Roskilde University

Unveiling the Potential of Artificial Intelligence for Social Good:

# AI's Contribution to Social Innovation

Thesis Project

**Master of Science in Social Entrepreneurship and Management**

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# Abstract

This thesis examines the role of artificial intelligence (AI) in promoting social innovation with a focus on the key characteristics of implementation. To investigate the contribution of AI in this process, the thesis uses a qualitative research method following an interpretivist and an adapted multiple case study approach. Insights from organizations such as Auticon, The Newsroom and Google help to analyze phenomenon of AI-assisted projects that serve the social good. The results show that artificial intelligence (with the help of humans) can foster collaboration, create social value, facilitate social innovation and offer solutions for social improvement in areas such as the environment, media, education or work. The work and the result should serve as a starting point to understand the potential Artificial Intelligence has for social innovation and social good.

**Key words:** *artificial intelligence, social innovation, social good, collaboration and diversity, significance, social value*

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# 1. Introduction

When the company "OpenAI" made its generative artificial intelligence "ChatGPT-3" available for the public in November 2022, people were beside themselves. Within a few days millions of people signed up to use the software and got a taste of what AI was capable of. People all over the world tested artificial intelligence for its abilities and weaknesses. Although the tool had already been available to the public since the end of 2019, it was its simplicity that triggered such hype when the third version was launched (OpenAI, 2024).

What most people don't realize, however, is that the technology behind ChatGPT has been around for several years. Artificial intelligence has been at the forefront of technological innovation for a few years now and has shown that it also has what it takes to tackle and combat some of humanity's most pressing challenges. The scope of AI ranges from climate change, healthcare, inequalities, and education and thus seems limitless (Russell & Norvig, 2021; Vinuesa et al., 2020). This thesis aims to bring order to an area that has developed somewhat uncontrollably in recent years and where the term artificial intelligence is often used misleadingly. By examining projects that utilize AI for social purposes, the aim is to explore the phenomenon of social innovation and the role AI plays in it.

While the capabilities of AI are developing at a rapid pace, the translation of these technological advances to the social sphere remains a complex and under-researched area (Schwab, 2017). The ability of AI to provide innovation and improvement in different areas has already been demonstrated in various projects. However, what factors play a role when it comes to the realization of social innovation, how can it be identified whether social innovation really occurs and is artificial intelligence really the decisive factor?

The aim of this thesis is to answer all these questions by looking at the potential uses of artificial intelligence for the common good. A comprehensive analysis of different AI-based projects for social good will help us to analyze the goals, methods and results (Floridi et al., 2018).

A new technological era is upon us and this work highlights the importance of a multidisciplinary approach to understanding and managing the development of artificial intelligence for social good. This thesis can be seen as a call or incentive to use the possibilities of artificial intelligence in a way that serves humanity in a positive way.

## 1.1. Motivation

The hype surrounding generative artificial intelligence has not passed us by, and it has awakened a fascinating curiosity in us that goes far beyond mere enthusiasm. We have the feeling that we are not even aware of the full potential of artificial intelligence and therefore need to actively engage with the topic in order not to fall behind. Technology has advanced exponentially since we came into the world, and we see artificial intelligence as not just a trend but a tool that has the ability to make a social impact on the world.

Tackling social problems with the help of artificial intelligence and using it to develop innovative solutions to social challenges motivates us to study the potential of this advanced technology. In this thesis, we want to identify and analyze examples of success from practice, understand their impact and also critically evaluate them, so that we not only gain academic insights, but also serve as a guide for future social entrepreneurial initiatives.

## 1.2. Problem Field

When we talk about “social good”, we are referring to the potential benefits that artificial intelligence can supply to social innovation initiatives that aim to improve the quality of life for a wide population through avenues such as education, safety, health, and living conditions, among others, but in a way that may not have direct economic returns (Hager, G. D., Drobnis, A., Fang, F., Ghani, R., Greenwald, A., Lyons, T., & Tambe, M., 2019, p.15).

While existing research on social innovation explores various facets and frameworks for theoretical grounding of social innovators (Kim et al., 2022), a critical gap persists. This gap lies in the under-examined intersection of social innovation and digital transformations, particularly the integration of AI.

At the same time, with the extensive financial incentives that are associated with AI, the practice of companies that exaggerate the capabilities of their products or services labeled as "AI" has been growing. By overstating the power of their AI models, companies might mislead consumers and stakeholders. This highlights the potential for inflated expectations and hinders a clear understanding of how AI can genuinely contribute to social good initiatives (Forbes, 2024).

This study delves into social innovation projects leveraging AI for social good. We aim to dissect the nature of social innovation, examining both the innovation process and its resulting outputs, and

identifying, examining, and discussing different aspects that, according to the literature, are key defining characteristics of social innovations. By analyzing these projects through the lens of the literature, we will explore the role and influence of AI within social innovation initiatives.

### 1.3. Research Question

In this section, we present the research question that arose from the problem area and briefly discuss how we answer the question.

The following research question was the result of the examination of the topic:

***How do artificial intelligence (AI) applications contribute to social innovation?***

We will answer this question through an analysis strategy emerged from our extensive literature review on the topic. We operationalized the theory by creating a strategy that distinguishes two dimensions of social innovations: a process dimension and the output dimension. Each dimension contains distinct aspects or key characteristics of social innovation that are used as units of analysis that guide the corresponding discussion.

While examining different social innovation projects that use artificial intelligence, we observe how these different aspects of social innovation are displayed, and explore the role that AI has within each of them, either in the process dimension or out dimension of the phenomenon. This analysis will ultimately contribute to a deeper understanding of how AI shapes and influences social innovation for social good.

# 2. Methodology

This section introduces the different elements that comprise the methodological framework. First, it elaborates on the philosophy of science that was considered the most appropriate to address the study problem. Secondly, the research design is explained, followed by the methods chosen to collect the data.

### 2.1. Philosophy of Science: Interpretivism

The interpretivist philosophy of science approach is about emphasizing the importance of understanding the subjective reality of human experience. This approach is central to the social sciences and is based on the belief that reality is socially constructed through human interactions and

interpretations. This makes interpretivism different from the positivist paradigms, which seek objective truths with the help of empirical observations and quantitative analysis. Instead, interpretivism is concerned with the meaning that individuals or groups attribute to events or phenomena, and at the same time holds the view that understanding these subjective interpretations is crucial to understanding social reality (Saunders et al., 2009).

Interpretivism has its origins in the philosophical works of Wilhelm Dilthey and Edmund Husserl, who emphasize the importance of understanding the lived experiences of individuals. Sociologists such as Max Weber developed this perspective further and supplemented it with the concept of "Verstehen", which translates to “understanding” and states that researchers must empathize with the subjects of their study in order to grasp the meaning they associate with their actions and interactions (Weber & Henderson, 2012). The emphasis on understanding the subjective meaning of human actions plays a decisive role in interpretivism and thus distinguishes it above all from positivist approaches, which place objectivity and generalization in the foreground.

The Philosophy of Science of Interpretivism uses qualitative methods to investigate complex social phenomena. Methods such as interviews, observations and document analysis help to gain deep insights into people's experiences, beliefs and motivations. Therefore, this approach is particularly suitable for studies that explore the human behavioral dynamics, social processes and organizational culture, where context and subjective interpreting play a crucial role in the results (Bryman, 2006).

What makes interpretivism particularly powerful is its ability to provide a detailed understanding of social phenomena from the perspective of those who experience them. This enables a deep insight into the complexity and diversity of human experience and thus offers a differentiated view of social reality that would not be possible with quantitative methods alone. Critics see the dependence on subjective interpretations as an impairment of the objectivity and reliability of the research results. In addition, the interpretivist focus on specific contexts and individual meaning can also limit the extent to which the results can be generalized (Saunders et al., 2009).

These criticisms make the interpretivist approach no less valuable a tool for gaining unique insights into complex human behavior and social interactions. This philosophy of science enriches our understanding of the social world by focusing on subjective experiences and individual interpretations, while emphasizing the importance of human behavior in shaping social phenomena (Weber & Henderson, 2012).

Considering all these factors, it can be said that interpretivism plays a crucial role in the social sciences as it emphasizes the subjective dimension of human experience and the importance of understanding. Qualitative methods provide a deep insight into the complexity of social life and contribute to a more nuanced and comprehensive understanding of social phenomena.

In the context of this research, an interpretivist philosophy is applied to investigate the contribution of artificial intelligence (AI) applications to social innovation. The choice of interpretivism is consistent with our aim as researchers to understand the complex and multi-layered nature of social innovation initiatives that utilize AI. By focusing on subjective experiences and interpretations, this research seeks to uncover the nuanced ways in which AI influences social innovation and the creation of social value.

With the help of the interpretivist approach, we want to comprehensively explore the social contexts in which AI is used. For example, the subjective experiences that the interviewees have had within the projects is crucial and helps to understand the perception of AI and its use. These subjective interpretations offer insights into the motivations, challenges and impacts of AI applications that may be overlooked by other methods.

## 2.2. Research Design

### 2.2.1. A qualitative research method

Usually, qualitative research implies studying things in order to gain understanding via interpretation. As well, this type of research also implies studying things in their natural setting and trying to make sense of the social phenomena in terms of how they cause meaning to people (Denzin & Lincoln, 2005 as cited in Guest, Namey, & Mitchell, 2013, p.6). Qualitative research prioritizes understanding how people construct meaning from their experiences in the world (Merriam, 2009 as cited in Guest, Namey, & Mitchell, 2013, p.6).

People experience things differently, therefore do not see the world in the same way. In the qualitative research this is assumed, associating to its nature the word interpretivist: people (including the researchers) perceive things differently, resulting in multiple interpretations, understandings, and meanings (Guest, Namey, & Mitchell, 2013, p.6).

In order to address our research question, this research intends to study the phenomenon of social innovations and artificial intelligence following this approach. We intend to understand the nature of social innovations, examining both the innovation process and its resulting outputs, as they appear in a natural setting of concrete and real projects that aim to innovate using artificial intelligence. We intend to make sense of these social phenomena in terms of how they cause meaning to the people involved or connected to them by hearing their voice (as we had access to interviews), or by finding what others have said about their projects (by desk-research to complement the interviews).

As the literature stresses, there is an extensive variability in the data collection methods among studies that are normally indicated as qualitative. The qualitative research approach permits to utilize different kinds of methods and techniques for collecting the data, as well as using different theoretical frameworks (Bryman, 2012, p. 383).

In general, the data gathered by qualitative researchers is verbal, using methods such as interviews and focus groups. However, there exist a big number of other ways of doing it, especially when direct access to participants in their natural settings is difficult, or even impossible, for a range of reasons (Guest, Namey, & Mitchell, 2013, p.7). This is reflected in our research. As just stated above, for all the selected cases it was possible to access the people behind the projects and thus obtain data directly from the voice of their owners or managers. But for some cases where we considered that the interview was not providing sufficient data, we complement the data collection by doing desk research.

In this manner, our paper adopts a qualitative approach, utilizing a personalized and interpretive case study method inspired by Yin (1995), which will be elaborated on in the following section. This method involves two primary data collection strategies: semi-structured interviews to gather first-hand data from the individuals responsible for devising and executing the projects, and desk research to supplement information where interview data is insufficient. Both are further explained under the Data Collection Methods section.

### 2.2.2. An Interpretivist and Adapted Multi-Case Study

Merriam-Webster's dictionary (2009) defines a case study as *"an intensive analysis of an individual unit (such as a person or a community) that emphasizes developmental factors in relation to the environment"* (Flyvbjerg, 2011, p. 301). According to this definition, case studies focus on an individual unit. As we intend to work with multiple cases rather than one, this research uses an approach based

on a so-called multi-case study to investigate the contribution of artificial intelligence (AI) applications to social innovation goals in different project contexts. Yin (2002, p.53) states that the multi-case study is a specific attempt to study something that has many cases, parts or members.

Crowe, S. et al (2011) points out that case study can be defined in various ways and that the approach to a case study can vary based on the researcher's epistemological perspective, whether they take a critical (questioning one's own and others' assumptions), interpretivist (trying to understand individual and shared social meanings) or positivist approach (aligning with the standards of natural sciences, such as emphasizing generalizability)" (p.4). This paper follows an interpretivist approach, prioritizing the understanding of individual and shared meanings associated with artificial intelligence in the different social innovation projects.

Based on the methodology proposed by Yin (1994), Tellis, W. (1997) outlines a four-stage process for conducting a case study as follows: 1) Design the case study, 2) Conduct the case study, 3) Analyze the case study evidence, and 4) Develop the conclusions and implications. Each stage of the methodology consists of the application of specific procedures that were applied throughout our research process (Tellis, W., 1997, p.6), as detailed below. We decided not to further develop on them but to list them below, suggesting the reader to refer to the cited article for further detail.

**1. Design the case study protocol:**

- a. determine the required skills
- b. develop and review the protocol

**2. Conduct the case study:**

- a. prepare for data collection
- b. distribute questionnaire
- c. conduct interviews

**3. Analyze case study evidence:**

- a. analytic strategy

**4. Develop conclusions, recommendations, and implications based on the evidence**

As stated by Yin (2003), single and multiple-case designs are variants within the same methodological framework and no broad distinction is made between the classic (single) and multi-case studies. Selecting between these approaches is a key research design decision, even though both are considered variants of the case study method (p.46).

To ensure transparency, we consider it valuable to stress that our research adopts an adapted multi-case study approach, drawing inspiration from Yin's work (2003) but acknowledging the need of adapting it. According to Yin (2003) as quoted by Baxter, P., & Jack, S. (2008), a multiple case study enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases. Comparisons are drawn and the researcher can predict similar results across cases, or predict contrasting results based on theory (p. 548). Unlike this traditional focus on replicating findings through case comparisons, our research design prioritizes a different and broader scope, examining different cases with the intention of generating broader appreciations on how different social projects are delivering innovation (or not) and which role does artificial intelligence play in the phenomenon.

On the other hand, our research design differs from both single-case and traditional multi-case study approaches. While a single-case study offers an in-depth exploration of a single phenomenon, our focus on a broader scope allows us to capture a wider range of experiences from different initiatives. At the same time, as mentioned before, traditional multi-case studies often involve deep comparisons between cases. However, our research design prioritizes understanding individual cases and their contexts. Even though we make potential connections between them, we do not strictly follow a replication logic of similar or contrasting results (Yin, 2003, p.42). By using desk research to supplement interviews, we aim to address potential limitations caused by having only one interview per case (this primarily was done with one of the cases). We consider that this adaptation allows us to balance the need for a broader perspective with the desire to gain valuable insights from each case, obtaining a reliable overview of how it contributes to social innovation, this being a new and rapidly developing field in vogue.

Additionally, case studies are more suited to the how and why questions, as such questions deal with operational links needed to be traced over time, rather than mere frequency or incidence. This type of research aligns well with our formulated research question, which aims to uncover how artificial intelligence (AI) applications contribute to social innovation.

As researchers, when utilizing the case study design, we need to adopt a critical and reflective perspective, which should be approached with careful consideration. This design allows us to engage with the raised issues and concerns, benefiting from multiple viewpoints. Through this engagement, we can potentially uncover relationships between phenomena, context, and subjects within the research.

### 2.2.3. The Cases

The following cases were selected by us for the research. In the following, we explain the reasons for their selection, and in the Analysis section we go into more detail before analyzing them.

**Auticon**

Auticon is a company that employs individuals on the autism spectrum as IT consultants, leveraging their unique cognitive strengths to deliver high-quality tech solutions.

**Selection**

Impressed by the special story behind the founding of Auticon and its social mission, we first took a closer look at the company and, above all, researched whether and how artificial intelligence is used. As it turned out that AI is used for the purposes of the social enterprise and therefore also for social good, we contacted the company and were quickly accepted for an interview.

**The Newsroom AI**

The Newsroom AI is a platform that utilizes artificial intelligence to generate, curate, and optimize news content, helping media organizations create personalized and engaging stories for their audiences.

**Selection**

We first read about the Newsroom project in a blog article from the Google Social Innovation Fund on AI. This fund helps social entrepreneurs from underserved backgrounds to develop transformative AI solutions and support them with issues they're tackling on a daily basis. In the context of our Masters in Social Entrepreneurship and Management, having a start-up driven by social entrepreneurs as one of our cases of study was essential to observe the phenomenon within the entrepreneurship arena.

**Google**

Google AI for Social Good is an initiative by Google that applies artificial intelligence to address global challenges such as healthcare, environmental sustainability, and crisis response, aiming to create positive societal impact.

**Selection**

Google is one of the largest technology companies in the world. Our first searches for information on artificial intelligence and social innovation put Google as a pioneer in this field, with a large presence

on the web showing various active projects that include artificial intelligence to socially innovate on different social fields ranging from innovations in the field of health and education to environment and urban sustainability.

### 2.2.4. Data Collection Methods

Yin (1994), as mentioned by Tellis. W (1997), proposes a framework for gathering evidence in case studies using six data sources: documentation, archival records, interviews, direct observation, participant observation, and physical artifacts. Each source offers unique strengths and weaknesses, requiring researchers to adapt their skills for effective data collection. While not all sources are necessary in every case study, utilizing multiple sources enhances the research's reliability. Ideally, researchers should select a combination of sources most relevant to their specific study (p. 10). In this project, the methods for data collection are the interview and documentation (desk-research). The following sections further develop the relevance of both methods and how they were applied in this research.

### 2.2.5. Semi-Structured Interviews

The interview is probably the most widely employed method in qualitative research being its flexibility that makes it so attractive for researchers. The term qualitative interviews is commonly used to refer to unstructured and semi-structured interviews, differing from structured interviews that are used in quantitative studies (Bryman, 2012, p. 469). In this project we used semi-structured interviews.

Semi-structured interviews offer researchers a valuable means to gain insights into how interviewees perceive their social environment, as highlighted by Qu and Dumay (2011). During the interview, both the interviewer and the interviewee engage in a dialogue, generating questions and answers through an active exchange of ideas and perspectives. Kvale (1996) recommends providing a contextual framework to interviewees before the interview starts. Therefore, the scope and intentions of our master thesis project was communicated to the different representatives of the cases where we were able to get an interview. Most of them asked us to provide a list of topics or questions to get prepared for the interview. In all cases, we just offered a short bullet point list to show interviewees the path that the interview was aiming to get, but in any case, questions were provided.

Semi-structured interviews are characterized by their flexibility, as they mainly adapt to the direction set by the interviewees and potentially shifting the focus on relevant elements that arise during the interviews (Bryman, 2012, p. 470). An interview guide is still needed, despite this flexibility. The guide maintains the conversation focused and structured during the interviews and also enhances the research's reliability (Kallio, 2016). During the interviews carried out for this project, we used an interview guide, but in all cases, unforeseen questions arose and with them, relevant and interesting conversations that were not contemplated. In one of the cases, an interesting conversation also developed based on questions from the interviewee to us about the purpose of our thesis and its objectives.

### 2.2.6. Interview Procedures

To ensure solid research, we also thought about how the interviews would be conducted.
We were present at all three interviews together in order to enable a dialog during the interview and to have a better understanding of the conversation afterwards. One of us was responsible for conducting the interview, while the other took notes, observed and asked possible additional questions. The sound was recorded by both of us in order to counteract any possible complications. We interviewed people with different positions from companies in various sectors. In the following, we go into more detail about the interviewees.

### 2.2.7. Interviewee Profiles

A. **Aleksander Oleszkiewicz (AO):** Alexander Oleszkiewicz is the Director of Auticon Labs, the Auticon's innovation lab, where they develop new products and make prototypes. He holds a Masters Degree of Business Administration (MBA) and his educational background is within engineering. Before joining Auticon in January 2024, he worked at Acoustic, a marketing technology company, and at IBM for more than thirteen years.

B. **Jenny Romano (JR):** Jenny Romano is the co-founder of The Newsroom, the start-up that works to fight misinformation and promote plurality of thought online. With a Master's in Management, she holds an extensive educational background in international business, sustainability, and cyberpsychology. Before founding The Newsroom she worked for Google and Salesforce, among other organizations.

C. **Pilar Gogorza (PG)**: Pilar is a Marketing Senior Manager at Google focused on Sustainability for the EMEA region. She works closely with the AI team that is integrating artificial intelligence into the areas of climate change and sustainability. With a Master of Science in Behavioural Sciences, she possesses an educational background in Marketing, Economics, and Business Administration. She has been working for Google for the last eleven years.

### 2.2.8. Coding

As Flick (2009) explains, interpreting the data is essential in qualitative research. The collected material, i.e. the data, should be categorized by the coding. In order to find similarities, differences and occuring themes, we coded the transcribed interviews. Using the literature, the interview guide and the interviews, we developed a framework for coding the data while being flexible in our approach to maintain an open mind for new and unexpected insights.

Coding is about constantly comparing occurrences, cases and ideas (Flick, 2009), which is why we listened to the interviews and read the transcriptions several times. In doing so, we discovered different themes and concepts. This enabled us to understand the data better and more deeply and thus also to identify the underlying concepts. In general, this approach helped us to develop a better understanding of the codes and subcodes.

Ryan and Bernard (2003) contend that themes and codes originate from both the data itself and the researcher's pre-existing theoretical understanding of the phenomenon being studied. In our case, we identified the themes and codes both from the framework we developed through the literature review and in the coding itself.

We have chosen an open approach to coding as described by Flick (2009), which means that the data was first separated and then segmented. The units of importance were then grouped in order to be annotated and labeled with concepts. The identified concepts were then grouped around the phenomena relevant to our research and research questions.

After all, concepts were drawn from the literature as well as from the statements of the interviewees in order to define the final codes. Which then led to our themes: Artificial Intelligence, Social Innovation, Social Value, Significance, Collectivity and Diversity and Behavior Change. The coding process was aided by a coding software called nVivo.

### 2.2.9. Desk-based Study

The other method that was used to collect information for this research is the one denominated desk-based study. After defining our research question and making the decision of working with real and concrete cases of enterprises using artificial intelligence in projects that aim for social innovation and social good, we found some difficulties to connect with the relevant people behind the projects and have access to talk with them. Implementing (in part) desk-based research offered us the possibility of conducting our study despite not having direct access (in some of the cases) to people to be able to interview them. This happened specifically in the case of Google, where we got an interview with a person from a team that even though it works very closely with the people behind the development and implementation of AI initiatives, hasn't a big influence on them.

In this paper we took the definition of desk-based research that Guest, Namey, & Mitchell (2013) provide. The authors refer to this kind of research as a study where data is collected indirectly (e.g, via the internet) to then be analyzed and interpreted in relation to the relevant theory compiled in the theoretical framework. We are talking about a form of primary research, considering that data is collected by the researchers. On the contrary, a secondary research is the one that entails using data that was gathered by others, typically from published research studies, and then interpreting it to uncover fresh insights pertinent to the research question and in relation with the theoretical framework. This frequently involves analyzing several studies within a particular field to draw conclusions that extend beyond the scope of the original research. Library-based research is another term often used interchangeably with secondary research and similarly relies on data collected by others (p. 8). In this paper, we did both primary and secondary research, collecting the information about the different cases from their webpages, articles from newspapers, etc. to complement the information collected through the interviews, as well as from academic articles that have studied the case before.

### 2.2.10. Using generative AI for this research

Trying to fully understand Bruno Latour and its philosophy of technology is not the aim of this section, as it would be too ambitious and out of scope for the purpose of this master thesis. But we do aim to incorporate its point of view of technology to justify and explain the approach with which we include Artificial Intelligence at some moments of the research process.

Artificial intelligence was used at some moments throughout the process of this research. We want to incorporate this section to explain in detail how it was used, for what purpose, and why it is important for researchers to incorporate this technology to potentiate and facilitate the research process. Indeed, it is important to always bear in mind the considerations to ensure the ethical, relevant, and justifiable use of it. These considerations are also mentioned in this section.

As quoted in R. Kerr (2016), Bruno Latour (1992), maintains that "technology is society made durable". According to this statement, nothing in the world is capable of being stabilized without the presence of non-humans. The existence of a purely social world is not possible since it functions through a hybrid network of humans and non-humans. What produces stability is the way these two are assembled (p. 21). In other words, this statement emphasizes the inseparable entanglement of technology with social and cultural contexts, suggesting that technological artifacts are not isolated entities that humans use to do things better, but rather entities embedded in broader networks. of human practices and institutions. Consequently, we could say that the incorporation of artificial intelligence into research practices occurs (and should occur) as it is deeply intertwined with the sociocultural dynamics of current times, thus influencing the nature of knowledge production.

In line with Latour's perspective on the inseparable entanglement of technology with social and cultural contexts, we integrated artificial intelligence (AI) into our research process to enhance and streamline some aspects of our work. AI was primarily employed for conducting comprehensive article searches, checking our texts to improve clarity and coherence (as we are not English native speakers), and assisting in structuring some chapters. Additionally, AI was invaluable in summarizing extensive literature, allowing us to distill complex information into concise summaries. These summaries were used solely to expedite the process of selecting relevant articles and authors. Subsequently, we delved into the chosen articles and authors in a traditional and in-depth manner.

By leveraging AI in these ways, we were able to optimize our research efforts, ensuring a more efficient and effective approach to knowledge production. This integration of AI underscores the evolving role of technology in contemporary research, highlighting its potential to augment traditional methodologies while also necessitating careful consideration of ethical, relevant, and justifiable use.

# 3. Literature Review

## 3.1. Artificial Intelligence

This part of the theoretical framework serves to give the reader an insight into the world of artificial intelligence, starting with artificial intelligence in general and moving on to the technology behind generative artificial intelligence. It should be noted that the inclusion of this section is primarily to provide the reader with a foundational understanding of concepts such as artificial intelligence, machine learning, and generative AI. This study does not aim to delve into the specific technologies used in our cases of study. Therefore, this section is not heavily referenced during the analysis.

Artificial intelligence is a discipline. It can be considered a branch of computer science that mostly deals with the creation of intelligence agents. These agents with intelligence are systems that can reason, learn, and act with autonomy. In other words, artificial intelligence has to do with theory and methods developed and employed to build machines that can act and think as humans, being able to perform tasks that normally require human intelligence (Google, 2023).

In a deeper look, Kaplan and Haenlein (2019) intend to build a definition for artificial intelligence that considers the way that AI achieves to have the human intelligence or human behavior mentioned in the previous paragraph. In this way, they define artificial intelligence as "*a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation*" (p.17). So as we can notice, the use and management of data is a crucial component of artificial intelligence. The data seems to be raw material with which AI works.

The three kinds of AI based on capabilities. The first one is **Artificial Narrow AI**. Artificial Narrow Intelligence, also known as Weak AI, represents the sole existing type of AI currently. Other forms of AI remain theoretical, for the moment. This variant can be trained to excel at a single or narrowly defined task, often outperforming human capabilities in speed and precision within that specific domain. However, its functionality is limited to its predefined task, focusing solely on a subset of cognitive abilities. Prominent examples include virtual assistants like Siri, Amazon's Alexa, IBM Watson, and even OpenAI's ChatGPT, which excels in text-based conversations (IBM, 2023).

**General AI**, Artificial General Intelligence (AGI), is a second type. Also termed Strong AI, remains a theoretical concept without practical realization to date. AGI possesses the capability to leverage previous learnings and skills to tackle novel tasks in diverse contexts without human intervention in model training. This versatility enables AGI to undertake any intellectual task achievable by a human (IBM, 2023).

The last type, **Super AI**, often referred to as artificial superintelligence, remains purely speculative and theoretical as AGI. If achieved, Super AI would surpass human cognitive abilities in thinking, reasoning, learning, and decision-making. Such advanced systems could potentially possess understanding beyond human comprehension, even developing emotions, needs, beliefs, and desires of their own (IBM, 2023).

### 3.1.1. Machine Learning

But if focusing on how AI works today, it would be important to understand how its raw material, the data, is managed by AI. And here is where the concept of Machine Learning appears. In essence, machine learning encompasses a wide range of techniques that enable computers to learn from data, without requiring explicit programming. These methods can range from relatively simple statistical models to highly complex deep neural networks (Kaplan and Haenlein, 2019, p. 17). To define it In simple and clear way, *"machine learning is the process of training a piece of software, called a model, to make useful predictions or generate content from data*" (Google ,2023).

The foundation for many of today's AI applications lies in traditional machine learning models. These models depend on algorithms designed and maintained by data scientists. In this way, we can notice that traditional machine learning necessitates human involvement to process new information and perform tasks beyond their initial training (IBM, 2023).

Machine learning methods can be broadly categorized into three main learning types: supervised learning, unsupervised learning, and reinforcement learning.

In **supervised learning**, data scientists act as instructors, providing labeled data that guides the algorithm's learning process (Nozari, H., Ghahremani-Nahr, J., & Szmelter-Jarosz, A., 2024, p.5). To explain this in a graphic way,

> *"This is like a student learning new material by studying old exams that contain both questions and answers. Once the student has trained on enough old exams, the student is well prepared to take a new exam. These ML systems are "supervised" in the sense that a human gives the ML system data with the known correct results" (Google, 2023)*.

Conversely, **unsupervised learning** empowers the algorithm to independently discover patterns and relationships within unlabeled data (Nozari, H., Ghahremani-Nahr, J., & Szmelter-Jarosz, A., 2024, p.5). This means that these models generate predictions based on data devoid of predefined correct answers. The objective of an unsupervised learning model is to discern significant patterns within the dataset. Put differently, such a model lacks guidance regarding data categorization and thus must

autonomously derive its own principles (Google, 2023). In other words, unsupervised learning finds hidden patterns in data and uses them to infer from unlabelled datasets that are entered into the system (Aggarwal, K. et al., 2022, p.118).

Finally, **reinforcement learning** employs a reward-based system, where the algorithm learns through trial and error, receiving positive or negative feedback based on its actions. (Nozari, H., Ghahremani-Nahr, J., & Szmelter-Jarosz, A., 2024, p.5). This means that these models generate predictions through a process of receiving rewards or penalties based on actions taken within a specified environment A reinforcement learning system generates a policy (this is, a probabilistic mapping from states to actions) that will elucidate the optimal strategy for maximizing rewards. To provide an example, this system is used to train robots to perform specific tasks, like walking around a room (Google, 2023).

Worth to remember that machine learning is a crucial component of AI, but AI itself is a broader concept. AI additionally encompasses a system's ability to perceive data through natural language processing, voice/image recognition, or even control physical objects based on learned information. This control could manifest in robots or other connected devices. (Kaplan and Haenlein, 2019, p. 17).

### 3.1.2. The Rise of Deep Learning

As mentioned, the spectrum of machine learning techniques encompasses everything from basic statistical models to deep neural networks. The field of AI has witnessed significant advancements since the pivotal development of those artificial neural networks in 2012. These networks enable machines to engage in reinforcement learning, mimicking the human brain's information processing. Unlike traditional machine learning models, deep learning empowers AI applications to learn and perform new tasks that typically require human intelligence. This allows for independent decision-making, novel behaviors, and the automation of various tasks across industries, including content generation, predictive maintenance, and more (IBM, 2023).

The authors also suggest that when defining AI it is important to consider the speed in which this field is moving at the same time that technology development progresses. What intelligent behavior adopted by machines years ago could now be considered barely noteworthy (Kaplan, A., & Haenlein, M., 2019, p. 3). Hence, it is expected that theoretical assumptions of the AI world today are not as developed or are quite different from the ones that will be elaborated in the future.

### 3.1.3. Generative AI

As explained by Dasborough (2023) in Fui-Hoon Nah, F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023), Generative AI is a type of artificial intelligence that can generate new human-like content, either if it

is a text or creative content such as music, images, or others. It could also provide consolidated data from different sources for analysis (p.277).

An easy way to quickly differentiate a Generative AI model from others like a traditional Machine Learning model is the output. When the output is content in the form of natural language, an image, audio, or text, we are talking about Generative AI. When the output is a data label in the form of a number, a class (e.g “spam or not spam”), or a probability, is a traditional predictive Machine Learning model (Google, 2023).

The different manifestations of AI-generated content (AIGC) facilitate numerous applications across various domains. Generative AI has the capability to produce textual content, including poems, political discourse, and academic papers, that often are very similar to human-generated content. Additionally, AI-generated images encompass a wide spectrum of creations, from artworks and synthetic faces to magnetograms of the Sun, spanning disciplines from the humanities to the sciences (Dasborough, 2023, p. 279).

Consequently, the author warns about the possible challenges that Generative AI can bring to humanity in vast fields, and stresses the relevance of developing with GenAi a human-centered collaboration dynamic as key to utilize it effectively.

## 3.2. Social Innovation

In this section, we look at social innovation by first analyzing its history, then defining it and finally providing a framework for naming a social innovation. The concepts developed in this section provided the theoretical foundation for creating the specific analytical strategy we will use to approach our case studies in the analysis section, thereby better addressing our research question.

### 3.2.1. History and evolution of Social Innovation

Various disciplines have already explored the concept of social innovation in the past, highlighting the growing interest in this area and in understanding how complex social problems are addressed through innovation. In her book "Theories of social innovation", Logue (2019) not only discusses the development of the term but also develops theories to understand and identify it.

The term and concept of social innovation has its roots in organizational and management theory, from where it has developed considerably over time. Drucker (1987) is seen as one of the first to explore social innovation in his discussion of the effects of non-technological innovations. With various examples of social innovations, such as the research laboratory or the agricultural advisor, he showed

how these optimized society and improved general well-being. Kanter (1999) took this concept further by addressing the responsibility of companies in solving social problems and satisfying social needs - thus linking the step from corporate social responsibility to social innovation.

Previous discussions around social innovation have largely centered on its potential as a business model and its potential to address social problems through cross-sector partnerships. However, this perspective was not limited to organizational and management studies but was relevant in all disciplines interested in social change. Mulgan (2006) provided some historical examples of social innovation at an individual level, such as Florence Nightingale, who reformed nursing and medical care and at an organizational level such as the trade unions or the Fenwick Weavers Society and felt that the concept could be applied retrospectively to many cases of social change.

With the growing popularity of the term, academics also began to take an interest in researching social innovation from different angles. This led to a rapid increase in the number of definitions of social innovation - a systematic review identified 76 different explanations of the term, highlighting its complexity and multi-layered nature. Nevertheless, common features such as the focus on social change, sustainability and the collective creation of social value emerged in the analysis (Edwards-Schachter & Wallace, 2017).

### 3.2.2. Understanding Social Innovation

Defining social innovation is not an easy task. This concept, or related terms like social invention, has existed for some time (Zapf, 1994). However, a universally accepted definition and scope for social innovation remains elusive. The field of sociology is still grappling with how to best understand and position this recent development. Consequently, there is a lack of a well-established theoretical and empirical framework to guide the definition and study of social innovation (Degelsegger, A., & Kesselring, A., 2012, p. 58).

However, the purpose of this paper is to understand different initiatives of social innovation that incorporate artificial intelligence. Therefore, we have made an extensive literature review on this term to better understand what social innovation is and what implies, and thus be able to address and create discussions around some key aspects of social innovation and how these are observed (or not) in the different cases of study when they apply artificial intelligence.

Innovation is commonly conceived as a newer and improved method or approach to doing things. Although it takes on diverse manifestations, such as emerging technologies, refined processes, or

streamlined business models, innovation doesn't have a singular and all-encompassing definition. Instead, it has been interpreted from multiple perspectives (Gupta, S., Kumar, V., & Karam, E., 2020, p. 499).

However, elaborating a broad definition that involves the mode of innovation and the novelty of the contribution, the OECD defines innovation as *"a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)*" (OECD/Eurostat, 2018, p. 32).

A perspective to consider when thinking about Innovations is by observing the genesis of those, that means, understanding how the innovation was created or developed. According to Birkinshaw et al. (2011) as quoted by Gupta, S., Kumar, V., & Karam, E. (2020), innovations are born usually through two primary approaches: a top-down or bottom-up approach. In the top-down approach, the actors who occupy decision-making positions (senior management in the case of a firm, for example) identifies a need and sets strategic direction for innovation, often engaging the entire organization to achieve the defined goals. Conversely, the bottom-up approach fosters innovation driven from the ground, where individuals identify improvement opportunities, develop ideas, and potentially see them implemented (in case of a company it could be an ordinary employee). Notably, research suggests that a hybrid model, combining elements of both top-down and bottom-up approaches, fosters a more successful innovation environment (p.499).

The traditional focus of innovation on new combinations of production factors limits its scope to advancements in technology, services, and business management within the commercial sector. Such focus and perspective fail to capture the full range of innovation needed for a transition from an industrial to a knowledge-based society, where advanced sustainable socio-economic and environmental development takes place. Therefore, a broader definition of innovation is necessary, one that transcends its conventional limitations. The changes in society require the inclusion of social innovations in a paradigm shift of the innovation system, that is characterized by the opening of the concept of innovation processes to the current characteristics of society (Hochgerner, J., 2012, 92).

Social Innovation can be defined as innovations that are social both in their ends and in their means, providing an effective way to empower people and drive societal change (Avelino, F., Wittmayer, J., and others., 2017, p.197). A key characteristic of social innovation according to Franz et al. as quoted by Avelino (2017) is the *"fact that people do things differently due to this innovation, alone or together. What changes with social innovation is social practice, the way people decide, act and behave, alone*

*or together*" (p.197). In the same line, Howaldt and Kopp also quoted by Avelino (2017) argue that social innovation is *"a new combination and/or new configuration of social practices in certain areas of action or social contexts*" (p.197).

Drawing on various reviews, Logue (2019) has identified common characteristics frequently associated with social innovation. These insights provide key understandings for defining, examining, and recognizing social innovations

- Social Value (Creation): The goal of social innovation is to improve social outcomes for collective benefit.
- Source: This is driven by individual, organizational or social movements - within, outside or between existing organizations (Tracey & Scott. 2017)
- Significance: Large-scale system change is preferred - but incremental change can also be transformative in the long term (Campbell, 2004)
- Collectivity: Social innovation is usually a collaborative process - most problems cannot be solved alone.
- Diversity: A diversity of actors and disciplines is necessary
- Relationality: New relational channel or configuration should be introduced for collaboration - the coordination point infrastructure varies is temporary and under theorized
- Change Behaviour (Hochgerner, J., 2012)

Based on different approaches to social change, Tracey & Scott (2017) have proposed a typology that includes (1) social entrepreneurship - where the aim is to facilitate social change through the creation of new organizations, (2) social intrapreneurship - here, change is driven by leveraging existing resources or organizations and (3) social extrapreneurship - where change comes about through cooperation between existing and new organizations. It highlights the diverse nature of social innovation and shows its potential to operate in different sectors and contexts.

As quoted in Hochgerner, J. (2012), Hubert et al. (2010, p. 26) suggest making a distinction between the **process dimension** and the **output dimension** of social innovations. A process dimension indicates that new forms of interaction are established while the output dimension encompasses the type of value or benefit an innovation is intended to generate; a value that is less interested in generating profit, and that include multiple dimensions of output measurement (p. 99).

### 3.2.3. Process dimension of Social Innovation

The lessons learned by EQUAL, an experimental initiative financed by the European Social Fund (2001-2009) focused on promoting innovation to address discriminatory practices in employment access and the labor market, exemplify characteristics that illuminate the shift in the process dimension associated with social innovation (Hubert et al., 2010, p. 26). These are:

1. Solutions must focus on the beneficiaries and be created with them, preferably by them, and never without them

2. Focusing on the strengths of individuals and communities rather than on their weaknesses

3. Capitalizing on the diversity of ethnicities, ages, religions, gender, etc. and not just combating discrimination

4. Developing a holistic approach rather than fragmented responses to people's diverse problems

5. Reinforcing and extending partnerships rather than having each organization individually handling 'its' services and 'its' responsibilities

6. Collaborative working and networking as ways to stimulate social innovation

7. Creating outreach solutions based in the local community rather than global solutions, remote from people and communities

8. Investing more in cooperation than in competition

9. Mainstreaming and sustaining social innovation in order to optimize investment in new solutions and multiply their added value

10. Valuing not only certifiable skills but also new skills associated with the innovation and the discovery of what's new, what has future and what works

11. Recognising and valuing social artists

12. Putting in place a new governance for learning

***Note:*** *Process Dimension of Social Innovation. FromHubert, A. (2010). Empowering people, driving change: Social innovation in the European Union. Bureau of European Policy Advisors (BEPA), p.26.*

This shift in the "process" dimension aligns with broader trends in business innovation, emphasizing open collaboration, participation, and non-linearity.

> *"(...) the concept of social innovation stems from the need for change both in terms of the outcomes that innovation is expected to deliver and the process through which these outcomes are generated. As it is used now in public and scientific debates, it relates not only to developing innovative solutions but also to new forms of organization and interactions to tackle social issues"* (Hubert et al., 2010, p. 27).

Throughout the process of our field work collecting the data from the different cases, we were able to detect that some of the previously mentioned characteristics that illuminate the shift in the process dimension associated with social innovation listed by Hubert et al (2010), became more evident than others. To facilitate the information processing and to build a consistent strategy of analysis we are focusing in this literature review on the terms of Collaboration and Diversity, considering that these terms encompass the characteristics that most prevail in our case studies.

#### 3.2.3.1. Collaboration and Diversity

Collaboration is a key driver of social innovations. Collaboration goes beyond simply working together, meaning that social innovations usually are initiatives that foster a culture of networking and knowledge sharing. Partnerships are usually encouraged to share experiences and provide feedback between peers and specialists on the topics. New solutions and stronger capacity for learning and innovation comes from collaborative dynamics (Vale, A., 2009, p.9).

Von Schnurbein, G., Potluka, O., & Mayer, A. (2023) highlight the polarity between collaboration and competition. They point out that precisely what allows social innovations is collaboration between sectors, when different points of view are under consideration, and actors are encouraged to work together rather than compete. The authors, citing Moulaert and MacCallum (2019), emphasize that *"the transformative power of social innovation is enabled by the values of solidarity, reciprocity and association, and it can help in resolving negative social issues such as inequity, exclusion, and marginalization"* (p. 318).

A collaborative paradigm is usually associated with the world of social entrepreneurship to which social network literature points as it predominantly being a collective activity. Collectivity is either a critical skill or a goal of social entrepreneurship. Indeed, social entrepreneurship often emerges from a collaboration between actors who have complementary resources and who have a common goal of creating social change (Dufays and Huybrechts, 2015, p. 214 and 220).

In a simple way, Wolff, T. (2009) talks about collaborative solutions as solutions that are not possible to achieve solely, that imply the conformation of partnerships that attempt the creation of community change through collaborative processes. In a more formal definition, the author refers to collaboration "*as a group of individuals and/ or organizations with a common interest who agree to work together toward a common goal. Thus we cannot just have a common interest we must also agree upon a common goa*l" (p. 57).

The will to achieve an objective and set goals is crucial to achieving social innovation. Sometimes it happens that those with a common interest come together to establish a partnership, but do not establish a common goal. This frequently happens in associations where higher authorities require various groups to meet with each other. The will to act must come from all those involved, and the objectives set must challenge everyone (Wolff, T., 2009, p.57).

In this way, the main ideas of collaborative solutions include incorporating those who will be directly affected by the solution, valuing racial and cultural diversity as the foundation for community unity, promoting active participation and empowerment from those involved, among others (Wolff, T., 2009, p.58).

On the other hand, partnerships can help to expand successful interventions to the community or beyond, do more with less resources, tackle limitations of the health and human service helping system, build healthy communities, or promote civic engagement (Wolff, T., 2009, p.58).

Incorporating and enhancing collaborative partnerships, rather than having each organization individually handle "its" services and "its" responsibilities, is the key principle. Problems can be addressed holistically and comprehensively by establishing partnerships. These partnerships are the ones that bring together diverse partners with complementary skills to resolve multidisciplinary problems, enabling a more systemic and inclusive approach to social innovation (Vale, A., 2009, p.8).

An important aspect of the collaboration between sectors, actors, and partners is the diversity of their profiles and cultures. This brings different and specific skills towards a common goal. A mutual recognition of the benefits that each partner can bring and share is a factor that fosters innovation.

Additionally, a collaborative dynamic of sharing objectives, knowledge, responsibilities, and financing also promotes innovation (Vale, A., 2009, p. 8).

### 3.2.4. Output dimension of Social Innovation

The "output" dimension, or the "social" aspect, as defined by Hubert et al. (2010), focuses on the innovation's value proposition, the created value, prioritizing societal well-being over solely maximizing profit. However, the precise nature of this "social" output remains open to interpretation. According to the authors, there are three distinct interpretations of the "social" dimension within social innovation, each proposing a unique approach:

- The social demand perspective: innovations that respond to social demands that are traditionally not addressed by the market or existing institutions and are directed towards vulnerable groups in society.
- The societal challenge perspective: innovations that respond to those societal challenges in which the boundary between social and economic becomes blurred and that are directed towards society as a whole.
- The systemic changes perspective: innovations that contribute to the reform of society in the direction of a more participative arena where empowerment and learning are both sources and outcomes of well-being

Nevertheless, Hochgerner, J. (2012) warns about getting trapped in normative prejudice when analyzing the outcomes of social innovations with the lens of the definition above provided that, according to the author, appears to be normative. The author stresses that the fact that social innovations strive for positive societal impact and that enhance society's capacity to act, are both perfect objectives that should be supported by social innovations. The trap appears together with the statement that strains that social innovations are 'social in their ends and means': assuming that all innovations contribute to such aims overlooks the sociological reality of diverse interests and needs. What appears beneficial to one group, in a specific context, may hold no value or even be harmful to others (p. 100).

Those analyzing and promoting social innovations should avoid the simplistic assumption that "social" equates to "good." Even though such an outcome is desirable, social innovations, like any innovation, don't guarantee universal positive impact across all social groups or individuals affected. Public acceptance can also vary significantly. Instead, the attribute "social" signifies purposeful interactions with individuals, groups, institutions, and organizations, as it is established in action theory. It

shouldn’t be confused with the concept of "caring", even though social innovations are needed and possible in the socially extremely relevant domain of “care” (Hochgerner, J., 2012, p.100).

During our fieldwork, while collecting data from our cases and constantly reviewing literature, we noticed that some common and key characteristics of social innovations, as identified by Louge (2019) and previously mentioned in this paper, align with the output dimension of social innovations. As defined by Hubert et al. (2010), the output dimension focuses on the innovation's value proposition and created value of the projects. We are talking about Social Value, Significance, and Change in Practices and Behavior. These key aspects of the output dimension of social innovations are deeper developed below in the theoretical framework and become key aspects and perspectives of the strategy we build for analyzing the cases.

#### 3.2.4.1. Creation of Social Value and Social Good

The term “social value” is not easy to understand at first and can have different meanings depending on the area of application. However, the goal is always the same - a positive impact on society (Schumpeter, 1909; Auerswald, 2009; Lange & Topel, 2006; Raiden & King, 2022). When discussing social value, we typically refer to creating measurable benefits for local communities, the environment, and other external stakeholders while also achieving financial returns and profits for the company. It is therefore about quantifiable value rather than solely focusing on abstract or unmeasured impacts (Salls, 2005; Khalifa, 2020). Measuring social value is challenging (Mulgan, 2010; Khalifa, 2021) and *“although funders, social organizations and policymakers are very enthusiastic about measuring social value, unfortunately they cannot agree on what it is, let alone how to assess it*” (Mulgan, G., 2010, p.1). So measuring the social value of our cases of study is undesirable in our work, and we focus less on the quantifiable numbers and more on the intrinsic benefits created by projects or initiatives. In our research, we do not emphasize measuring social value or evaluating specific activities. Instead, we focus on the desired outcomes of the projects and facilitate a discussion between the and the concept of social value.

Social value, which has its origins in economic theory, was initially unrelated to social innovation. When the traditional economic theory underwent a transition from an individual to a social value approach, Joseph Schumpeter took a critical view on this shift in his work “On the Concept of Social Value ' (1909). In Schumeter's opinion, traditional economic models with a focus on individual needs were not suitable for understanding the benefits of the community (Schumpeter, 1909). He

emphasized that social value is not just an aggregation of individual values, but rather an independent concept that takes the interdependence and mutual influence of individuals within a society into account. In doing so, he shows that the collective actions of individuals can achieve results that can have a benefit for the community (Schumpeter, 1909). Although Schumpeter's work relates to the economy and the importance of social value in its context, these insights can also be applied to social innovation.

Social entrepreneurship is a key area where social innovation is crucial and the theory of social value is most effectively demonstrated. Social entrepreneurs are recognised for their ability to create social value through innovative solutions to societal problems, in short: social innovation. Auerswald (2009) argues that social entrepreneurs differ from traditional entrepreneurs in that they put social value above financial gain. This distinction is crucial as it emphasizes the unique contribution of social entrepreneurs to addressing critical societal challenges that remain unsolved by conventional business practices (Auerswald, 2009). When it comes to creating social value, there are two perspectives. On the one hand, it is claimed that social enterprises play a more important role in creating value, as they develop powerful ideas to solve social problems; on the other hand, skeptics see large companies as having the bigger potential to create social value. However, Auerswald believes that both sides contribute to social value in different ways and also benefit from each other. Traditional companies often overlook the social benefits outside their organization, while social enterprises lack resources (Auerswald, 2009).

Social value creation has now emerged across various domains, each characterized by distinct applications and impacts. In our review of literature concerning the creation of social value through initiatives involving artificial intelligence, we observed that scholars predominantly use the term "social good." The area of artificial intelligence for social good is a relatively new field emerging from technological advancements. Therefore, there is scarce existing literature on artificial intelligence applied in social innovation and the term social good appears recurrently. Various projects within this movement are addressing issues in the environment, media, and the employment of people with special needs (Google, 2024; Auticon, 2024; Newsroom, 2024).

This research considers social good as an expected result of social innovation projects. We maintain that artificial intelligence (AI) can be applied to support companies in realizing social innovations and thereby promote social good, contributing to tackling some of the world’s most challenging social problems.

When we talk about “social good”, we are referring to the potential benefits that artificial intelligence can supply to social innovation initiatives that aim to improve the quality of life for a wide population through avenues such as education, safety, health, and living conditions, among others, but in a way that may not have direct economic returns (Hager, G. D., Drobnis, A., Fang, F., Ghani, R., Greenwald, A., Lyons, T., & Tambe, M., 2019, p.15).

In current days, artificial intelligence is already being employed by scientists and researchers in different projects that have an impact on social challenges as could be climate science or curing cancer. On the other hand, there are other social benefits of artificial intelligence that do not depend on significant scientific breakthroughs but that provide to existing efforts aimed at assisting individuals or communities facing difficulties or emergencies in both advanced and developing economies. Importantly, these solutions often extend support to those who are underserved by conventional or commercial solutions (Chui, M., Harryson, M., Valley, S., Manyika, J., & Roberts, R., 2018, p.3).

Throughout a research project carried out by the McKinsey Global Institute (2018), researchers made an analysis of about 160 AI social impact use cases. They made an in-depth examination of all social areas where AI could be used by grouping the use cases into ten social-impact domains based on taxonomies in use among social-sector organizations (e.g. security and justice, education, health and hunger, etc.). All the use cases domains they have created touch on some aspect of the 17 Sustainable Development Goals developed by the United Nations. Thus, the authors estimate that the application of AI to address social challenges potentially could help hundreds of millions of people worldwide in the future (Chui, M., Harryson, M., Valley, S., Manyika, J., & Roberts, R., 2018, p.5-6).

Furthermore, the authors then identified the specific AI capabilities (e.g. natural language processing, image and video classification, speech to text, etc.) employed in each of the use cases and subsequently mapping those capabilities to the predefined domains. In this way, they were able to find some patterns of which AI capabilities are mostly used to address the different social challenges (Chui, M., Harryson, M., Valley, S., Manyika, J., & Roberts, R., 2018, p.10-11).

#### 3.2.4.2. Significance

*“There is, however, a misconception that could severely limit the potential of and interest in systems change: that, by definition, it needs to be big” (*Mühlenbein, 2018).

According to Logue (2019), significance plays an important role when it comes to social innovation, as innovators want to ensure that their idea brings about change and therefore has a meaning for society, whether on a small or large scale - the potential for change is crucial (Logue, 2019).

The significance of an innovation and the resulting change in the system, be it economic, social or environmental, is based on two primary approaches: large-scale and incremental change (Campbell, 2004). According to Campbell (2004), while large-scale system changes are often sought for their immediate impact and transformative power, he points out that gradual change can usually also stimulate major change in the long term.

Incremental change is much simpler and in many cases used for targeted (social) innovation. The innovation is aimed at a specific problem that is smaller in scope and in which the innovator is familiar. As the name suggests, incremental change is about taking continuous, small steps to reach your goal and thus achieve a significant impact. Gradual change is particularly useful in environments where large-scale change is unfavorable or where it makes sense to move towards bigger changes with small innovations (Mühlenbein, 2018). This type of change can either continue on a small scale, solving small or targeted problems one at a time, or move towards large-scale change and tackle bigger problems.

When large-scale social change is sought to address society's social problems, it is usually described as ambitious and bold. However, such changes are inevitable in order to address deep-rooted problems and make a significant and far-reaching impact, they require a clear vision and understanding of the system and sufficient resources. In addition, successful large-scale change requires systemic adjustments in policies, social norms and practices within institutions (McCannon et al., 2017; Keller & Schaninger, 2019).

At first, it seems as if large-scale change is needed to solve major social challenges. In most cases, however, it is a combination of both approaches that turns a (social) innovation into a successful one. While the desire for large-scale change sets the vision and a goal, it is gradual change that moves the social entrepreneur towards the goal in small steps. The two approaches form a dual approach that offers flexibility and adaptability, making it possible to tackle immediate problems while working towards a larger goal (Mühlenbein, 2018).

#### 3.2.4.3. Change on Social Practices and Behavior

Social innovation and behavioral change exhibit a dynamic interplay. Our literature review suggests a cyclical relationship: innovation often necessitates a shift from established behaviors, while successful social innovations can themselves trigger widespread behavioral change. This phenomenon can benefit organizations, communities, or entire societies. This section tries to bring various theoretical perspectives that show the dynamic between behavioral change and social innovation, to then observe and analyze how this interplay manifests in our case studies.

Social innovation has emerged as a prominent field of study in recent years, attracting a growing attention of scholars and policymakers across various societal sectors. This emerging interest reflects the broad spectrum of disciplines from which the phenomenon has been explored like management studies, public administration, behavioral change, regional and urban development, sociology, and economics (Gupta, S., Kumar, V., & Karam, E., 2020, p. 499).

According to Neumeier, S. (2012) social innovations are "*changes of attitudes, behavior or perceptions of a group of people joined in a network of aligned interests that in relation to the group's horizon of experiences lead to new and improved ways of collaborative action within the group and beyond*" (p.55). Social innovation is not the tangible improvement itself but the change of attitudes, behavior or perceptions that result in a new form of action that enables the improvement in the first place (Neumeier, S., 2012, p. 55).

Hochgerner, J. (2012) points out that social innovations transcends mere ideas, manifesting as novel rules for social participation, improved services for specific populations, and even shifts in societal behaviors or social protection approaches. For an idea to qualify as a social innovation, it must translate into action: offering a more effective or entirely new solution compared to existing options, gaining social acceptance and implementation, and ultimately delivering sustainable benefits to target groups. This aligns with the concept of innovation in other fields, where true impact hinges on practical application and lasting positive outcomes (p. 92).

This conceptualization of social innovation emphasizes the iterative process of proposing, testing, implementing, and disseminating new social practices that challenge established practices. This intentional deviation from "stereotypical practices" aligns with the core characteristics of innovation in various fields. The impact of these social innovations can be observed through changes in individual and group behaviors, social relationships and even institutionalized procedures, which, according to the author, makes them susceptible to empirical investigation (Hochgerner, J., 2012, p.96).

A key characteristic of social innovations according to McKelvey, M., & Zaring, O. (2018) is their ability to bring about system-changing impacts, altering perceptions, behaviors, and structures, which leads to profound societal change. For social innovation to be system-changing, the existing system must adapt to enable significant changes in social practices and relationships (p. 598-599)

To delve deeper into how social innovations drive changes in behavior and social practices, we explored the literature on social innovations and social change, social practices change, behavior change, among others. We were particularly interested in getting an overview of the different ways that social innovations can influence social behavior or practices. The aim is to further be able to analyze our case studies and understand how they influence (or do not) social behavior or practices, and what role does the integration of artificial intelligence play in that phenomenon.

We were able to identify the following processes or mechanisms:

**Awareness and Education**

Mulgan et al. (2007) point out that raising awareness and spreading the word is a crucial phenomenon for social innovation to scale-up, meet their objectives and thus, modify practices and behaviors. Diffusion campaigns play a significant role in this process by providing the necessary information to the public, which can lead to changes in attitudes and behaviors. The authors provide examples of different social movements that have had a successful impact over the last half century such as environmentalism and feminism; movements that have the intention to modify practices and actions (p. 15).

**Community Engagement**

Civil society, social economy, and social entrepreneurship are highly relevant when it comes to enhancing the reach of a certain social innovation, and therefore, influencing changes in long-lasting and sustainable practices over time, for the benefit of society in general. The commitment to social and economic development on the part of these actors is essential and they certainly cannot be considered, as it happens in many cases, as residual actors (Hochgerner, J., 2012, p.12).

These actors are who have the will and often the ability to act to transform society and bring about social change. Many of the initiatives emerging from the field of social economy and civil society have proven to be innovative in addressing social, environmental and social problems, while contributing

to economic development. Very often their success has been due to their ability to integrate, involve and make the community participate as part of the change (Hochgerner, J., 2012, p.12).

**Policies and Regulations**

According to Giddens (1984), as quoted by Lukesch, R. et al., (2020), the "reconfiguration of social practices" leads to "stable, valued, recurring patterns of behavior," which he refers to as "institutions". Lasting changes in social practices often involve replacing or creatively destroying previous practices. Thus, fostering innovation within a political framework can seem paradoxical since it implies disrupting existing institutions. Social innovation and institutional change are interconnected, requiring both bottom-up initiatives (social innovation) and top-down initiatives (institutional innovation) ( p.6).

The institutional fabric of society is where policies and political frameworks (top-down) intersect or clash with social innovation (bottom-up). Social innovation initiatives can challenge the political-institutional fabric or act upon invitation, providing pilot projects and examples for policymakers. (Lukesch, R. et al., 2020, p.6).

Governance refers to the structures and functions of handling societal efforts, involving public, private, and civil society actors. Public governance specifically involves efforts by public entities to fulfill duties and improve common well-being, with policies and political frameworks as integral components. Social innovation induces institutional changes, manifesting in governance patterns across various sectors, including cooperatives, healthcare, finance, and rural policies. The interaction between social innovations and policies reveals mutual relationships and interdependencies that evolve over time and vary by case (Lukesch, R. et al., 2020, p.7).

# 4. Analysis

This part of the thesis focuses on analyzing our three cases. Starting with the presentation of the strategy of analysis, we then move on to the individual projects. We conclude each case analysis with reflection on the role of AI within their initiatives.

## 4.1. Analysis strategy

This study employs a strategic framework to analyze the social innovation projects that leverage AI for social good. Two dimensions, derived from our literature review, are distinguished: the **process dimension** and the **output dimension** of social innovations. Each dimension contains distinct aspects

or key characteristics of social innovation that are used as units of analysis that guide the corresponding discussion.

**Process Dimension of Social Innovation**

The process dimension indicates that new forms of interaction are established. As mentioned in the theoretical framework section, we take as a unit of analysis Collaboration and Diversity, considering that these terms encompass the process dimension characteristics that most prevail in our case studies.

- **COLLECTIVITY & DIVERSITY:** Social innovation is usually a collaborative process (most problems cannot be solved alone, with a diversity of actors and disciplines involved in that collaboration.

**Output Dimension of Social Innovation**

The output dimension encompasses the type of value or benefit an innovation is intended to generate. As deeper explained in our theoretical framework, we are taking as units of analysis for the output dimension Social Value, Significance, and Change in Practices and Behavior.

- **SOCIAL VALUE (Creation):** The goal of social innovation is to improve social outcome for collective benefit.
- **SIGNIFICANCE**: Large-scale system change is preferred - but incremental change can also be transformative in the long term.
- **BEHAVIOR CHANGE:** A key characteristic of social innovation is the fact that people do things differently due to this innovation, alone or together. What changes with social innovation is social practice, the way people decide, act and behave, alone or together.

This strategy is used in the following sections to analyze each chosen social innovation project. Drawing insights from the theoretical framework, we will examine their initiatives, observe how different aspects of social innovation are displayed, and explore the role that AI has within each of them, either in the process dimension or out dimension of the phenomenon. This analysis will ultimately contribute to a deeper understanding of how AI shapes and influences social innovation for social good.

The interview guide was developed based on our Analysis Strategy. The interview was divided in two sections according to the two-dimensional framework designed to analyze the social innovation projects that leverage AI for social good. The first part is composed of questions that focus on the process dimension of social innovations and the second part contains questions designed to address the output dimension of social innovations. All questions contemplate the distinct units of analysis that compone the two dimensions and that guide the corresponding discussion.

**Interview Guide**

Introduction:

1. About us
2. Can you tell us something about <project> and what is your position?

**Process Dimension:**

1. **Collectivity & New Forms of Interaction:**
    - Can you describe the development process of your AI solution?
    - Who were the key stakeholders involved (individuals, organizations, communities)?
    - How did you ensure diverse perspectives were considered?
    - Did this process establish new ways for stakeholders to collaborate on the social issue?
2. **Diversity:**
    - Was there a mix of expertise involved in developing your AI solution (e.g., technical, social science, community development)?
    - How did this diversity contribute to the project, especially in terms of establishing new forms of interaction and collaboration?
3. **Source:**
    - What motivated the development of this project?
    - Was it driven by an individual, organization, or social movement?
    - Where did the initiative originate (within, outside, or across existing structures)?

**Output Dimension:**

4. **Social Value & Intended Benefit:**
    - What social issue is your AI solution addressing?

- How does your project improve social outcomes for the target population?
- Can you provide examples of how it creates positive change and what type of value or benefit it is intended to generate?

5. **Significance & Long-Term Transformation:**
    - Does your AI solution aim for large-scale systemic change?
    - If not, how does it contribute to long-term positive transformation, considering the intended benefit?
6. **Behavior Change:**
    - How does your AI solution influence people's behavior?
    - Do they approach the social issue differently because of your project?
    - Can you describe any changes in decision-making or actions (individually or collectively)?

## 4.2. Case Analysis

### 4.2.1. Auticon

Auticon is a leading global social enterprise founded with the aim of creating an inclusive working environment, particularly for neurodivergent people on the autism spectrum. It was founded in Munich about 12 years ago by a desperate father of an autistic child who wanted to give his son the opportunity to work in a normal job. Auticon has since expanded into several countries and consists of various subsidiaries that work independently of each other but share a common mission to promote integration in the workplace at an international level - the only way to ensure a unified strategic vision (Interview with AO, 2024, p.1; Auticon, 2024).

Auticon employs and places people with autism as IT specialists in areas such as data analysis, software development or quality assurance, for which they are ideally suited due to their cognitive strengths. These are areas in which an eye for detail, the ability to recognise patterns and a sustained ability to concentrate are particularly advantageous. The specialists work on a wide variety of internal and external projects and are always supported by coaches (Auticon, 2024).

Auticon is committed to making a social impact through educational initiatives that aim to raise awareness of neurodiversity across the profession. Through comprehensive neurodiversity training,

developed in cooperation with neurodiverse employees, Auticon aims to educate external organizations about the benefits of neurodiversity and how to effectively support neurodiverse employees. In this way, they not only advocate for change internally but also seek to have an external impact on society and the industry towards neurodiverse people (Auticon, 2024).

Auticon is much more than just a company that employs neurodiverse people - it is a catalyst for social change. The innovative use of artificial intelligence and efforts in the field of education make Auticon a social enterprise that supports autistic people in the labor market and promotes an inclusive society (Interview with AO, 2024, p. 1; Auticon, 2024).

**Collectivity and Diversity**

When it comes to driving social innovation, it is important to consider the aspect of collaboration and diversity within the process (Logue,2019). At Auticon, these factors play a major role simply because the company focuses on employing autistic people in the IT sector in 15 countries around the world.

An important goal for the person who develops cross-company innovations and manages AI projects, among other things, is to develop a tool that facilitates collaboration between consultants across national borders. This tool should enable consultants to share projects, knowledge and new ideas (Interview with AO, 2024). Oleszkiewicz's initiative exemplifies a key characteristic of (social) innovation: collaboration. As the theory underpins, it is not just about working together, but much more about fostering a network culture and sharing knowledge. Vale's (2009) assertion that new solutions and better learning emerge through such collaborative dynamics strengthens this idea (p. 8f.). When asked how these AI tools are developed, Oleszkiewicz, Director of Auticon Labs, emphasizes an important aspect of the collaboration:

> *"So basically we try to use this time for internal for development of internal tools or improvements in the company or products that we can later sell to the market… it was all done by the way of our, of our daily jobs"* (Interview with AO, 2024, p. 1).

Auticon employees work together on these projects according to availability and skills, similar to an open source approach, which is consistent with Wolff's (2009) statement on collaborative solutions, where often individuals or organizations work towards a common goal, even if the structure is informal (p. 57f.). The consultants at Auticon, whether neurodiverse people or so-called job coaches,

use their free time in addition to projects to work together on a goal and thus form a kind of ad-hoc team (Interview with AO, 2024, p.1).

Another point that is not directly related to AI tools, but is highly relevant to the aspect of collaboration, is the distribution of available resources. Auticon's consultants have different strengths and should be allocated according to the customer's requirements. A resource manager takes on this task and ensures that the various skills are utilized effectively. This ensures that the complementary resources are utilized for a common goal and thus contribute to social innovation (Vale, 2009).

When asked how the idea for the AI tool for CVs, which we have already described in the case description, came about, Oleszkiewicz emphasizes that this innovation was initiated by an employee:

> *"And this came as one of those ideas from, from the employees that they think they can automate and improve this, this process… it was quickly grasped by all of those stakeholders who then were benefiting and were willing to invest time. And some resources into the development"* (Interview with AO, 2024, p.1.).

This also emphasizes how, by taking up and developing individual ideas, the organization promotes collective activities and at the same time recognises the benefits - which in turn promotes (social) innovation.

Collaboration is already associated with a great deal of diversity at Auticon, but the aspect is nevertheless also reflected in other independent examples. If you look at Auticon as a whole, you see a company that employs, advises and supports individuals with autism. The company has recognised the special abilities and perspectives of neurodiverse people and makes the best possible use of these characteristics. Bringing together these different personalities with different skills, viewpoints and cultural background promotes both collaboration and, above all, (social) innovation (Vale, 2009). Auticon values the active involvement and empowerment of its consultants by including different actors across disciplines. When consultants from different projects and therefore with different skills are not busy, they come together and work on a solution, promoting diversity through collaborative work. Again referring to Auticon as a whole, you can see the holistic problem solution they are pursuing. Oleszkiewicz pursues the goal of facilitating collaboration across countries and teams with different perspectives. His ambition embraces a key principle of social innovation, as he wants to enable a more systematic and integrative approach to solving multidisciplinary problems:

> *"One of my goals is to start building some integration platform for our entities, for our consultants to work together across those countries to share the knowledge, to collaborate on projects, to build some new products that we will be able to push to the market."* (Interview with AO, 2024, p. 1).

Collectivity and diversity play a major role at Auticon and can be seen in the various examples just mentioned, with AI playing a role to a greater or lesser extent. Generally speaking, however, AI is not the driving force behind collaboration and the inclusion of diversity. Although Oleszkiewicz mentions that he plans to simplify the collaboration of the various entities using an AI tool, this is still a vision and does not have a major impact on the collaboration and diversity that takes place. For the purpose of completeness and because it has an impact on social innovation within the company, it was nevertheless included in the concept.

With or without artificial intelligence - Auticon clearly has a collectivity and diversity within its organization and social innovation.

**Social Value Creation**

With collectivity and diversity we have now touched on an aspect that is relevant to the process dimension of social innovations. We are now going a step further and looking at what outcomes social innovation should achieve. Social value creation is one of the three outcomes of the output dimension that we analyze in the case of Auticon.

According to Auerswald (2009), social entrepreneurs create social value through innovative solutions to social problems. Auticon was founded for exactly this reason, as Oleszkiewicz explains:

> *"And the main purpose creating the company was to make a workspace which will be friendly for people on the autism spectrum who will support them in getting skills that are necessary for being self-sufficient and be able to take care of themselves. And then to actually promote their unique skills and abilities to other companies."* (Interview with AO, 2024, p.1).

The founder of Auticon originally only wanted to open up the possibility for his neurodiverse son to work in a "normal" job, as he saw how difficult it is for autistic people on the labor market; by founding Auticon, he intended to solve precisely this social problem (Auticon Interview, p.1).
Auticon has since gone one step further and is building a bridge between neurodiverse people and potential employers by acting as an intermediary, as the interviewee tells us.

*(...) They have good experience. They pick very good education, very good results. But then when it comes to the actual job market, they are diametrically a lot. So we try to be kind of intermediary"* Interview with AO, 2024, p.2).

Auticon is therefore not only an employer for people with autism, but is also committed to ensuring that other companies recognise the potential of neurodiverse people and take them on and employ them in their company - they not only create social value internally through work opportunities, but also externally. We are unable to say whether the focus here is on social value rather than financial value. However, Auticon was founded as a social enterprise and describes itself as such, which is why we assume that it is in line with the concept of social entrepreneurship (Auerswald, 2009).

Oleszkiewicz can even quantify this social value a little and affirms that Auticon is trying to measure its impact.

> *"But you know, we try to think this through the lens of how many people are getting jobs through us. And globally, it's around 600 people right now, you know, our consultants who are placed into different roles and jobs through Auticon"* (Interview with AO, 2024, p.7).

Although the measurement of value is irrelevant to our work, the statement by the director of Auticon Labs confirms the actual creation of social value and can substantiate this with a figure.

Chui et al. (2018) state that the creation of social value involves approaches that contribute holistically and integratively to problem solving. By integrating people with autism into the world of work and thus addressing multiple dimensions of social exclusion, Auticon can be said to be creating social value.

Artificial intelligence does not play a fundamental role in the creation of social value in the case of Auticon, as the company was founded as a social enterprise and has set itself the goal of creating social

value from the outset, without the involvement of AI. New projects such as those realized by Oleszkiewicz contribute to this and may create more social value, but this can be seen as an extra.

**Significance**

The example of Auticon demonstrates significance in several aspects, however we will look at the output dimension of social innovation in terms of the large-scale and incremental change that is being sought. Auticon is the perfect example of how a small, incremental change can achieve a change on a large scale. As already mentioned, the founder wanted to offer his son the opportunity of a "normal" job and enable people with autism in general to gain a competitive position in the labor market - an ambitious goal (Auticon, 2024). His mission quickly took on great dimensions and the company was able to open further branches in Germany and Europe shortly after its foundation (Weigel, 2021). Logue (2019) emphasizes that what matters is the change achieved, whether large or small.

As already mentioned, the social value generated by Auticon's work can be seen in figures that reflect its significance. Hundreds of autistic people have gained a meaningful job through Auticon's progressive placement and employment (Interview with AO, 2024, p. 4). The combination of incremental placements leading to a significant total impact illustrates the dual approach of gradual and large-scale change described by Mühlenbein (2018).

Auticon has driven the creation of a supportive and inclusive work environment: "*to make a workspace which will be friendly for people on the autism spectrum*" (Interview with AO, 2024, p. 1). This focus on inclusion reflects Auticon's significant social impact and supports the theory that incremental changes to workplace practices and policies can lead to broader systemic change over time (Keller & Schaninger, 2019).

As with significance, it is not artificial intelligence that is driving change, be it small or large. The company has been driving meaningful change even before the introduction of AI tools and continues to do so. Artificial intelligence helps, but it is not the decisive factor.

**Change on Social Practices and Behavior**

Another characteristic that defines social innovation in its outcome (dimension) is the change in social practices and behavior. Using Auticon as an example, we look at whether and how their initiatives lead to a change in society.

One way to stimulate and affect such change is through education, as Mulgan et al (2007) argue that raising awareness is crucial when it comes to scaling and changing practices and behavior. Auticon initially only brought neurotypical and neurodiverse people together internally in the workplace and taught both groups to work together.

> *"So we started as a kind of services company delivering services of autistic people who worked along neurotypical employees showing how to work with them, how to make best use of data and over time, this evolved into also another social mission which is to educate"* (Interview with AO, 2024, p.1).

Oleszkiewicz also mentions that in addition to employing autistic individuals within their organization, Auticon works to place them with clients, enabling a general shift in workplace practices and norms, thereby facilitating an inclusive work environment. Consequently, customers and companies that are not specialists in such working models are also sensitized and educated, which leads to a change in behavior (Interview with AO, 2024, p. 9).

The AI tool for CVs developed by Oleszkiewicz also supports the Change on Social Practices and Behaviour, as he himself explains:

> *"You know, I think it is helping a lot with bias related to hiring autistic people. I mean from the from our customers' point of view, yeah, that they were sometimes getting resumes or CVs, which they would reject based on the standard, let's say, approach. And now they realize that with this tool and with our support, they can spot those places which are significant to their needs"* (Interview with AO, 2024, p.8).

As Neumeier (2012) states, social innovation involves changes in attitudes and behavior, which in turn lead to new forms of action. Auticon provides clients and potential employers with a tool to better assess the abilities of autistic people, leading to a change in employment practices and a reduction in bias. This intervention helps alter the perception and behavior of employers towards autistic candidates, fostering more inclusive hiring practices.

Oleszkiewicz also looks at other possible applications of artificial intelligence and describes what impact these could have. With his idea, he wants to support autistic consultants in their communication and make their inclusion even easier and smoother.

> *"So if the consultant is struggling with some more technical or more specific elements, they still need help and then AI could be a kind of a tool which will help them guide the consultant in the right direction"* (Interview with AO, 2024, p.3).

This vision has yet to be realized, however it demonstrates the impact AI could have on further changing behavior.

A major focus that can be seen at Auticon is education. As already mentioned in the form of placements within external companies as well as in the form of eLearning courses from auticon's neurodiversity specialists and neurodivergent colleagues. These courses are designed to demonstrate the benefits of neurodiverse employees, raise awareness of barriers and encourage inclusion, with the overall aim of: Change on Social Practices and Behavior (Auticon, 2024).

Here too, using the example of Change on Social Practices and Behavior shows that artificial intelligence supports and enhances the outcome of the initiative. In this case, however, AI is not the decisive factor for social innovation and it would also be possible without the use of AI.

### 4.2.2. The Newsroom

The Newsroom is a Portuguese startup that aims to help journalists fight misinformation and promote a diversity of voices online, but also to help readers in general to get diverse perspectives and quiet neutral information when reading news. This is done by offering two AI driven products, one for journalists and another for readers (The Newsroom, 2023).

It was founded in December 2020 by two entrepreneurs that were both working in the tech area and quite frustrated with polarization and misinformation (Interview with JR, 2024). At the beginning the interest was exclusively in the area of misinformation and the integration of AI to help with contrasting misinformation and inaccurate information generally. After further developing the idea, they moved from exclusively looking at misinformation to also bringing plurality to media consumption (Interview with JR, 2024).

In 2021, the project was running with a small team of two people (the two co-founders), and right now in 2024, the enterprise is formed by the two co-founders, a full-time full-stack developer and two interns (Interview with JR, 2024).

For the future, The Newsroom has the ambition of becoming a trusted and reliable company, with strong user confidence. By collaborating with news agencies and other journalism entities, they want to transform the news industry towards durable journalism, reducing the prevalence of clickbait and biased information. Ultimately, the goal is to empower readers with the tools to critically evaluate the news they consume and facilitate a more discerning and informed society (Innovation Origins, 2011).

**Collectivity and Diversity**

The newsroom is the result of the encounter of two people with the same concerns about a topic and the same intentions to generate an initiative to tackle that problem. *"My co-founder and I were both working in tech. We're both quite frustrated with polarization and misinformation and we decided that we wanted to try and do something about it"* (Interview with JR, 2024, p.4).

These firsts aspirations became now in two specific tools that help to fight misinformation and promote a diversity of voices online (The Newsroom, 2013): For readers, a technology that offers summaries that highlight areas of agreement and different perspectives among sources, enhancing their understanding and enabling informed opinions. For Journalists, a specialized platform to access curated insights and analyses, which assist them in research and content creation, thereby streamlining the editorial process (Interview with JR, 2024).

The newsroom is a startup that started exclusively with a B2C value proposition, originally working directly with users. After going back and forth in a dynamic process in search of combining their ambitions to contribute to a good cause with the need to create a sustainable business, they now do the same thing on the B2B side, working also with media companies (Interview with JR, 2024). We could define The Newsroom as a start-up that arose from the field of social entrepreneurship, that according to the literature emerges from a collaboration between actors who have complementary resources and who have a common goal of creating social change (Dufays and Huybrechts, 2015, p. 214 and 220).

Following characteristics from the collaborative paradigm identified in the literature, the initial development phase of the project mainly focused on understanding and identifying the needs and frustrations of who will become the end-users of their products. As Jennie, the Co-Founder stressed:

> *"So the first part of the development was a lot of interviews. So speaking with...I mean initially with readers and then with journalists around what frustrated them about the current news assessment, what were pain points what they wished existed etc."* (Interview with JR, 2024, p.2)

This aligns with Hubert et al. (2010) and Wolff (2009) who stress the importance of creating solutions with and for beneficiaries, incorporating those who will be directly affected by the solution, promoting active participation and empowerment from those involved, among others. This is a key characteristic that illuminates the shift in the process dimension associated with social innovations.

As mentioned before and throughout the paper , a process dimension of social innovations indicates that new forms of interaction are established (Hubert et al., 2010, p. 26). Other interactions within the development process of The Newsroom that we would like to put on the spotlight are the involvement of various stakeholders within the product development phase, including the definitions on the artificial intelligence model to be incorporated.

> *''We had a couple of partners along the way (…) on defining what the impact thesis would be, what the AI needed to look like. And so there were a couple of other stakeholders that informed the way we built the product, namely in the first phase of product development. We actually partnered with Meta on explainable AI and we had a program with Google as well. And so even though they didn't have a direct say into the product, we still, we still interacted with them on explainable AI, product design, etc. which did inform how we ended up creating the product''* (Interview with JR, 2024, *p.3-4)*.

Other key stakeholders in the development included readers, journalists, tech teams, and business functions within the startup. The mentioned partnerships with organizations like Meta on explainable AI and the program they had with Google influenced the product's design and brought value (Interview with JR, 2024).

We could affirm that key collaborations brought together diverse perspectives and expertise that facilitated a holistic approach to innovation development of The Newsroom. Vale (2009) argues that collaboration is more than just working together. meaning that social innovations usually are

initiatives that foster a culture of networking and knowledge sharing. Partnerships encourage experience sharing and feedback among peers and specialists. Collaborative dynamics generate new solutions and a stronger capacity for learning and innovation (p.9).

Collaboration and partnerships continue to this day, as fundamental factors that allow the expansion of the project and its growth:

> *"we have an initial pilot with media company in the UK. They were actually starting to use the platform tomorrow morning (…) in which they were using our tech, but there was quite a bit of manual intervention on our end. In the meantime, we agreed to do a pilot together"* (Interview with JR, 2024, *p.3)*.

This focus on local pilots could underscore the need for creating outreach solutions based in the local communities rather than global solutions and fostering collaborative working and networking as ways to stimulate the innovation, bringing greater learning, discovery and innovation (Hubert et al., 2010).

The Newsroom's journey exemplifies some of the assumptions of social entrepreneurship and social innovation developed in our theoretical framework. Its emergence from a collaborative dynamic within individuals with common goals, their initial focus on user needs, and the creation of partnerships and networks to boost innovation, learnings and expertise, showcase some of the key characteristics that illuminate the shift in the process dimension associated with social innovation.

The role of AI in this context is not primarily as a facilitator or key driver of the collaboration and diversity that, according to the literature, leads to a social innovation. Instead, AI is envisioned as part of the final product or solution of The Newsroom that will bring the benefits for their target community: journalists and readers.

**Social Value Creation**

This section intends to address the key aspect of social value creation within the The Newsroom project. As mentioned before in our analysis strategy, this key characteristic of social innovations is taken as a unit of analysis to focus on understanding the goal that our cases of study have in order to produce a specific social outcome for collective benefit. In order to get closer to answering our research question, we also try to observe how AI applications involved in this project contribute to this goal.

The main objective of The Newsroom is to help journalists fight misinformation and promote a diversity of voices online, but also to help readers in general to get diverse perspectives and quiet neutral information when reading news (The Newsroom, 2023). In words of the Co-Founder, the social value they expect to create could be defined as "*a better informed society. (...) affecting how they consume information. So the whole point of bringing (...) diverse perspectives and quite neutral information (...), actually contributes to people engaging quite a bit more with it"* (Interview with JR, 2024, p. 5).

This is done by offering two products: an AI co-pilot for journalists that helps with research and verification, ensuring that writers identify important stories, find diverse perspectives and ensure the reliability of information. For readers, there is a mobile app tailored to their interests that provides them with unbiased information and lets them decide on their own opinions (Interview with JR, 2024, p.5). So they have a dual approach: on one hand, enhancing the reader's experience by providing multiple points of view. On the other hand, aiding journalists in navigating vast amounts of information. This approach aims to contribute significantly to a healthier information ecosystem, both from information consumption and production (Interview with JR, 2024, p.5).

In our theoretical framework, when discussing social value, the authors refer to creating measurable benefits for local communities, the environment, and other external stakeholders (Salls, 2005; Khalifa, 2020). As mentioned before, our research does not emphasize on the aspect of measurement and concentrates more on the result desired by the projects. But during the interview, the measurable aspect came about when discussing the value created by The Newsroom.

> *"So there is also something that we have asked people when we interviewed them to have a happy impact measurement and many of them I don't know the exact number but I think it was 73 or 74% of the ones we interviewed reported that they were more open to different perspectives and that reflected on the conversations they had be it at the pop with their friends or online"* (Interview with JR, 2024, p. 7).
>
> *"(...) and usage engagement and time on app are obviously things we measure"* (Interview with JR, 2024, p. 8).

It is clear that the co-founder intends to measure the value created. But measuring social value is challenging (Mulgan, 2010; Khalifa, 2021) and while funders, social organizations, and policymakers

are eager to measure social value, they struggle to reach a consensus on its definition, let alone its assessment. Since social value is inherently subjective, it varies in meaning from person to person (Mulgan, G., 2010, p. 1). This is visible in the case of The Newsroom. When trying to go deeper and investigate the method they use to measure the impact, the answer was they *"basically took around the might some people that were using the app sent them an email and asked can we ask you a few questions. It was not very scientific"* (Interview with JR, 2024, p. 7).

As previously stated, The Newsroom could be classified as a start-up within the field of social enterprises. In 2021, the project was running with a small team of two people, just the two co-founders. After developing a clear idea of how they were going to meet their goal of contributing to a "*a better informed society"*, they started struggling with making this idea a healthy business (Interview with JR, 2024, p.1 and 3). According to the social value literature, ensuring financial returns and profits for the company is as important as creating benefits for society (Salls, 2005; Khalifa, 2020). However, analyzing this strictly from the perspective of social value theory is challenging. This term emphasizes the measurable nature of the social value created, which, as previously mentioned, is not currently a serious focus in The Newsroom. Therefore, to address this gap, we can introduce some insights from the field of social entrepreneurship theory.

Auerswald (2009) argues that social entrepreneurs differ from traditional entrepreneurs in that they put social value above financial gain. We are not in a position to affirm or deny this in the case of The Newsroom, since we did not have further access to information related to how they are financed and what their priorities are. But we do know the co-founder's sayings that maintaining a healthy business is part of her objectives. The pertinent debate in this case may revolve around the observation made by Smith, W. K. et al (2010). The authors argue that the social and commercial sides of a social enterprise are not separate entities but are inherently intertwined and frequently under conflict. While simultaneously addressing both social and financial aspects may enhance the overall performance of the organization, these divergent pursuits often involve conflicting identities, value systems, and norms (p. 2). However, as noted earlier, we did not have the opportunity to delve deeper into this aspect, and therefore, we are unable to explore it further.

What is interesting to explore and discuss is the role of AI in this context. The Newsroom employs artificial intelligence to cluster and analyze news articles based on specific topics, (the example given by the co-founder was a geopolitical event), identifying consensus and divergences within them. This AI-driven process enables the platform to present a comprehensive and balanced view of news stories to its users. For readers, the technology offers summaries that highlight areas of agreement and

different perspectives among sources, enhancing their understanding and enabling informed opinions. Journalists, on the other hand, use a specialized platform to access curated insights and analyses, which assist them in research and content creation, thereby streamlining the editorial process (Interview with JR, 2024, p.1, 2 and 4).

Unlike Auticon, which was founded as a social enterprise and has set itself the goal of creating social value from the outset, before and without the involvement of artificial intelligence, The Newsroom has built up its entire social value proposition around their AI solution they have developed. Is this AI solution which allows them to meet their social goal of contributing to a better informed society, affecting how people consume information, bringing diverse perspectives and neutral information, and thus contributing to people to engage more (Interview with JR, 2024, p. 5).

But is the role of AI in The Newsroom project the key driver for their social innovation? The co-founder of the project has her own opinion about innovation and AI.

> *"What drives innovation is entrepreneurs and AI, (...) in some cases AI is a decoration. Like you have companies that started yesterday and they say they have 10 years of AI research when really they don't (...) But like we've been working with AI for three and a half years. However, AI is just a tool. Nothing else. You wouldn't be able to do this, but you would be able to do other stuff that maybe is not scalable" (Interview with JR, 2024, p. 9-10).*

This enables an analysis from another perspective of social innovations: their significance. This aspect encompasses the scalability aspect and their pursuit of immediate impact and transformative power. The following section delves into that discussion, exploring the role that AI plays around these concepts in The Newsroom project.

**Significance**

The ambition for greater impact and greater scope of the social good they want to bring to society is present in the desires of the co-founder of the Newsroom "*The point there as always is the scale. So, how many people do you reach? and how does this propagate? and this is true on the consumer app as much as on the journalist app"* (Interview with JR, 2024, p. 7). This ambition to make significant change is what, according to Logue (2019), innovators want to ensure their ideas. But the author

indicates that the significance of social innovations could be whether on a small or large scale and what matters is the potential for change that the innovation brings.

At the moment, The Newsroom is building significance on a small scale. They have a small number of readers, that according to their first feedback surveys are engaged with what the app offers, and a few media companies that are starting to pilot their app for journalists (Interview with JR, 2024, p. 8). But their ambition for greater impact is evident in the continuous enhancements and iterative improvement they are making to their AI initiative to expand its reach.

> *"right now we mostly surface perspectives that are already in English. But the big limitation there is that if I'm talking about Argentina and I don't look at Argentina and media as plural as I can be I'm still not bringing the real Argentinian perspective into the mix. And so we have trained our AI on six languages and Spanish in this case is one of them. However we do not surface original language media yet. And so in terms of international exchange in general scaling up it can ensure it happen both in terms of adoption and in terms of making the products more sophisticated"* (Interview with JR, 2024, p. 6).

This reflects the dual approach discussed by Mühlenbein (2018) where incremental changes in the innovations done as small steps are the ones that gradually take the initiative closer to a more significant impact, moving towards larger-scale transformations.

Exploring the role that artificial intelligence plays in the innovative proposal of the newsroom, we could reveal a deep connection to the concepts of significance, improvement, and large-scale transformations. As mentioned in the previous section, the core product of this initiative that is shown as an innovation is its AI-driven platform. Artificial intelligence plays a crucial role in enabling an innovation on a large scale within The Newsroom context. According to the co-founder, "*You wouldn't be able to do this (without AI) but you would be able to do other stuff that maybe is not scalable. But it is a tool*" (Interview with JR, 2024, p. 10). This highlights how artificial intelligence could be essential for achieving scalable innovations that drive significant impact and transformations.

**Change on Social Practices and Behavior**

This section aims to analyze The Newsroom project from the perspective of the change on social practices or behavior that their innovation could bring to users in particular and to society in general.

This perspective is a key aspect of the output dimension of social innovations, according to our literature and as stated before in our analysis strategy.

The Newsrooms seem to have an effect on behavior and practices of their users. In fact, their ultimate goal of contributing to *"a better informed society"* is, according to the co-founder perspective, a result of an expected change in behavior and social practices of their target groups (readers and journalists). They expect a change on how they consume information and on how much people are engaged with news (Interview with JR, 2024, p. 5).

Looked from another point of view: their dual approach before mentioned of enhancing the reader's experience by providing multiple perspectives, and of aiding journalists in navigating vast amounts of information (Interview with JR, 2024, p.5), has an expectation of changing behaviors and practices of those groups:

> *"we had an overwhelming majority saying that through the app they felt they were engaging with points of view that they would otherwise not see or not engage with or normally dismiss"* (Interview with JR, 2024, p. 5).

> *"I think it was 73 or 74% of the ones we interviewed reported that they were more open to different perspectives and that reflected on the conversations they had be it at the pop with their friends or online"* (Interview with JR, 2024, p. 7).

> *"we are contributing to a better information ecosystem on the production side"* (Interview with JR, 2024, p. 5).

> *"they have basically an overview of what happened over the past 24 hours, who has written about what were the main events, and that's analysis of consensus and perspectives to allow them to streamline research and writing. And the research and the editorial, so deciding what to write about when they're writing a new piece"* (Interview with JR, 2024, p. 2).

Drawing on Hochgerner, J. (2012, p.96), we could say that if this changes on practices from readers and journalist occur while using the products of The Newsroom, we may qualify the project as a social innovation, as for an idea to qualify as a social innovation, it must translate into action: offering a more effective or entirely new solution compared to existing options, gaining social acceptance and

implementation, and ultimately delivering sustainable benefits to target groups. Furthermore, the author says that the impact of social innovations can be observed through changes in individual and group behaviors, social relationships and even institutionalized procedures and is that what makes them susceptible to empirical investigation.

If we follow the idea that changes in individual and group behaviors are what make innovations susceptible to empirical investigation, we could observe that the co-founder also does this association. When discussing with her the change of practices and behavior of users, she refers to the data they have collected from users as the validation of what she is saying.

Trying to understand through the theory in which way The Newsroom could be influencing the change of practices and behaviors, we agreed that what could happen is a change through community engagement. Hochgerner (2012, p.12) notes that the involvement and integration of community actors are essential for sustainable social change. The Newsroom could be fostering community engagement by enabling users to discuss and consider diverse viewpoints. This could be happening on the target group of readers and within the media companies that are piloting their product.

We could assume that the role that the integration of artificial intelligence plays in this phenomenon is quite crucial in the case of The Newsroom. As mentioned before, is their Ai driven product which allows, in this case, the change in social practices and behavior through the engagement of the different actors involved.

### 4.2.3. Google

The overview that we will make in this paper about Google focuses on its trajectory developing artificial intelligence, to provide the reader the impression that the company has been working on the development of this technology since its inception, and not only in recent times, as many people believe.

From its modest beginnings in a garage in 1998, Google has transformed into one of the largest tech companies of the world. This remarkable trajectory is marked by continuous innovation, from the groundbreaking PageRank algorithm to the acquisition of YouTube and the development of the Android operating system. Google's ability to identify and capitalize on emerging technologies has further solidified its position as a global leader (Muo, 2023).

Artificial intelligence has been a priority for Google since their earliest days. For the 25th anniversary of the company, they published an article highlighting the ten biggest moments for their AI development.

The early applications of AI started in 2001, t when they implemented machine learning to suggest improved spellings for user queries. This was followed by the launch of Google Translate in 2006, leveraging machine learning for automatic language translation, fostering global communication (Google, 2023).

The years 2015 and 2016 are marked as a moment of democratization of the technology as well as the rise of its efficiency. That year, they released TensorFlow, an open-source machine learning framework, democratizing AI development by making it more accessible and scalable. In 2016, Tensor Processing Units (TPUs) were introduced. These custom-designed silicon chips significantly accelerated training and deployment of AI models, boosting efficiency (Google, 2023).

Deep Learning innovations appeared in 2016 and 2017. Google DeepMind's AlphaGo became the first AI program to defeat a human world champion in the complex game of Go. This victory exemplified the potential of deep learning in tackling intricate challenges. Another significant milestone occurred in 2017 with the introduction of the Transformer architecture by Google Research. This revolutionized language understanding by enabling machines to better grasp the context and relationships within sentences (Google, 2023).

Later on in 2019 and 2020, search and scientific advancements were introduced. BERT (Bidirectional Encoder Representations from Transformers) was presented and significantly improved Search's ability to comprehend user queries, leading to a more natural search experience. Google DeepMind achieved a scientific breakthrough in 2020 with AlphaFold. This system addressed the protein-folding problem, a longstanding challenge in biology with immense implications for disease treatment and understanding (Google, 2023).

The year 2023 was marked as a year that brought Generative AI accessible for Everyone. This year they presented Bard, a large language model built upon LaMDA, which facilitates collaboration with generative AI (Google, 2023). This year 2024, they presented the next-generation model called Gemini.

As mentioned before, the person interviewed form Google is a team member of the marketing team that works closely with the sustainability and climate change AI solutions developing teams. The data collection for this case was complemented with desk-research.

**Collectivity and Diversity**

As mentioned before, Google has been working in the development of artificial intelligence since their earliest days. We assumed beforehand that this only could have been possible through extensive and long-term collaboration of different teams composed by people from different backgrounds. The idea that collaboration and diversity is part of the essence that made google big is present in different media papers and articles, as an example:

> *"Google's success is not solely attributed to its iconic perks but is rooted in a purposeful mission, transparent communication, and a commitment to hiring the best. This blueprint serves as a guide for companies aspiring to build a culture of innovation, where employees are not just contributors but integral parts of a collective mission"* (Medium, 2023).

Again the idea of a collective mission with common goals appears as indicated by the literature that stresses that it is not only about common interests but common goals that make collaborative solutions innovative and change makers (Wolff, T., 2009).

We got the opportunity to interview the Google Marketing Manager focused on sustainability and working closely with the AI team that is integrating AI into the areas of climate change and sustainability. Starting from the point that a marketing team member was working closely to AI developers gave as the clue that collaboration is indeed at the heart of google. Not to our surprise, the interaction appears as a normal and key factor of the AI solutions created.

> "*So I would say it's very cross-functional (...) There is this interaction with teams, with people with different expertise, and with different backgrounds. And how can we work until… Yeah, I think in general, the teams that are developing AI are teams that are engineers, like scientists, and have a more technical background"* (Interview with PG, 2024, p. 2).

At the same time, diversity appears as the idea of the interaction between people from different backgrounds. We know that an important aspect of the collaboration between sectors, actors, and partners is the diversity of their profiles and cultures, that bring different and specific skills towards the common goal (Vale, A., 2009, p. 8). But it seems that such a culture of innovation can't be reached only with that. Simply having a diverse workforce isn't enough. The initiatives promoted by Google go beyond just representation to tackle the underlying reasons why exclusion happens. By prioritizing solutions designed with people in mind and cultivating a culture that embraces inclusion, Google strives to create a workplace that's fair and equitable, where everyone feels valued for their unique perspective and truly belongs (Mainwaring, S., 2021). And as also stated by the literature, mutual recognition of the benefits that each partner can bring and share is a factor that fosters innovation (Vale, A., 2009, p. 8).

Google's artificial intelligence initiatives that aim to innovate frequently involve the interaction of partnerships with governments, cities, and other external organizations, facilitating tailored solutions that address specific local challenges. For example, the Marketing Manager (PG) mentioned the importance of partnership for the development Project Green Light, an initiative that aims to help cities reduce emissions by optimizing traffic lights, helping mitigate climate change and improving urban mobility (Google, 2024).

> *"this started more with a research team developing this model, leveraging the data that we have from google maps, then to really improve these, we had to work with partners like cities, governments, and within deploying these, many teams were involved. So it wasn't just these, again, research teams, but as I said, other teams like our partnerships team, our policy team. (...), but even if the development of these models might start with more of a research team, then to bring these to life, we really need to work with other internal teams, but also, again, this external partner"* (Interview with PG, 2024, p. 3).

According to the literature, integrating diverse perspectives through partnerships across public, private, and civil society sectors is vital to create solutions that no single sector could achieve alone. These partnerships, described as "collective change interventions" by Künkel (2005), address complex challenges and foster sustainable development and innovation. Successful partnerships are driven by shared values and require commitment, open communication, creativity, courage, perseverance, accountability, and co-leadership capabilities from all partners.

The role of AI in this context could not be seen primarily as the facilitator or key driver of the collaboration and diversity that, according to the literature, leads to a social innovation. It seems that the collaboration and partnership between Google, cities and governments, together with the decision of creating inclusive working environments, are values driven by the people that lead these initiatives. However, the case of Google could open some interesting questions. Is it not Project Green Light and the collaboration between Google and different stakeholders to pilot the project, in some way possible thanks to what Google Maps and its technology was able to bring up?

Isn't the collaboration to drive Project Green Light a result of what Google Maps technology offered? In other words, to what extent has Google Maps technology fostered Google, cities, and governments to collaborate around the Green Light Project, that will bring the reduction of emissions?

AI is essential for enhancing Google Maps: thanks to AI, Google Maps can predict traffic patterns, suggest alternative routes, and offer personalized recommendations based on user preferences Singh, P. (2024). And this is data leveraged by Google for developing Project Green Light (Interview with PG, 2024, p. 3). The collaboration around Project Green Light is driven by people. But at some point, AI enables collaboration around a project as positive and useful for cities and the environment as Project Green Light.

We consider these to be thoughts and questions to consider, looking toward the future. Increasingly developed technologies will open up previously unthinkable opportunities, encouraging different parties and stakeholders to collaborate in pursuit of the same innovative objective. In such a scenario, would artificial intelligence not have a major role in influencing the process dimension of social innovations? Would artificial intelligence not play a key role in fostering collaboration that leads to social innovation?

**Social Value Creation**

Google has its own department that deals with artificial intelligence for social good. The team consists of people from various specialist areas who are working together to create a better world. Two areas in which this initiative is particularly interesting are basic research in the field of AI for new algorithms and techniques for social purposes and the development of AI applications to solve specific problems to make everyday life easier for different people (Interview with PG, 2024, p.1-2).

The range of initiatives of Google AI for Social Good is extensive and includes many different initiatives like an app to empower health workers in Kenya, a model to forecast floods, an app to help people with non-standard speech be better understand, a wildfire boundary tracker to provide better information to the affected communities and fire authorities, the already mentioned project Green Light, among others (Google, 2024).

As explained in our literature review, concerning the we observed that scholars predominantly use the term "social good" when referring to creation of social value through initiatives that involve artificial intelligence. The area of artificial intelligence for social good is a relatively new field emerging from technological advancements, with some research already done on the subject that can make us understand a little more about what it is about. Chui, M. et al (2018) explain that artificial intelligence, making use of its different capabilities ((e.g. natural language processing, image and video classification, speech to text, etc.) is already being employed by scientists and researchers in different projects that have an impact on social challenges as could be climate science or curing cancer. The application of AI to address social challenges potentially could help hundreds of millions of people worldwide in the future.

Unlike the other cases, it can be seen that at Google there is a determined ambition to generate a concrete and massive impact on society by improving critical areas such as health, poverty, education, etc.: *"Google's goal overall is to make AI helpful for everyone to improve their lives as many people as possible"* (Interview with PG, 2024, p.1).

Investigating the literature about AI for social good, we can see that the value created within the field of "AI for Social Good" is mostly linked to the possibility of managing large amounts of data in order to make decisions that benefit society.

> *"Given the advances and adoptions of AI and big data technologies, it is possible to collect complex, heterogeneous, high-resolution environmental data, and process them via AI models for estimating and predicting environmental qualities, such as air quality, and for enabling the generation of personalized alert and advice to improve the health and well-being of individual citizens and facilitate relevant decision-making"* (Li, V. O., Lam, J. C., & Cui, J., 2021, p.1).

In this way, analyzing the social output of Google initiatives from the perspective of the concept of social value could be assertive, as measuring results could be a possibility. As stated in the literature, when discussing social value, we typically refer to creating measurable benefits for local communities, the environment, and other external stakeholders while also achieving financial returns and profits for the company. It is therefore about quantifiable value rather than solely focusing on abstract or unmeasured impacts (Salls, 2005; Khalifa, 2020).

And in artificial intelligence for Social Good this is already happening.Cowls, J. et al (2021) argue that the UN Sustainable Development Goals (SDGs) offer a helpful framework for measuring the positive impact of artificial intelligence for Social Good (AI4SG) initiatives.These globally agreed goals could offer a straightforward definition of social good, simplifying the task of measuring and evaluating the social outcomes of projects harnessing the potential of artificial intelligence. Bringing the two together, the so called “AI4SG” and the UN Sustainable Development Goals, could exploit existing measures of progress to help us understand where AI initiatives can most effectively contribute and to identify where they should be deployed to promote a more just and sustainable world (p. 2).

Reflecting on the role of AI in the creation of social value in the case of Google, we could say that in this case technological advances are of great influence for social innovation. Again, there are teams, partnerships and collaboration of people that boost the innovations. But in the case of Google, we are talking about social outputs only possible to the power of the AI and its possibility to process big amounts of data. We observe that by using AI to analyze large amounts of data to create a beneficial social output, technology is the one that plays a key role in the social value created.

**Significance**

For a social innovation to be labeled as such, it should have a significance (Logue, 2019). In the following, we take a look at Google's initiatives and the contribution they make to society. Gogorza summarized the importance of Google's "AI for Social Good" initiative in one sentence:

*“Google’s goal overall is to make AI helpful for everyone to improve their lives as many people as possible”* (Interview with PG, 2024, p.1).

Google itself states its focus on the responsible use of artificial intelligence to improve the quality of life of people around the world, demonstrating its commitment to social change (Google AI, 2024), which Logue (2009) argues is crucial to the significance of social innovation.

The Google AI for social good initiative is committed to making a positive social impact in a range of different areas. Google is a large company that has been exploring the use of artificial intelligence for social purposes for around 6 years now; in 2018, the company provided 25 Mio. $ in funding (Candid, 2018). We can therefore speak of a large-scale change that is being pursued.

Of course, Google also uses its ideas as pilot projects, as in the case of "Project Green Light", and therefore tends to proceed incrementally (Interview with PG, 2024, p.2-3; Google, 2024; Tracy, 2024).

> *"And we started doing pilots. So right now, the Green Light is live in 12 cities. But yeah, it started a few cities in Europe, such as Hamburg. So we really had to, again, pilot these in different cities and not just in Europe, but we've been trying to also deploy it across different regions because we know that the challenges are so different. For example, in Africa or Latin America"* (Interview with PG, 2024, p.3).

According to Campbell (2004), incremental change is required to bring about significant long-term and large-scale change over time in order to achieve relevance.

Another of the areas in which Google uses its AI is the prediction of forest fires, with the aim of making a significant contribution by providing real-time information so that communities and governments can respond effectively (Interview with PG, 2024, p.4; Google, 2024; The Power Of AI in Wildfire Prediction And Prevention, 2023). The goal is to bring about comprehensive change that addresses deep-seated problems and requires adjustments within the political system and its practices (McCannon et al., 2017; Keller & Schaninger, 2019).

We have highlighted two projects here as examples of the importance of social innovation. However, the number of projects that Google supports with its initiative shows us the great meaning that this has created (Tambe, 2021).

The Google initiative "AI for social good" is a kind of accelerator for positive social impact that helps non-profit organizations, academic institutions and social enterprises that seek social good around the world to accelerate their mission with the help of artificial intelligence. The resources that Google makes available to these organizations help them to achieve their goals faster and easier - but does not take over the task completely.

**Change on Social Practices and Behavior**

In the following, we will analyze the impact of the initiative on change in social practices and behavior, which, according to Logue (2019), is essential as a result for social innovation.

With the aforementioned wildfire prediction project, Google is helping those affected, according to the interviewee: *"We can basically send them these notifications and predict how the fire is going to develop, so they're obviously safe"* (Interview with PG, 2024, p.4). This enables the people affected by the fire to react better to the danger and changes their behavior. This social innovation also leads to a more effective solution compared to the existing one, which in turn leads to acceptance and ensures that nothing stands in the way of implementation (Hochgerner, 2012).

The interviewee mentions how Google's implementation of artificial intelligence in "Google Maps" uses indirect methods to get users to change their behavior. Navigation users are shown a route that is supposed to save fuel, thus encouraging them to change their behavior (Google Interview, p.4; Plowman, 2024). This seemingly small feature shows how artificial intelligence can influence the behavior of individuals, which is consistent with McKelvey and Zaring's (2018) idea that social innovations can have system-changing effects by shifting both perceptions and behaviors.

Although artificial intelligence helps to change people's behavior, it is only a support for the task that organizations have already set themselves before the introduction of AI.

# 5. Discussion

With the aim of providing a new perspective to answer the research question, we would like to use Bruno Latour to briefly discuss a statement that we heard in the interviews and that is also frequently found in the literature, namely that artificial intelligence can only be seen as a tool (The Newsroom Interview; Auticon Interview; Laher, 2023; Botha, 2021; Condon, 2018).

By definition, "a tool is also anything that helps you do something you want to do" (Cambridge Dictionary, 2024). According to this description, artificial intelligence fulfills this purpose by expanding human capabilities and thus making various tasks easier and more efficient, which in our case corresponds to the implementation of the characteristics of social innovation through artificial intelligence. From a fundamental point of view, AI is simply a tool. As announced, however, we want to look at this statement through Latour's eyes.

The actor-network theory (ANT) presented by Latour (2005) does not see social phenomena as something that arises between people, but emphasizes the participation of non-human entities. We consider the AI in this equation as the non-human entity. Accordingly artificial intelligence is not just a passive instrument, but an active player when it comes to influencing and shaping social actions. The influence of AI is therefore not limited to functional use, as the traditional definition of a tool suggests, but has the ability to promote collaboration, create social value, promote significance and change behavior and social practices. However, it is important to mention that a non-human and a human actor should never be equated (Venturini, 2023). And as Venturini (2023) nicely summarizes in his work "Bruno Latour and Artificial Intelligence": "That's the whole interest of technologies: because they are different from humans, they can deal with the same tasks in ways that are different and sometimes more efficient (p.105).

We will now move on to the conclusion and want the reader to be aware that there is much more to the term "tool" than its traditional meaning.

# 6. Conclusion

To answer our research question: *"How do artificial intelligence (AI) applications contribute to social innovation?"*, this paper examined three different settings in which artificial intelligence is used to promote social innovation: Auticon, The Newsroom and Google. The cases all have one thing in common: they demonstrate how AI can drive social innovation in different ways.

In the case of **Auticon**, we examined the use of AI within the company because, unlike the other two examples, it is not anchored in the core of the company but is used internally to support the mission. The integration of AI aids in the employment and social inclusion of neurodiverse individuals. Through the use of artificial intelligence, biases can be reduced and efficiencies enhanced, increasing opportunities for meaningful employment among those with autism. Even though AI significantly enhances these efforts, the company's fundamental mission of creating social value predates and transcends its AI initiatives, **demonstrating that AI is more of a tool than a primary catalyst for social change**.

**The Newsroom** integrates AI to enhance journalism by combating misinformation and disinformation. Here, AI plays a crucial role in facilitating changes in social practices and behaviors by fostering engagement among journalists and readers. This case exemplifies how **AI can be central to the value proposition of a**

**social innovation project**, yet it is the entrepreneurs and their innovative approaches that drive the initiative forward.

**Google** employs AI in various projects like Project Green Light, which aims to reduce traffic emissions. AI in this context significantly enhances collaboration and social innovation by providing critical data and insights. While human teams and partnerships are essential drivers of these innovations, **AI's ability to process and analyze vast amounts of data is key to achieving impactful social outcomes**.

Across all cases, **AI proves to be a powerful enabler of social innovation**, enhancing the ability to create social value, foster collaboration, and drive significant social impact. However, it is important to recognize that **AI itself is not the sole driver of social innovation**. The technology supports and amplifies the efforts of organizations and individuals committed to social change.

This study's findings highlight the diverse roles AI can play in social innovation. AI can act as a tool that supports and enhances existing social initiatives, facilitate large-scale innovations, and drive significant transformations in social practices and behaviors. The integration of AI in social innovation projects can lead to profound societal changes, but the success of these initiatives ultimately relies on the vision, creativity, and dedication of the people behind them.

In conclusion, while AI is a valuable tool for advancing social innovation, its effectiveness **depends on how it is applied and integrated into broader social efforts**. The potential of AI to contribute to social good is immense, but it requires thoughtful implementation and a collaborative approach to realize its full impact. This research provides a foundation for understanding the relationship between AI and social innovation and offers insights for future initiatives aimed at leveraging AI for social good.

# 7. Perspectivation

In this section, and after concluding the findings of our research, we aim to reflect on different perspectives regarding the reliability and validity of it. We want to assure the reader that we worked hard for a close alignment between our research question, design, methodology, and execution.

Let's begin by examining the case selection process. This process prioritized two key factors: active artificial intelligence integration and accessibility. Initially, we identified organizations and projects demonstrably using AI for social innovation. Following this initial research, we established criteria

based on the feasibility of contacting them, securing a response, and ensuring our own research interests.

We are aware that each case study (Auticon, The Newsroom and Google) exemplifies a distinct facet of AI's application and impact. We acknowledge that in research that strictly follows a multi case study method, this could awake concerns about validation. In the methodology section, we detail the interpretivist and adapted case study approach we employed, specifically addressing potential validation concerns in multi-case studies. Furthermore, we think that this inclusion of cases with different characteristics enriches our paper. We prioritize a holistic approach that welcomes varied perspectives and characteristics, rather than confining ourselves to homogenous cases and seeking replication for generalization. We firmly believe this diversity enhances the richness of our findings, offering valuable insights into the complex interplay between AI and social innovation.

According to Yin (2002), external validity is concerned with whether the questions of the study can be generalized beyond the immediate case of study. We acknowledge that the chosen case studies represent specific implementations of AI in social innovation projects. While this focus provides a rich understanding of these unique contexts, it limits the generalizability of the findings. We also acknowledge that our sample size, with only few interviews conducted within each case, further restricts the ability to broadly generalize the results.

However, while generalizations are limited, the exploration of these specific cases could be relevant for people or teams working or intending to work on similar AI-driven social innovation projects. The insights of our research could also serve as a starting point for further research.

Bryman (2012) explains that the reliability of a study depends on consistent results, meaning that similar findings should be obtained if the experiment is repeated with a different sample or at a different time. Researchers should be aware that during the process of data collection, recording, and analysis, their subjective interpretation is involved. To mitigate this and improve consistency, we employed transparent coding practices, categorizing and systematizing the collected data based on the concepts and theories that emerged from our literature review. We also developed the semi-structured interview guide to ensure consistency between interviews. This is detailed in our analysis strategy section. This guide provided us with a framework for the interviews and at the same time allowed us to maintain some flexibility to accommodate spontaneous exchanges with interviewees outside of what was previously planned. Our analysis strategy was based on a comprehensive review of the literature on social innovations. This review allowed us to identify key aspects or characteristics that define social innovation, both in terms of process and result.

By employing a thematic analysis framework specifically tailored to address these key aspects individually, we ensured a consistent and robust analysis across all cases. This allowed us to observe precisely how AI contributed to each distinct facet of social innovation. We posit that even though we prioritized a wide scope of generating broader appreciations on how artificial intelligence is contributing to different social innovation projects, our analysis provides a solid foundation for understanding the relationship between AI and social innovation projects, as it provides a comprehensive overview of the role of AI in each of the key characteristics and aspects of social innovations.

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# 9. Appendix

## Interview with Aleksander Oleszkiewicz from Auticon

BN:
First, we're going to introduce ourselves.
My name is Bill.
I'm originally from Munich, Germany.
And I'm studying together with Juan Denmark, our master degree in social entrepreneurship and management.
And yeah, this interview is part of our master thesis about the use of artificial intelligence for social good, social innovation.
And especially about whether these project is really applying social innovation or the real goal of this project is social innovation.
So maybe as your part of the introduction, could you tell us something about out-icon, what they do and what your position is?

AO:
Sure.
Yeah, auticon was established like a dozen years ago in Munich, Germany actually.
So in your hometown by a person who has an autistic child.
And the founder noticed that the kid had problems in finding the job, keeping the job and there are other autistic people who have similar problems.
And the main purpose creating the company was to make a workspace which will be friendly for people on the autism spectrum who will support them in getting skills that are necessary for being self-sufficient and be able to take care of themselves.
And then to actually promote their unique skills and abilities to other companies.
So we started as a kind of services company delivering services of autistic people who worked along neurotypical employees showing how to work with them, how to make best use of data.
And over time, this evolved into also another social mission which is to educate.
So we have a lot of activities related to spreading the knowledge about building a workspace that is friendly.
Now not only for autistic people but in more general for people who are neurodivergent, this includes ADHD, dyspraxia, dyslexia and other developmental differences in the neurological, let's say, part of the person.
They all have some specific or different ways of communicating, processing the information, the information, working with others which are not always very well suited into workplace or environment which was designed for the majority of people who what we call our neurotypical who are, let's say, the standard we can say.
My role in this organization, I just started couple of months ago, but my role, you know, over time we evolved into a holding of 15 out of companies across the world.
We are operating in 15 countries and those companies are pretty much working as a standalone entities.

So we of course have the same mission, the same purpose, the same goals, but they are operating independently in every country.
One of my goals is to start building some integration platform for our entities, for our consultants to work together across those countries to share the knowledge, to collaborate on projects, to build some new products that we will be able to push to the market.
And also to facilitate our internal communication.
So, you know, that's like an innovation lab, both for products that we will be offering to the market, but also for our internal way of working.

BN:
Okay, very interesting.
And so, more specifically now, what can you tell us something about the projects where artificial intelligence is being used?
I think you told Juan already that there is only one use case and others you're working on, but maybe you have something to tell us.

AO:
Yes, or, you know, as I started to work, I made an inventory of what was happening across those 15 countries.
And of course people are creative people are looking for new solutions.
And we are using artificial intelligence in one of our countries to help with matching of candidates with the job, job posts or job, you know, descriptions.
One of the challenges of autistic people is that they kind of struggle to define what is really important, how to, you know, understand or interpret the requirements in the job description.
And so, one side of this solution is actually taking the job description for our clients and analyzing this using AI to identify what are the true heart and soft skills required to fulfill this role.
And then on the other end of the communication, when we are getting resumes of our consultants, they are often listing a lot of things that they did in the past.
But they again, they struggle to adjust those resumes to specific job descriptions.
So they are not very well tailored.
So what we are doing with this system is actually to again extract their key skills and then match it to those job descriptions.
So in the database, we can find out who are the top five or top 10 consultants who are most likely be a good fit for a specific job requisition.
And this is working pretty well.
We were trying different approaches with some tests, like cognitive skills, testing and things like that, but they were not always very predictable in terms of how people will be performing on the job in the future.
While with this approach where we really collect the history of the person and then try to adjust it through a system to specific job requirements, this is showing us very good results so far.
So this is the current thing that we already use.
Going forward, we are thinking about maybe some new products, some other use cases, like in Auticon, every consultant is having an assigned job coach, a person who is helping them with navigating the job or work environment, communicating with others, understanding the quality of the job.
Understanding the own limitations, their strengths, their weaknesses.

So we try to support people in the organization, but also we see that many of the challenges that are reported to those job coaches are very repeatable.
So sometimes someone doesn't understand someone said something using some, you know, not straight language and then for autistic people, it's sometimes difficult to make the right interpretation what they really want from them.
So again, one of the ideas we have and we probably will be willing to evaluate is if this would be possible to support the work of job coaches with some AI tools, like a chat, which will let consultants ask their questions and maybe give them some first level of of explanation or estimation about the policies about what it might need, you know, how to set the goals.
There are a lot of things that might be helpful and then the job coach is still, you know, I think we need humans to work with that, but we already have, you know, some prepared ideas how to deal with the specific situation.
There are job coaches are not psychologists, they have some background in coaching, mentoring, but they are not experts in the field.
So if the consultant is struggling with some more technical or more specific elements, they still need to help and then AI could be a kind of a tool which will help them guide the consultant in the right direction.
So I think it's very interesting.

BN:
Thank you for this insight.
I think we can work with this already, but we need to dig a little deeper now specifically to this project.
So I'm going to start with the questions.
So first to do to the collectivity a little bit to understand it.
Can you can you describe the development process of this AI solution you're already working with?

AO:
Yeah, this was developed internally by our consultants and this was like, I don't know how to best call it, volunteer activities.
So, you know, we have our consultants are assigned to projects and they work for customers, but then when the project is finished, they are, let's say, on the bench, yeah, they, they, so they don't have, there are moments in time when they are not on the customer project.
So basically we try to use this time for internal for development of internal tools or improvements in the company or products that we can later sell to the market.
So this was like, you know, a little bit of an ad hoc teams, there was one person leading this from the, you know, through the long term, but the actual development and contributions this was done by, by many people, it's, I would, you know, it's not a real open source, but the similar approach yet that there is an idea, there is a goal that we want to achieve.
And then people who have time, who have skills, who want to contribute, they just come in and they may be solve one problem or develop one module, so they do some parts of the work.
So it was not, it was not a formal project like with this, you know, steady team and committee and the kind of steering committees or things like that, it was all done by the way of our, of our daily jobs.

BN:
Okay.
And can you tell us something about the key stakeholders that were involved in this process?

AO:
You know, the key stakeholders are, you know, as I said, we use this internally. So one that's part of our business model that we work with companies and we look what they need, what skills they need, what, what kind of employees they are looking for.
And then we try to find the right consultants who will be able to fulfill those jobs.
So this is basically, you know, the core of our organization operations.
And of course, in some countries, this is more important in others.
This is less important because they are different ways of working.
But in that case, we have a database of like few hundred consultants who are willing to work with us and are ready to jump on projects.
Not all of them are employed.
It's also people from, you know, from like talent database that that we are holding.
And there is a person responsible for, you know, fulfilling their requisitions from customers.
So it's, you know, it's not a project manager, but it's like a resource manager person who is basically working on sourcing those, those requirements that are coming from, from our customers.
So that's directly, let's say our, I would say, you know, sales, but it's not really selling, but rather matching people to the right, to the right jobs.
So that's the key stakeholder.
But of course, then when you think about this, that's also beneficial for consultants because they are getting better jobs and they are better aligned with the requirements.
And it's beneficial for our customers who are getting people who can really deliver what they need.

BN:
So yeah, I think you already answered this question just to repeat it and to understand it. Because how did you ensure that these diverse perspectives were considered, but you already told us that different people like from the customer side and from the workers or consultants were involved and so that everybody had to say something about how you can implement this solution or to make it better.

AO:
That's correct.
And that's also not something what was done, completed and just, you know, forgotten.
I mean, in terms of the development, this is still evolving.
So as we see that something is working particularly well, we try to, you know, extend it to other parts of the solution.
We see something is not well aligned.
We need to make some changes.
This is all happening.
So it's a, it's a living solution that is just supporting our daily business.

BN:

Very interesting.
And yeah, so would you say this process that establish new ways for stakeholders to collaborate to the social issue or yeah.

AO:
I think it might be way more efficient in this collaboration because we did. I mean, it was not a new process.
We were doing this before the tool was created, but it was very manual and very difficult sometimes to scan through like hundreds of of CDs and make sure that we grasp the right skills, the right, you know, experience, the right knowledge of those of those people.
And then when a new job description was coming, you know, to find out or make sure that we really evaluate this in the proper way.
So now this is automated and it's, it's more efficient on the other hand, we started this as a project in one country, but we now see that we might want to roll it out to other countries as well.
It will, it is you know, getting interest from from other people doing similar types of tasks that we can maybe, you know, expand the reach and also help them with their work.

BN:
Yeah, so I think the next category would be diversity, but it's again about the mix of expertise that was involved in this process, but you already told us.
And again, it's a, so I'm going to jump to the next one, which is source.
So the question would be what motivated the development of this project.

AO:
You know, this was our internal need.
I mean, we, as I said, we see, we see the challenge with the amount of data to analyze.
We have consultants who are very skilled with those kind of, let's say tasks and projects.
And we wanted to enable the innovation mechanism in the organization.
So basically, we were asking actively if someone see something, what will make out to come more efficient if they see some areas for improvement and they have ideas how this can be improved technology.
And this came as one of those ideas from, from the employees that they think they can automate and improve this, this process.
So it was driven by individual person, basically, or more than one, but you know, the idea that this can be done came from an individual, but of course, you know, it was quickly grasped by all of those stakeholders who then were benefiting and were willing to invest time.
And some resources into the development.
It's kind of a mixture between individual and organizational kind of organization is creating the environment and encouraging this kind of activities.
And you know, I'm getting every every week or every two weeks, some ideas from different parts of the world from our consultants about what can be improved, not all relate or actually majority not related to pay.
But we are looking actively for those kind of ideas and we then evaluate them and try to help people to at least build a prototype or pilot and then see if something is really beneficial or not.

BN:
It's kind of repetitive again, but the origin of this initiative was then like just within the structure of the organization, like you asked the different consultants and job coaches and stuff and they told you this would be an amazing thing to do.

AO:
Yeah, the need came internally for sure.

BN:
Okay, so I'm going to jump to the next category, which would be a little bit of the output dimension, especially the social value and tenant benefit.
So what would you say is the social issue your AI solution is addressing?

AO:
Yeah, so this a little bit gets to what I already said in terms of this, you know, communication skills of people on the autism that they communicate differently, they read things very literally.
So if in the job description, it is written that you have some good coding skills in Java, let's say many, even if they know how to code in Java, they said, oh, I'm not good.
I'm not very good.
I don't I'm not a master.
Even though you can realize that they are much better than 70% of other people who are coding in Java.
So we are trying to build something what is kind of separating their own bias or interpretation from the actual needs of the customer and the actual skills.
So if we see in the resume that they already completed several projects using specific technology and the customer is requesting one, two years experience, then we know it's a good match.
Even if the specific word, maybe they personally would treat it.
No, I'm not yet there.
I don't fulfill all of the criteria.
So I would rather not not apply.
And that's that's a very common scenario that people are not even applying, not, you know, then getting hired is the next stage, which we try to support.
But those are no like job coaches and in different tools.
But here we just want to make sure that their skills are really recognized and properly evaluated.
So they don't downplay their own experience.
And what would you say, how does this project improve the social outcomes for the target population?
You know, I don't have any specific metrics.
As I said, I just joined two months ago and I'm still pretty new in the company.
I'm gathering the information.
The thing is that depending on the country and depending on the research, but among people who are, you know, who have diagnosed who are diagnosed with autism.
That's sometimes from two to 20% of them only are employed.
So there is a huge group of people on the autism spectrum who cannot even find find their jobs.

As I said, in some countries, it's like 98% in some countries.
It's maybe 70%.
But they have good skills.
They have good experience.
They pick very good education, very good results.
But then when it comes to the actual job market, they are diametrically a lot.
So we try to be kind of intermediary.
It's difficult to say how this particular tool improved the whole process.
But you know, like in the US, we have a few dozen of people hired and on the projects who didn't have those jobs before.
So, you know, it's a very difficult thing to measure.
But you know, we try to think this through the lens of how many people are getting jobs through us.
And globally, it's around 600 people right now, you know, are consultants who are placed into different roles and jobs through Auticon.
And of course, I wouldn't say that all of them would not have jobs otherwise.
But that's something what we see is helping.
We are putting them in the teams of our customers.
We are educating customers.
So this is also opening some doors in those organizations in the long term.
And this I tool is helping in general because it's like.
Yeah, as I said, it's very difficult to measure the specific aspect of the tool because it's just one part of the process here.
Helping people to get into the process actually.
But then of course the outcomes are not directly tied to the tool.

BN:
I think you already explained.
And the scale of all the corners big with that 15 countries.
So would you say it's a large scale system systematic change.
How would you label it?

AO:
I think it will.
I mean, it has a potential to become one.
As I said, we started in one country, which is now using this tool.
The other countries are now evaluating the idea of how this can be incorporated into day processes.
So I think right now it's, you know, one 15th of our business, but it has potential to grow into into other parts of the world as well.

BN:
And do you know if, if Auticon is planning to give this tool to other to the world like to outside of the company?

AO:
Yeah, that's something we are always considering with our internal projects.

I don't have yet any plans like that, but that's one of the things we will be considering for this tool as well.
It will require a very different approach because it will then become more like an applicant tracking system for incoming applications, maybe.
That's possible.
On the other hand, there are plenty of tools that are helping with applicant tracking on the market.
And it would be difficult to build an end to end solution.
So maybe we will treat it as a plugin to existing tools to just support this particular.
You know, part of the process and hiring of people with different neural types, but not right now, maybe in the future.

BN:
And now the last category would be like behavior change.
How do you think does your AI solution influence people's behavior?

AO:
You know, I think it is helping a lot with bias related to hiring autistic people.
I mean from the from our customers point of view, yeah, that they were sometimes getting resumes or CVs, which they would reject based on the standard, let's say, approach.
And now they realize that with this tool and with our support, they can spot those places which are significant to their needs.
And I highlighting that this person is actually a good fit.
So this is helping with this understanding of how people communicate their skills, their experiences, how they make those interpretations.
And it's opening the eyes of companies that people on the outskirts spectrum can be very valued workers for them.
Even if, you know, sometimes the first impression, the way they write the CV doesn't look as good as they might have expected.
So they actually are also approaching the social issue differently because of this solution.

BN:
Yeah, I think the last question is again repetitive.
Yeah, I would say that's it with the questions.
I mean, when do you have something to add or ask?

JB:
No, I think that also we are on time.

I think it was super useful.

So thank you very much for your time.

AO:
Yeah, if you will have any follow-up questions, send me an email.
Maybe this will be easier to just approach this between other tasks.
But yeah, sure.
I wish you good luck.

That's an interesting work you are doing.

BN:
Yeah, thank you very much.

JB
Thank you very much.Have a good day.

AO:
Bye.

# Interview with Jenny Romano from The Newsroom

**JENNY:**

I'm Jenny, I'm one of the 2  founders of the Newsroom Italian-based in Portugal, Lisbon and the Newsroom is a Portuguese startup that's working in the area of AI applied to the media industry. We started back in December 2020 by looking exclusively at the area of misinformation and so how could AI help contrast misinformation and inaccurate information generally. We then started exploring the area of context and bringing plurality to the news. And so when I'm reading about a topic, I don't know, Iran, Israel as of yesterday, what are different perspectives on the topic?

And so basically the whole idea moved from exclusively looking at misinformation to looking at shelter bubbles as well. So how can we bring the plurality to media consumption?

We started back in 2020 initially with exclusively a B2C value proposition. So we were working directly with users, so giving users plural information with different perspectives, etc.

As of the second half of last, well, more the end of last year, we started actually working with media companies. And so basically supporting their journalists when they are doing research, when they are fact checking the pieces that they're writing, etc. using AI to accelerate those processes.

In a nutshell, that's me.And then you have a lot of questions. I honestly didn't have a chance to look at them, all of them, but let's see if I can improvise and answer them.

**JUAN:**

Yeah, don't worry, don't worry, it's going to be useful anyways. But could you provide us an example, please, of how it works? Because right now, okay, first of all, with customers, then with journalists, but like a simple example to understand how it works.

**JENNY:**

So on the back, it works like this. So that's how you're reading about, reading good writing about Iran-Israel. We do, the first thing we do is identify who is talking about a certain topic, Iran-Israel. And so we build a group, we identify a group of articles that are about the same topics. Okay?

They're all talking about this. Then, once we have clustered them, we group them, we break them into pieces to compare them. And so basically, at a single sentence level, what are the areas that these 50 articles agree on, and what are the things they disagree on? Okay?

In a nutshell, that's what the technology does. So it basically does cross-referencing that scale.

In the same way, you would do if you wanted to get informed about Israel-Iran, you would read probably something from the BBC, then something from Pub-News, then something from the Atlantic, etc., etc.

Across the spectrum. And then you would form your own opinion based like, okay, I think this is the gist of it, and this is my interpretation of it. That's how the technology works in the back. For users or for readers, this was doing exactly this.

So giving you a summary and then the consensus areas and the different perspectives. And everything was delivered, it's delivered through a mobile app.

For journalists, there is a platform on which they log into. And they have basically an overview of what happened over the past 24 hours, who has written about what were the main events, and that's analysis of consensus and perspectives to allow them to streamline research and writing.

And the research and the editorial, so deciding what to write about when they're writing a new piece.

**JUAN:**
And I have to pay, for example, if I am a user or reader, I need to pay, or I can download the…

**JENNY:**
So right now the app is free. We do have membership plan that is in our roadmap. It is not there yet, and for journalists, yes. Normally we work directly with the publication and then they give access to their journalists.

**JUAN:**
Okay, great.

We would like to focus in the first part of the interview on the process dimension of this initiative that you have, meaning that we would like, for example, first want to know if you can describe the development process of this solution that you have.
Like how was the first development of it?Yes.

**JENNY:**

So the first part of the development was a lot of interviews.

So speaking with...I mean initially with readers and then with journalists around what frustrated them about the current news assessment, what were pain points, what they wished, what they wished existed, etc.

It was actually pretty interesting for us because in the beginning when we focused exclusively on this information there was a lot of interest from users, as in O yeah! that is so needed, oh my god, it's so necessary, etc.

But then when we had a solution that was exclusively geared for misinformation, people wouldn't actually use it.

And we then went back and interviewed again and there was something quite interesting for me, which is that everybody said it was needed, but it was not them who needed it. It was always somebody else. And so yes, misinformation is a huge problem, but I am not the issue. My mom, my neighbor, my cousin doesn't actually know how to interpret the news, but I can.

And so the problem with that was that that's not how you got the product. You can't build a business on this. And there was a pretty interesting learning for us in terms of validation.

But people saying yes, this is necessary, isn't really enough to tell you that it is actually.

And so we started from there and then a lot of it, a lot of the iterations went through rounds of interviews and understanding what was going well in terms of the product analytics, what people were using, what they weren't.

So we set up the initial product, we killed it, we went back to interviewing people. And then on the basis of the feedback that they gave us, we went tweaking the app. And now we're doing very much the same thing on the B2B side.

So we had an initial pilot with a publication in the UK. They were actually starting to use the platform tomorrow morning. And we were starting.

So we had an initial quite manual pilot in which they were using our tech, but there was quite a bit of manual intervention on our end. In the meantime, we agreed to do a pilot together.

And so they were paying for the pilot and so on and on. It will start using it.

**JUAN:**

I want to ask any other stakeholder was involved in this because you mentioned like in the development of this solution. You mentioned the people that you are interviewing, you, your team, but can you further develop the different, like trying to identify the different stakeholders that were part of this development from the beginning?

**JENNY:**

So final users.

Yes.

Use publications.

I work team with the different functions. So the tech side, the business side, etc.

We had a couple of partners along the way, not necessarily on the specifics of the product, but on defining what the impact thesis would be, what the AI needed to look like.

And so there were a couple of other stakeholders that informed the way we built the product, namely in the first phase of product development.

We actually partnered with Meta on explainable AI and we had a program with Google as well.

And so even though they didn't have a direct say into the product, we still, we still interacted with them on explainable AI, product design, etc. which did inform how we, how we ended up creating the product. So I would say that's it.

**JUAN:**
Yeah.
So there was quite a diverse, diverse stakeholders that were involved.

Do you think that this diversity contribute at some point to the development of development of this app or the solution?

**JENNY:**

Yes, tottaly

**JUAN:**

What motivated the development of this project? You said that the beginning misinformation, but then where this idea came from?

**JENNY:**

It was it's really simple.

My co-founder and I were both working in tech. We're both quite frustrated with polarization and misinformation and we decided that we wanted to try and do something about it.

That's where it came about.Like I was working on monetizing media because I was in sales at Google and she was analyzing how people interact with content online because it was data scientists at LinkedIn.

So we have different but quite complementary points of view on the matter and we both cared about the problem and that's pretty much how it started.

**JUAN:**

That was an organization.

Like do you confirm how is the team structured or is it you and other collaborators?

**JENNY:**

So right now it is myself, my co-founder, Pedro, there is a full-time full-stock developer and then there are two people doing an internship with us. But like core team thats it. .

**JUAN:**

Great.

Now we would like to focus a little bit more on the output dimension that we have already talked about it. Meaning that for example if you want to talk about the social issue we already talked about with this misinformation that's what we are addressing.

How does your project improve social outcomes for the target population? Can you like better define by what we already talk about this I think. Like which is the this is bringing or what is exactly that you can identify as the value that you are creating?

**JENNY:**

A better informed society.  be it as in like affecting how they consume information. So the whole point of bringing you diverse perspectives and quite neutral information and start with, actually contributes to people engaging quite a bit more with it.

Because there are two issues here.

One is yes okay there is misinformation but there is generally a trust crisis in the news and people are very much disengaging from it. Especially younger generations just don't read newspapers anymore. Very very seldom.
I don't know if you do what actually be serious.

But like the way we deliver information is quite neutral in the beginning and quite plural so you always have multiple points of view.

And we had a very scrappy initial impact assessment which we basically interviewed a bunch of our users and asked them how they felt about the products whether they felt they had anything changed in the way they were informed by using the app.

And we had an overwhelming majority saying that through the app they felt they were engaging with points of view that they would otherwise not see or not engage with or normally dismiss. So on the **reading side** that's it.

On the **production side** you need tools to navigate the immense amount of information out there if you're a journalist as well as if you were a reader. And so by making that job easier by surfacing different perspectives faster etc etc we are contributing to a better information ecosystem on the production side.

So it's basically two sides of the same coin,  that they can't exist without the other.

**JUAN:**

And do you think that this or maybe it's not in the scope of your organization or maybe yes or maybe you think that this in the future could be like scaling up.

Do you think that this idea or this product could be in a long term extended to other parts of the world or to further or to do you think that this can grow in any way?

**JENNY:**

Yes. And yes otherwise otherwise I would not have started it totally.

I think both on the adoption side they can definitely grow and on board more users like be it on the on the reader side or on the on the journalist side.

On the other hand on the actual perspectives we bring because right now we mostly surface perspectives that are already in English. But the big limitation there is that if I'm talking about Argentina and I don't look at Argentina and media as plural as I can be I'm still not bringing the real Argentinian perspective into the mix.

And so we have trained our AI on six languages and Spanish in this case is one of them. However we do not surface original language media yet. And so in terms of international exchange in general scaling up it can ensure it happen both in terms of adoption and in terms of making the products more sophisticated.

min 18.10

It is in bring actually bring diversity.

**JUAN:**

Do you think that can happen soon or do you have any plan?

**JENNY:**

So as I said we have trained the AI on the six languages and we started with English on the output side now especially with the publisher relations. We actually started with the UK but we have a couple of more projects coming up from Portugal.

And so Portuguese because we are Portuguese company so this is where our network is. And so likely the first language and set of perspectives etc will go in is the Portuguese one and that should happen in the next two months. And from there definitely it is in the plans.

**JUAN:**

Great. Now it is about probably the same as before but in turning around the question meaning that do you think that this solution can influence on the people behavior?

Because now you are people that are reflecting on their behavior and they want to get more informed like I want to get less bias information or I am a journalist that want to see more clear through all information out there.

Do you think that through your initiative you can reach any kind of changing in the behavior of people?

**JENNY:**

So there is also something that we have asked people when we interviewed them to have a happy impact measurement and many of them I don't know the exact number but I think it was 73 or 74% of the ones we interviewed reported that they were more open to different perspectives and that reflected on the conversations they had be it at the pop with their friends or online.

So this exposure to perspectives that were not their own but that didn't make them feel judged or ostracized. So I don't know let's say you are a Democrat and I'm a Republican or by third time. You will consume your media I will consume my media and mostly I will think you are completely cruelist about the world and you will think that I am completely cruelist about the world.

However there is a fair bit that we probably agree on and there is a tiny bit of difference and by seeing that people reported higher openness to other perspectives and to having conversations with people that is agreed with. So I think it definitely can. The point there as always is the scale. So, how many people do you reach? and how does this propagate? and this is true on the consumer app as much as on the journalist app.

**JUAN:**

But these are you collected are from people that are users actually users of the app?

**JENNY:**
Yes

**JUAN:**

or it was okay. Okay. Super interesting.

**JENNY:**

So we basically took around the might some people that were using the app sent them an email and asked can we ask you a few questions. It was not very scientific.

**JUAN:**
No, it's okay but it's good to know that also it's maybe this was not from when you were like with that before you launch the project but not this is a 20 users.

**JENNY:**
No, I was after I think it was after eight months of usage.

**JUAN:**
And this how's the way that you're measuring like internally the success of like the success of your project? because or.. the impact if we can call impact or the influence if we can call influence there's a anyway you're measuring through interviews through surveys to the customers or there's any other factor that you consider?

**JENNY:**

So I mean usage engagement and time on app are obviously things we measure.

One of the things that came up a lot in the interviews we carried out was the engagement with the different perspectives on the app. And so we built analytics within the app to test that. And so we now are able to say okay Jenny has spent five minutes on the app and she on the five articles that were published today on three she engaged with different perspectives and how did she do that.

And so we take that as a proxy of the of this openness that I was mentioning right now that's it.

**JUAN:**

Okay.

Anything I think I don't have any I don't have more questions as no bill if you have something on the no okay. Okay, I think that's it.

Thank you very much.

**JENNY:**
Can I ask you a question?

**JUAN:**

Yes, of course, sorry because of the customer this thing of the camera I can't believe it that is not working. I don't know what's going on.

**JENNY:**

No problem. What is your thesis about?

**JUAN:**

Yes, we are trying to we are studying social entrepreneurship and management and we are focusing right now on social innovation. So we wanted to to reach different projects that are using AI and trying to understand how social innovation trying to address the address the phenomenon of social innovation through these different initiatives that use AI. So basically we are right now in the middle of the development also as you notice I sent you this morning the new questions.

So we are changing we are testing the questions and changing the questions as we go through the interviews and also we are building our framework but together with our supervisor but in like in a high level is this is observe real cases, concrete cases of initiatives that have any different try to address any social issue using AI and see what's going on.

But so what's the hypothesis that you're testing?

**JENNY:**

Is there an hypothesis?

**JUAN:**

No, there's no, is more explorative. There's no hypothesis.

But we wanted to see but also we want to see but we don't know if we can at some point we don't want to measure because we can't measure all this stuff with the interviews but we want to yes to discuss on this topics but we will be interesting to discuss whether if it is the AI that is helping in the social innovation or not or maybe just the AI is a tool to do things faster and easier.

So we're going through different cases and see the role that AI has within this project and if it is the AI itself fostering the innovation or not or just the decoration. Does it make sense?

**JENNY:**

It does.

**JUAN:**

But your question helps us as well to keep talking about this.

**JENNY:**

Cool. Can I propose a third way.

Yes, of course. Like you mentioned, you said is it the AI driving the innovation or is the AI a decoration?

I think AI is a tool. It's not what drives innovation.

What drives innovation is entrepreneurs and AI, like in some cases AI is a decoration. Like you have companies that started yesterday and they say they have 10 years of AI research what I really don't.

But like we've been working with AI for three and a half years. However, AI is just a tool. Nothing else

**JUAN:**

Yes, but in your case for example. You wouldn't be able to do this without AI.

**JENNY:**

You wouldn't be able to do this, but you would be able to do other stuff that maybe is not scalable. But is a  tool.

**JUAN:**

But can you further develop it?

**JENNY:**
It's like saying, okay, there is stuff on the internet. Yes, okay, the internet is a tool and probably we wouldn't be able to have this conversation without the internet.

However, we wouldn't be having this conversation if you didn't reach out and propose and decide to read this thing. It's something that can help you do things, but it's not what drives.

Okay.

**JUAN:**

Yes, I totally get the point.

**JENNY:**

One drives the social innovation. Like I think there is right right now and this is something I've seen change a lot over the past years.

There is this whole thing about people saying that either AI will completely kill us and then humanity or it will solve all the problems possible on the planet. AI is a tool. It's a technology.

It will do what we decide to make of it. It's not going to go beyond that.

And I think the whole conversation about AI being this new gods be it good or bad and depending on how you want to interpret it is actually a very big distraction and we should be asking us our questions about how do we deploy it responsibly what are areas in which it makes sense to deploy it, etc., more than oh, this new thing coming, the world will change completely as we know it won't.

**JUAN:**

But do you think that maybe in, but now we are like just thinking about in 50 years it will be just a tool?

**JENNY:**

Yeah, I really think it will become like many other things that we have. If you think about how our parents used to work, they worked in a very different way from what we do now.

But AI is a technology and it's a technology that is made by humans. So humans have control over it. We can decide what to make of it.

And it's like now, I don't know if you've seen the reports about people using the AI Copilot from Microsoft and being quite underwhelmed. And this always happens in the cycles of innovation. Like you have this new thing and people are like, oh my god, this is going to change the world. And then there is this illusion that everybody is like, this is actually not so useful. And then it kind of goes back to stability. I think right now we are a bit on the caos of, oh, this is complete magic. And now it's going down as in, is it really?

On some things it is, I think AI is super cool. But I think we need to ask ourselves the tough questions. I can't know, AI can help produce thousands of images at scale. Okay, do we need it? Do we need so much more content in the world?

And I think if we focus so much on will AI save us or kill us, we spend our time on that. And we don't spend it on actually asking ourselves, what do we want to make of this? Like what?

Because it is within our control. So I think going back to your point, I don't think it needs to be what drives social innovation or just a decoration on top to say I did a bit of statistics and I think a bit of AI on it.

It can be a fundamental tool, but I think it is a tool.

**JUAN:**

But for example, but in another for example, no, no, yes, but for example, in another field, I don't know, for example, in climate change, I don't know, I don't want to speak just for speaking, but maybe another field without it's really AI that allows to innovate because without AI, maybe it's, it wouldn't be possible to do this thing in a new way and better than if doing benefit for the society.

**JENNY:**

Yes, but there was a report that came out a few days ago about the fact that the AI industry has the same emissions as the whole country of the Netherlands. And so I think at some point we will have to decide, okay, is this worth it? Because like there is an investor I follow and LinkedIn and yesterday he said that he thinks that if you invest in AI, you can't call yourself a true climate investor because AI has a huge environmental impact.

It is something you can agree or disagree with. But I think like in all things, like you study economics and management, you know what cost-benefit analysis is and I think you just, we just need to keep asking ourselves these questions. Like do we need AI for this? For most of stuff, I don't think we, I think we're trying to apply AI to random stuff and I'm not sure it's always completely relevant. And in that case, it can be a bit of the decoration you were mentioning earlier.

But even what we do, like some of it may be done without AI, there is a huge piece of education within our app. So we tried to embed media literacy principles in the way we built the product.

There are ways to do media literacy without AI. You go to do train teachers, you do online trainings, you can do a micro learning app for media literacy if you want back there.

AI can be something that accelerates but it can't be the whole goal. At least from my perspective, you're investigating this much more than I am.

**JUAN:**
No, but it's more than welcome your view that you are. It's more than welcome your point of view that is from someone that is investing all the time, all your time in this project, like working and developing this. So super useful. Your voice.

Thank you. We will feel free to send you. Maybe if we have another question, be an email, but this is okay.

But just send me the thesis, I will read it.

With the pressure.

Yeah, yeah.

We will send you something.

First we have to approve.

No, but we're going to prove.

We're going to do it well.

So I'm sure you're well.

But thank you.

Thank you.

Thank you for your time.

Thank you a lot.

No way.

Have a beautiful day.

You too?

Bye.

Bye.

# Interview with Pilar Gogorza from Google

JB:

If you're not involved very into the development of this initiative, but for us it's super interesting to have at least a point of view for someone that collaborated with the team.
We are all of us, we're considering that So thank you very much.
So what can you tell you about your role and your position?
So yeah, we can look at your questions, as I said.

PG:

Some might be a bit harder for me to answer exactly, but I think I can share overall a bit of Google's approach to AI and obviously a bit more context around that. But yeah, on your first question, so I think I've shared this before, but I am part of the marketing team.
So I worked on my team, but for the past two years and a half, I've been focused on sustainability. And a lot of what we do with AI as you all, you probably already know, has to do with helping address these societal challenges.
And a lot of that has to do with climate. So in that sense, I've been working closely to some of the teams that are developing AI, because again, many of the features that we have are helping predict plots or helping predict wildfires or helping cities with use emissions.
So I'm very close to those projects. Great.

JB:

Can you tell us something about the development of those initiatives?

PG:
So yeah, and I will share a few links, which you might have seen already.
But let me share here in the chat. But yeah, I mean, if you've been doing some research, you might have seen some of these.
But I think Google's goal overall is to make AI helpful for everyone to improve their lives as many people as possible. And I think one important thing to call out is that there's a lot of emphasis in the way that we're doing this, so that it's bold, but mostly responsible.
So it's really about ensuring a responsible AI. And overall, I think there are like four big buckets that we're focusing on when it comes to AI. So one is improving knowledge and learning. Another bucket is boosting creativity and productivity. The third one is enabling others to innovate and grow. And then the last one is all about, again, building and deploying AI responsibly.
And that's where all of these things that I was mentioning around climate, for example, like helping solve these big societal challenges.
It's in. So that is a bit of like Google's approach overall. But yeah, I think it's really good if you can take a look at it like that I shared.
There is also like a tab that is done about responsibility and how again, we're making sure that we're bringing the benefits of AI to everyone, but in a very responsible way.

And you might have seen this as well, but we have some AI principles that we launched. I don't know when we launched this, but it was like a long time ago.

And that's an art thing that's mind you worth highlighting. My Google has been in the AI space for a really long time. Obviously last year, OpenAI was that GPD like really make these, you know, much more close to everyone.
And we kind of like lagged behind a little bit, but Google has been working on AI for so long. And it does have like the best research teams on AI, to be honest. But yeah, I think we probably haven't done as much of a good job in again, like telling that story and sharing more of how we've been developing AI.
So I think that's also an interesting thing to know. But yeah, I would definitely recommend you to take a look at those principles because I do think that's something really important in terms of how we are again developing AI.

JB:
From connecting to what you are saying, when we start searching about Google, using AI, we start associating with what you think, like Google develops AI for social good, like all for social, for this response connected with this responsibility, that we didn't find out on chat to be deal or in other places.
And what can you tell us about because you are from a team that is not exactly specifically the team that develops this. So we know already that there is an interaction between different and like diversity between the different people that are collaborating on this.
How does that work from your experience, connecting to your daily life?

PG:
They are this interaction with teams, with people with different expertise, and with different backgrounds. And how can we work until… Yeah, I think in general, the teams that are developing AI are teams that are engineering, like scientists, have a more technical background.
But they work very closely with a lot of other teams to again ensure this responsible approach. So I don't know, like policy.
You know, other kind of teams that have a really good understanding of more of these societal issues and challenges. So I would say it's very cross-functional.
And you probably have seen this from the examples as well, but we do also work a lot in partnership.
Like it's not just Google developing these and really working with partners. So yeah, I think many of the examples that I shared already with you, JB, are again, working with governments or working with cities, working with other organizations.
So that we'll be again, ensure that we are bringing on of those diverse perspectives. So yeah, I would say that there's quite a big mix of expertise involved.

JB:

Can you provide us an example of exactly what you and your team, how you and your team contribute to this? Like an example of a project or an intervention that you have?

PG:

Yeah, I mean, I think there are a few examples, as I said before, like I don't know, for example, Project Greenlight. So this was developed by a research team at Google.
Basically, this project, when I can share the landing page, but basically this project is all about helping cities reduce emissions by optimizing the final landing page, by optimizing traffic lights.
Here you can read more. But yeah, like obviously again, the research teams developed that model. But then to really deploy these, like we had to work with, again, cities to see how this could actually help them.
And we started doing pilots. So right now, the Greenlight is live in 12 cities. But yeah, it started a few cities in Europe, such as Hamburg. So we really had to, again, pilot these in different cities and not just in Europe, but we've been trying to also deploy it across different regions because we know that the challenges are so different. For example, in Africa or Latin America.
So even if again, this started more with a research team developing this model, leveraging the data that we have from maps, then to really improve these, we had to work with partners like cities, governments, and within deploying these, many teams were involved. So it wasn't just these, again, research teams, but as I said, other teams like our partnerships team, our policy team. So I do think that, again, this is just an example, but even if like the development of these models might start with more of a research team, then to bring these to life, we really need to work with other internal teams, but also, again, this external partner.
And connecting this, bringing this project to life, what did you see about that experience of the outcome or when this differentiation between the research phase or the phase that is behind the skin until it is out there in reality. I mean, this project is still a bit of a pilot phase in a sense that, again, as I said, it's it's live in 12 cities at the moment. We do have plans to scale to or desire, but yeah, as I said, like it's a matter of starting to test the model. So basically, with Greenlight, we provide the city's recommendations that they can sort of, you know, accept, let's say, and based on that, they will make, again, adjustments to the traffic lights. And what we've seen so far is that based on these pilots that we've been running, we've been able to reduce emissions by 30% which is quite high from stop and go traffic. So I think, again, what we see is we start like typically with this thing. We start with a few cities. As I said, I think we start like with three. We see, you know, early results and based on that, we keep improving the model so that we can scale it to more cities. And it's really like back and forth, you know, trying to incorporate that feedback.
And yeah, with that, like keep expanding to have more impact. So the intention of scaling and to like great dogs and larger and scale changes is in all the projects that you're in well. Yeah, I mean, as the models are getting better and better, I think we're also very mindful of that. I would say in the sense that I don't know, for example, with wildfires, we're actually now planning to scale wildfires to Europe. But we've been trying to do that for a while and because of the data, we weren't able to do that in a sort of impactful way because there wasn't like quality data to actually, again, use these models to predict wildfires. So even if we launch this feature in the US for a long time ago, yeah, we haven't like reached those standards in our regions.
And so when that's the case, like we again, acknowledge that and we are like not sort of like forcing to scale features or things that are not working as we intend to work. So I think it depends. But yeah, obviously when we see that these AI models are working and can have impact, we do try to scale them to increase our impact, of course. And from what you have been observing, once you are interacting or applying or trying these systems, maybe you can see it now, but maybe you think that can happen.

JB:

Do you think that this can change the behavior of people while interacting with with an issue that you are trying to address? Do you think that your implementations at the end will have an impact on the behavior of people when they are trying to ask this right now?

PG:

Yeah, I mean with wildfires prediction, for example, then the idea there is to help people that you know, are in those like situations where they might be again like nearby a wildfire and they don't know what's happening so that we can basically push these notifications to them and predict you know how the fire is going to evolve so that they are obviously like safe. So yeah, I think it depends like obviously on the project. But yeah, we definitely want to to shape people's behavior. And our example is really efficient routing, which you might have seen, but basically on Google Maps when you... Is that right? Can you repeat what? It's fuel efficient routing. I can't bring it as well. But basically that's a figure that we launched on Google Maps to basically when you, you know, your on Google Maps and you are searching to go from point A to B by car. It will by default if the time difference, it's not that much by default, it will show you the fuel efficient route which might not be like the fastest one. Maybe it's like one or two minutes longer, but based on sign-als like real-time traffic or road conditions, it's the most fuel efficient. And we have seen, I can't remember the exact number, but I can share it now, let me check. So far since we launched that feature, for example, let me see how many emissions we help save. We have it here. So yeah, I'll pin this to you, but basically we have helped prevent more than 2.5 million metric tons of CO2 emissions. So that's around taking 500,000 fuel-based cars of the road for a year since we launched it. So we're definitely trying to, again, like shape people's behavior. And we know that there's a really big opportunity for Google to do that.
In the sense that so many people use our products, that we know that we have such a big scale, that we're able to sort of match people to make more, I know in my case, sustainable decisions through our products. And we leverage AI to make all of these recommendations. Then we can, again, have a big impact.

JB:

Now, more like on, it's not, I don't know if it's more philosophical or it's not, but like, apart from these projects, specifically. What do you think the role of AI will be, like, two questions? If you feel that the changes or the innovations that you are bringing right now with these projects are because of AI, specifically, like are only possible because of AI and this development. And what do you think in the future, how this will evolve, like which role will have AI in addressing more and more social issues? From a person that is working in that environment, in a company that is all the time talking about that, with your personal view about this.

PG:

So you mean like, what's the impact? Can you like, can you give me the question?

JB:

Yes. On one hand, like, if you think is, if it is AI, what allows these changes or innovations that you are developing, like, it's only because of the development of AI that you can do this. And in the future.
Yeah. How do you think that this will evolve and which role will have AI to better address and yes, some of its five social needs?

PG:

So yeah, I think definitely, I'm sorry, I will just call my phone, pretty last five minutes because I have to go, but yeah, definitely. I mean, for sure, AI is allowing to do this in a way that it wouldn't be possible otherwise. Like, that's for sure. And as I said, like, Google has been using AI for a really long time now, like, we've been an AI first company for a really long time now.
And otherwise, like, we know that we wouldn't be able to like do all the things that we do. So 100% like AI is enabling us to have all of this impact. And then your second question.
In the future, how this will evolve?

JB:

How do you think, do you think that it will be like better development and we will get things to do?

PG:

Yeah. Totally. I mean, and I'm sure you know this, right? Like, right now there is a bit of like a race to a guy, in a way. I mean, all of the companies are like really focused on getting this right because we know that it's really, you know, what is happening. And it will again, enable so many like things that were not even aware of. So yeah, like, Google is super focused on, and again, like getting AI right. And we are doing a lot already. As I said, I do think that Google has probably the best like research teams on AI. But well, obviously because of the size of Google, there are challenges that come with that. Like, we're not, you know, a startup or yeah, I mean, Google is like a renowned big company now. And so there are challenges that come with that. But yeah, for sure, we do think that the future is all about AI.

JB:
The presence of the terminology AI within everything connected to Google is marketing or
how marketing influence in using AI for social group like what you can share.

PG:
Yeah, I mean, I think to b honest, again, as I said, like Google uses AI for pretty much everything. I mean, most of the products are built, leveraging AI. I mean, not everything. But it has been like Google as I said, it has been an AI first company for a really long time now. I think actually it's a big deal.
Because it's like, we've never really talked about it as much as we maybe should have. And then again, last year, we exploded. And we weren't really like, recognized as an AI company because we again, maybe I didn't been talking that much about it.

Like, for example, we had like Gemini, which is, you know, actually, you know it. And we had that for actually a pretty long time. But it was for internal use because as I said already, even obviously the size of Google, it's not that we can launch something that maybe, you know, there's some reputation on risk. And that's kind of what happened. Mostly this was bigger in the US, but what I'm trying to say is I think actually for Google is a big deal. But it's like now we are obviously trying to put AI more front-end center. But I think we've been like using AI for a really long time for a lot of our products, like the majority of them. And we haven't been really discussing about that.

JB:
Okay. Thank you very much for your time.

PG:
No welcome. Sorry that I had to leave a little earlier, but I'm pretty useful. Yeah, I've sent you some links. I already, I think, shared most of them, but I don't recommend that you again go through that side that I share with them. The principles and the exerting your questions. Let me know.

JB:
Yes. All right. Thank you.

PG:
I hope I could take you out. Right. Thank you. Good to meet you. Bye.