity, and competitiveness of the researchers. They provide a lens to understand how value is assigned, negotiated, and contested in various contexts, guiding this research in answering the proposed research questions and providing a reason as to why social science researchers might use generative AI.

The concept of the script within user studies is used to examine how generative AI tools are designed to perform certain tasks and functions, and how they imply certain expectations and assumptions about their users and their research. I will also explore how the users may accept, resist, or modify the script, and how they may encounter tensions or contradictions between the script and their own research goals and values through document analysis. Furthermore, I will investigate how the script may affect the validity and reliability of the research. The knowledge gained here aids in conducting empirical research on the perceptions and experiences of social science researchers who use generative AI tools in their qualitative research. I will use experimental intervention with ex-post interviews to collect data on how the researchers use the tools, how they evaluate their performance and usefulness, and how they reflect on the impact of the tools on their research. I will also use user studies as a way of analysing the data, by applying thematic analysis to identify patterns, themes, and discourses that emerge from the users' narratives.

## 4.1 Valuation Studies

Valuation studies, as a field, provide a critical framework for understanding the dynamic interplay between value creation and the socio-technical systems within which such values are embedded. It is a field marked by its breadth and depth, encompassing a wide range of contexts and applications. At the core of this discipline lies the fundamental quest to discern how, why, and by whom value is ascribed in various settings. Value includes cultural, social, ethical, and practical dimensions that influence how individuals and societies recognize and prioritize different entities, practices, and ideas and they do not merely describe economic value. Kjellberg and Mallard (2013) have been instrumental in delineating the contours of this field. They identify four distinct "sites" that serve as fertile ground for studying valuation processes: economically driven environments, scenarios marked by rapid valuation changes, the arenas where valuation systems and tools are both constructed and solidified and the social settings undergoing significant change. Each site is intricately connected to the others, creating a complex mosaic of valuation practices that are reflective of the larger technological, organizational, and social dynamics. Relating to such foundational sites, the work of Lamont (2012) offers a vital comparative approach, providing a lens through which one can view the varied ways in which societies confer value upon individuals, objects, and practices. This sheds light on the diverse valuation landscapes that permeate different cultures and societies.

The concrete application of valuation theories is vividly captured in the work of Heuts & Mol (2013) for example, who delve into the valuation of everyday objects such as tomatoes, offering a microcosmic perspective on how value can be ascribed in seemingly mundane contexts. This work acts as a reminder that valuation is not an abstract concept confined to high-level discussions but is a tangible process that can affect the most basic elements of our daily lives.

Doganova (2018) brings to the table a methodological approach by intertwining Actor-Network Theory (ANT) with economic valuation, thus providing a new set of tools for investigating how valuation is performed in practice. This approach is particularly salient in the context of academic research, where the valuation of scholarly work is increasingly mediated by technological and economic devices.

The recent conceptualization of "Valuation Constellations" by Waibel et al. (2021) adds another layer to our understanding, proposing that valuation is a collective process shaped by networks of actors, tools, and institutions. This perspective emphasizes the relational aspect of

valuation, suggesting that value is not inherent but is the result of intricate interactions and negotiations. For this thesis, this notion of value is of great importance as I unpack how generative AI is valued within qualitative research.

#### **4.1.1 Valuation and marketization of knowledge production**

Venturing deeper into the realm of valuation, this thesis focuses on the specific intersection of valuation and the marketization of knowledge production. Here, we find ourselves in a landscape where the traditional academic pursuit of knowledge for its own sake is increasingly interwoven with market forces. Falkenberg & Fochler's (2022) discourse provides a poignant critique of the prevailing valuation regime within academia, which privileges metrics of productivity and competitiveness over other, perhaps more intrinsic, scholarly values. To underline the competitive nature of researchers in the context of academic capitalism, I draw on Burrows' (2012) exploration of the h-index and metric assemblages. Burrows discusses the multifaceted pressures within academia created by various metrics, such as citation counts and teaching quality assessments, and how these contribute to a culture of quantified control. These metrics, which include the h-index and impact factors, have become intertwined with notions of academic value and prestige, often driving behaviours aimed at maximizing these metrics over other scholarly pursuits. This environment fosters a competitive landscape where researchers are motivated to increase their metric standings, leading to a culture that equates numerical indicators with academic worth. This highlights the pressures researchers face, providing context for their engagement with new or novel technologies as a means to advance in this metricized landscape.

Falkenberg & Fochler introduce the notion of assetization in academia, conceptualizing scholarly outputs as assets that can—and do—circulate within academic markets. This conceptual framework is crucial as it exposes the underlying economic logic that has permeated the academic sphere, transforming the very nature of research technologies into commodities that are valued for their potential to yield future academic dividends. This assetization process reflects a strategic approach by researchers to navigate the competitive academic landscape, emphasizing the potential of technologies to promise productivity and signal innovativeness. We can extend the analysis of how economic imperatives reshape the academic landscape by looking at Hackett's (2014) work. It elucidates the influence of capital on research priorities, suggesting that universities increasingly function as knowledge corporations, where research agendas are driven by marketability rather than scholarly pursuit alone. This mirrors the critique by Falkenberg & Fochler (2022), where academic outputs are

valued as assets within a competitive marketplace. This underlines the extent to which academic capitalism could dictate the adoption and utilization of generative AI in research practices.

However, Falkenberg & Fochler caution against an uncritical adoption of such new or novel technologies. They argue that such an approach may inadvertently undermine the essence of scholarly inquiry, potentially leading to a devaluation of critical thinking and an increase in research fallacies; while technologies can enable significant epistemic advances, their prioritization may also lead to tensions between strategic goals and the pursuit of knowledge for its own sake. They advocate for a balanced approach where researchers leverage technological advancements while simultaneously cultivating and maintaining their own domain expertise and critical acumen.

In the context of this thesis, generative AI emerges as a poignant case study within this marketized landscape of knowledge production. The assumption guiding this exploration is that social science researchers are not merely passive users of AI technology but are active agents who reshape these tools in their usage to fit their specific scholarly needs and contexts. This assumption, which is substantiated through document analysis, sets the stage for the empirical investigation that unfolds in the subsequent chapters.

Through this lens, the thesis will critically examine the usage of generative AI tools in social science research. It will explore the interplay between these tools and the researchers who use them. This analysis will be substantiated by empirical data, providing insights into the contemporary valuation of knowledge production in the age of generative AI.

## **4.2 User Studies**

User studies present a rich and multi-dimensional exploration of how individuals interact with, interpret, and influence technological systems. The field of user studies extends beyond mere investigation of information-seeking behaviours, delving into the intricacies of how users interact with information in varied environments. It is fundamentally concerned with the holistic experience of users, including their motivations, preferences, and challenges in accessing and utilizing information. This area of study employs a diverse range of methodologies, from qualitative interviews and ethnographic observations to quantitative surveys and data analytics, aiming to paint a comprehensive picture of user engagement. Insights gained from user studies are pivotal in designing user-centred information systems and services, ensuring they are accessible, intuitive, and responsive to the evolving needs of

diverse user groups. By understanding the nuanced ways in which individuals and communities engage with information, researchers in this field contribute to the development of more effective and empowering information environments (Siatri, 1999). The essence of user studies therefore lies in understanding the relationship between technology and its users as a dynamic and reciprocal process. Technologies are not only shaped by their creators but also by the users who bring their own interpretations, needs, and modifications to these systems. This interaction often results in unintended consequences and uses that diverge from the original design intentions. For instance, studies on the use of mobile technology in different socio-cultural settings reveal how mobile phones become more than communication devices; they transform into symbols of personal identity and social standing, reflecting, and reinforcing cultural norms and values (Maguire, 2014; I. Lee et al., 2007)

Empirical research in user studies also highlights the diverse ways in which different groups interact with technology. A study examining elderly users of medical alert systems, for example, sheds light on how such technologies can empower users by providing safety and independence, while simultaneously creating new dependencies and vulnerabilities (Sixsmith, 2000). These nuanced insights emphasize the importance of considering the broader social context in which technology is used, moving beyond simplistic narratives of technological determinism.

A pivotal concept within user studies is the 'script' as articulated by Madeleine Akrich (1992). This concept suggests that every technology has a set of instructions or 'scripts' embedded within it that dictate how it should be used, as envisioned by its designers. These scripts not only guide user behaviour but also reflect the assumptions and values of the designers, often overlooking the diversity of user experiences and needs. However, the interaction between users and technology is not one-way; users often *de-scribe* these technologies, finding creative and unintended ways to adapt, resist, or repurpose them. This process highlights the agency of users in shaping the trajectory of technological development and its social implications (Akrich, 1992). I will examine this concept further in the next section.

The richness of user studies lies in their ability to capture this complex interplay between technology, its intended uses, and the actual practices of its users. By examining technologies in their real-world contexts, user studies offer invaluable insights into the often unpredictable and multifaceted nature of human-technology interactions. These insights are critical not only for understanding current technological trends but also for guiding the design and

implementation of future technologies in a way that is more inclusive and attuned to the diverse needs and values of users.

#### 4.2.1 The Notion of the Script

As mentioned, the *de-description* of technical objects is a pivotal concept in the analysis of generative AI within social science research. Madeleine Akrich's (1992) seminal work on the 'script' of technical objects lays the groundwork for understanding how technological artefacts are embedded with the visions and assumptions of their creators. These 'scripts' are inscriptions of usage, projected user behaviours, and anticipated contexts of use. They actively shape and are shaped by the interactions they create with users. In the context of this thesis, the 'script' becomes a crucial analytical tool. It provides a lens through which the incorporation and application of generative AI in social science research can be critically examined. The document analysis methodology, detailed in the preceding methodology chapter, allows for a granular inspection of how generative AI is discussed, *inscribed* and *de-scribed* in the context of academic use.

Akrich (1992) invites us to consider the mutability of these 'scripts'. As researchers in social science engage with generative AI tools, they may conform to, resist, or rewrite the narratives inscribed within these technologies. This interaction, this *de-description*, is a form of renegotiation between the user and the tool. It is an active process of reinterpreting the technology, challenging its anticipated use, and potentially reshaping its function within the research process. For instance, generative AI, as epitomized by platforms such as OpenAI's ChatGPT, is designed with certain presumptions about its use cases. However, social scientists, as users, may diverge from these presupposed paths. They may find innovative or unanticipated ways to integrate these tools into their research practices, thereby *de-scribing* the original 'script' of the technology.

This thesis will trace these paths of adaption, drawing from a selection of documents to uncover how generative AI is being appropriated and sometimes contested by its users. It will interrogate how these interactions reflect broader themes of marketization, valuation, and the shifting paradigms of knowledge production. In doing so, it aims to provide a detailed account of the process, offering a nuanced understanding of the role of generative AI in academic research in preparation for the experimental empirical approach.

To recapitulate: As this thesis navigates the emerging terrain of generative AI in qualitative social science research, it does so through the lens of its sensitizing concepts: the notion of the

script emerging from user studies and the marketization of knowledge production embedded within valuation studies. These concepts serve as a compass, guiding the exploration of how these advanced tools are valued, appropriated, and potentially *de-scribed* by researchers - a process evidencing the agency of users as active constructors rather than passive recipients of technology. By considering the increasing intertwining of market forces with scholarly pursuits, this thesis anticipates that researchers leverage AI tools to gain competitive advantage, a phenomenon rooted in the marketization of knowledge production. The ensuing empirical work, grounded in document analysis and experimental intervention, is designed to uncover the ways in which social science researchers interact with, adapt, and potentially transform these AI tools in practice.

## 5 Material and Methods

To answer my posed research questions, I use a mixed-methods approach. To explore current generative AI tools used in social sciences research, how they are imagined to be used and how they are *inscribed* and *de-scribed* by the researchers, I first use document analysis on a selection of relevant articles from OpenAI, social scientists and makers of qualitative research tools. In addition, I analyse documents that market generative AI features in popular qualitative research software. With the knowledge gained from this initial document analysis, I curated a selection of gen AI tools and deployed the experimental approach, which in turn provides the primary empirical data. Here, the participants fill out an initial survey, afterwards they get access to the list of tools and are encouraged to re-do a research task that they have done recently, but this time with the help of AI. They can choose as many tools as they want and take as much time as needed. This is then summed up by ex-post interviews with the participants.

### 5.1 Document Analysis

I follow the approach posed by Kristin Asdal and Hilde Reinertsen to explore how generative AI is *inscribed* and *de-scribed* in its usage by social science researchers as mentioned in the sensitizing concepts. The method involves analysing various types of documents, including books and newspapers, academic articles, and documents from (government-)institutions but even transcripts, to name a few. Shortly: Anything with text can be used for document analysis following this method, this can even extend to videos and more. The authors developed six “moves” which are used to conduct the analysis from various angles. Those moves are 1 Document sites, 2 Document tools, 3 Document work, 4 Document texts, 5 Document issues and 6 Document movements (Asdal & Reinertsen, 2021). In this analysis, I focus on the move of document tools, since it shows among other details how documents enable things to happen elsewhere (Asdal & Reinertsen, 2021, p. 40), aligning with the assumption that those texts in question shape how generative AI gets used by researchers, effectively inscribing and de-scribing the technology. The authors differentiate between three different forms of document tools, but those forms are not exclusive:

*Tools of governing* are document tools that connect to the questions of “How is society governed? How does something become a political issue? How is the relationship between politics, administration and expertise exerted and balanced in practice? How does expert knowledge act upon politics?” (Asdal & Reinertsen, 2021, 44). With *tools of knowledge*, we can explore how those documents “[...] contribute to rendering something visible, that is,

enable us to observe, acknowledge, analyse and discuss a given phenomenon.” (Asdal & Reinertsen, 2021, 45). Lastly, there are *tools of economy*. These can act as so-called market devices for example and can take the form of advertisements, contracts, patents, scenarios, and more. (Asdal & Reinertsen, 2021, 47f).

With this method in mind, I first analyse three different documents that speak on the same issue as document tools in the sense that they describe how generative AI could and or should be used (in the social sciences). Second, I analyse the descriptions of three popular software tools in qualitative research that (recently) got updated with generative AI functionalities. I argue that these documents act as tools for *inscribing* and *de-scribing* the technology of generative artificial intelligence in the sense of Madeleine Akrich (1992).

To reiterate, Akrich theorises that designers "*inscribe*" a vision of the world into the technical objects they create. This inscription includes assumptions about the users, the environment, and the specific ways the object will be used. For example, a designer might *inscribe* the idea that a user of a particular software has a certain level of technical expertise, or that a device will be used in a specific physical or cultural context. However, once the technical object is out in the world, users often use it in ways that were not anticipated by the designers. This process is what Akrich refers to as "*de-scription*." Users, through their interactions with the object, can modify, resist, or even reject the *inscriptions* embedded in it. In essence, Akrich's work highlights the dynamic relationship between designers, users, and technical objects. It emphasizes that while designers may *inscribe* their visions into objects, the actual use of these objects is shaped by a variety of factors, including the users' needs, desires, and the specific contexts in which the objects are used.

The articles chosen for the first section of this document analysis are the “GPT-4 Technical Report” by OpenAI, “How ChatGPT Could Transform Higher Education” by the blog Social Science Space, written by Kaite Metzler, vice President of SAGE, and “How to use ChatGPT in Social Science Research” by “The Sociology Space”, written by Joshua K. Dubrof, a professor of Sociology. As one can imagine, because of how new this technology still is, there are not many documents on this specific topic to find yet. Blogposts, Guides, and other forms of low-threshold content from the social sciences are just starting to emerge with some scientific papers on the horizon, which in turn shows again why this research is of great importance. The ones chosen are an attempt to represent an overview of the direction in which the usage of generative AI in the social sciences might be headed.

To enrich our picture of how generative AI is starting to and already influencing qualitative social science research, I also analyse the websites describing qualitative research software that integrated generative AI in the second part of this document analysis. These Software-tools are AtlasTI, well known for coding interviews, MAXQDA, a direct competitor to AtlasTI, and Consensus, a search engine specifically for scientific material.

All these documents have in common that they are either directly based on or at least relate to GPT-4, the latest Large Language Model by OpenAI. Because of this, GPT-4 will serve as an example for generative AI in this research, as it is currently the most used product in that space (*Infographic*, 2023) and most other popular generative AI systems are based on GPT-4 like Microsoft's Bing (*Reinventing Search with a New AI-Powered Microsoft Bing and Edge, Your Copilot for the Web*, 2023).

The methodology was slightly adapted by integrating AI-tools in this research itself. This primarily focused on the initial summarization of documents, at least partially, through AI assistance. The rationale behind this strategy was to enhance the efficiency and accuracy of subsequent analytical processes. Leveraging the capabilities of generative AI to distil key information and insights from extensive documents presented significant time-savings.

Continuing further, the AI was tasked with autonomously determining which of these categorical tools were most fitting to each specific document, by attempting to explain Asdal and Reinertsen's methodology and prompting it to apply this methodology to the previously summarized documents. This was not just a procedural choice but also a strategic move to explore the boundaries of AI's analytical capabilities. It presented an opportunity to examine how AI can engage with complex theoretical frameworks and, in essence, served as both a tool and an object of study. While the results required significant adjustments from my side and most of the categorisations had to be done manually, some of the explanations as to why the generative AI "thought" that a certain document belonged in a certain tool-category proved to be quite thought-provoking.

## **5.2 Experimenting**

Following the initial document analysis, I implement an experimental method focusing on the tool of intervention (Guggenheim, 2023a, p. 3). I chose to follow this path as it represents a new and free methodological approach to the social sciences, with Guggenheim encouraging to "Liberate yourself from empirical dogma" (Guggenheim, 2023a), which fits very well

when researching new areas like the usage of generative AI. In his lecture, he presents a straightforward way of how to do this:

“

1. Materialize a question by creating an experimental system
2. Allow the experimental system to cogenerate
3. Think in design logics
4. Work with the singularity and strangeness of the experimental system
5. Think about recording devices
6. Instruct the participants
7. Liberate the participants by restricting them
8. Understand the experiment as a performance
9. The experimenter is a performer

“(Guggenheim, 2023b, p. 2)

While designing the experiment I describe below, I use these steps as a guide for orientation. Besides Guggenheim's views, there are many different experimental methodological approaches within the field: Mize & Manago, (2022) for example provide a comprehensive overview of experimental methods in social sciences, emphasizing the critical aspects of manipulation of independent variables, random assignment for causal inference, and the importance of internal and external validity. In contrast, the paper by Gross & Krohn, (2005) introduces the concept of society as a laboratory, advocating for a broader understanding of sociological experiments beyond traditional laboratory confines. This view aligns with the Chicago School of Sociology's idea of societal self-experimentation, highlighting the recursive relationship between application and production of sociological knowledge. While these papers present very different ways of experimentation, I choose to show them here as examples to visualize how broad the implementation of experimental methods in the social sciences is.

Regarding Michael Guggenheim's method, his teaching of experimental methods emphasizes the experimental as a mode of inquiry that is not confined to traditional laboratory settings. Guggenheim's approach likely advocates for a more flexible, context-driven understanding of experimentation in social sciences (Guggenheim, 2023a). Since the document analysis helped to surface how generative AI might get de-scribed when used for

qualitative social science research, I take these different forms of *de-scriptive* use and apply them to the experimental setting.

The original plan was to evaluate potential participants to determine their level of knowledge of generative AI and then divide them into two groups. The first group should have already preexisting knowledge of generative AI, while the second group should have little to no experience. But, as the recruitment proved to be more difficult than anticipated (I discuss this in more detail below), I had to adapt the plan:

When sampling participants, I still use a quick evaluation beforehand to determine the level of knowledge the potential candidates have on generative AI. For the overarching approach, I have two researchers. The first one already has some knowledge about the technology and is provided with an introduction to generative AI tools (also relying on the information from document analysis). This first researcher then uses the AI tools for a specific research task during the experiment, one they have already completed recently to compare the results. The second participant is a researcher who had little to no experience with AI tools. They are also provided with an introduction to generative AI tools and use these tools for a specific research task during the experiment. Subsequently, I scheduled ex-post Interviews with each participant after they completed the task to gain further understanding of the process, how these tools were used and what changed through their usage in addition to what I can learn through the results that they produced during the experiment. These are semi-structured interviews with the social science researchers to address the research questions posed. Here is how those steps play out in detail:

### **5.2.1 Phase 1: Recruitment and Onboarding**

#### *Recruitment.*

This phase is pivotal in establishing the foundation of the experiment. The aim is to recruit a diverse group of participants who are actively engaged in qualitative research within the social sciences. The recruitment targets include PhD candidates, Postdocs, and Professors with an interest or experience in qualitative methods. The recruitment process leverages various channels, including academic networks, social media platforms, and direct outreach within university departments. Mailing Lists for the Postdocs of the social science faculty of the University of Vienna were used. Additionally, department and research platform heads from the social sciences from different Universities throughout Austria were contacted directly via email. Further, contact was established with private research institutes from the field through colleagues. To gain further reach and the possibility to recruit more participants,

I created a simple website for this thesis, explaining the research project and the role of potential participants. This website was then shared through relevant mailing newsletters and received over 50 views. The site as well as the additionally sent emails explain the research like this:

### Introduction

This project aims to research the impact of using generative AI tools in qualitative social science research. It is part of my MA thesis in Science and Technology Studies (STS).

### Why participate?

This is an opportunity to explore how using those tools in our everyday work changes our research and to contribute to a deeper understanding of AI's role in academic research in general. As far as we can tell from the development of the past year, even if the hype around gen AI is eventually dampened, the underlying technology is here to stay. As a researcher, it's likely that gen AI will cross your path in some form. This project is an opportunity to get a first idea of what happens if you decide to use these tools in your daily work, potentially preparing you to make an informed decision when the time comes.

### Your role as a participant

As a participant, you'll fill out a short initial survey to assess your familiarity with generative AI. After that, you will be provided with a selection of gen AI tools and a short description of each of them. You will then choose one or more of these tools to re-do a qualitative research task of your choosing that you have completed recently, just this time with AI. These might be tasks such as data analysis (like interview coding), writing assistance, or even literature review (retrieving scientific literature), the choice is yours!

In the last step, as close as possible after your completion of the task, you will be interviewed by me on your experience in this whole process as well as on what changed when you completed your specific task with AI. Your feedback will be instrumental in understanding the practical and theoretical implications of the usage of AI in qualitative research. I value your time and have designed the study to be flexible, as you can choose the task that fits you best and do it whenever it is possible for you. Our final interview will also be online, enabling more flexibility. While this MA thesis is in English, your participation may happen partially or completely in German as well, whatever fits you best!

In the end, two people responded. This enabled me to conduct experiments with two participating researchers. Ideally, I would have planned to conduct three experiments, as this would have possibly enriched the findings. Recruiting participants for student-level research is notoriously difficult, and in this case, I asked participants to participate in my experiment, heightening the workload for them compared to only interviewing participants for example. I see these as the main reasons as to why only two people accepted my invitation to participate, even though I contacted well over 100 people.

### *Initial Survey*

Upon recruitment, participants are required to complete an initial survey after signing the informed consent form. This survey is designed to capture an initial profile of each participant, including their academic background, specific area of research, and their prior exposure to and experience with AI tools in a research setting. The survey also probes into participants' perceptions and expectations of AI technologies, particularly focusing on any apprehensions or concerns they might have.

This survey was conducted using the “SoSci Survey” tool by the University of Vienna, keeping the collected data contained within the university’s servers.

#### **5.2.1.1 Initial survey:**

- **Introduction:**
  - Brief introduction about the purpose of the survey.
- **Personal Information:**
  - What is your primary field of study or research area?
- **Familiarity and Knowledge:**
  - On a scale from 1 (not familiar) to 5 (very familiar), how would you rate your familiarity with generative AI technologies?
  - Have you received any formal training or attended workshops on the use of AI in research? (Yes/No)
    - If yes, please provide brief details.
- **Experience with AI Tools:**
  - Have you previously used any generative AI tools in your research or academic work? (Yes/No)

- If yes, please specify which tools
- **IF Previous Application:**
  - In what contexts have you used AI tools? (Multiple choice: Data Analysis, Writing Assistance, Literature Review, Others)
  - What types of tasks have you used AI tools for? (Open-ended)
- **Perceptions and Expectations:**
  - What are your expectations or concerns regarding the use of generative AI tools in qualitative research? (Open-ended)
- **Closing:**
  - Thank participants for their time and input.
  - Information on the next steps of the research project.

### *Onboarding Process*

Following the survey, an “onboarding” document is shared. This is critical for ensuring that all participants have the same baseline understanding of the AI tools that will be utilized in the experiment. Brief descriptions of them are provided. This phase not only familiarizes participants with the functionalities of these tools but hereby also sets the stage for what they can do with them.

## **5.2.2 Phase 2: Task Execution**

### *Task Selection and Rationale*

Participants are instructed to select a task from their recent research endeavours. This task should ideally represent a typical qualitative research activity, such as data analysis, literature review, or coding of interview transcripts. The rationale behind selecting a recently completed task is to facilitate a direct comparison between the traditional method of execution and the AI-assisted method.

### *AI Tool Assignment and Execution*

Participants are given the autonomy to choose one or multiple AI tools that they find most suitable for their selected task. This choice is informed by the onboarding document and the specific features of each tool as they relate to the task at hand. During the task execution, participants document their process, noting any challenges, efficiencies, or unexpected outcomes. This documentation is vital for the comparative analysis that follows, where the

outputs of the original task are put in context with the AI-assisted outputs to gauge the impact of AI integration.

### **5.2.3 Phase 3: Ex-post Interviews**

#### *Interview Design and Execution*

Post-task execution, each participant engages in a semi-structured interview. These interviews are designed to extract nuanced insights into the participants' experiences. The interviews cover a range of topics, from the perceived impact of AI tools on the quality and productivity of research to considerations regarding the validity and reliability of the tools. Additionally, the interviews seek to understand the ethical dimensions of using AI in research, and how these tools align with or deviate from the participants' initial expectations. I transcribe the interviews so their contexts can be analysed more easily. This transcription is done mostly automatic using the provided tools within the Microsoft 365 Software suite.

This questionnaire is designed to elicit detailed responses on specific aspects of the participants' experiences, such as their choice of AI tool, its perceived impact on their research process, and their overall satisfaction with the tool. The questionnaire also probes into future perspectives, gauging the participants' willingness to integrate AI tools in their future research endeavours.

#### **5.2.3.1 Interview Questionnaire:**

- **Introduction:**
  - Introduction and purpose of the interview.
  - Confirmation of consent and confidentiality.
- **Background and AI Tool Selection:**
  - Briefly describe your research area and experience with qualitative methods.
  - Which generative AI tool(s) did you use, and what led to this choice?
- **Impact on Research Process:**
  - How did the AI tool influence your methodological approach in qualitative research?
  - In what ways did the AI tool affect your data collection, analysis, or interpretation processes?

- **Quality and Productivity:**
  - Did the use of AI tools impact the overall quality of your research outcomes?
  - How did AI tools affect the efficiency or time management in your research process?
- **Validity and Reliability:**
  - Can you discuss any concerns or observations regarding the validity and reliability of data generated or processed by the AI tool?
  - Did the AI tool introduce any new challenges or advantages in ensuring the rigour of your qualitative research?
- **Ethical and Privacy Considerations:**
  - Were there any ethical dilemmas or privacy concerns you encountered while using AI tools in your research?
- **Comparative Insights:**
  - How does the output from the AI-assisted task compare with your usual research practices?
- **Overall Experience and Future Outlook:**
  - Has this experience altered your perspective on the use of AI in qualitative research?
  - Would you consider integrating AI tools in your future research projects?
- **Closing:**
  - Opportunity for additional comments.

#### 5.2.4 Analysis

In the analysis phase of the experiment, I employed the enterprise version of the Microsoft Copilot AI to analyse the interview transcripts efficiently and securely. This choice was motivated by the need for a robust solution that guarantees the privacy and confidentiality of the data. The enterprise version of Copilot is specifically designed to meet these requirements, as it does not save any user data or conversation data, nor does it utilize such data in training its language models (This enhanced data protection is only available to Organisations and not to Individuals, I gained access through my organisational account). This feature was crucial in ensuring that the sensitive information shared by participants remained secure and was processed in compliance with ethical research standards while still enabling me to search through and understand the Transcripts much faster. The enterprise version of Copilot

facilitated a more effective and expedient analysis process. Its advanced search and information retrieval capabilities allowed me to navigate through the interview transcripts by asking specific questions, enabling a faster and more thorough examination of the data. This significantly reduced the time required to extract relevant insights from the interviews.

To maintain the anonymity of the participants, I striped the transcripts of any personal information before uploading them to Copilot. This involved using the 'search and replace' function to remove all names and other identifiable information from the transcripts. Additionally, I exercised caution in the drafting of the thesis to ensure that, if possible, no excessive details were included that could potentially reveal the identities of the participants. This approach was adopted to uphold the ethical standards of confidentiality and to protect the privacy of the individuals involved in the study.

#### **5.2.5 AI Tools Used in the Experiment:**

*Consensus.app* is an AI-driven platform designed to enhance access to scientific evidence. It functions as a search engine, leveraging AI/ML to analyse peer-reviewed research papers and present findings in a comprehensible format. It features key information extraction, data distillation, and provides access to over 200 million scientific papers.

*Lex.page* is an AI-powered writing tool that assists in content creation, and overcoming writing challenges. It offers a range of functionalities including content generation, writing assistance, document outlining, and features like 'Ask Lex' for quick information retrieval. It is powered by GPT-3 and GPT-4 language models.

*ChatPDF* is an innovative tool for interacting with PDF documents, facilitating quick access to information through a chat interface. It features semantic indexing, content summarization, and detail retrieval capabilities, using the GPT-3.5 language model.

*Jenni.ai* is an advanced AI writing assistant, similar to LEX, but with additional features. It helps generate various types of content, and offers academic assistance, sentence completion, plagiarism checking, citation finding, and text transformations.

*MAXQDA*, a software for qualitative and mixed methods data analysis, now includes an "AI-Assist" feature. It automates the analysis process, and offers text summarization, code memo summary, paraphrasing, and code suggestions, enhancing the qualitative data analysis experience.

*Atlas.ti*, known for qualitative data analysis, has introduced "AI Coding Beta powered by OpenAI" for automating the coding process. This feature enables automatic inductive analysis, open and descriptive coding, and offers granularity customization for the coding results.

These AI tools provide an array of functionalities that might enhance the research process in various aspects while relating to the identified usage of such tools from the document analysis, from data analysis to content creation. Their integration into the experiment offers a comprehensive understanding of how such advanced technologies can transform qualitative research methodologies in the social sciences.

### **5.3 Approach reflection**

Overall, this mixed-methods approach, combining document analysis and an experimental design with follow-up interviews, allows for a comprehensive exploration of the research questions and provides a nuanced understanding of the role of generative AI tools in social sciences research. There are some concerns, though, mainly related to the potential bias from the researcher or interviewee and the small sample size for interviews. It is possible that some researchers might not want to admit the use of such technologies because of concerns of plagiarism accusations, for example. It could also be that researchers might know of those technologies but do not (want) use them at all. Some of the potential problems with this research methodology might be addressed with the experimental component, as it can provide more controlled insight into how the use of generative AI tools affects researchers' perceptions, concerns, and task completion, but finding participants could still be difficult. During the whole process, I must be aware that my own biases, background, and assumptions inevitably shape the research process, from the selection of documents for analysis to the interpretation of experimental and interview data.

In reflecting upon the experimental approach, itself, some strengths and weaknesses become visible. The methodology is overall quite uncommon in the social sciences, adding to the experimental element. The recruitment strategy, aimed at engaging diverse participants from the social sciences tries to maximise the depth of insights gained from the experiment. The use of a dedicated website and detailed instructions for participants aims at a thorough approach to engaging with potential contributors. Furthermore, the comparative nature of the design, where researchers redo tasks with and without AI assistance, allows for a better assessment of AI's influence on the research process.

However, the experimental approach shows further limitations. The recruitment method, while comprehensive, inadvertently attracts participants with a preexisting disposition towards AI, thereby introducing a selection bias. The focus on participants from the social sciences also raises questions about the generalizability of the findings to other disciplines. Additionally, the reliance on participant self-reporting could introduce subjective biases, potentially affecting the reliability and authenticity of the data collected. Variability in how participants choose and use AI tools poses another challenge, as it leads to inconsistencies in the application of these tools, complicating comparative analyses. This aspect underscores the importance of a more standardized approach in future iterations of similar experiments.

From an ethical standpoint, the experiment raises some concerns. The use of AI tools in research necessitates stringent considerations regarding data privacy and consent. Ensuring that participants are fully informed about how their data might be processed by AI systems is crucial. Furthermore, the potential for AI tools to perpetuate existing biases present in their training data cannot be overlooked. This issue highlights the need for critical examination of AI outputs to ensure fairness and accuracy in research findings. The increasing reliance on AI tools also prompts a reflection on the future of research skills and methodologies. Overdependence on AI could lead to a diminished role for human judgment, potentially affecting the integrity and authenticity of qualitative research. While this is not a direct concern for this first exploration into the usage of AI tools, it is certainly a concern that has to be kept in mind for ensuring transparency and accountability in the use of AI tools is imperative, as is being open about their limitations and potential errors, and it is something that the participants should keep in mind.

In conclusion, while the experimental approach offers valuable insights into the integration of generative AI in qualitative social science research, it also presents significant challenges and potential ethical considerations. Addressing these concerns is crucial for maintaining the validity, reliability, and ethical integrity of research that incorporates emerging AI technologies. With the empirical approach now fully outlined, I dive into the first part, document analysis, in the following chapter.

## **6 Analysing Documents**

In this chapter, I will analyse the selected documents along the lines of the aforementioned categories, tools of governing, tools of knowledge and tools of economy as defined by Asdal and Reinertsen. I will explore how these articles intervene in the usage of generative AI and lastly, how these documents themselves function as a tool and for whom.

### **6.1 Documents describing the usage of generative AI**

This section delves into three key documents that shed light on the usage of generative AI, specifically focusing on GPT-4 by OpenAI. The first document, the GPT-4 Technical Report, serves as the foundational text describing the technical specifications and intended uses of the AI model. The second document, "How ChatGPT Could Transform Higher Education," takes us into the academic arena, specifically higher education, to explore how this technology is being imagined and applied, while the third document, "How to use ChatGPT in Social Science Research," provides a practical guide for researchers in the social sciences.

#### **6.1.1 The GPT-4 Technical Report**

The GPT-4 Technical Report was chosen because it is the most thorough description of how the engineers at OpenAI envision the usage of their AI product (ChatGPT). The report talks specifically about GPT-4 which is the AI that sits at the core of ChatGPT, but also many other generative AI products and the software tools that we will analyse in the second part of this chapter. They not only show the technical capabilities using certain benchmarks of ChatGPT, but they also present different use cases for it, thereby inherently inscribing their vision of how their product should be used. This is why I deem it important to include this document in the analysis, even though it is not a document that is restricted to the social sciences, as it helps us to explore where the usage of ChatGPT in the Social Sciences deviates from OpenAI's vision, with this report, therefore, serving as a baseline.

The GPT-4 Technical Report primarily serves as a tool of knowledge. As a technical report, it provides detailed information about the features and capabilities of the GPT-4 model. It introduces new aspects of the technology and showcases different use cases, helping to render the capabilities of GPT-4 visible. This aligns with the role of a tool of knowledge, which enables us to observe, acknowledge, analyse, and discuss a given phenomenon. However, the report also serves as a tool of economy. It is a document produced by a private company about a product that ultimately needs to be marketed and made profitable. By comparing GPT-4 to older versions and competitors, the report influences market decisions related to AI tools. This fulfils the role of a tool of the economy, which can act as market devices and influence

economic decisions. The report does not seem to serve as a tool of governing. While it provides information about the technology, it does not set guidelines or regulations for its use. It is produced by a private company, not a governing body, and its primary purpose is to explain the features of the GPT-4 model, not to govern its use.

The technical report intervenes by providing detailed information about the capabilities and use cases of GPT-4, thereby guiding potential users on how to best utilize this technology from OpenAI's point of view. It outlines the model's ability to accept both image and text inputs and produce text outputs, which can inform users about the types of tasks GPT-4 can handle. For example, it can be used for generating text based on given prompts, summarizing information, and writing code in various programming languages. The report also discusses the model's performance on various professional and academic benchmarks, such as passing the bar exam with a top score. This seems intended to give potential users an idea of the level of sophistication and accuracy they can expect from GPT-4 and can inform decisions about whether and how to use the model in various professional and academic contexts.

Furthermore, the report highlights the improvements in GPT-4's factuality and adherence to desired behaviour, which should assumingly reassure users about the reliability of the model's outputs, catering to users who are considering using GPT-4 for tasks that require accurate and "unbiased" information. One might argue that the document functions as a tool by providing a somewhat comprehensive overview of the GPT-4 model, including its development, capabilities, and performance on various benchmarks. It also discusses the limitations of the model and the steps taken to improve its performance and reliability. This document therefore serves as a broad tool for AI researchers, developers, and users who are interested in understanding the workings of the GPT-4 model and its potential applications. But it clearly also serves as a tool for OpenAI to market their product, ChatGPT-4.

The GPT-4 technical report by OpenAI presents a specific vision of the product by its maker and therefore inscribes a certain way of usage into ChatGPT. It provides a detailed account of the model's architecture, training methodology, and potential applications. It sets the stage for how ChatGPT should be used and what it can achieve. The effects of this document are seen in the widespread adoption of ChatGPT for various tasks, including but not limited to text generation, translation, and question-answering. However, the inscription also somewhat limits the perceived usage of ChatGPT to the technical and computational realm.

### **6.1.2 “How ChatGPT could transform higher education”**

The article, published on [soicalsciencespace.com](https://soicalsciencespace.com), on how ChatGPT could transform higher education by Kaite Metzler serves as a gateway to our topic of interest, as it talks about higher education overall, but also includes a specific section of how this generative AI can be used for writing papers, conducting literature reviews, get feedback on your own writing and more. As these are all important forms of work for the Social Sciences, I believe that this article is of relevance to this research.

I argue that the Social Science Space article primarily serves as a tool of knowledge. It provides an overview of what ChatGPT can do, how it can be used in higher education, and the potential dangers of using it. The article also provides examples of how academics can use ChatGPT, such as writing a first draft of a conference session proposal or a press release for a research project. These examples help to render the capabilities of ChatGPT visible, fulfilling the role of a tool of knowledge. However, the article can also serve as a tool of governing. It discusses the ethical considerations of using ChatGPT, such as the risk of students using it for cheating and the question of plagiarism. By discussing these issues, the article provides a framework for how ChatGPT should be used ethically, similar to guidelines or regulations. This influences how the technology is used, suggesting an alignment with the role of a tool of governing. Lastly, the article also serves as a tool of economy. It mentions several other AI tools that can be used for similar purposes as ChatGPT, such as “Writeful”, “ecree”, “TooWrite”, and “CoAuthor”. By providing this information, the article could influence market decisions related to AI tools, fulfilling the role of a tool of economy.

The article intervenes in the usage of generative AI by providing a more balanced perspective on the use of such technologies, specifically ChatGPT, in higher education. It highlights potential uses: The article outlines several ways in which it could be used in higher education. By doing so, the article provides academics and students with a starting point for integrating AI into their (research) practices. But the article also doesn't shy away from discussing the potential risks and dangers of using AI in higher education. It highlights concerns such as the reproduction of biases and stereotypes, the potential reduction of human interaction, and the possibility of generating inaccurate or unreliable information. This encourages a more cautious and informed approach to the use of AI in higher education. The text concludes by suggesting ways to mitigate these risks. It emphasizes the importance of educating students and educators on the ethical use of AI, developing guidelines for its use, and incorporating critical thinking and ethical reasoning into the curriculum. This provides a

possible roadmap for institutions considering the integration of AI into their academic practices.

The article functions as a tool for users of generative AI by providing an overview of the potential applications and implications of using ChatGPT in higher education. It discusses the capabilities of ChatGPT, its potential uses in many different aspects of higher education, and the potential risks and dangers associated with its use. This document therefore serves as a tool for educators, students, researchers, and academic administrators in general who are considering the integration of AI technology, particularly ChatGPT, into their teaching, learning, and research processes.

The article by Social Science Space “How ChatGPT Could Transform Higher Education” has multifaceted effects. On one hand, it could inspire educators and academic institutions to explore the use of ChatGPT in their teaching and learning processes, potentially leading to innovative pedagogical practices. On the other hand, it could also stimulate critical discussions about the ethical implications of using AI in education, such as the risk of reproducing biases and reducing human interaction. In terms of "inscription" and "de-description" of technical objects, this document can be seen as a "de-description" of ChatGPT. While the GPT-4 technical report "inscribes" a certain way of usage into ChatGPT, this article "de-scribes" ChatGPT by envisioning its use in ways that were not explicitly intended or prescribed in the GPT-4 technical report. It expands the potential use cases of ChatGPT beyond its original "inscription", suggesting its application in the context of higher education and showing its usefulness for specific tasks that were not envisioned by OpenAI. This "de-description" process, in turn, could influence how ChatGPT is further developed and used, potentially leading to new "inscriptions" that reflect the needs and concerns of the academic community.

### **6.1.3 “How to use ChatGPT in social science research”**

This document dives into the usage of how generative AI, but especially ChatGPT can not only be used for qualitative tasks like summarization, creating first drafts or even coding of interviews, but also for quantitative work in the social sciences. It seems to be one of the first articles that really goes in-depth as to why this technology can be of interest to social science research, therefore showing its relevance for this paper.

Dubrof’s article primarily serves as a tool of knowledge. It provides a practical example of how ChatGPT can be used in social science research in the style of a research report or scientific article. This example helps readers understand the technology's potential

applications, fulfilling the role of a tool of knowledge. The article provides a detailed walkthrough of how to use ChatGPT in research, from brainstorming and summarizing text to creating tables and coding. It also discusses the limitations of ChatGPT, providing a balanced view of the technology. However, the article also serves as a tool of governing in a way. By showcasing a practical application of ChatGPT in the field, it provides a model that other researchers might follow. This could be seen as similar to a guideline or planning document, as it provides a model for how the technology could be used in practice. This influences how the technology is used, aligning with the role of a tool of governing. The article emphasizes the need for researchers to be diligent and check the AI assistant's work, effectively setting guidelines for its use. The article does not seem to serve as a tool of economy as it does not discuss, or influence market decisions related to AI tools. Rather, it focuses on the practical use of a specific tool (ChatGPT) in social science research.

Similar to the documents I analysed before, the article by Joshua K. Dubrof intervenes in this case by providing a practical and specific guide on how to utilize ChatGPT in the field of social science research. The author positions the AI as an assistant and the researcher as the director, thereby setting the stage for how the interaction between the two should ideally occur. This intervention is significant as it helps to shape the perception and approach of social scientists towards using AI in their research. The article also outlines the current limitations of ChatGPT, such as its inability to access information beyond September 2021 (this is not the case anymore though, as the newest version has internet access), its inability to crawl the web, and its tendency to present inaccurate information.

By doing so, the author intervenes by setting realistic expectations for researchers about what the tool can and cannot do, thus helping them to avoid potential pitfalls and misunderstandings. Despite these limitations, Dubrof suggests several ways in which ChatGPT can be used effectively in social science research, including brainstorming, summarizing text, creating text to edit, analysing data from .csv files, creating tables, and assisting with (interview) coding. These suggestions serve as prime examples by providing researchers with practical strategies for incorporating AI into their research processes. He further intervenes by demonstrating the use of ChatGPT in a research project, using it to analyse data from the European Social Survey for 2018 and to write a research paper based on the analysis. This practical demonstration serves as an intervention by providing a tangible example of how AI should be used in social science research. The article functions as a tool in the same way it intervenes- by providing a practical guide on how to utilize ChatGPT in

social science research. It outlines the capabilities and limitations of the AI model, offering strategies to effectively use the tool despite its constraints. It also provides examples of how ChatGPT can be used in various research tasks, as mentioned before. This document serves as a tool primarily for social scientists and researchers who are interested in incorporating AI technology, specifically ChatGPT, into their research process.

Dubrof's article "How to use ChatGPT in Social Science Research" has several effects. Firstly, it "demystifies" the use of AI in social science research in a way by providing practical examples and use cases. This could encourage more researchers to experiment with AI in their work, potentially leading to a change in research methods and findings. Secondly, it provides a realistic assessment of the current capabilities of AI (at the time of writing of course), which might help manage expectations and prevent misuse or overreliance on the technology. This article also 'de-scribes' the usage of ChatGPT in a very similar way to the document by Social Science Space. While, as mentioned above, the GPT-4 technical report 'inscribes' a certain way of usage into ChatGPT, Dubrof's document 'de-scribes' it by exploring and suggesting ways it can be used in social science research that were not explicitly intended or prescribed in the GPT-4 technical report. To reiterate, the author discusses how ChatGPT can be used for brainstorming, summarizing text, creating text to edit as well as simple data analysis. These uses go beyond the 'inscribed' uses of ChatGPT as a language model for generating text, demonstrating how users can and will adapt the technology for their own uses.

## **6.2 Documents describing the implementation of generative AI into software tools**

This section analyses three pivotal websites that detail the integration of generative AI into qualitative research software tools, namely AtlasTI, MAXQDA, and Consensus. AtlasTI, renowned for its coding capabilities for interviews, now incorporates generative AI functionalities that supposedly greatly improve the qualitative coding process. MAXQDA, a very similar product in the qualitative research software arena and a direct competitor to AtlasTI, also weaves in generative AI to enrich its feature set. Lastly, Consensus serves as a specialized search engine for scientific material and now includes generative AI to enhance its search and summarization capabilities.

### **6.2.1 "AtlasTI"**

Moving on to Software tools for social science research, we take a look at AtlasTI. This tool has incorporated AI, specifically OpenAI's ChatGPT, into the qualitative data analysis software. This feature, known as "AI Coding", automates the coding of text material, aiming

to reduce manual effort. It generates code suggestions based on the user's research intentions. However, users retain control over the final application of these codes. In the context of its website content, the governing tools could be the rules and guidelines provided in the FAQ section. This includes information about data privacy, the restrictions on the use of AI Coding, and the guidelines for its use. The statement about maintaining full control for optimized scientific accuracy also falls under this category, as it governs how users interact with the AI Coding Beta tool.

The AI Coding Beta tool description itself can be considered a tool of knowledge, as it generates and it provides instructions on how to use the product. The information about how AI Coding works, how OpenAI and GPT models work, and the benefits of using AI Coding Beta also fall under this category, as they disseminate knowledge about the tool and its underlying technology.

The website includes several economic tools. The AI Coding Beta tool contributes to the production of coded data and insights. The "Buy now" button and the information about the tool being available for Win, Mac, and Web in itself contribute to the distribution and consumption of the tool. The mention of reducing overall data analysis time by up to 90% and the potential to uncover insights that might have been missed also are a significant indicator of the perceived economic value of the tool.

The describing text for this software intervenes by offering a solution to the time-consuming and tedious task of manual data coding. By automating this process, the tool promises to save users significant amounts of time and energy, allowing them to focus more on data interpretation. The document functions as a tool by providing information about the AI Coding Beta tool. It educates potential users about the tool's capabilities, benefits, and how it works. It also guides users on how to use the tool effectively and responsibly. The document serves as a communication tool between the company and its potential users. The text contributes to the promotion and understanding of the AI Coding Beta tool. It enables potential users to learn about the tool, understand its benefits, and make informed decisions about whether to use it. The document's effects could include attracting new users, increasing the tool's adoption, and shaping perceptions about the tool and the company.

### **6.2.2 "MAXQDA"**

In examining the Tools of Governing in the context of MAXQDA AI Assist, I analyse the following components: Firstly, MAXQDA AI Assist asserts complete organizational control over data privacy and access, stating that user data isn't used for AI learning. While this is

commendable, one may question the extent and effectiveness of this control, and what measures are in place to ensure its enforcement. Secondly, the governing structure in place for access to AI Assist appears bifurcated depending on license types. Turning to the Tools of Knowledge, a few MAXQDA AI Assist features stand out: The tool offers a feature that allows users to select text passages, which it then summarizes and stores as memos. This functionality is designed to assist in the aggregation and distillation of information. Additionally, the tool has the capability to analyze segments of coded data, proposing subcodes based on its analysis, suggesting an advanced level of AI-driven understanding and pattern recognition, aiming to streamline the coding process. Furthermore, the tool presents the ability to automatically generate summaries of coded segments, an attribute that holds the promise of synthesizing complex data into digestible insights. Lastly, concerning the Tools of Economy with this text about MAXQDA AI Assist, I want to highlight these facets: The tool's economic model, which offers free access to subscription users and student license holders, could be seen as a positive step towards democratizing access to AI tools. However, how sustainable this model is in the long run, and whether it might restrict the tool's development or availability. Finally, the economic distribution of access based on licensing could be viewed as either a well-structured or divisive strategy. The question arises whether such an approach could inadvertently foster inequality of access, especially if organization license holders face delays or other barriers in gaining access to the tool.

In the exact same manner as AtlasTI, the description on the website introduces a new tool, AI Assist, that aims to revolutionize the field of qualitative data analysis. It therefore also intervenes by offering a solution to the time-consuming and tedious task of manual data coding. By automating this process, the tool also promises to save users significant amounts of time and energy, allowing them to focus more on data interpretation. The MAXQDA website provides information about the AI Assist tool. It educates potential users about the tool's capabilities, benefits, and how it works. It also guides users on how to use the tool effectively and responsibly. The document serves as a communication tool between the company and its potential users. As we can see from the analysis so far, the description of AtlasTI and MAXQDA produces a very similar result, as the website contributes to the promotion and understanding of the AI Assist tool. It enables potential users to learn about the tool, understand its benefits, and make informed decisions about whether to use it.

### 6.2.3 “Consensus”

Examining the Tools of Governing within the web content for the Consensus search engine, there are a few key elements that lend themselves to analysis: The document delineates instructions on the formatting of queries and the process of how a search is conducted. While these guidelines streamline the interaction between the user and the tool, one could question if these set parameters might limit flexibility and spontaneity in usage. Additionally, while outlining source material and underlying technology, the document effectively sets rules and expectations for usage. However, it's essential to assess how accessible and understandable this information is to average users.

Delving into the Tools of Knowledge, the site presents valuable insight into the Consensus search engine: It comprehensively explains the technology behind the tool, including the use of AI language models, “claim extraction models”, and vector searches. While providing detailed information, a potential point of critique might be the level of technical knowledge required to comprehend these descriptions. However, the transparency about its strengths and limitations, critical for informed usage, would be worth scrutinizing.

Finally, the Tools of Economy aspect of the website warrants some attention: The document clearly functions as a promotional tool for the Consensus search engine, aiming to increase its adoption by highlighting features and benefits. While this approach is common, it's important to evaluate if it thoroughly represents the tool's strengths and weaknesses, or if it risks overselling its capabilities. The mention of the tool being a work in progress suggests future updates or improvements, which may retain existing users and attract new ones. Yet, it also raises questions about its current readiness and if users are informed about potential challenges or limitations in its present state.

The document intervenes by providing a detailed explanation of how the Consensus search engine works. It addresses the need for users to understand the underlying process of the search engine, which is crucial for effective usage. By explaining the process, it demystifies the technology and makes it more accessible to users. It functions as a tool by providing valuable information that enables users to effectively use the Consensus search engine. It educates users on how the search engine works, how to format their queries, and what to expect from the search results.

Very similar to the other tools, the description here contributes to a better understanding of the Consensus search engine. It enables users to use the search engine more effectively by providing them with the necessary knowledge. The effects of the document could include

improved user experience, more effective searches, and increased user confidence in the search engine.

### 6.3 Discussion

The analysis of the three documents in the first part reveals a number of noteworthy findings. First of all, every document serves as a multitool to its maker. The "GPT-4 Technical Report" by OpenAI, as a tool of knowledge and economy, inscribes a vision of ChatGPT as a sophisticated AI model with a certain set of capabilities. It provides an account of the model's capabilities, training methodology, and potential applications, setting the stage for how ChatGPT should be used and what it can achieve. The article from by Katie Metzler, serving as a tool of knowledge and governing, de-scribes ChatGPT by envisioning its use in ways that were not explicitly intended or prescribed in the GPT-4 technical report. It expands the potential use cases of ChatGPT beyond its original inscription. Joshua K. Dubrov's article also functions as a tool of knowledge and governing, and provides a first practical guide on how to utilize ChatGPT in social science research. It outlines the capabilities and limitations of the AI model, offering strategies to effectively use the tool despite its constraints. This document serves as a tool primarily for social scientists and researchers who are interested in incorporating AI technology, specifically ChatGPT, into their research process. It also de-scribes the usage of generative AI by exploring and suggesting ways it can be used in social science research that were not explicitly intended or prescribed in the GPT-4 technical report. While these documents all serve as multi-tools, they serve different purposes. While the focus of OpenAI's document seemingly lies on the function as a tool of economy, the other two seem to primarily serve as a tool of knowledge.

Since I identified that the articles by Metzler and Dubrov *de-scribe* the vision of OpenAI at least to some degree as shown above, it is now important to take a closer look at what the applications for generative AI defined by those authors have in common. An overarching sentiment seems to be that generative AI can save you time as a researcher. Both Metzler and Dubrov mention that either implicitly or even explicitly, e.g. "Some other things I've tried using ChatGPT for that I think could save academics a lot of time are [...]" (Metzler, 2022) or by referring to ChatGPT as your personal research assistant (jdubrow2000, 2023). Most of those "efficiency improvements" are attributed to the writing capability of generative AI, which is a valuable learning for the second empirical part of this thesis, as it suggests focussing on writing tasks in the experimental intervention. This also aligns with our theoretical approach, suggesting that researchers feel the need to improve their efficiently

because of the marketization of knowledge production (Fochler, 2016b). There are also other use cases described in those articles, like using ChatGPT to code interviews, many times faster than a human ever could. But the bottom line still manifests as social science researchers aiming to make their work more efficient through the de-scription of generative AI.

The second part of this analysis looked at how qualitative research software is described and marketed through its makers by analysing relevant website content as documents. Each tool serves to a degree as a combination of the tools of governing, knowledge, and economy, but it is very clear, that the main focus of all those documents lies on selling the respective software product, therefore primarily showing itself as a tool of economy.

Now, I am taking a look at the notion of de-scription as this has not happened yet for these documents. I will take MAXQDA as an example for all three software products in this case. Looking at this analysis through the lens of inscription, two prominent points come to mind. I can either look at this Software as a standalone new product or as an addon or further development of GPT-4. If I go with the first option, we may see that MAXQDA inscribes a certain vision into their product through this website content. This inscription might then again be de-scribed by the users of this software (e.g., qualitative social science researchers). The second option, to look at this as a further development of GPT-4, would then complicate our analysis. In that instance, MAXQDA itself would de-scribe generative AI, in this chase GPT-4, by incorporating it into their own software and using it in ways that were not envisioned and therefore inscribed by the original maker. This then again might be de-scribed further by disrupting the newly created and inscribed vision of MAXQDA with use cases for their software that they themselves did not intend. Nevertheless, at some point in either process, the software maker inscribes their own vision.

AtlasTI and MAXQDA, both qualitative research software tools, inscribe a vision of AI as a sophisticated tool with a certain set of capabilities. They provide an account of the tool's capabilities, training methodology, and potential applications, setting the stage for how these tools should be used and what they can achieve. However, this inscription also confines the usage of these tools to the specific imagined use cases, potentially overlooking their potential in other areas. On the other hand, Consensus, a scientific search engine, de-scribes AI by envisioning its use in ways that were not explicitly intended or prescribed in its original inscription. It expands the potential use cases of AI beyond its inscription, suggesting its application in the context of information retrieval.

All the use cases of these qualitative research software tools primarily aim to increase efficiency, as mentioned above in detail. They mostly do not claim other benefits such as better or more objective insights. This therefore aligns with the findings from the first part of this document analysis. For the second part of the empirical in this thesis, this analysis also suggests that the experimental intervention might consist in part of a writing task or an interview-coding task (MAXQDA/AtlasTI) as well as the retrieval of scientific information (Consensus), allowing us to further explore the posed research questions. Armed with the insights gained from this analysis, we will dive into the experiments with two participating researchers in the following.

## 7 Experimenting

In this section, I present the first experiment. Participant A, a PhD student in the social sciences, began by completing an initial survey that gauged their familiarity with and attitudes towards generative AI tools in research. Following this, Participant A took a week to experiment with selected AI tools, allowing them to apply these tools to their own research context. Both participants were instructed to use AI tools for a research task they already had done before, so a comparison could be established. This hands-on phase provided valuable practical insights into the utility and challenges of AI tools in academic research. After this experimentation period, I conducted an online interview via Zoom with Participant A to discuss their experiences and the outcomes of using these tools. This interview offered deeper insights into the participant's subjective experience and the impact of AI tools on their work.

### 7.1 Participant A

Initial Survey:

*What is your primary field of study or research area?*

“Political science, social policy, pension policy”

*On a scale from 1 (not familiar) to 5 (very familiar), how would you rate your familiarity with generative AI technologies?*

3

*Have you received any formal training or attended workshops on the use of AI in research? (Yes/No)*

*If yes, please provide brief details.*

NO

*Have you previously used any generative AI tools in your research or academic work? (Yes/No)*

YES

*If yes, please specify which tools*

“ResearchRabbit AI, ChatGPT, connectedpapers”

*In what contexts have you used AI tools? (Multiple choice: Data Analysis, Writing Assistance, Literature Review, Others)*

“Writing Assistance, Literature Review”

*What types of tasks have you used AI tools for? (Open-ended)*

“Writing Assistance, Literature Review”

*What are your expectations or concerns regarding the use of generative AI tools in qualitative research? (Open-ended)*

“Expectations: improving writing skills by learning from text improved by AI; finding relevant literature faster; concerns: missing key contributions through biased AI results (e.g. most works by men etc.)”

Based on the transcript of the interview and the insights gained, I have identified five central themes that orient themselves on the overarching questions I posed and categorized the responses of Participant A accordingly. This facilitates a comparative analysis with as Participant B.

#### *Background and Choice of AI Tool:*

They discuss their experience in interviews and document analyses in international projects regarding their research as a predoc in political science. The choice of tools they used previously, including MAXQDA, ChatGPT, and Research Rabbit was driven by a need to streamline research processes, particularly in creating abstracts and drafts. For this experiment, they tried out the AI text-editor Lex. The interviewee faced challenges with AI tools due to vague requests, leading to suboptimal outputs, particularly with Lex. They emphasize the importance of structured requests for better results from AI and mention better experiences with different AI tools they used before.

"I only looked at Lex.page and used it... I am familiar with AtlasTI and MAXQDA, but I did not look at these AI tools because I just didn't have a use for them" (A1)

Focusing in on the selected AI tool, the interviewee commented on the user interface of Lex, noting that it lacked sufficient explanations despite having many features. This lack of guidance further contributed to the participant's challenging experience with Lex, as they felt that a more informative interface might have made the tool more accessible and effective.

#### *Quality and Productivity:*

Despite initial difficulties with AI output quality, they acknowledge the efficiency of Research Rabbit in a literature review. They also mention that using AI for everyday tasks besides research like email writing and revising short texts proved efficient once they overcame the initial learning curve. They note that using AI tools like ChatGPT for these tasks proved to be efficient and reliable. However, they experienced significant initial time investment in learning to use each of these tools effectively.

The interviewee discusses their initial struggles with AI tools, emphasizing time loss and dissatisfaction with the output quality. However, they acknowledge the benefits for specific tasks, again mentioning, "Research Rabbit... greatly helped in organizing the literature efficiently". Participant A faced a particular challenge with LEX while preparing for a conference. They wanted to design an abstract for a paper they were writing, which currently lacked a clear argumentative structure. When they tried to use Lex for this task, the tool was unable to generate useful ideas or assist in structuring the abstract effectively. This inadequacy was attributed to the participant's own uncertainty about what they wanted to convey, suggesting a limitation of AI tools in facilitating the development of complex thoughts and structures on their own.

"[...] first, I had to find my way around because it was not very intuitive [...] What I've already tried is to get a summary of several articles. Unfortunately, it didn't work at all because Lex always told me that it doesn't have access to the article" (A2)

Going further in describing their experience with the tool, the interviewee states:

"I had the feeling that LEX could not do that for me, and that was because I myself did not really know what I want to say. That means, it could not generate any ideas for me, so to speak. So I had hoped that my work would just be much easier now, where this program is there, so that, so that I so to speak.... get past such a blockage and maybe have more ideas or something, ... [but it] has shown itself in that LEX did not know how an abstract is structured." (A3)

#### *Validity and Reliability:*

The interviewee expresses concerns about the relevance and depth of AI-generated content, especially in specialized contexts. While Research Rabbit was effective for literature review, others fell short in summarizing articles, raising validity concerns. They emphasise that other AI tools did not meet expectations for tasks like summarizing articles, manifesting concerns about the validity of outputs in specific contexts.

"Yes, especially in the beginning when I used Lex, it took me much longer... In the end, the result was so poor that I could have done it myself right from the start [...] I am a big fan of Research Rabbit because the review process works extremely fast... I probably use it almost every day simply because I have to read so much all the time ". (A4)

Addressing concerns about AI data, the interviewee remarks, "There were many instances where the AI-generated content was not entirely relevant to my specific research context" (A5). They also question the depth of AI understanding in specialized research areas. While

AI tools enhanced efficiency in one instance for the interviewee, literature review, they remain critical of their accuracy and reliability compared to traditional methods, especially when compared to traditional methods of research. They highlight the limitations of AI in their experience with tasks like summarizing articles, where specific domain knowledge is essential.

“When AI is used in such a way that, for example, it improves the language a bit, it’s also completely okay, because in the past we did it with editors, or proofreaders, who improved the English here or maybe the German, depending on the case. It costs less money. Of course, there are those affected by it. I think. This does not change the qualitative research itself, because the authors themselves know what they want to write. And the ideas they have are still originally theirs, which means, this is not about plagiarism, but really just about how I can convey my prose better, better to the readers.” (A6).

#### *Ethical and Privacy Considerations:*

The interviewee's concerns extend to the ethical dimensions of AI tool usage, including the environmental impact of high energy consumption and potential gender biases in AI algorithms. They also reflect on the conditions under which these tools are developed, referring to manual data cleaning. They also mention "the opaque nature of data handling and user privacy in AI systems".

“It really bothered me [...] under what conditions this knowledge or these tools are produced, which are actually next level for our time.” (A7)

#### *Future:*

The interviewee speculates about the future development of AI in research, expressing both scepticism and optimism. They are cautious about over-reliance on AI but also recognize its potential to simplify certain aspects of research work. They emphasize the need to understand its limitations and the importance of responsible usage.

“I think the expectations are quite detached from this particular experiment [...] But otherwise, I mean, I have seen it myself now because if I don't know exactly what I want to write, then I can't write with AI... [...]" (A8).

In summary, the interviewee, Participant A, demonstrated a cautious yet open attitude towards the integration of AI tools in their academic workflow. Initially, their survey responses indicated a moderate familiarity with generative AI technologies (rating themselves

a 3 out of 5) and previous experience with AI tools in writing assistance and literature review. This background set the stage for their expectations: to improve writing skills through AI-augmented texts and to find relevant literature more efficiently. However, they also voiced concerns about potential biases in AI outputs, such as gender biases or missing key contributions.

Their experience with Lex, an AI text-editor, brought these concerns to the forefront. While Participant A had high hopes for the tool, particularly in tasks like organizing literature and drafting texts, they encountered several challenges. The tool struggled with understanding and aiding in the development of complex, nuanced academic tasks, as evident in the difficulties faced in creating an abstract with a clear argumentative structure. Issues with intuitiveness and the user interface further compounded these challenges.

Moreover, Participant A's experiment with Lex brought into sharp focus the concern about the quality and reliability of AI-generated outputs. The tool's inability to grasp the depth of academic content and its struggle with argumentation structure echoed Participant A's initial apprehensions about AI's limitations in qualitative research. This aligns with their concerns expressed in the survey about the potential for biased results from AI tools.

The high initial time investment mentioned repeatedly by Participant A also sheds light on another aspect: the real-world efficiency of working with AI tools. Although they see potential in AI for specific tasks like literature organization and writing short texts, the learning curve and time required to effectively use tools like Lex suggest in their case that these technologies might not yet be the optimal solution for speeding up the overall research process.

## 7.2 Participant B

In Section 7.2, I explore the experiment involving Participant B, a postdoctoral researcher working in the field of technology assessment. Like Participant A, Participant B started by completing the initial survey to assess their familiarity and perspectives on generative AI tools in research. Participant B then engaged in multiple periods of experimentation with these AI tools, integrating them into their specialized field of study. This phase was crucial in further understanding the usage of AI tools in the social sciences. Upon completion of this experimentation phase, I conducted a face-to-face interview with Participant B. This in-person interaction allowed for a more in-depth and nuanced discussion about their experiences, providing insights into the practical and theoretical implications of AI tools in advanced research settings.

Initial Survey:

*What is your primary field of study or research area?*

*“Science and Technology Studies, Technology Assessment”*

*On a scale from 1 (not familiar) to 5 (very familiar), how would you rate your familiarity with generative AI technologies?*

2

*Have you received any formal training or attended workshops on the use of AI in research?*  
(Yes/No)

*If yes, please provide brief details.*

NO

*Have you previously used any generative AI tools in your research or academic work?*  
(Yes/No)

NO

*If yes, please specify which tools*

NONE

*In what contexts have you used AI tools? (Multiple choice: Data Analysis, Writing Assistance, Literature Review, Others)*

NONE

*What types of tasks have you used AI tools for? (Open-ended)*

NONE

*What are your expectations or concerns regarding the use of generative AI tools in qualitative research? (Open-ended)*

“that it comes with a lot of extra work to assess the robustness, accuracy and validity of the outcome”

As mentioned before, I am presenting the results from the interview with participant B in the same themes as the ones used in the section of participant A. This enables a comparison in the following part. Since this interview lasted about twice as long as the first one, the findings here will be a bit longer.

#### *Background and Choice of AI Tool:*

Participant B, with around 25 years in qualitative social research, has applied various methods like interviews and participant observation using tools like AtlasTI and MAXQDA. They focus on qualitative methods, with an emphasis on advisory contexts, requiring robust and reliable methods. In discussing the choice of AI tools, Participant B noted their institute's focus on digitalization, albeit their personal research emphasis remains on biotechnology. The institute's approach involves a comprehensive discussion on the societal application of AI tools, not just in terms of personal use but in a broader societal context. They opted to use generative AI tools in a project involving document analysis related to biotechnology impact assessment, choosing these tools for their potential suitability in large-scale document analysis. Participant B selected ChatPDF for their project on document analysis within biotechnology impact assessment. The primary reason for this choice was ChatPDF's non-requirement for account creation or logging in, which aligned with Participant B's emphasis on privacy and data security. This selection was part of their approach to handling a project that entailed evaluating a significant number of documents from Technology Assessment (TA) institutions.

"[...]as a result, the embedded applications like MAXQDA and AtlasTI were no longer considered because they did not fit the type of analysis we were doing. Additionally, we are particularly focused on privacy at our institute. For me, this meant ruling out any tools that would require a login or were paid. However, what remained was the Chat PDF application, which I thought would be really interesting to try out in this context" (B1).

Participant B also tried out another tool that was not on the provided list – Perplexity. Perplexity AI is a search engine and chatbot that leverages LLMs. It aims to combine traditional search engines with the efficiency and direct response capabilities of generative AI. A key feature of Perplexity is its emphasis on citations, aiming to ensure that responses are supported by credible sources, thereby addressing concerns about the reliability of the

information presented. The interviewee used Perplexity in a more open manner, as it does not have a PDF upload function like ChatPDF. They used it to ask questions and found it interesting that it not only cited but also linked to specific PDFs. This allowed the participant to expand their corpus of literature as they were provided with articles that they might not have considered before:

"With Perplexity, you can't work with PDFs like ChatPDF, but conversely, you can ask questions just like with Chat GPT. [...] Not only was it providing citations, but it was also actually linking to the PDFs. [...] When I posed a specific question, we had four concrete case studies where it was particularly interesting for the clients, not just biotechnology in general, but what are the issues with biotechnological applications in relation to, for example, fish species with increased muscle growth. I then copy-pasted that very specific question. [...] This has already given me the opportunity to expand my understanding regarding the spectrum of documents and the ability to directly read and verify the content within the documents [...] I can also go back into the documents and compare them. While the tool already provides hints about what might be interesting, such as a potential risk, for example, that in this case, these animals might be more susceptible to viral or bacterial diseases. Then I say, 'Okay, that's interesting, that's an issue I hadn't considered yet.' So, in that sense, the text becomes relevant to me, and I can go into the publication to verify if it's accurate and what the specifics are. I found this combination to be very interesting." (B2)

#### *Quality and Productivity:*

Participant B's first interaction with generative AI involved understanding the types of texts produced by these tools. They noted the impact of AI-induced structuring on texts and its implications for texts intended for advisory functions in technology assessment. They found that the AI's structuring often led to arbitrary formulations, bringing in a certain randomness that did not align with the nuanced approach they aim for and the AI-generated texts sometimes lacked the depth and specificity needed. They compared the language of the AI outputs to that of glossy brochures, noting that it tended to be overly simple, optimistic, and cheerful. This style was seen as inappropriate for the ambivalent and critical nature of TA work. They highlighted a mismatch between the AI-generated language and the more critical, nuanced language required in their field. Participant B also commented on their experience with the quality and structure of AI generated text:

"I see now these highly structured texts and view this structuring differently, especially when I work with students. I see myself as more competent in distinguishing [between

different structures] and also more skilled in discussing with students what this does to the text and whether they might want to write differently, whether another form of structuring or a different manifestation of structuring might be sensible. That was the next step in using this Chat PDF. The next step was: What can it achieve in terms of a robust compilation? What specific issues were actually mentioned in this PDF, which would have been an evaluation goal for me.” (B3)

The participant discussed the potential for AI to increase efficiency in administrative tasks, such as project proposals, arguing that theses are tasks where AI could be actually helpful in their view:

"For example, project acquisition, that's already there. So, there are, for me, when I look at generative AI, also practical contexts at the institute. There are already application contexts where I think, 'Oh, this could be beneficial for me,' and one such application context is especially when I think about the EU. I think to myself, AI can easily handle what I have such resistance to, that I can't actually bring myself to use the entire wording of the call to write a proposal without my own involvement. I can't do it; I can't write a submission that is innovative in the sense that it goes beyond what the call requests or does something different. So, I believe it would actually be a total efficiency increase in that sense. Maybe even using a hybrid approach and saying, 'Okay, Tool, do what I...[don't want to do], and then try to incorporate at least two innovations into what the AI generates. But you have to, I think, overall, you have to discuss what this, what this project industry is all about.'" (B4)

#### *Validity and Reliability:*

There was uncertainty about the reliability of AI tools in accurately reflecting document contents. Participant B mentioned revisiting the AI tool and finding improvements in its referencing to uploaded PDFs but remained sceptical of its accuracy for their project needs, where detailed and accurate reflection of specific documents was critical. Initially, Participant B was unsure whether the AI's responses were specifically referencing the content of the PDF they uploaded or not. This uncertainty about the source of the AI's information was a major issue for them. In a subsequent use of the tool, it became clearer that the AI's responses were indeed relating to the PDF, but Participant B remained concerned about the reliability of the AI tool for their project, especially when precise and accurate information was required. They were also concerned about the underlying learning mechanisms of the AI tool and the data sources it utilized for generating responses. They questioned how the AI tool could learn and

provide relevant information based solely on the document provided, given the complex nature of their research material.

"I went back in today and don't know, could something have changed?.. because I first tried it out in November, I believe. And at that time, I had the impression, so it seemed to me, and now I also don't know, am I hallucinating or is it the generative AI... I remembered that the result I got, I couldn't be sure whether it was referring to the PDF or not. I have now started it again and it was already clear that it refers to the PDF. At that time, it wasn't clear to me, so my major issue was that it wasn't clear what the source was. It did answer my question about what are the issues with biotechnology? I had uploaded the PDF but from the answer, it wasn't clear what the data is based on. With the answer in the new run today, it was already relatively clear that it refers to the PDF and practically only to that. To see if this is really the case, I still have to... I would have to go in more closely, but that was a problem for me, that I would have needed the text to reliably refer only to that and I also don't know how that can be with a learning AI. It can't have learned just from this document so that is actually the classic... so what data are really flowing in there? In a research project where it is important that it is precisely about this PDF and not what all issues one can have with technology, this is a problem." (B5)

#### *Ethical and Privacy Considerations:*

Participant B expressed concerns about ethical aspects, including the learning aspect of AI tools. They highlighted the problem that while the AI learns, the user might not, resulting in a loss of personal learning and understanding that comes from direct interaction with, in this case, the documents. They express apprehension about the control private corporations have over these AI tools. They highlight the potential for these corporations to alter their market models at any time, thereby creating a one-sided dependency. Additionally, the participant raises concerns about the potential for these tools to create a competitive advantage, not more in the sense that this might be an opportunity to re-think the current competitive system in knowledge production. On the topic of privacy, the participant voices concerns about data privacy and security, particularly in relation to the use of login credentials. They worry about the potential for data to be retained by the tool, which could pose significant privacy risks. The participant also underscores the importance of exercising caution when becoming dependent on these tools. They warn that these tools may change their terms of use or become cost-prohibitive, which could pose challenges for those who rely heavily on them. This concern is further compounded by the potential impact on the job market. The participant

fears that the widespread use of AI could lead to the replacement of human workers, shifting the focus of training from people to technology, where they present an example:

"[...] a colleague, she told me that some distinguished professor has applied generative AI, for [his work], and his statement was, it's amazing, this AI now replaces almost five assistants for him, which would be Pre Doc assistants. The problem was that with the Pre Doc assistants, he had to always check if the output was correct, and he has to do that with AI as well, but the AI is much faster and can achieve much more. However, the problem now, and this is also a labour market policy issue, is that through the use of the five assistants, he also trained five individuals. While through the use of AI, only a technology or a technique is further developed. This means that there is a shift here. Again, do we want to educate young people, or do we want to educate generative AI? Are we investing time in personnel resources or are we investing time in economic assets?" (B6)

#### *Future:*

Despite the challenges, Participant B sees value in experimenting with AI tools, especially as a method of understanding their capabilities and limitations. They anticipate using AI tools like Perplexity for research expansion, particularly in contexts where linking to relevant documents can broaden the research scope. However, they remain cautious about fully integrating AI tools into their workflow, emphasizing the importance of personal learning and critical evaluation of AI-generated content. They also mentioned the potential for AI to increase accessibility and fairness in the scientific community but also raised concerns about the potential for AI to create a one-sided dependency on private corporations and their business models. The participant also shared their thoughts on how they feel about colleagues using such tools as well as the future of how AI tools are used at their institute:

"So, we didn't just think about it individually, but rather collectively. That's, well, it becomes very contextual. I have the utmost confidence that [my colleagues] will do it well. We have sufficient collective understanding at the institute, and I know that everyone approaches this from a thoughtful perspective. So, it's all the more important that there is this collective alignment in terms of style, attitude, and reflection. [...] I don't have any immediate specific reflections on it right now. I'm just surprised that we don't collectively embrace it more. Otherwise, I understand that it's used for resolving linguistic or national issues. I've also heard from people who do more coding themselves that it's very useful for discussions, which makes perfect sense to me because it helps in developing one's own

language. Actually, I was surprised by the abundance. The diversity of what's being used, both qualitatively and quantitatively. And then, of course, there's the aspect that doesn't apply to colleagues directly, but in principle, it's about having a competitive advantage. If I use it faster than others, I gain a competitive advantage, and I don't necessarily disclose where my sudden productivity comes from. It's not a reflex I have within the institute itself, but it's a factor that plays a role. In this field of research, competition is prevalent in many aspects, and by using it more than a colleague, I can gain a relative advantage on all levels. However, I believe this is more of an intra-institutional dynamic." (B7)

In summary, Participant B, who specialized in Science and Technology Studies and Technology Assessment, approached AI with notable caution and limited prior familiarity. Rating 2 out of 5 in their understanding of generative AI technologies, they had neither formal training nor previous experience in using AI tools in research. Ethical considerations, particularly regarding privacy and data security, were prominent in their decision of which tool to use. This backdrop set the stage for their experiment with ChatPDF, driven by a need to delve into the robustness, accuracy, and validity of AI outcomes in document analysis.

During the course of their use of ChatPDF, Participant B encountered challenges related to the tool's reliability and the quality of its outputs. They noted that while the tool offered potential efficiencies, it also demanded significant effort to assess the relevance and accuracy of its results. Concerns were raised about the extra workload required to validate the AI's performance, particularly in ensuring that the AI's responses were specifically relevant to the content of the uploaded PDF documents. This was crucial in their field, where precision and detailed analysis are paramount. The interview also revealed a tension between the perceived efficiency gains from using AI tools and the loss of learning opportunities. Participant B was concerned that while AI can process and summarize vast amounts of information, this might come at the cost of personal learning and understanding, which are integral parts of the academic research process. Also, concerns about becoming reliant on tools that are controlled by private corporations worries about privacy and ethical issues related to AI use as well as further commodification of research were voiced.

The experience of Participant B underscores the importance of a critical and cautious approach to integrating AI tools in research, especially in fields that require nuanced and in-depth analysis. Their journey with ChatPDF revealed the complexities involved in the application of AI in academic contexts, highlighting the need for careful evaluation of AI-generated content for its applicability, accuracy, and ethical implications. This detailed

assessment by Participant B illustrates the broader challenges and considerations in adopting AI technologies in qualitative research.

### **7.3 Discussion**

In this section, I compare the differences and similarities from both experiments and highlight the main argument, which is then set into context with the document analysis and related back to the literature.

#### **7.3.1 Differences in Background and Experience with AI**

The background and experience with AI of participant A and B are markedly different. Participant A, a PhD student in social sciences focusing on political and pension policy, had a moderate level of familiarity with generative AI technologies, rating themselves a 3 out of 5. They had previous encounters with AI tools such as ResearchRabbit AI and ChatGPT, suggesting a certain level of comfort and understanding of these technologies in their academic work. On the other hand, Participant B, a postdoctoral researcher in Science and Technology Studies and Technology Assessment, had limited prior experience with generative AI, reflected in their lower familiarity self-rating of 2 out of 5. This difference in background and exposure to AI tools set the stage for their distinct approaches and experiences in the subsequent experiments.

#### **7.3.2 Reflecting Different Priorities and Varied Experiences**

The criteria for selecting AI tools between the two participants diverged significantly, illuminating their differing priorities and concerns. Participant A opted for Lex, driven primarily by time constraints. This choice indicates a need for efficiency and perhaps a willingness to compromise on certain aspects of the tool's functionality due to time pressure. In contrast, Participant B's selection of ChatPDF was largely influenced by concerns over privacy and data security, as evidenced by their preference for a tool that did not require account creation or logging in. This difference in tool selection criteria is indicative of the diverse factors that researchers consider when integrating AI into their work, ranging from practical considerations to ethical and privacy concerns.

The experiences of participant A and B regarding the quality and productivity of the AI tools used were notably different. Participant A found Research Rabbit to be efficient for literature review purposes but faced challenges with Lex, particularly in creating an abstract with a clear and structured argument. This suggests that while some AI tools may excel in

certain tasks, they may fall short in more complex, nuanced academic activities. In contrast, Participant B observed that the texts generated by ChatPDF were arbitrary and overly simplistic, lacking the depth and criticality required in their field of Technology Assessment. This highlights a mismatch between the output of the AI tool and the sophisticated analytical needs of their research.

Despite their different experiences, both participants expressed concerns about the validity and reliability of the content generated by AI tools. Participant A's apprehensions centred around potential biases in AI results, such as gender biases or the omission of key contributions, reflecting a concern for the comprehensive and unbiased nature of academic research. Participant B, while also concerned about validity, focused more on the reliability of ChatPDF in accurately reflecting the contents of the documents they were analyzing. This concern is particularly pertinent in fields requiring precise and detailed analysis, where the accuracy of information is paramount.

The ethical and privacy considerations of both participants also differed. Participant A highlighted broader ethical issues such as the environmental impact of AI and potential inherent biases within AI algorithms. These concerns suggest a sensitivity to the wider societal implications of AI technology. Participant B, however, was more focused on the ethical aspects of learning from AI tools, the control exerted by private corporations over these technologies, and concerns about data privacy and security. This reflects a more focused concern on the immediate implications of AI tool use, particularly regarding the handling and security of research data.

### **7.3.3 Similarities: Common Struggles and Perspectives**

Despite their differences, both participants shared common experiences and perspectives on certain aspects of their AI tool usage. They both encountered initial struggles in effectively using AI tools, indicating a universal learning curve that transcends user background or the specific AI tool in question. This commonality suggests that regardless of one's prior experience with AI, adapting to and effectively utilizing these tools in academic research involves a period of adjustment and learning.

Furthermore, both participants expressed concerns about the limitations of AI in comprehending and assisting with complex academic tasks. This shared viewpoint underscores a recognition of the gap between the current capabilities of AI and the nuanced, often intricate demands of academic research. It highlights the need for continued

development in AI technologies to better align with the specific needs of academic disciplines.

Lastly, despite the challenges they faced, both participants acknowledged the potential of AI to simplify certain aspects of research work. However, they also cautioned against over-reliance on these tools, suggesting a balanced view of AI's role in academic research. This perspective reflects an understanding of the benefits that AI can bring to research, tempered with an awareness of its limitations and the importance of maintaining a critical and thoughtful approach to its integration.

#### **7.3.4 Putting the findings into the context of Document Analysis**

Relating the findings from the experiments with Participants A and B back to the initial document analysis, I draw several connections and insights that deepen our understanding of the practical application and theoretical implications of generative AI in qualitative social science research.

The analysis highlighted various envisioned uses of AI, such as writing assistance and literature review, which were echoed in Participant A's and B's experiments. However, their experiences also underscored the gap between these idealized uses and the reality of AI tool performance. For instance, Participant A's struggles with Lex in creating a structured abstract and Participant B's observations about the superficiality of AI-generated texts in ChatPDF demonstrate the limitations of these tools in handling complex academic tasks, a concern also raised in the document analysis. The analysed documents emphasize the efficiency and practicality of AI tools in research such as the GPT-4 Technical Report and articles from Social Science Space and The Sociology Space, which present generative AI as a time-saving tool for researchers. This is at most only partly reflected in Participant A's appreciation of Research Rabbit's efficiency and Participant B's use of Perplexity to expand their literature corpus, but as the findings show, the researchers did both come to the conclusion that a significant time investment would be needed to actually see an efficiency improvement when using gen AI for research tasks. The ethical concerns and privacy considerations discussed in the documents are mirrored in the participants' experiences. Participant A's ethical concerns about AI biases and Participant B's emphasis on privacy in choosing ChatPDF resonate with the discussions in the analysed documents about the ethical use of AI and data security.

In light of the document analysis and the insights from the experiences of Participants A and B, a significant observation emerges: the process of *de-scribing* AI tools, where the

practice does not always align with the initial intentions and imaginaries of the tool providers or makers, seems to pan out differently here. This deviation offers a compelling perspective on the actual utilization and adaptation of AI tools in the realm of social science research.

As I explored the concept of *de-scribing* AI tools within the document analysis, I hypothesised that researchers might reinterpret or repurpose these tools beyond their intended uses as envisioned by their creators. This idea suggests that researchers, in their practical application of AI tools, could potentially reshape and redefine the tools' functionalities to better suit their specific research needs. However, the reality, as evidenced by the experiences of the two participants in this study, presents a contrasting narrative.

Both Participants A and B initially engaged with multipurpose AI tools that were not specifically designed for research applications. These tools, as provided in the experiment, were intended to serve a broad range of functions, and were not tailored to the nuanced requirements of academic research. Participant A's struggle with Lex and Participant B's challenges with ChatPDF underscore this mismatch. Rather than *de-scribing* and adapting these multipurpose tools to fit their research needs, both participants quickly disengaged from using them. This rapid disengagement suggests that the tools' broad functionalities and the lack of specificity in their design made them less conducive to the participants' research tasks.

Interestingly, when both participants independently selected alternative tools, their choices were notably different from those provided in the experiment. Participant A chose Research Rabbit, while Participant B opted for Perplexity. Unlike the initial multipurpose tools, these alternatives were specifically designed for research applications. This crucial distinction meant that the vision *inscribed* in these tools by their creators aligned more closely with the participants' needs as researchers.

This alignment is a critical observation. The tools chosen by the participants were already tailored for research, negating the need for the participants to *de-scribe* them. In essence, the tools' original design and intended use matched the participants' expectations and requirements. This congruence between the tool's design and the user's needs suggests that when AI tools are specifically crafted with a particular audience or application in mind, their utility and effectiveness are significantly enhanced.

The insights here, therefore, highlight a key aspect of AI tool utilization in academic research within this study: the importance of alignment between the tool's design intentions and the user's specific needs. When AI tools are general and multipurpose, as in the case of the initially provided tools, researchers may find them less applicable to their specialized requirements, leading to disengagement. In contrast, tools that are purpose-built for research

contexts, like Research Rabbit and Perplexity, are more likely to be embraced by researchers, as these tools inherently resonate with their specific research methodologies and objectives.

In concluding this chapter, our exploration of the experiences of Participants A and B with AI tools in social science research provides invaluable insights, laying a foundational understanding that will be further contextualized in Chapter 8. This chapter has not only allowed us to get a glimpse into the practical realities of using AI tools in academic research but has also raised critical questions about the alignment between tool design and researcher needs.

The journey through this chapter reveals a striking contrast between the theoretical imaginaries of AI tools, as presented in the initial document analysis, and the practical experiences of the participants. This contrast is particularly evident in the participants' shift from multipurpose, generative AI tools to those specifically tailored for research purposes. As we transition to the next Chapter, these findings set the stage for a deeper discussion in the context of relevant literature. The next chapter will delve into how these insights resonate with the reviewed scholarly discussions relating to AI in research.

## **8 Discussing the overall Results**

In Chapter 8, I reflect on my own experiences with generative AI in light of the results. Afterwards, I venture into a synthesis of the empirical findings with the theoretical frameworks that inform this thesis. This chapter also aims to contextualize the real-world experiences of Participants A and B within the broader scholarly discourse on generative AI in qualitative social science research. Here, I examine the contrast between the often technooptimistic literature on AI and the pragmatic challenges faced by the participants. This comparison provides a platform to re-evaluate current perceptions of AI in research, acknowledging both its potential and limitations. Additionally, I explore how ethical considerations and concerns about bias in AI, as echoed in the experiences of the participants, align with and expand upon academic discussions. This exploration sheds light on the complex ethical landscape in which modern researchers operate. I also delve into how the concepts of marketization of knowledge production and the 'script' from user studies manifest in our participants' interactions with AI tools. This analysis offers insights into how these sensitizing concepts influence researchers' engagement with AI in the competitive academic environment.

### **8.1 Reflecting on my own experience with AI in light of the findings**

My journey into the world of generative AI has been a blend of personal curiosity and academic exploration, significantly influencing the direction of my thesis. My interest in AI, particularly the generative type, began well before the emergence of tools like ChatGPT and has grown with the development of large language models. This deep interest did not just keep me engaged; it really shaped the way I approach my research, especially in areas like qualitative research. For my thesis, it was crucial for me to dive in and really get to grips with these AI tools. This hands-on approach was vital not just for my own understanding but also because I was providing these tools to the participants in my experiment. The document analysis revealed a preference for tools adept at generating and summarizing text, reflecting the current trends in the application of generative AI in social science research. I had to make sure that the tools were not only functional but also suitable for the tasks at hand. Testing these tools myself was an important step to ensure that my participants could use them effectively in the experiment, helping to build a solid foundation for the research.

My initial engagement with generative AI began with ChatGPT, an experience shared by many if not most venturing into this field. This early phase was marked by a steep learning curve as I navigated the complexities of effectively communicating with AI. A key discovery

during this period was the critical role of precise prompts in shaping the quality of AI outputs. This insight, gleaned while working with ChatGPT-3, highlighted that AI responses could be significantly flawed without carefully crafted prompts. Improving my prompts thus became an essential skill, one that would prove very useful as I explored other AI tools. The introduction of Microsoft's Bing AI, which offered the capability to read and summarize PDF documents within a browser, marked a notable advancement in my journey with generative AI tools. This tool provided new opportunities for efficient literature summarization and information extraction from academic papers. The experience in writing prompts proved to be necessary to see Bing AI's potential. As the market practically exploded with a variety of generative AI tools, testing them got a lot easier, because they revealed themselves to all be working in the same way.

Through my continuous interaction with these tools, I (and many others) arrived at a significant realization: proficiency in prompting directly correlates with the effectiveness of the results. This understanding brought into focus the inherent nature of AI—it simulates intelligence rather than possessing it. A key moment of this realization was recognizing that AI's responses of incapability were not finalities, but rather invitations for persistent or revised prompting. Rephrasing often yielded the expected results, even if the AI assured me before that it would not be capable of fulfilling my ask. In my observations, large language models, though lacking emotions or consciousness, exhibited a form of responsiveness to positive and negative reinforcement, reminiscent of human interactions. This behaviour, a result of their training on human-generated data, reflects patterns of reward and behavioural adjustment. While this does not denote intelligence or emotional understanding, it is an intriguing aspect of AI behaviour that significantly impacts how users interact with these tools, and it is also something that should be incorporated when promoting AI to do something. Reflecting on the evolution of my prompting skills, the journey has been rather interesting. It has emphasized a crucial lesson: the more deliberately and thoughtfully a query is articulated, with a clear anticipation of the desired outcome, the more precise and useful the AI's response. The ability to effectively communicate with AI has emerged as a pivotal factor in harnessing its potential.

When I reflect on my own experiences in comparison to the results from Participant A, a few thoughts come to mind:

Participant A's journey with the AI writing tool Lex serves as a case study in managing expectations and adaptability. With a self-assessed moderate experience with AI tools,

Participant A entered the experiment with predetermined beliefs about Lex's capabilities. Opting to use only Lex, based on its perceived relevance to their needs, Participant A's experience soon diverged from their expectations. The results of their week-long engagement revealed a gap between what they anticipated and the tool's actual performance. This gap led to frustration and eventual disengagement.

My own experiences with generative AI tools echo those of Participant A, especially regarding the challenges of AI responses. I have encountered numerous instances where AI tools generated incorrect results or expressed their limitations. These experiences taught me to rephrase and redefine prompts. This adaptability arose from the realization that ineffective AI responses often signalled unclear or inadequate instructions on my part. Recognizing this, I adopted a more reflective approach, understanding that if an AI tool doesn't produce the expected outcome, it might reflect my own incomplete grasp of the task. Participant A's struggles with Lex, particularly their efforts to generate an abstract for an undefined research project, parallel my challenges in AI interaction. This situation underscores a critical learning curve in AI usage: recognizing the tool's limitations and the necessity for clear, precise inputs. Participant A's realization that their expectations did not match Lex's functionalities, and their acknowledgement of an unclear research direction, underscore the intricate interplay between user expectations, AI capabilities, and the clarity of research objectives.

A central question arises from both our experiences: does the time invested in mastering generative AI tools lead to significant time savings in the long run? While mastering these tools undoubtedly requires a substantial initial investment of time, the potential long-term benefits, particularly in enhancing research capabilities, are up for debate. Participant A's observation that their time investment did not result in time savings casts a spotlight on the practicality of integrating AI into research methodologies. This resonates with our theoretical lens - researchers use technology to get ahead. If the technology cannot provide this for them, the reason for using it vanishes. This insight necessitates further research to evaluate the overall effectiveness and efficiency of generative AI tools in academic research settings and beyond.

In my exploration of user experiences with AI tools, the case of Participant B also highlights important findings. Participant B's initial interaction with ChatPDF was revealing, highlighting again the substantial learning curve in AI interactions. With a self-assessed experience level of 2 out of 5 in using AI tools, Participant B's approach lacked the experience to dive deeper into effective prompting. Notably, they did not explicitly instruct

the AI to source answers from the uploaded document, leading to a pivotal miscommunication. This incident underscored for me the stark operational differences between human and AI cognition. AI tools, unlike humans, do not infer context or implications beyond their given instructions. This fundamental difference in interpretive abilities was at the start of Participant B's experience with the tool, as the AI defaulted to sourcing information from its training data rather than the provided document.

This experience significantly shaped Participant B's perception of the AI tool, breeding a sense of scepticism. I have come to realize how crucial these initial interactions are in shaping users' trust in AI technologies. Particularly in the realm of AI such early misalignments can have lasting impacts on user confidence.

It was also very interesting to me that they did not attempt to converse with or correct the AI tool, treating it more as a static database rather than an interactive assistant. This approach is similar to the usage patterns I observed with participant A. Participant B's experience, in my view, is emblematic of the challenges faced by novice users of AI as it emphasizes the need for a more nuanced understanding of how users approach and interact with AI.

When reflecting on the experiments that both participants took part in, it's fascinating to observe their decision-making processes regarding the selection of AI tools. Each participant was provided with a list of multiple AI tools, yet both chose to use only one from the list but for different reasons. A common reason was the irrelevance of certain tools to their current research, but their individual motivations diverged significantly beyond that.

Participant A, faced with time constraints, made a quick decision in selecting a tool. In contrast, Participant B's choice was deeply influenced by privacy concerns, leading them to opt for the only tool that did not require account creation or login. Despite the variety of tools available, their decision to test only one tool from my provided list is telling. Intriguingly, both participants also mentioned using and preferring other tools that were not on my list, indicating the rapid evolution of AI technology. This evolution became evident as new tools, which were released during the nearly year-long research process and thus not included on my initial list, were found to be more favourable by the participants.

For Participant A, the tool of choice was Research Rabbit. This tool appealed to them due to its speed in delivering results. Participant A was able to input a few papers and quickly receive a list of related works, facilitating an efficient research process. Similarly, Participant B was drawn to Perplexity, which allowed them to input a research question and get linked to

actual research papers. This feature enabled them to read and verify the information provided by the tool, contrasting with their experience with ChatPDF, where they faced uncertainty about the source and accuracy of the information provided.

These preferences highlight a key aspect of user interaction with AI tools: the value of immediate and clear results. Both participants favoured tools that offered quick starts and transparent, useful outcomes. This is especially significant when considering Participant B's experience with ChatPDF, where the lack of clarity about the information source led to scepticism. In both cases, the tools they chose themselves not only met the participants' specific needs but also offered a level of clarity that enhanced their research experience.

In conclusion, the experiments with both participants revealed insightful and somewhat unexpected results. Each participant's approach to selecting and using AI tools sheds light on different aspects of user preferences and needs in the context of AI-assisted research.

## **8.2 How the findings relate to the literature**

Reflecting on the reviewed literature, the experiences of Participants A and B in the context of generative AI's role in qualitative social science research offer insights that intersect with various themes and questions raised in the literature. The upcoming part will delve into these intersections, analysing how the empirical findings from the experiments relate to the broader scholarly discourse.

### **8.2.1 Relating to the state of the Art**

Diving right in, I found that in certain strands of the reviewed literature, especially in regards to using AI for coding, there is a seeming portrayal of techno-optimism to be found. Yet this contrast between the techno-optimistic portrayal of AI in literature (Costa, 2023; Marathe & Toyama, 2018; Chen et al., 2018; Rietz & Maedche, 2018; Hamilton et al., 2023; Crowston et al., 2011) and the pragmatic experiences of Participants A and B underscore the complexities of AI integration in research. The literature often highlights the potential of AI and ML to transform research methodologies, yet the practical challenges faced by the participants reveal a more nuanced reality. This gap between expectation and experience might necessitate a critical re-evaluation of the angle many papers seem to take when it comes to generative AI.

The ethical and bias considerations in the use of AI tools on the other hand, as highlighted in the literature, are crucial aspects that have been echoed in the experiences of Participants A

and B. The concerns raised by Costa (2023), Shaw (2020), and Hesselmann (2023) about the potential biases and ethical challenges associated with AI usage in research find practical resonance in the apprehensions expressed by our participants. Participant B's focus on privacy underscores a significant ethical concern in the deployment of AI tools. The concerns of Albrecht (2023), that the usage of AI could amplify the tend to quantity over quality in research publications, also resonates with the thoughts of participant B. The emphasis on data security and the ethical handling of personal information reflects broader issues in AI research related to user consent, data protection, and the ethical use of sensitive information. Interestingly enough, Balmer's (2023) critique, regarding a certain communication style of AI that it enforces in its writing, is something that participant B also found in their experimentation with gen AI tools. These concerns are not just technical issues but also involve deep ethical considerations about the rights of individuals and the responsibility of researchers in safeguarding these rights in a digital landscape increasingly mediated by AI technologies.

Participant A's concerns about potential biases in AI outputs highlight another critical ethical issue. The risk of AI algorithms perpetuating existing biases or creating new ones is a well-documented challenge in AI development. This concern is particularly pertinent in social science research, where biased outcomes can significantly impact the validity and integrity of research findings. Participant A's apprehensions reflect a growing awareness of the need to critically assess AI tools for their potential to reinforce stereotypes, perpetuate inequalities, or skew research outcomes based on biased data sets. Costa's (2023) insights on the risks associated with AI advancements, Shaw's (2020) critique of the ethical and social issues in AI's data accumulation and surveillance, and Hesselmann's (2023) exploration of the normative implications of AI tools in academic publishing all emphasize the need for a conscientious approach to AI integration in research. These authors advocate for a critical stance towards AI, urging researchers to consider not only the technical capabilities of AI tools but also their ethical implications.

### **8.2.2 Situating the Results with sensitizing concepts**

The concept of the 'script', as described by Madeleine Akrich, provided a profound theoretical approach to how researchers interact with generative AI tools. These tools come with inherent scripts - assumptions and functionalities encoded by their designers. However, as outlined in chapter 7, the experiences of both participants diverge from the process of *de-*

*scription*, where users re-interpret and adapt these tools to fit their specific research contexts. Participant A's struggle with Lex and Participant B's experience with ChatPDF reveal how they navigated, and at times resisted, the scripted functionalities of these tools. But rather than, *de-scripting* those tools, they took a shift towards tools specifically designed for research, such as Research Rabbit and Perplexity instead of adapting the other tools to their needs to align more closely with their research needs and methodologies.

In analysing the experiences of Participants A and B with generative AI tools, a compelling narrative emerges, one that resonates deeply with the concept of the marketization of knowledge production in academia. This narrative is not just about the adoption of new technologies but is also reflective of the broader socio-economic pressures that shape academic practices.

Both participants, constrained by time and the need to balance multiple responsibilities, demonstrate a pragmatic approach in their engagement with AI tools. Initially, they explore multipurpose AI tools, perhaps with an expectation of streamlining their research processes. However, they quickly encounter limitations and frustrations. This initial experience is emblematic of a broader trend in academia where the allure of technological solutions is often tempered by the realities of their practical application.

Participant B's move to Perplexity and Participant A's switch to Research Rabbit are not mere shifts in tool preference but are strategic decisions driven by a need for efficiency and time management. These choices implicitly reveal the underlying capitalist structures within which academic research operates. Both participants, pressed for time and grappling with the demands of a competitive academic environment, opt for tools that promise quicker results, albeit for different aspects of their work. This behaviour underscores a key aspect of the marketization of knowledge production: the necessity to stay productive and competitive, often at the expense of in-depth engagement with new tools or methodologies.

This market-driven approach to research is further exemplified in the participants' inclination to use AI for (in their view) tedious tasks, such as grant writing and email correspondence. These are not the core elements of their research but are essential for maintaining their competitive edge and securing financial resources. Participant B's reflections on the pressure that researchers face to publish and secure grants highlight this aspect starkly. The use of AI in these contexts suggests a prioritization of tasks that directly contribute to maintaining or enhancing their competitive position within the academic market.

These experiences of Participants A and B resonate with the theory of marketization in knowledge production, as outlined by Falkenberg & Fochler (2022) as well as Larivière et al. (2015). Their interaction with AI tools reveals a pragmatic approach where the primary criterion for tool adoption is not necessarily its potential to enhance the research process *per se*, but rather its ability to save time and resources. This approach mirrors the broader academic landscape, increasingly influenced by market logic, where efficiency, productivity, and competitiveness are paramount.

Moreover, this trend reflects a shift in the perception and role of research tools within academia. Generative AI tools, in this context, are valued not just for their technological capabilities but for their ability to contribute to the academic capital of researchers even though both participants reflected on the drawbacks and ethical concerns of AI. This perception also reconnects to Hackett's (2014) observation of universities functioning as knowledge corporations and Burrows' (2012) critique of the metricized landscape of academia. In such an environment, tools like AI are not merely technological aids but are integral to the strategic positioning of researchers in the academic marketplace. This aligns closely with Falkenberg and Fochler's concept of assetization in academia. As discussed, innovative research technologies like AI are not merely evaluated on their technical merits but are also seen as strategic assets that can enhance a researcher's academic profile and capital.

In conclusion, the engagement of Participants A and B with generative AI tools offers a microcosmic view of the larger trends in academic research, where market forces significantly influence research practices. Their experiences reflect a reality where the integration of AI in research is less about technological innovation and more about navigating the competitive and marketized landscape of academia. This reality, though at odds with the idealized vision of AI as a transformative tool for research, offers critical insights into the evolving relationship between technology, academic work, and the market forces that shape them.

## 9 Conclusion

This thesis embarked on an explorative journey to critically examine the impact of generative AI on qualitative social science research. It opened with a comprehensive analysis of the role of AI and machine learning in contemporary research, emphasizing the transformative potential and inherent challenges specific to the social sciences. This discussion was instrumental in setting the stage for a deeper inquiry into how AI reshapes research methodologies and knowledge production. I then delved into critical theoretical frameworks, namely valuation studies and the concept of the script within user studies. These frameworks provided a multifaceted lens through which the integration of AI tools in academic research was examined. Valuation studies offered insights into how these tools are perceived and valued in the academic market, reflecting the broader dynamics of knowledge production in a competitive academic landscape. Meanwhile, the concept of the script sheds light on the design and functionality of AI tools, as well as the expectations and assumptions embedded within them by their creators.

Employing a mixed-methods approach, the thesis combined document analysis with experimental interventions to offer both a theoretical and practical perspective on the use of generative AI tools. The document analysis illuminated the discourse surrounding generative AI, revealing how documents act as tools to *inscribe* or *de-scribe* specific visions within AI software. This provided a backdrop against which the empirical findings from the experimental intervention could be shown. The experimental intervention, featuring real-world experiences of researchers using AI tools, brought to the fore the practical challenges and adaptations in the utilization of these technologies. This empirical exploration highlighted how researchers navigate the scripted functionalities of AI tools, struggling to deviate from their intended use and instead choosing different tools that align more closely with their specific research needs and methodologies. This was not merely a technical adaptation but also a strategic decision influenced by the broader market pressures in academia.

Therefore, the empirical findings challenge the initial hypothesis that researchers would extensively use AI tools within their research to gain speed and efficiency. Instead, the findings highlight a critical gap between the potential of AI tools and their actual utilization in the current competitive academic structure. Researchers, driven by the need to stay productive and competitive, prioritize tasks that contribute to their academic standing and resource acquisition. Consequently, the use of AI for administrative tasks like email management and

grant applications seems to become more prevalent than its application in innovative research methodologies.

This research was guided by one main question and two sub-questions, the answers for which I strived to explore. How does the usage of generative Artificial Intelligence impact qualitative research in the social sciences? How do generative AI tools influence the qualitative academic output of social science researchers? And how do qualitative social science researchers perceive the impact of generative AI tools on (their own) work? After conducting this research, we can draw conclusions that help us to find some answers:

Throughout this thesis, I followed the hypothesis that researchers would utilize generative AI tools to stay competitive and efficient in the realm of marketized knowledge production. The empirical findings, however, unfolded differently than anticipated. It became evident that researchers are primarily driven by the need for immediate efficiency gains. While this actually aligns with the initial assumption, it does so in a different way than expected. They showed little interest in exploring new AI technologies unless these tools provided rapid and tangible improvements in time management. This trend underscores a pragmatic approach: researchers are not inherently interested in the technology itself but are solely motivated by what it can do for them, the prospect of gaining an advantage in a highly competitive academic environment. Therefore, I find that within the case of this research, if AI tools do not quickly demonstrate a significant increase in efficiency, researchers are unlikely to invest further time in them, as this would contradict their goal of maximizing productivity within the constraints of the current academic system. In the further contextualization of the experiments with the findings from the earlier conducted document analysis, it is illuminated how the initial appeal of multipurpose AI tools is often overshadowed by the practical realities of their application in specialized research contexts. The switch to research-specific AI tools by the participants in this study was driven by the search for tools that required minimal initial investment in learning and offered immediate, visible results. This preference was shown by both participants' transition to more specialized tools. Participant A, initially struggling with Lex, turned to Research Rabbit for more efficient help during their literature review. Similarly, Participant B, faced with the problems in ChatPDF, opted for Perplexity. These choices were driven by the immediate applicability and ease of use that these research-specific tools offered. Their switch underscores a pragmatic approach in tool selection, reflecting the critical need for time efficiency in academic research. Researchers, pressed by the demands of a competitive academic environment, gravitated towards tools that could

quickly enhance their research process without a significant upfront investment in learning. Rather than extensively employing AI tools within their research for enhanced efficiency, researchers demonstrated a pragmatic approach, prioritizing immediate utility and time-saving applications. This preference for tools that offer rapid, tangible benefits without substantial initial investment reflects the intense pressures of a competitive academic environment. Researchers gravitated towards AI applications that aligned with administrative tasks, a strategic choice that echoes the broader dynamics of marketized knowledge production.

In the context of document analysis, this thesis illuminated the gap between the idealized visions of AI tool functionality and their practical application in academic research. The participants' experiences highlighted this disconnect, leading them to seek out tools specifically designed for research, such as Research Rabbit and Perplexity. This strategic shift underlines the importance of aligning tool functionality with specific research needs, a vital consideration in the current landscape of academic research.

In acknowledging the limitations of this study, it's essential to recognize that while the findings offer valuable insights into the integration of generative AI in qualitative social science research, they are bounded by certain constraints. Firstly, the small sample size and specific demographic of participants limit the generalizability of the results. The experiences and perceptions of two researchers do not comprehensively represent the broader academic community's engagement with AI tools. Additionally, the study's focus on a select set of AI tools may not encompass the full spectrum of available technologies and their diverse applications in social science research. The experimental design, while meticulously planned, may also carry inherent biases linked to the selection of tools and the interpretation of participant feedback. Furthermore, the rapid evolution of tools within the realm of AI means that the tools and methodologies discussed may quickly become outdated, impacting the study's long-term relevance.

Even though the results are limited in their generalizability, I can still draw some suggestions from them regarding the use of generative AI tools in qualitative research. First, it should always be made transparent that these tools were used in the research process. Secondly, the researchers must constantly reflect on the inherent biases and limitations of the AI tool and ultimately, the researcher has to be held responsible for the end result, especially when these tools have been used. Thirdly, the research has shown that learning how to effectively use those tools needs a significant time investment upfront with a lot of trial and

error involved. This should also be communicated clearly since the learning curve is (at least in the case of this study) steeper than advertised.

The findings from this study open several avenues for further research. Firstly, a more comprehensive examination involving a larger and more diverse sample of researchers could provide deeper insights into the varied ways generative AI is being utilized and perceived across the social sciences. Additionally, future studies could explore the long-term impacts of AI tool integration on research methodologies and academic workflows, including the ethical implications and potential biases inherent in AI technologies.

Another critical area for investigation involves the impact of market forces on academic research practices, especially in relation to AI adoption. Further research could examine how the pressure to remain competitive and efficient shapes the choice and use of AI tools, and how these tools, in turn, influence the dynamics of knowledge production, dissemination, and valuation in academia.

In conclusion, this thesis serves as a starting point for deeper and specialized research into the multifaceted impact of generative AI on qualitative research and the broader socio-economic factors that influence technological adoption in academia. It also invites ongoing dialogue and research into the responsible and ethical integration of AI tools, ensuring that technological advancements align with the core values and objectives of qualitative social science research. As the academic landscape continues to evolve, this thesis underlines once more the need for critical engagement with emerging technologies, fostering a balanced approach that harmonizes technological innovation with the intricate realities of their usage.

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## Appendix

### Abstract German

Diese Masterarbeit begibt sich auf eine explorative Reise in den Bereich der generativen KI-Werkzeuge innerhalb der qualitativen sozialwissenschaftlichen Forschung, verankert in den Theorien der *Valuation Studies* und *User Studies*. Ziel ist es, die Frage zu beantworten: *Wie wirkt sich die Nutzung generativer Künstlicher Intelligenz auf die qualitative Forschung in den Sozialwissenschaften aus?* Die Arbeit untersucht, wie diese fortgeschrittenen Technologien die akademische Forschung beeinflussen, sowie ihr Potenzial, Herausforderungen und ethische Implikationen im akademischen Kontext, wobei das Versprechen der Innovation mit den praktischen Gegebenheiten der akademischen Arbeit abgewogen wird. Durch einen Mixed-Methods-Ansatz, der Dokumentenanalyse und experimentelle Intervention kombiniert, untersucht die Studie die Integration, Nutzung und ethischen Herausforderungen der KI in der Forschung durch die Erfahrungen, die in einem experimentellen Aufbau mit zwei Forschern geschaffen wurden. Es zeigt sich, dass Sozialwissenschaftler innerhalb des Rahmens dieser Studie oft Effizienz priorisieren und sich auf Werkzeuge konzentrieren, die sofortige Ergebnisse mit minimalem Lernaufwand bieten, was den wettbewerblichen Druck der akademischen Arbeit widerspiegelt. Die Ergebnisse deuten auf ein nuanciertes Verständnis der Rolle der KI hin, heben ihr Potenzial zur Verbesserung von Forschungsprozessen hervor, betonen aber auch die Notwendigkeit einer sorgfältigen Integration unter Berücksichtigung ihrer Grenzen und offenbaren, dass Forscher Effizienz über Innovation bei der Werkzeugnutzung priorisieren. Diese Masterarbeit unterstreicht die Komplexität der Integration von KI in die akademische Forschung und bietet Einblicke in das dynamische Zusammenspiel zwischen technologischen Fortschritten und der sich entwickelnden Landschaft der sozialwissenschaftlichen Forschung.

## Consent Form

### Einverständniserklärung

Zustimmung zur Teilnahme an einem Experiment sowie einem ex-post Interview und der Verwendung dieser Daten im Rahmen einer Masterarbeit

Ich stimme hiermit zu, an einem Experiment zur Nutzung von generativer KI in qualitativen Methoden teilzunehmen sowie ein Interview zu meinen Erfahrungen in diesem Experiment zu geben. Ich wurde darüber informiert, dass das Interview digital aufgezeichnet wird und bin damit einverstanden. Die Aufnahme wird von dem durchführenden Studierenden für den Zeitraum der Ausarbeitung der Masterarbeit gespeichert und wird danach gelöscht. Die Aufnahme wird nur dem durchführenden Studierenden zugänglich sein. Einige Aussagen können von dem Studierenden anonymisiert in schriftlicher Version im Rahmen der Masterarbeit zitiert werden. Diese Aussagen werden den Leser:innen der Masterarbeit zugänglich sein. Die Daten werden ausschließlich zu wissenschaftlichen Zwecken verwendet werden. Es werden keine personenbezogenen Daten in der Masterarbeit verwendet. Mir ist bewusst, dass diese Teilnahme freiwillig stattfindet und ich daher jederzeit unterbrechen oder abbrechen kann. In solch einem Fall, werden die mich betreffenden Daten, die bereits erhoben wurden, nur mit meiner expliziten Zustimmung verwendet. Mir ist bewusst, dass ich mein Einverständnis zur Benutzung meiner Daten auch künftig jederzeit widerrufen kann.

Name des/r Interviewpartners/in:

E-Mail-Adresse:

Datum:

Unterschrift des/r Interviewpartners/in

Unterschrift des durchführenden Studenten

## **Participant Onboarding**

### **Introduction:**

Dear participants,

As you prepare to explore the AI tools provided, I encourage you to approach them with an open mindset. It is essential to recognize that the effectiveness of these tools often hinges on the specificity and structure of your prompts. Should the initial output not meet your expectations, rephrasing or refining your queries can significantly enhance the results. I urge you to experiment with different methods of engagement, be bold, and try different ways of interacting with these tools. It's all about exploring!

### **AI-Tool Descriptions:**

#### **Consensus:**

Consensus.app is an AI-driven platform aimed at improving access to scientific evidence by enabling users to delve into research papers quickly, even without the necessity for expertise in the field. Here's a detailed breakdown of its functionalities:

- Access:
  - <https://consensus.app/> - Free, but requires Login after first use.
- Scientific Evidence Accessibility:
  - Designed to make scientific evidence accessible to individuals regardless of their background or expertise by leveraging AI/ML to analyse peer-reviewed research papers and present the findings in a comprehensible format.
- Search Engine:
  - Operates as a search engine utilizing AI to discover insights within research papers, catering to posed queries.
- Key Information Extraction:
  - Employs AI to extract crucial information from research papers, allowing users to swiftly scan summaries to find papers pertinent to their research, and aids in understanding research papers more easily.
- Data Extraction and Distillation:
  - Utilizes AI to extract and distil data directly from research papers, aiming to provide evidence-based answers to user queries. It's powered by GPT-4, which helps in generating scientific summaries.
- Extensive Coverage:

- Provides access to over 200 million scientific papers without the necessity for keyword matching, ensuring extensive coverage of scientific literature.
- Instant Analysis:
  - Offers proprietary and purpose-built features that leverage GPT-4 and other Language Models to summarize results, aiding in instant analysis of the content.
- Data handling:
  - Consensus pledges to anonymizing all user data including search queries etc. Additionally, some query data will be sent to OpenAI servers as part of AI prompts to enable the AI specific features. Data sent to OpenAI for processing is anonymized and is not used for AI training.

## LEX:

Lex.page is an AI-powered writing tool designed to assist users in creating content and overcoming writing challenges. Here's a breakdown of its functionalities:

- Access:
  - <https://lex.page> - Free, but requires Login
- Content Generation:
  - Generates various types of content including blog posts, articles, scientific papers, and so on.
- Writing Assistance:
  - Assists in drafting essays, articles, and stories, and offers suggestions based on context.
  - Utilizes a feature where typing '+++' prompts the AI to complete sentences.
- User Interface:
  - Provides a Google Docs style editor with integrated AI support.
- Technology:
  - Powered by language models GPT-3 & GPT-4.
- Assistance Features:
  - 'Ask Lex' feature for quick information retrieval within the editor, and a "creativity" slider to adjust text uniqueness and coherence.
- Document Outlining & Drafting:
  - Can generate complete text outlines or drafts tailored to the type of paper being written.
- Learning and Adaptation:

- Designed to learn from user interaction and improve suggestions over time.
- Data handling:
  - Like with google docs, all data on LEX gets processed on their servers. Additionally, data will be sent to OpenAI servers as part of AI prompts to enable the AI specific features. Data sent to OpenAI for processing is anonymized and is not used for AI training.

### **ChatPDF:**

ChatPDF is a novel AI tool designed to enhance interaction with PDF documents. Here's a summary of its capabilities:

- Access:
  - <https://chatpdf.com> – Free, does not require Login for main functionality.
- Document Interaction:
  - After uploading a PDF document, the document and a dedicated chat window are shown side by side.
  - Users can pose questions to their PDF documents and receive instant responses, which facilitates quicker access to information without having to read through the entire document.
- Semantic Indexing:
  - It analyzes PDF files to create a semantic index, presenting relevant text segments via a text-generation AI.
- Content Summarization and Detail Retrieval:
  - Useful for summarizing large PDFs and answering detailed queries regarding the PDF content.
- Technology:
  - Utilizes the GPT-3.5 language model for its operations.
- Data handling:
  - All Data processing happens on the ChatPDF servers. Additionally, data will be sent to OpenAI servers as part of AI prompts to enable the AI specific features. Data sent to OpenAI for processing is anonymized and is not used for AI training.

## MAXQDA:

MAXQDA is a software for qualitative and mixed methods data analysis, which now incorporates an "AI-Assist" feature to aid in the analysis process. Here's a breakdown of its capabilities, especially focusing on the AI-Assist feature:

- Access:
  - <https://www.maxqda.com> – Paid, but has a free trial period, requires Login
- Automatic Analysis:
  - The AI-Assist feature in MAXQDA simplifies work by automatically analysing and summarizing elements of a research project using OpenAI technology.
- Text Summarization:
  - It offers the ability to have text passages summarized automatically, including multiple text segments coded with the same code to explain common themes across codings.
- Code Memo Summary:
  - AI-Assist can add a summary to the Code memo to help explain the coded content of a code, with the ability to choose the language and the length of the AI-generated summary, which can then be modified like any other text.
- Paraphrasing and Code Suggestions:
  - Provides automatic paraphrasing of text passages and suggests new codes to be applied to the text data.
- Segment Summarization:
  - Enables summarization of selected text passages, coded segments, and the creation of automatic summaries for coded segments of a topic.
- Subcode Suggestions:
  - Analyses coded segments and suggests possible subcodes, aiding in deeper analysis of the data.
- Customization:
  - Allows customization of interactions by adjusting the content, length, language, and format of the results, providing a tailored analysis experience.
- Integration:
  - The AI-Assist feature is integrated within MAXQDA, adding to the software's existing capabilities in qualitative data analysis by leveraging gen AI to automate certain aspects of the analysis process.
- Data handling:

- Most data processing happens locally. The texts uploaded for summary generation or subcode suggestions are deleted post-processing, at the latest after 30 days. Data sent to OpenAI for processing is anonymized and is not used for AI training.

### **AtlasTI:**

Atlas.ti, a software designed for qualitative data analysis, has recently introduced a feature known as "AI Coding Beta powered by OpenAI" which aims at automating the coding process of textual data to a significant extent. Below are the details of the AI Coding Beta feature and its capabilities:

- Access:
  - <https://atlasti.com> - Paid, but has a free trial period, requires Login
- Automatic Coding:
  - The feature enables automatic inductive analysis of textual data by applying codes based on the substance of the data, making the process faster.
- Open and Descriptive Coding:
  - AI Coding Beta is designed to perform open and descriptive coding for text material automatically, thus aiming to save time and energy and allowing the researcher to focus on data analysis and interpretation for better and faster insights.
- Automation with Human Supervision:
  - The feature generates fully automated code proposals while also allowing for human supervision to review and refine the results, ensuring transparency and control over the coding process.
- Granularity Customization:
  - With a new slider control in Atlas.ti Desktop, researchers can customize the granularity of AI Coding results based on specific needs, giving a balance between automatic support and human refinement.
- Efficiency and Accuracy:
  - AI Coding Beta may reduce overall data analysis time greatly and increase the accuracy of results through using OpenAI's model. This may allow for the uncovering of insights and patterns that might otherwise be missed.
- Future Integration:
  - In the near future, Atlas.ti plans to allow researchers to work with their own code sets.
- Data handling:
  - For AI features, data is uploaded to both ATLAS.ti and OpenAI servers for processing. Data sent to OpenAI for processing is anonymized and is not used for AI training.

## **JENNI AI:**

Jenni.ai is a writing assistant designed to enhance the content creation process by leveraging generative AI, similar to LEX, but with more added features.

- Access:
  - <https://jenni.ai> – Free, requires Login
- Content Generation:
  - Helps users in generating various types of written content including academic essays, research papers, blog posts, emails, personal statements, and more.
- Academic Assistance:
  - Provides support in essay writing and other academic endeavours.
- AI Autocompletion:
  - Offers sentence completion and can generate entire texts based on user input.
- Plagiarism Checker:
  - Ensures originality of content with a built-in plagiarism checker.
- Citations:
  - Finds citations from trustworthy resources to back up facts.
- Text Transformations:
  - Allows rephrasing or altering sentences to suit user preferences.
- Ease of Use:
  - Quick Setup: Online software with no installation required; users can sign up for a free trial quickly.
- Technological Foundation:
  - Utilizes a blend of custom AI, GPT-4, AI21, and current text analysis techniques to deliver high-quality content.
- Data handling:
  - All data processing happens on JenniAI servers, some data gets sent as part of a prompt to third party gen AI providers like OpenAI, but also others

## Original Quotes

### Participant A

A1

"Ich hab nur LEX.page angesehen und hab das auch genutzt... Kenne AtlasTI und MAXQDA die anderen KI Tools da drinnen nicht habe ich mir nicht angesehen weil ich einfach gerade keine Verwendung dafür habe."

A2

"Genau. Also zuerst habe ich mich mal zurechtfinden müssen weil es ist nicht extrem intuitiv gewesen [...] Was ich schon probiert habe ist mir eine Zusammenfassung geben zu lassen von von mehreren Artikeln. Das hat leider überhaupt nicht funktioniert weil mir Lex immer gesagt hat dass es keinen Zugriff auf den Artikel hat"

A3

„Im Ich hatte das Gefühl, dass dass Lexus nicht machen konnte für mich, und zwar deswegen, weil ich selbst nicht wirklich wusste, was ich sagen will. Das heißt, es konnte mir keine Ideen generieren, sozusagen. Also ich hatte gehofft, dass meine Arbeit einfach viel einfacher wäre, jetzt, wo dieses Programm da ist, damit, damit ich sozusagen so eine Blockage sozusagen ... weiterkomme und vielleicht mehr Ideen habe oder so..., [Aber es] hat sich gezeigt, dass Lex nicht wusste wie ein Abstract aufgebaut ist.“

A4

"Ja speziell anfangs wie ich Lex verwendet hab hab ich deutlich länger gebraucht... Im Endeffekt war das Resultat eh so schlecht dass ichs von Anfang an selbst hätte machen können [...] Ich bin ein großer Fan von Research rabbit weil das reviewen einfach extrem schnell funktioniert [...] Das verwende ich wahrscheinlich fast täglich einfach weil ich so viel lesen muss die ganze Zeit"

A5

"Es war oft so dass der KI-generierte Content nicht wirklich relevant war für meinen Forschungskontext"

A6

"Wenn KI so genutzt wird, dass man zum Beispiel die Sprache etwas verbessert oder so ist es auch völlig in Ordnung, weil früher haben wir das ja mit Editoren gemacht oder

Korrekturlesern, die hier das Englisch verbessert haben oder das Deutsch, je nachdem. Das kostet weniger Geld. Natürlich gibt es da auch Leute, die davon betroffen sind, ich denke. Das ändert aber jetzt nicht die qualitative Forschung selbst, weil die Autoren und Autorinnen ja selbst wissen, was sie schreiben wollen. Und die Ideen, die sie haben, sind ja noch immer ihre eigenen, das bedeutet, hier geht es nicht um Plagiate, sondern wirklich nur darum, wie ich meine Prosa besser an die Leserinnen und Leser vermitteln kann."

A7

"Es hat mich schon ziemlich gestört [...] unter welchen Bedingungen so dieses Wissen oder diese Tools produziert werden die eigentlich natürlich next Level sind für unsere für unsere Zeit"

A8

"Ich denke mir die Erwartungen sind recht losgelöst von diesem speziellen Experiment [...] Aber ansonsten ich mein ich hab das ja jetzt selbst auch gesehen weil ich wenn ich nicht genau weiß was ich schreiben will dann kann ich auch nicht schreiben mit ... mit KI"

## **Participant B**

B1

„[...] Dadurch sind die eingebetteten Anwendungen MAXQDA und Atlas TI weggefallen weil es eben nicht um eine solche Auswertung ging. Dann kommt dazu dass wir eben besonders vorsichtig sind auch was Privacy betrifft am Institut. Und für mich sind damit auch alle weggefallen wo ich ein Login brauchten würde und auch die die kostenpflichtig sind. Aber übrig geblieben ist das Chat PDF Anwendung wo ich mir gedacht hab das wäre jetzt wirklich interessant es hier auszuprobieren.“

B2

„Mit Perplexity kann man nicht mit PDFs wie ChatPDF arbeiten, aber umgekehrt kann man Fragen stellen, genau wie bei Chat GPT. [...] Es wurden nicht nur Zitate bereitgestellt, sondern tatsächlich auch die PDFs verlinkt. [...] Als ich eine spezifische Frage stellte, hatten wir vier konkrete Fallstudien, bei denen es für die Kunden besonders interessant war, nicht nur allgemein Biotechnologie, sondern welche Probleme bei biotechnologischen Anwendungen in Bezug auf beispielsweise Fischarten mit erhöhtem Muskelwachstum auftreten. Ich habe dann diese ganz spezifische Frage kopiert und eingefügt. [...] Dies hat mir

bereits die Möglichkeit gegeben, mein Verständnis bezüglich des Spektrums der Dokumente und der Fähigkeit, den Inhalt innerhalb der Dokumente direkt zu lesen und zu überprüfen, zu erweitern [...] Ich kann auch zurück in die Dokumente gehen und sie vergleichen. Während das Tool bereits Hinweise darauf gibt, was interessant sein könnte, wie zum Beispiel ein potentiell Risiko, dass in diesem Fall diese Tiere anfälliger für virale oder bakterielle Krankheiten sein könnten. Dann sage ich ok, das ist aber interessant das ist ein issue der kam für mich noch gar nicht vor also da ist für mich der Text dann schon relevant für mich und dann kann ich gezielt in die Publikation reingehen und schauen stimmt das wirklich und was ist es konkret? Ich fand diese Kombination sehr spannend".

B3

„[...] also ich ich seh jetzt eben diese hochstrukturierten Texte und diese Strukturierung auch anders im Sinne von wenn ich mit Studierenden arbeite. Sehe ich mich da kompetenter [verschiedene Strukturen] unterscheiden zu können und auch kompetenter eben mit den Studierenden zu diskutieren und was das auch macht mit dem Text und ob sie vielleicht aber auch anders schreiben wollen würden ob eine andere Form der Strukturierung oder auch eine andere Ausprägung von Strukturierung quantitativ sinnvoll sein könnte. Das war so der nächste Schritt in der Anwendung dieses Chat PDF. Der nächste Schritt war. Was kann das leisten im Hinblick auf einer robusten Zusammenstellung? Was wurde in diesem PDF konkret tatsächlich genannt an Issues? das wäre ja für mich eine Auswertungsziel gewesen.“

B4

"Projekteinwerbung zum Beispiel, das ist schon. Also es gibt für mich. Ich mir generative KI anschaut auch was die Praxis so am Institut sind. Es gibt schon anwendungskontext da wo ich mir denk oh da könnt's mir was bringen und ein so ein Anwendungskontext ist vor allem wenn ich an die EU denke, da denke ich mir, die KI kann genau das leisten, wo ich in mir solche Widerstände habe, dass ich es nicht schaffe, also tatsächlich das gesamte Wording des Calls zu verwenden, um daraus ohne mich das selbst zu verwirklichen, einen.. einen an sich nur aus dem, was bereits in Call steht, einen Antrag zu schreiben. Ich bring das nicht über mich, ich kann es nicht, dass ich nicht eine Submission schreibe, die in dem Sinne innovativ ist. Als sie mehr macht als der Call fordert oder etwas anderes macht. Also ich glaub da wäre es tatsächlich in dem Sinne eine totale Effizienzsteigerung. Vielleicht sogar da einen Hybrid zu verwenden und zu sagen, OK Tool, mach das was ich [nicht machen will] und versuche dann das was das KI generiert, dann doch noch zumindest ein bis zwei Innovationen reinzubringen.

Aber da muss man eben, also da wird man, ich glaub, da wird man eben insgesamt darüber reden müssen, was diese, diese überhaupt, diese Projektindustrie wieder aufgesetzt ist."

B5

Ich bin heute nochmal zurück gegangen und...weiß nicht kann sich da was getan haben? also kann das sein weil ich hab das erste Mal ausprobiert im ... November glaube ich...Ich hatte da in Erinnerung, dass das Ergebnis, das ich da bekommen habe, dass ich da nicht sicher sein konnte, ob das sich auf das PDF bezieht oder nicht. Ich habe jetzt das noch einmal gestartet und da war schon eindeutig, dass es sich auf das PDF bezieht. Damals war mir das nicht, also war mein Major issue, dass mir nicht klar war, was die Quelle ist. Es hat mir zwar geantwortet auf meine Frage, was sind die Issues mit Bio-Technologie? Ich hatte das PDF hochgeladen, aber aus der Antwort heraus war mir nicht klar, was die Datengrundlage ist, auf der die Antwort basiert. In dem neuen Run heute war es schon relativ eindeutig, dass es sich auf das PDF bezieht und praktisch nur auf das. Um zu sehen, ob das wirklich so ist, müsste ich noch genauer reingehen, aber das war für mich eine Problematik, dass ich gebraucht hätte, dass der Text sich verlässlich nur darauf bezieht, und ich weiß auch nicht, wie das sein kann bei einer lernenden KI. Sie kann nicht nur anhand dieses Dokuments gelernt haben, also was ist tatsächlich der Klassiker, also welche Daten fließen da rein? In einem Forschungsprojekt wo es wichtig ist dass es sich speziell auf dieses eine PDF bezieht und nicht auf alle issues die man mit dieser Technologie haben kann, ist das ein Problem.“

B6

"[...] eine Kollegin, hat mir erzählt dass ein quasi emeritierter Professor die generative KI angewandt hat [für seine Arbeit] und seine Aussage war, das ist ganz toll, diese KI ersetzte ihm jetzt quasi 5 Assistenten, das wären also Predoc Assistenten und die Problematik war weil bei den Predoc Assistenten quasi musste er ja auch immer überprüfen ob der Output stimmt und das muss er bei KI auch, aber die KI ist viel schneller und kann viel mehr leisten. Das Problem ist jetzt aber auch ein Arbeitsmarktpolitisches, denn über den Einsatz der 5 Assistenten hat er zugleich 5 Personen ausgebildet. Während über den Einsatz der KI bildete er nur eine Technologie oder eine Technik weiter aus. Das heißt, man hat hier auch eine Verschiebung. Wiederum will man junge Leute ausbilden oder will man generative KI ausbilden, steckt man Zeit in Personalressourcen oder steckt man Zeit in ökonomische Assets?"

B7

"Also da habe eben nicht nur ich darüber mir Gedanken gemacht sondern wir eben gemeinsam. Das ist ja das kommt dann eben sehr auf den Kontext an. Ich hab prinzipiell das größte Vertrauen, dass [meine Kolleg\*innen] das gut machen. Also wir haben doch ausreichend gemeinsames Wissen am Institut, dass ich weiß, dass alle das aus einer bedachten Haltung heraus machen. Also das ist dann halt umso wichtiger, dass es diese Kollektivierung von Stil, von Haltung, von Reflexion gibt. [...] ich habe da jetzt keine konkreten sofortigen Reflexionen. Mich wundert nur, dass wir es ebenso wenig kollektiv reflektieren. Sonst verstehe ich, dass es verwendet wird, um sprachliche, also nationale Probleme zu beheben. Ich höre auch von Leuten, die eben mehr selber codieren, dass es vor allem auch das Diskutieren sehr sinnvoll einsetzen lässt. Das ist für mich auch total logisch, weil das die eigene Sprache entwickelt. Eigentlich war ich von der Fülle überrascht, von der Diversität, was eingesetzt wird, und auch quantitativ, wie viel schon eingesetzt wird “