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Adopting the Future: Early Perceptions of AI-enhanced Smart Glasses

A Qualitative Exploration of Consumer Expectations and Adoption Barriers

Emil Vendlegård

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UPPSALA UNIVERSITET

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Abstract

The rapid advancement of smart wearable technologies, particularly AI-enhanced smart glasses, represents a significant shift in how users interact with technology. This study explores how potential early adopters perceive these technologies, focusing on the drivers and barriers influencing their acceptance and adoption. Utilizing a qualitative approach, data were collected through semi-structured interviews and focus groups with engineering students and professionals from a global telecommunications company. The study identifies four core themes shaping consumer expectations: privacy concerns, data vulnerability, behavioral shifts, and user preferences. Participants expressed both excitement about the innovative potential of AI integration and concern over issues such as data misuse, bystander privacy, and over-reliance on AI. Despite these concerns, many viewed the camera and AI functionalities as essential to the usefulness of the device. The findings highlight that trust in technology and responsible data practices are pivotal in mitigating perceived risks. This study contributes to the understanding of technology diffusion and offers practical insights for designers and marketers seeking to navigate the path from early adoption to mainstream acceptance.

Faculty of Science and Technology

Uppsala University, Uppsala

Supervisor: Rebecka Cedering Ångström Subject reader: Göran Lindström

Examiner: Elísabet Andrésdóttir

Populärvetenskaplig sammanfattning

Kan ett par glasögon som är förstärkta med artificiell intelligens (AI) förändra hur vi använder teknik och beter oss i vardagen? Denna studie undersöker hur tidiga användare av teknik, så kallade early adopters, upplever AI-förstärkta smarta glasögon. Att kombinera AI med smarta glasögon är ett nytt fenomen som introducerar många nya möjliga sätt att interagera med teknik, men det medför också utmaningar, fokuset i denna studie har legat på att identifiera drivkrafter och hinder som påverkar acceptans och adoption av ny teknik.

Hur teknik sprider sig i samhället och varför konsumenter väljer att börja använda eller inte börjar använda ny teknik är ett område inom forskningen som har tillägnats mycket uppmärksamhet. Denna studie använder teoretiska modeller så som Diffusion of Innovation av (Rogers, 1962) och Extended Technology Acceptance Model av (Venkatesh & Davis, 2000) för att identifiera drivkrafter och hinder för acceptans av ny teknik. En genomgång av existerande forskning har identifierat att AI tillför många nya funktioner till smarta glasögon och möjliggör för ett nytt sätt att använda och interagera med teknik. Tidigare forskning har också förklarat att risk och trust är viktiga faktorer för att förklara acceptans av smarta glasögon samt att det finns ett behov av kvalitativa studier med faktiska användare.

Genom en kvalitativ forskningsmetod har data samlats in via semistrukturerade intervjuer och fokusgrupper med ingenjörsstudenter och yrkesverksamma vid ett globalt telekommunikationsföretag. Fyra centrala teman identifierades i deltagarnas resonemang kring AI-förstärkta glasögon: integritetsfrågor, dataskydd, beteendeförändringar samt användarpreferenser. Deltagarna uttryckte både entusiasm och oro över potentialen som AI-förstärkta glasögon medför. Trots att deltagarna i studien var positiva över att använda teknik på det här sättet, ett sätt som är mer öppet och låter användaren vara mer medveten om sin omgivning, växte frågor angående datainsamling, integritet och en övertro på AI. Trots dessa farhågor, som i de felsta fall relaterar till den integrerade kameran, ansåg deltagarna i studien att kameran och AI-funktionerna är nödvändiga för att glasögonen ska medföra tillräckligt upplevt värde och intressanta anvädningsområden.

Sammanfattningsvis, resultatet av denna studie visar att potentiella tidiga användare av AI-förstärkta glasögon hade en generellt sett skeptisk attityd till att börja använda AI-förstärkta glasögon. Deltagarna i studien uppskattade den inbygda AI-assistenten som är medveten om användarens omgivning samt objektigenkänningen som glasögongen medför. Studien visar att både förtroende för tekniken och för företaget bakom tekniken är avgörande för att minska upplevda risker. Ansvarsfull hantering av data som glasögonen samlar in visade sig ha en stor påverkan på acceptans. Studien bidrar till ökad förståelse för spridningen av ny teknik, mer specifikt AI-förstärkta glasögon, och ger praktiska insikter

för utvecklare och marknadsförare som vill underlätta övergången från en nischmarknad till en massmarknad.

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1 Introduction

Technology is constantly evolving, shaping the way we interact with the world. Over the past few decades, innovations such as the personal computer (PC), the smartphone, and the internet have transformed daily life. Yet, these technologies faced challenges related to adoption and acceptance by consumers. When first introduced, personal computers were met with skepticism, with concerns about their complexity and practicality (Venkatesh & Brown, 2001). Similarly, the widespread adoption of smartphones revolutionized communication and access to information but also raised debates over privacy, screen time, and digital dependency (Arruda-Filho et al., 2010). Likewise, the internet raised concerns regarding privacy invasion (Bhatnagar et al., 2000). Each of these technological shifts illustrates how new innovations must overcome social and psychological barriers before reaching mainstream acceptance.

We are currently experiencing another transformation in technology with the rise of smart wearables. This category encompasses small electronic and computing gadgets that can be worn on the user's body (Niknejad et al., 2020a), enabling constant access to information. Some researchers consider this technological evolution to be the next generation of ubiquitous technologies after the smartphone (Liu et al., 2015; Park et al., 2016). Within the category of smart wearables, smart glasses are set to become one of the most prominent areas in tech over the next three years (Bajarin, 2025), with worldwide sales reaching 1.52 million units in 2024. The market is expected to grow significantly, with forecasts suggesting that sales might rise to 90 million units by 2030 (Wire, 2025).

While consumers are increasingly interested in smart wearables in the form of smart glasses and their potential to enhance everyday tasks, such as communication, navigation, learning, and fitness-tracking, the primary use of smart glasses so far has been in the home, as a shared household device (Yao et al., 2024). Nevertheless, consumers are eager to use their smart glasses outdoors, paralleling the evolution of the telephone, which transitioned from a stationary, communal household tool to a mobile, personal gadget (Yao et al., 2024).

Earlier studies on smart glasses and their potential in markets have been conducted, a few examples include healthcare, where smart glasses can aid in surgeries and training through real-time data visualization (Aekanth & Tillinghast, 2023; Iovanel et al., 2023), or well-being where smart glasses can be used to increase awareness of vital biometric information (Tikkanen et al., 2023), and education (Al-Emran et al., 2023). Other studies have reviewed the acceptance of smart wearables, including smart glasses (Kalantari, 2017; Niknejad et al., 2020b).

Despite existing research on smart glasses and smart wearables, a critical shift is now taking place with the emergence of smart glasses enhanced with artificial intelligence (AI). This development fundamentally redefines what these devices can do. Introducing AI to smart glasses enables them to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, perception, and language understanding (Russell & Norvig, 2021). Through machine learning and natural language processing, AI systems can analyze data, recognize patterns, and make decisions with minimal human intervention. When integrated into smart glasses, AI has the potential to enhance their capabilities, transforming them from a passive device into a device that is aware of the user's context. (Williams, 2025). AI-enhanced smart glasses capable of interpreting the user's surroundings through real-time images from the integrated camera, alongside audio recognition via the built-in microphone, offer users valuable assistance with daily activities. These features, combined with the ability to intelligently respond to vocal commands, mark an innovative advancement in the realm of smart wearables. Some authors go as far as stating that smart glasses are the perfect hardware for artificial intelligence (Honan, 2024).

The emergence of AI-enhanced smart wearables in the shape of glasses calls for a new examination of the drivers and barriers influencing consumer adoption and acceptance of smart wearables. As this technology remains in its early stages and is yet to reach mass market adoption, this study builds on data gathered from potential early adopters of smart glasses, individuals who often influence broader adoption through their role as opinion leaders in social networks (Rogers, 1962).

1.1 Purpose and Research Questions

The purpose of this study is to investigate consumer acceptance and diffusion of emerging technologies. By exploring how smart wearables, enhanced with AI, are perceived among potential early adopters of the technology, this study contributes to a deeper understanding of the adoption process. Using qualitative data from focus groups with potential early adopters from a university and a global telecommunications company, this study aims to understand how these perceptions influence the transition from niche markets to the mainstream market, thereby expanding the literature on technology diffusion and consumer behavior.

With this purpose in mind, this study will focus on below research questions:

1. How are AI-enhanced smart wearables perceived by potential early adopters?

2. How do potential early adopters perceive the drivers and barriers to adopting AI-enhanced smart wearables?

Chapter 2 presents the theoretical foundations and prior research, including an overview of AI-enhanced smart wearables, relevant diffusion theories, technology acceptance models, and key concepts such as trust and privacy. Chapter 3 describes the research strategy and design, outlining the abductive qualitative approach, data collection methods including focus groups and expert interviews, as well as ethical considerations. Chapter 4 presents the empirical findings from the study, structured around four key themes: privacy concerns, data vulnerability, behavioral shifts, and user preferences. Chapter 5 discusses these findings in relation to existing literature and theoretical frameworks, highlighting key tensions, patterns, and implications. Finally, Chapter 6 offers concluding remarks, discusses the theoretical and practical implications of the study, outlines its limitations, and suggests directions for future research

2 Theoretical Foundations and Prior Research

This chapter begins by describing the contemporary phenomenon of AI-enhanced smart glasses and the development that has taken place in this rapidly growing segment. Then, this chapter introduces three layers of theory relating to technology adoption and consumer acceptance. By first revisiting traditional diffusion theories, such as the Diffusion of Innovation (DOI) framework by Rogers (1962), we then continue with a model that strongly relates to the DOI, which is Crossing the Chasm by G. A. Moore (1991), that explains why certain innovations never reach mass market adoption, and the critical role that early adopters have in the transition from niche markets to mass market. Next, to understand why consumers decide to adopt or reject a new technology or innovation, we will start with an overview of existing studies on the acceptance of smart wearables, and how acceptance can be explained through the lens of the Extended Technology Acceptance Model (TAM2) by Venkatesh and Davis (2000). TAM2 is an extension of the original Technology Acceptance Model (TAM), which was introduced by Davis (Davis, 1986). Finally, this chapter ends with an overview of existing studies on perceived risk and how trust can act as a mediator of risk, and by doing so, increasing the likelihood that consumers accept and adopt an innovation.

Given the many variants of smart wearables in the form of glasses, and the many different definitions, it becomes essential to define the type of glasses that will be commonly referred to throughout this study:

- **Augmented Reality (AR) Glasses**: AR glasses are wearable devices with one or two screens that can merge virtual with real information in the user's field of vision (Danielsson et al., 2020)

- **Smart Glasses**: A term encompassing wearable technology that combines eye-wear with computing capabilities, offering users digital information and interactive experiences

- **AI-enhanced Smart Glasses**: Smart glasses that are integrated with AI, which offers a personalized, context-aware experience

2.1 The Landscape of AI-enhanced Smart Wearables

Research on smart wearables, including the field of smart glasses, is mainly focused on the application of smart wearable technologies across various fields. A few examples of sectors include health (Aekanth & Tillinghast, 2023; Iovanel et al., 2023), well-being (Tikkanen et al., 2023), and education (Al-Emran et al., 2023). This growing interest can be attributed, in part, to the many different ways smart wearables can enhance the

user experience through human-computer interaction, distinguishing them from mobile devices (Stefana et al., 2021). Additionally, the rapid advancement of the Internet of Things (P. Malhotra et al., 2021), which encompasses smart glasses (Ferreira et al., 2021), has further fueled this trend.

However, there have been previous unsuccessful attempts to introduce smart glasses. Smart glasses first entered the market in 2013 with the launch of Google Glass (Klein et al., 2020), shaping early definitions of the technology. For instance, Aungst and Lewis (2015) described Google Glass as a wearable device similar to eyeglasses but integrated with a technical interface that transforms it into a computer interface. This innovation later stalled due to high cost and privacy concerns (M. Porter & Heppelmann, 2017). The privacy concerns stem from the fact that the glasses functioned as a form of constant, pervasive recording. Subsequently, Microsoft launched HoloLens, which was viewed as a promising alternative, but due to it being expensive, having a narrow field of view, and being bulky to use, the HoloLens was not prepared for widespread consumer adoption (M. Porter & Heppelmann, 2017).

Today, smart glasses are becoming more popular and are on their way to breaking into the mainstream. One example is Meta Ray-Ban smart glasses, a collaboration between Meta and EssilorLuxottica, that sold over one million examples in 2024 (Williams, 2025). Also, Meta recently introduced their Orion augmented reality glasses prototype, while Snap revealed their fifth-generation Spectacles, both of which have a fashion-forward and sleek design. Fashion-related factors have proved to be relevant determinants in explaining consumer acceptance (Haque, 2015). In a recent MIT Technology Review, Williams (2025) explains that smart glasses are finally on the verge of becoming useful, and will be the next big consumer device category.

The addition of artificial intelligence (AI) has significantly advanced smart glasses, expanding both their functionality and practical applications. With AI, these devices can now analyze and make sense of the surrounding environment, offering advice and context-aware information via speakers integrated in the frame (Honan, 2024). By utilizing technologies like natural language processing and machine learning, the glasses can identify objects, people, and gestures, creating a more seamless and engaging user experience.

Meta, together with Google, are the two tech companies leading the development of AI-enhanced smart glasses (Williams, 2025). Although integrating augmented reality into smart glasses is a very interesting technology, Meta states that AI is the truly interesting thing with smart glasses, and both the founder of Meta and co-founder of Google state that smart glasses are the perfect hardware for AI (Honan, 2024). As Meta Ray-Ban glasses are the first pair of glasses with built-in AI assistance, it becomes relevant to study the

end-users of AI-enhanced smart glasses to understand if this is a technology that will reach mainstream market adoption. Due to their leading status and the million units sold, this study will use a pair of Meta Ray-bans for the study, an example of which can be seen in figure 1.



Figure 1: The Meta Ray-ban glasses used in this study

2.2 Diffusion Theories

The definition of emerging technologies have been widely debated in academic research, and have played a key role in policy discussions and initiatives. Several studies propose overlapping yet distinct definitions of emerging technologies, highlighting different characteristics. Some definitions focus on their potential economic and societal impact, particularly when they exhibit a more 'generic' nature (Martin, 1995; A. L. Porter et al., 2002). Other researchers emphasize the uncertainty surrounding their emergence (Boon & Moors, 2008) or the aspects of novelty and growth (Small et al., 2014). Moreover, the interpretation of emerging technologies varies depending on an individual's perception. One might consider a technology emergent because of its novelty and expected socio-economic impact, while others may see the same technology as a natural extension of an existing technology.

Emerging technologies are inherently complex and volatile, with their key players constantly shifting as new technologies and entrants disrupt existing firms. The underlying knowledge of the technology, the products, the processes emergent from them, the viable marketing strategies, and profitable business models of the technologies are difficult to pre-

dict and continuously evolving (Srinivasan, 2008). Furthermore, assessing the potential returns on investments in emerging technologies is highly uncertain (Adner & Levinthal, 2002), due to the unpredictable value of the technology and because newer innovations can swiftly diminish their worth.

However, as these emerging technologies has the potential to disrupt the market and existing status quo, examining consumer acceptance and adoption, as well as the broader diffusion of innovations, can help mitigate uncertainty. One widely used model that aims to explain this diffusion process is the Diffusion of Innovation theory by Rogers (1962).

2.2.1 Diffusion of Innovation

Getting a new idea adopted, even when it has obvious advantages, is often very difficult. Many innovations require a rather long period, often many years, from the time they become available until the time they are widely adopted. The Diffusion of Innovation (DOI) theory explains how, why, and at what rate technology innovation spreads (Rogers, 1962). Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system (Rogers, 1962).

The adopter categories model is a key aspect of this theory, serving as the foundation for numerous analyses of adoption behaviors today. This model classifies adopters into categories resembling a normal distribution, as seen in figure 2. It suggests that 2.5% of individuals are innovators, embracing an innovation when it's new and unproven; 13.5% are early adopters, who adopt when they recognize personal advantages; 34% constitute the early majority, who adopt after observing others and recognizing clear productivity benefits; 34% make up the late majority, who adopt following the majority's adoption and when ample adoption support is present; and 16% are laggards, who delay adoption as much as possible (Rogers, 1962). Additionally, there are five factors that explain the potential of a new innovation:

1. Relative Advantage
2. Compatibility
3. Complexity
4. Triability
5. Observability

Relative advantage is the degree to which an innovation is seen as better than the existing product that it replaces. Compatibility explains how consistent the new innovation is with the values and needs of potential adopters. Complexity is how difficult the new innovation is to understand or use. Triability is to which extent the innovation can be tested or experienced before the consumer has to make a decision. Observability is the degree to

which the results of the innovation are visible to others.

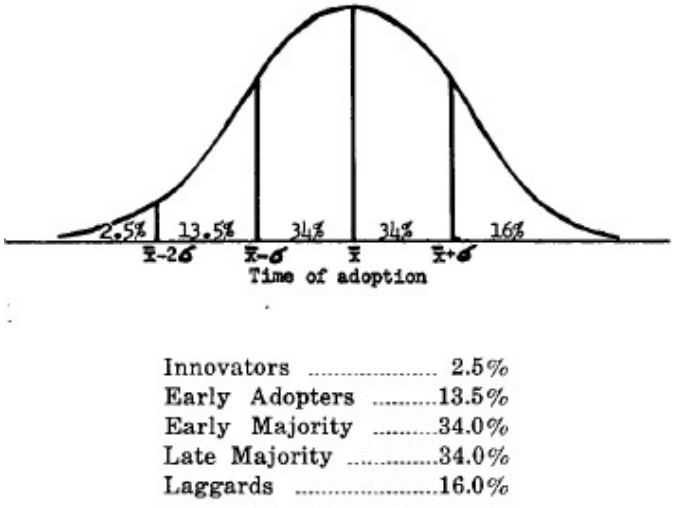


Figure 2: Adopter categories based on relative time of adoption

While the DOI theory is a foundational model in the research of innovation diffusion (Guo & Huang, 2024), it is important to remember that this theory was introduced at a time when consumer-focused innovations were primarily viewed as new products or standardized services, markets were seen as composed of individuals or stable consumer segments with well-defined and relatively consistent behaviors over time. Additionally, innovators were regarded as individual firms that had significant control over both the innovation itself and the communication surrounding it. This raises concerns regarding the model's relevance today. Some literature even suggests that consumers rather buy access instead of ownership, whereas innovations are often created with or between consumers, and markets are largely platform-based, complex, and based on actions between other actors and consumers (Kristensson et al., 2020). Platforms such as the App Store and Google Play are examples that have emerged following the introduction of the smartphone and are good examples of the complex market that exists today.

However, regarding smart wearables enhanced with AI assistants, the adoption can be determined with the five factors aiming to explain the potential of an innovation (relative advantage, compatibility, complexity, triability, and observability) (Rogers, 1962). According to Koutromanos and Kazakou (2023), one area for research could be to investigate the relative advantage variable of the DOI, to examine whether users of smart glasses perceive their advantages and affordances as superior to those of other mobile technologies.

2.2.2 Crossing the Chasm

As experienced by many entrepreneurs and investors, not all products are a success, and there are many companies that no longer exist, or whose stocks have been so diluted

that they have lost all monetary significance. Some of these cases can be explained by what is called the chasm (G. A. Moore, 1991). Between each adopter category in the diffusion of innovation bell curve, there exists a gap, each gap representing an opportunity for marketing to lose momentum, and to miss the transition to the next market segment (G. A. Moore, 1991). By transitioning to the middle of the bell curve, a product has reached mass market adoption. These gaps appear because of failed efforts to convince the next group in the technology adoption life cycle to buy the product, often due to failed marketing efforts or an inability to understand the different adopter categories and their perceived values (G. A. Moore, 1991).

The most significant of the gaps, the so called chasm, is the gap between early adopters and the early majority, as seen in figure 3 (G. A. Moore, 1991). Early adopters expect a radical discontinuity between the old and the new technology, and they are prepared to champion this cause while facing a lot of resistance from established norms (Rogers, 1962). Being the first larger group to adopt an innovation, they are prepared to bear with the inevitable bugs and glitches that might exist in any innovation. On the other side of the chasm is the early majority, and unlike the early adopters who seek radical discontinuity, they want evolution. They want technology to enhance, not disrupt, established norms and ways of doing business. By the time the early majority adopts an innovation, they want it to work properly and integrate with existing technologies (G. A. Moore, 1991). To bridge this gap and cross the chasm, companies need to target the majority market, a customer segment that are pragmatists, who, unlike early adopters, will not buy a product based on a vision. Instead, the mass market needs a compelling reason to buy the product, and thereby a high degree of trust in the product. When doing so, G. A. Moore (1991) states that companies can apply a few strategies, one of the most important being to identify their beachhead. A beachhead is a target market that is large enough to matter and where customers will have the most benefit from your product. When the product has gained traction and received good reviews from the beachhead market, this market segment can help in convincing the mass market of the product's benefits.

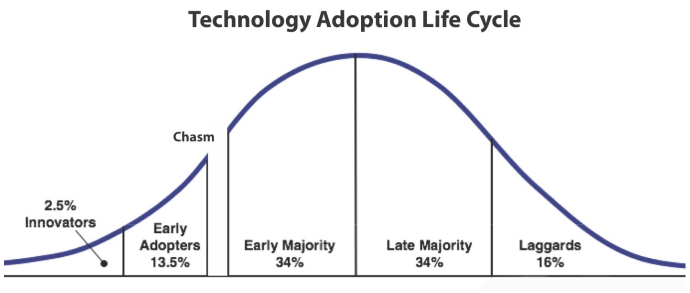


Figure 3: The Technology Adoption Life Cycle

However, crossing the chasm is a theory that was introduced in 1991, and just like DOI, this theory can be met with the same criticism that the dynamics of modern markets have

changed (Kristensson et al., 2020). This raises questions about the theory's continued relevance. For instance, software companies are taking over a larger part of the economy, the early market (including innovators, early adopters, and early majority) has grown substantially, and due to the competitive and highly technological landscape, some authors argue that the early majority has jumped over the chasm (Bussgang, 2021). However, others argue that the core principles of crossing the chasm are still highly relevant, more than 20 years after its first publication (Rachitsky, 2022).

As early adopters are critical in convincing the majority to adopt a new technology (Rogers, 1962), it becomes relevant to investigate this group in the setting of AI-enhanced smart glasses to identify a potential beachhead market. While previous studies have investigated use cases and benefits of smart glasses, such as within the health sector (Aekanth & Tillinghast, 2023; Iovanel et al., 2023), well-being (Tikkanen et al., 2023), and education (Al-Emran et al., 2023), the additional feature of an integrated AI assistant calls for a renewed visit to this research area.

2.3 Individual Acceptance Models

While the DOI framework explains how emerging technologies are adopted from a macro perspective, frameworks such as the Technology Acceptance Model try to explain technology adoption from an individual user behavior (Davis, 1986).

2.3.1 Technology Acceptance Model (TAM)

Various models aim to explain why end-users decide to adopt or reject a new technology, one of the most common being the Technology Acceptance Model (TAM), which focuses on the physiological and behavioral aspects of adoption at an individual level (Davis, 1986). When initially introduced in 1986, TAM achieved significant success mainly through advancements in theory and measurement techniques (Davis, 1986). Notably, TAM pinpointed two critical yet previously neglected factors influencing user acceptance: perceived usefulness and perceived ease of use. Perceived usefulness is defined as "subjective probability that using a specific application system will increase his or her job performance within an organizational context" (Davis et al., 1989). Perceived ease of use is defined as "the degree to which the prospective user expects the target system to be free of effort" (Davis et al., 1989). These elements constitute the foundation of the original model and continue to be central to TAM (Davis & Granic, 2024).

2.3.2 Extended TAM (TAM2)

Building on the original TAM model, Venkatesh and Davis (2000) introduced an elaboration of this model, called the Extended Technology Acceptance Model, or TAM2. This

model expands on the original TAM by incorporating new theoretical constructs, focusing on the factors influencing perceived usefulness and usage intentions, analyzed from the perspectives of social influence and cognitive instrumental processes, see figure 4. Unlike the original TAM, TAM2 includes a set of constructs aiming to take others into account. One such construct is subjective norm, explaining how the influence of others who are significant to the adopter might influence the adoption decision. Another is image, defined as "the degree to which use of an innovation is perceived to enhance one's status in one's social system" (G. Moore & Benbasat, 1991). Having these exogenous variables in mind when explaining acceptance, previous research has noted that the explanatory power of TAM2 is 20% higher than that of the original TAM (Wu et al., 2011).

While TAM2 was introduced in 2000, the framework with its two main variables, perceived ease of use and perceived usefulness, and additional constructs, is still a valid model (Davis & Granic, 2024) and has been successfully applied to explain the acceptance of diverse technologies (Harris & Rogers, 2023; Ho et al., 2023; Saleh et al., 2022). With its societal impact, flexibility in addressing emerging challenges, and a commitment to ensuring that technology truly serves and benefits society, TAM2 is still a relevant framework for future studies on user acceptance. It will remain crucial in realizing the intended benefits of new technology across society and industry (Davis & Granic, 2024).

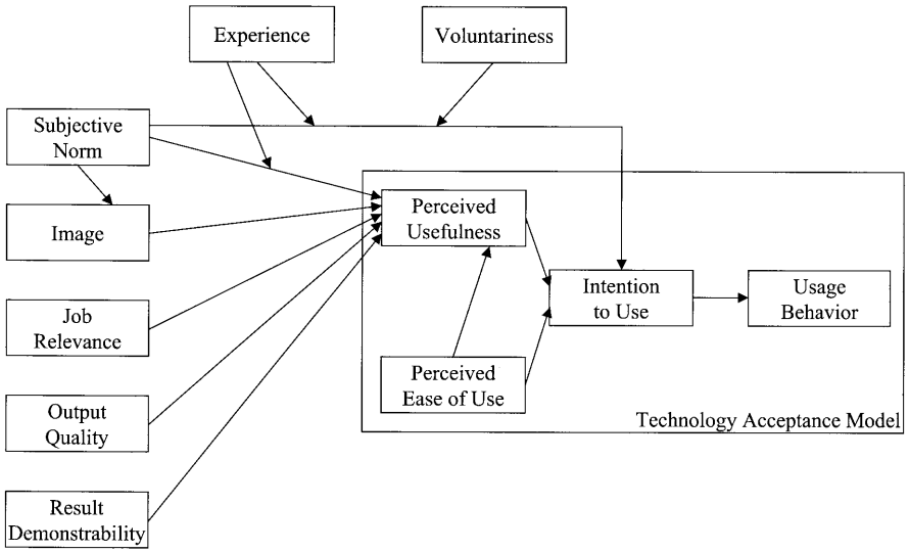


Figure 4: Extended Technology Acceptance Model, TAM2

Although TAM2 is a widely applied framework, and studies like Rauschnabel and Ro (2016) have developed an exploratory model specific to AR smart glasses, building on the fundamental constructs of DOI and TAM/TAM2. In their study of 201 German consumers, they identified five primary drivers: expected functional benefits, perceived ease of use, positive brand attitudes, social norms, and individual-difference variables, and found that self-presentation benefits and privacy concerns have a surprisingly limited impact

on adoption intention. In the review of 21 studies on the acceptance of smart glasses, Koutromanos and Kazakou (2023) identified that the key variables of TAM, perceived usefulness, and perceived ease of use, should be complemented with variables perceived risk and perceived trust, to better explain the acceptance of smart glasses. Additionally, earlier research expresses a need for a qualitative approach that lets users interact with the glasses before forming their opinion, as the majority of existing studies are quantitative and not with actual users (Koutromanos & Kazakou, 2023).

2.4 Privacy and Trust

As AI-enhanced smart glasses collect and store a lot of data from the individual user, their surroundings, and nearby individuals, legitimate concerns regarding privacy and trust remain potential obstacles to growth and important issues in the context of AI-enhanced smart glasses.

2.4.1 Perceived Risks in the Context of Smart Glasses

When referring to risk, it is important to distinguish the perceived risk from the actual risk-taking. While perceived risk is defined as the users' subjective evaluation of incurring losses while using a particular system (Chen & Li, 2017; Marriott & Williams, 2018), risk-taking is more related to the outcome, implying that there is something of importance to be lost (Colquitt et al., 2007). Perceived risk acts as a psychological barrier, where uncertainty and feelings of vulnerability can deter technology use even before any actual adverse outcomes occur (Chen & Li, 2017; Marriott & Williams, 2018). Understanding the perceived risks, therefore, provides deeper insight into the emotional and cognitive processes that underpin user behavior in the early stages of technology adoption.

Risk is one factor that affects the adoption and acceptance of smart glasses. Regarding acceptance and use cases of smart glasses, privacy, trust, and other people's privacy are the most frequently mentioned risks (Koutromanos & Kazakou, 2023). Privacy issues stem from the perceived threat to personal privacy caused by the formidable and growing capability of information technology to gather extensive data about individuals, often without their awareness or control (Collier, 1995). As technologies become more personalized, widespread, and pervasive, the significance of privacy concerns will rise. Consequently, privacy concerns can be described as users' inherent worries about the potential compromise of their personal information when interacting with a specific technology (N. Malhotra et al., 2004). These privacy issues impact the perceived trustworthiness of the technology and introduce a psychological risk barrier, characterized by uncertainty and vulnerability (Barney & Hansen, 1994), thereby influencing the likelihood that individuals will embrace a new technology (Connolly & Bannister, 2007).

While much of the discussion on privacy centers on the user, bystander privacy introduces an additional layer of complexity. Bystander privacy refers to the concerns of individuals who are not the direct users of the smart glasses but whose data may inadvertently be captured. This is particularly relevant for wearable devices with continuous sensing capabilities. The pervasive ability of information technology to collect data can lead to significant privacy infringements, not just for the user but also for people in their immediate environment (Collier, 1995). Bystanders may feel that their personal space is invaded without consent, leading to social pushback and an erosion of public trust in the technology. Such privacy concerns can have a domino effect; if bystanders perceive that their privacy is compromised, it can create a broader distrust that extends to users, who may then reconsider their own engagement with the technology (N. Malhotra et al., 2004).

2.4.2 Trust as a Mediator of Risk

Trust is defined as "*the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*" (Mayer et al., 1995, p. 712). Trust, in the context of technology acceptance and adoption, requires a dual perspective. The consumers need to trust the people or the organization behind the technology (Lankton et al., 2015), but consumers also need trust in the technology itself (Lankton et al., 2015). The foundation of trust in people and trust in technology varies, not only concerning the underlying object but also regarding the trusting beliefs. Trust between people includes judgments that the other party has appropriate attributes and motives to behave as expected in a risky situation (Mayer et al., 1995), whereas trust in technology reflects beliefs about a technology's characteristics, rather than its motives (McKnight et al., 2011).

In the case of AI-enhanced smart glasses, the integrated AI introduces new risks relating to trust, privacy, and data that need to be mitigated for successful consumer acceptance and adoption. Trust can mitigate the negative impact of perceived risks (Colquitt et al., 2007), as trust serves as a psychological lubricant that can reduce the apprehension stemming from uncertainty and perceived vulnerability (Connolly & Bannister, 2007). In the context of AI-enhanced smart glasses, these devices have advanced built-in sensors, recognizing voice, and have outward-facing cameras that can map the space around the user. This lets them understand what the user is doing and what environment they are in. When combined with the integrated AI assistant, AI-enhanced smart glasses can collect and use large amounts of real-time information about the user and their surroundings. This data can help the AI provide useful information at the right time and place, supporting the user with their tasks wherever they are. Although previous studies have investigated privacy and trust in the context of smart glasses, with researchers such as Rauschnabel and Ro

(2016) stating that potential privacy concerns seem less likely to influence smart glasses adoption, these studies were done on AR-glasses without AI features. As previously stated, the integrated AI assistant in the Meta Ray-Ban glasses makes them even more intrusive, and it is therefore important to investigate how trust can mitigate any perceived risks.

2.5 Research Gaps

As the theoretical framework consists of fundamental models explaining the adoption and consumer acceptance of technology innovations, these are widely applied in existing research. However, in the context of AI-enhanced smart glasses, there exist research gaps in the theoretical framework that this study seeks to explore. Firstly, as early adopters are critical in convincing the majority to adopt a new technology (Rogers, 1962), it becomes relevant to investigate this group in the setting of AI-enhanced smart glasses to identify a potential beachhead market. While previous studies have investigated use cases and benefits of smart glasses, such as within the health sector (Aekanth & Tillinghast, 2023; Iovanel et al., 2023), well-being (Tikkanen et al., 2023), and education (Al-Emran et al., 2023), the addition of AI let's the user interact with the glasses in a completely new way, and calls for a renewed visit to this research area.

Secondly, as AI-enhanced smart glasses is a fairly new technology yet to reach mass market adoption, it's relevant to understand how, or if, the adoption of this innovation can be determined with the five factors trying to explain the potential of an innovation (relative advantage, compatibility, complexity, triability, and observability). Thirdly, another area of research calls for complementing the key variables of TAM/TAM2, perceived usefulness, and perceived ease of use, with additional variables, perceived risk and perceived trust, to better explain the acceptance of AI-enhanced smart glasses (Koutromanos & Kazakou, 2023). As previously stated, the integrated AI assistant makes these glasses even more intrusive, and it is therefore important to investigate how trust can mitigate any perceived risks.

Finally, previous research has expressed the need for a qualitative study that lets users interact with the glasses before forming their opinion, as the majority of existing studies on smart glasses are on individuals' perceived opinions about smart glasses, without having had the opportunity to interact with the glasses (Koutromanos & Kazakou, 2023).

In answering the research questions below, this study aims to bridge the gaps in the existing literature:

1. How are AI-enhanced smart wearables perceived by potential early adopters?

2. How do potential early adopters perceive the drivers and barriers to adopting AI-

enhanced smart wearables?

3 Methodology

This chapter first explains the study's qualitative research strategy and the research design that was used to collect data. The section continues discussing the sampling of participants, ethical considerations, and limitations of the chosen methodology.

3.1 Research Strategy

Before deciding on the study's research strategy, it is vital to establish a strong methodological foundation, deciding on which view of the world the study will take.

3.1.1 Underlying Research Assumptions

When establishing a strong methodological foundation, it is essential to have a brief discussion regarding the ontological and epistemological perspectives that underpin this study. These philosophical considerations shape the research approach and influence how knowledge about consumer acceptance and the diffusion of emerging technologies is generated. Ontology concerns the nature of reality and the assumptions researchers make about how phenomena exist (Saunders et al., 2007), and this study adopts a constructivist ontology, recognizing that consumer acceptance of smart glasses is not a fixed or objective reality, but rather a socially constructed phenomenon. Individual experiences, cultural contexts, and social interactions shape acceptance and adoption. Therefore, this study acknowledges multiple realities as expressed by potential early adopters, rather than seeking an absolute, universally applicable truth. This ontological stance aligns with an interpretivist approach, allowing for an in-depth exploration of subjective meanings and consumer perceptions. Epistemology addresses the nature of knowledge and how it can be acquired (Saunders et al., 2007). Given the constructivist ontological stance, this study follows an interpretivist epistemology, emphasizing the importance of understanding human experiences through a qualitative research strategy. Knowledge about consumer perceptions and adoption behavior is co-constructed through dialogue, making it context-dependent rather than objective and generalizable.

3.1.2 Qualitative Research Strategy

In social research, two strategies are typically employed, the quantitative approach and the qualitative approach (Bryman, 2015). The distinction between quantitative and qualitative research is often regarded as fundamental, stating that quantitative research is research that can be measured, while qualitative research is research that cannot be measured (Bryman, 2015). However, the differences between the two research strategies are deeper than the simple issue of the presence or absence of quantification (Bryman, 2015). While quantitative research is often associated with a positivist epistemology and tends to seek

patterns or generalizable findings, it can still be applied to study dynamic and subjective phenomena such as attitudes and beliefs. In contrast, qualitative research more explicitly embraces a constructivist view of social reality, one that is shaped through individual interpretation and social interaction (Bryman, 2015). Further, qualitative research involves studying the meaning of people's lives, under real-world conditions, thereby being able to capture the views and perspectives of participants in a study (Yin, 2010). Additionally, qualitative research covers contextual conditions, capturing the social, institutional, and environmental conditions that form people and their opinions (Yin, 2010).

As this study investigates consumer acceptance and adoption of AI-enhanced smart glasses, a qualitative research strategy is used to capture the depth and complexity of individual experiences. Unlike quantitative methods, which focus on measuring predefined variables, qualitative research allows for a more nuanced exploration of subjective meanings, contextual influences, and evolving consumer attitudes. Further, the majority of existing studies on smart glasses follow a quantitative methodological approach (Koutromanos & Kazakou, 2023). Therefore, previous studies express a need for a qualitative approach that lets users interact with the glasses before forming their opinion. Through methods such as focus groups and expert interviews, this approach enables a richer understanding of the underlying factors driving or hindering adoption, uncovering insights that may not emerge through numerical analysis alone.

3.2 Research Design

Qualitative research primarily examines the significance of real-world events rather than merely their occurrence (Yin, 2010). As noted by Yin (2010), this quest for meaning is essentially a search of concepts, which are more abstract than the specific data collected. Moreover, by logically grouping these concepts, a theory concerning the studied events can be formulated (Yin, 2010). Taking an inductive approach to the research design means letting the data lead to the emergence of new concepts. A contrasting approach is the deductive approach, letting existing concepts and theories decide what is relevant to study (Yin, 2010). This study has taken a third approach, an abductive approach, which moves back-and-forth between theory and data (Bryman, 2015). Abductive reasoning offers a nuanced approach to understanding and interpreting complex phenomena.

3.2.1 Semi-structured interviews

To form a better understanding of the research area, initial interviews with experts in the field were conducted. In the setting of qualitative interviews, Bryman (2015) mentions that there are two major types of interviews, the first being the unstructured interview. In the unstructured interview, the researcher only has a brief set of notes with a certain

range of topics to guide the direction of the interview. Bryman (2015) explains that there might be as few as just one single question that the interviewer asks, and then the interviewee is allowed to reply freely. The unstructured interview can very much be described as a conversation, as it possesses many of the same characteristics (Burgess, 1984; Yin, 2010). The second commonly used alternative in a qualitative setting is the semi-structured interview, combining features from the unstructured interview and the structured interview. The semi-structured interview has a list of questions and somewhat specified topics that should be covered during the interview. This list is often referred to as an interview guide, but the interviewee is allowed to steer the conversation in another direction if they find it suitable. In a semi-structured interview, the interviewer may follow up on the interviewee's replies, asking questions that might not have been covered in the interview guide (Bryman, 2015).

As the purpose of conducting interviews for this study is to gain in-depth insight from experts within the field, a semi-structured interview method was used for data collection. Bryman (2015) explains that the semi-structured interview format is a preferred approach for studies with a fairly clear focus, so that the more specific issues can be addressed, which is the case for this study. The nature of the research questions, exploring how potential early adopters of AI-enhanced smart wearables perceive smart glasses, further calls for a semi-structured approach. In section 3.2.4, a more detailed description is given about the interviews.

3.2.2 Focus Groups

To understand how potential early adopters of AI-enhanced smart wearables perceive smart glasses and how these perceptions affect technology adoption, it is beneficial to interview multiple participants simultaneously. Conducting focus groups allows for dynamic discussions where participants can express their concerns, challenge each other's viewpoints, and build on shared experiences (Bryman, 2015). Additionally, it helps researchers identify key themes, misconceptions, and informational needs that may not emerge in individual interviews. Therefore, focus groups will act as the main source of data collection in this study. To emphasize the need for focus groups, the process of understanding and interpreting social phenomena is not something that is done by studying individuals in isolation from each other (Wilkinson, 1998). Instead, it is something that can be understood by studying the interaction between individuals. Therefore, focus groups better reflect the process through which meaning is constructed in everyday life and are therefore better suited to capture social phenomena than individual interviews.

The number of participants in a focus group can vary, usually, a typical group should include six to ten members (Morgan, 1998). This is not necessarily the case for all focus

groups. For instance, where the participants are likely to have a lot to say on the research topic, due to participants being very involved or emotionally preoccupied with the topic, smaller focus groups can be used (Morgan, 1998). When topics are controversial or complex, using smaller focus groups is suggested, this is because it makes it easier to gradually extract or interpret meaning through careful observation, analysis, or reflection (Morgan, 1998). Although the participants in this study will be able to interact with the AI-enhanced smart glasses before participating in the focus group, it is still a novel technology yet to reach mass market adoption, therefore being complex to analyze and requiring a smaller focus group.

Regarding the total number of groups required for a study, Bryman (2015) explains that it can vary widely. While it is unlikely that one focus group will give enough data to answer the research questions, equally, there are strong arguments saying that too many focus groups are a waste of time. One way to decide when there are enough groups is when the researcher is able to anticipate what the next group is going to say (Calder, 1977). As this study is limited by a certain time frame, a total of four focus groups were conducted. In section 3.2.4, the data collection process is explained in further detail.

3.2.3 Sampling in a Qualitative Setting

There are many approaches when recruiting participants for a qualitative study. In this study, participants were recruited based on what Bryman (2015) describes as purposive sampling and snowball sampling. As this study aims to understand the drivers and barriers of AI-enhanced smart wearables, purposive sampling was used when recruiting participants for the focus groups. When researchers select participants according to purposive sampling, the sample group is more or less decided early on in the research process based on the scope of the study (Bryman, 2015). More specifically, participants in the focus groups have been recruited based on researcher-driven recruitment (Peek & Fothergill, 2009), whereby the researcher, often with the support of an organization with an interest in the research, uses emails, flyers, and face-to-face recruitment.

As the purpose of conducting semi-structured interviews was to complement the focus groups and further cover specific topics, snowball sampling was mainly used to identify and recruit participants. Snowball sampling is a technique which, from an initial sample of people relevant to the research question, samples other participants who have relevant experience or characteristics (Bryman, 2015). Based on the insights from the focus groups, experts within the relevant field were recruited, after having had an initial interview the participants were encouraged to recommend further participants. As Bryman (2015) explains, snowball sampling is an effective method to recruit participants when lacking contacts in the field, and was, therefore, an effective method in recruiting participants for

this study.

3.2.4 Conducting Interviews and Focus Groups

Before deciding on what area this study should research, initial interviews with experts in the field were conducted, see table 1. These interviews were done with experts from various disciplines at Ericsson Research and with one external company, SKUGGA, which has developed a miniaturized smart module that can be embedded in any fashion eyewear frame. The interviews were semi-structured and followed an interview guide consisting of general questions about their view on AI-enhanced smart wearables and what they thought would be the most interesting area to investigate. As AI-enhanced smart wearables in the form of glasses represent a novel technology, the insights from these interviews were later used when forming the purpose and research questions of this study.

Role	**Date**	**Duration**
Head of Research: Agenda and Quality	2025-01-22	61 min
Master Researcher: Statistics	2025-01-27	28 min
Research Leader: Networks	2025-01-27	49 min
Principal Researcher: Business Models	2025-01-28	45 min
Experienced Researcher: ConsumerLab	2025-01-29	37 min
Principal Researcher: Future Use Cases	2025-01-30	42 min
External company: SKUGGA	2025-03-06	61 min

Table 1: Initial interviews with experts in the field

However, the majority of this study builds on data from focus groups. A total of four focus groups were conducted with potential early adopters of smart glasses, two focus groups were conducted with students from Uppsala University, and two focus groups were conducted with working professionals at the global telecommunications company Ericsson. Conducting four focus groups gave enough data to answer the research questions, as the data was becoming saturated, while the study still maintained a reasonable complexity for the data analysis. To qualify for the study, and ensure that the participants were potential early adopters of AI-enhanced smart glasses, participants had to fulfill certain criteria regarding their use of Generative AI and Extended Reality (XR), as these are some of the core features in AI-enhanced smart glasses. The screener used to identify potential early adopters can be found in Appendix B.

Building on the definition of early adopters (Rogers, 1962), this study defines potential early adopters of AI-enhanced smart glasses as someone who (1.) immediately try and adopt new technology, (2.) or someone who already have tried and used smart glasses, or (3.) as someone who extensively use Generative AI and XR tools, as these are core

features of AI-enhanced smart glasses. From the initial group of 40 participants, 16 were defined as potential early adopters, and they could therefore participate in the focus groups.

The student groups were conducted on two occasions at Campus Ångström, at Uppsala University. These participants were recruited with physical flyers and online announcements on a student portal, the invitation can be found in Appendix A. This approach allowed for a much better reach, and an estimated 300 students saw the invitation, out of which 13 reported their interest, and nine qualified for the study. To determine whether one qualified for the study or not, the previously mentioned screener was used, which can be found in Appendix B. The first student group consisted of three participants, as the fourth participant got sick with a late notice, and the second student group consisted of five participants. The group size was aimed at four people, but this can vary depending on the situation and the topics being discussed (Bryman, 2015; Morgan, 1998). Student group 1 was conducted on the 10th of April, and student group 2 was conducted on the 15th of April. A more detailed description of the student groups can be found in Table 2 and Table 3.

Respondent	**Role**	**Age**	**Duration**
Respondent 1	M.Sc. student in Information Technology	18-29 years	61 min
Respondent 2	M.Sc. student in Information Technology	18-29 years	61 min
Respondent 3	B.Sc. student in Mechanical Engineering	18-29 years	61 min

Table 2: Student Group 1

Respondent	**Role**	**Age**	**Duration**
Respondent 4	M.Sc. student in Sociotechnical Systems Engineering	18-29 years	66 min
Respondent 5	M.Sc. student in Sociotechnical Systems Engineering	18-29 years	66 min
Respondent 6	M.Sc. student in Sociotechnical Systems Engineering	18-29 years	66 min
Respondent 7	M.Sc. student in Sociotechnical Systems Engineering	18-29 years	66 min
Respondent 8	M.Sc. student in Sociotechnical Systems Engineering	18-29 years	66 min

Table 3: Student Group 2

The working groups were conducted on two occasions together with Ericsson Research at their headquarters in Kista, Sweden. These participants were recruited with physical flyers

and with an internal e-mail invitation to employees of Ericsson Research, resulting in 27 individuals expressing interest in participating in the study, out of which eight qualified to participate in the study. The first working group consisted of four participants, all of whom were employees at Ericsson, and the second working group consisted of four participants, two of whom worked at Ericsson and two that was writing their Master's thesis at Ericsson. Working group 1 was conducted on the 23rd of April, and working group 2 was conducted on the 24th of April. A more detailed description of the working groups can be found in Table 4 and Table 5.

Respondent	**Role**	**Age**	**Duration**
Respondent 9	Commercial Readiness	54-65 years	69 min
Respondent 10	Principal Researcher: Radio	54-65 years	69 min
Respondent 11	Experienced Researcher: Networks	18-29 years	69 min
Respondent 12	Chief Solutions Architect	42-53 years	69 min

Table 4: Working Group 1

Respondent	**Role**	**Date**	**Duration**
Respondent 13	Experienced Researcher: Artificial Intelligence	18-29 years	80 min
Respondent 14	Business and Development Manager	18-29 years	80 min
Respondent 15	Master Thesis Student R&D	18-29 years	80 min
Respondent 16	Master Thesis Student R&D	18-29 years	80 min

Table 5: Working Group 2

The focus groups were structured to allow participants to engage with and test the Meta Ray-Ban smart glasses. This interaction was a crucial component of the focus groups, considering the demand for studies involving user interaction with the glasses (Koutromanos & Kazakou, 2023). Before the focus group began, the participants were given a set of tasks that they could perform to try to familiarize themselves with the glasses. During the focus groups, the participants were introduced to images representing different usage scenarios involving smart glasses to stimulate discussion, as seen in Appendix D. The scenarios were followed up with a set of questions to be discussed around the table. Given that AI-enhanced smart glasses have not yet been widely adopted in the market, it was deemed appropriate to provide these scenarios to help encourage dialogue. The material was filmed and transcribed to help capture the participants' opinions accurately, analyze the material, and identify themes. As the student groups were conducted in Swedish, the quotes used from these two interviews have been translated to English for this study, and

this process is further discussed in section 3.4.

3.2.5 Qualitative Data Analysis

One of the main challenges with qualitative research is the vast amounts of data that are being generated through notes and transcripts (Bryman, 2015). Therefore, the researcher must use an analytical procedure and codification that allows the researcher to identify the key concepts and themes that are being discussed. One such approach to data analysis is thematic analysis, but unlike strategies such as grounded theory or critical discourse analysis, thematic analysis does not have an identifiable heritage or has been outlined in a cluster of techniques (Bryman, 2015). Nevertheless, it is one of the most used approaches to analyze qualitative data (Bryman, 2015). In thematic analysis, identifying themes is a key component of the method. Themes and subthemes are essentially recurring patterns within the text that are then used to examine the data. These themes and subthemes emerge from a detailed process of repeatedly reading through the transcripts or field notes that comprise the data (Bryman, 2015). When searching for themes one should look for repetitions, metaphors and analogies, similarities and differences, as a few examples, in the data (Ryan & Bernard, 2003). An emphasis on repetition is probably one of the most important criteria for establishing that a pattern within a data source, or among multiple sources of data (Bryman, 2015). However, repetition alone is not sufficient to identify a theme, instead the researcher must reflect on the initial coded data to establish linkages between them (Bryman, 2015), and by doing so a theme emerges that can assist in answering the research questions.

As this study employs a qualitative research design with focus groups and semi-structured interviews, this has generated a rich dataset, and thematic analysis is a suitable approach when analyzing the information gathered for this study.

3.3 Ethical Considerations

When conducting qualitative research and studying human subjects, in this case in the form of focus groups and less structured interviews, it becomes important to have ethical considerations in mind (Iltis & MacKay, 2024). A few considerations to keep in mind are informed consent, protecting confidentiality and privacy, showing respect for participants, conducting appropriate data collection and analysis, and using findings responsibly (Iltis & MacKay, 2024). To guarantee compliance with these criteria, no sensitive information such as sexual orientation or political beliefs, and a consent letter was prepared for participants to sign prior to participating in the focus groups. The consent letter can be found in Appendix C. The consent letter starts by introducing the study, explaining its purpose and rationale to the participants, details the types of data collected, specifies who

will have access to the data, and describes the data storage location. Finally, participants are informed that their participation is voluntary, they can withdraw at any point, and their identities will remain confidential. By following these guidelines, this study aims to ensure the responsible and respectful conduct of research.

3.4 Methodological Limitations

Despite numerous measures aimed at establishing a rigorous methodology, the study has certain limitations that could influence the outcomes.. Firstly, the participants in the focus groups, potential early adopters of AI-enhanced smart glasses, were recruited among engineering students at Uppsala University and among employees of Ericsson Research. While the participants had to fill in a screening form, as seen in Appendix B, to ensure that they were potential early adopters of AI-enhanced smart glasses, it is important to acknowledge that these groups are not representative of the broader population. Engineering students and research professionals are likely to possess higher-than-average technical proficiency, a strong interest in emerging technologies, and both groups likely have presumed positive or negative attitudes about AI-enhanced smart glasses. Additionally, these groups tend to be more homogeneous in terms of educational background, socioeconomic status, and possibly demographic factors such as age and gender.

Secondly, as the focus groups were structured on a set of questions relating to each scenario in Appendix D, naturally, this affected the topics that were discussed during the sessions. Therefore, this might have had an impact on the findings presented in chapter 4. Finally, the focus groups have been transcribed with the built-in transcription tool on Teams. To ensure that the transcribed material aligns with what was said, the recordings were compared to the transcribed material afterwards. As the student groups were conducted in Swedish, the citations from these focus groups have been translated into English. Although the translation is determined to be accurate, it is relevant to mention. Additionally, in the writing of this report, AI tools have been used for grammar, as these tools are a quick and accurate way of controlling spelling.

4 Findings

This chapter begins by presenting observations from each of the four focus groups to see whether any notable group dynamics or interaction styles set the different groups apart. After this, the themes and sub-themes identified from the focus groups will be presented. The themes that emerged were obtained with the data analysis technique of thematic analysis. A total of four themes were identified, these being: privacy concerns, data vulnerability, behavioral changes, and user preferences. These were complemented with ten closely related sub-themes, which were identified from the collected data.

4.1 Observations from the Four Focus Groups

While the participants of this study had to pass the same screener to qualify for the study, one can still observe similarities and differences between the two student groups and the two working groups.

A common observation from both the student groups and the working groups was their concerns about data collection, where the data is stored, and by whom. It could be observed that the working groups made a larger effort in protecting their data compared to the student groups. Another common opinion between the student groups and the working groups was that smart glasses make a more appealing case in smaller subgroups, where the elderly and the visually impaired were one commonly referred group, as the built-in camera and AI-assistant can explain to the user what's in front of the user. One similarity regarding the participants behavior was that in every student group and working group there were one to two individuals who had much to say about the subject, where the other participant's had to be encouraged to speak up.

One could observe some differences between the four focus groups. One general trend that was observed between the student groups and the working groups was their attitude towards the Meta Ray-Ban glasses. Compared to the working groups, the student groups had a more negative attitude towards the glasses. Although having passed the same screener, one could observe that the working groups were generally more positive towards these smart glasses. However, considering that the working groups were recruited from Ericsson Research, where a lot of emphasis is put on new technologies and how these can be used, this might explain why the working groups saw more use cases and had a more positive attitude towards the smart glasses. Adding to this, a few participants from both the first and second working groups had previous versions of smart glasses at home, while the student groups had only interacted with the technology at school or through mobile applications. It could be observed that the working groups made a larger effort in protecting their data compared to the student groups. However, it is difficult to

tell whether this difference is related to age, as the members in the student groups were younger compared to the working groups, or if it is related to the participants' occupation. Additionally, the working groups were more interested in the technical specifications of the glasses compared to the student groups, which perhaps can be explained due to their occupation at Ericsson Research.

Below follows a presentation of the identified themes and sub-themes from the focus groups. The themes have emerged naturally from the collected data by identifying what subjects were discussed most frequently. As the focus groups had a set of questions relating to each scenario in Appendix D, naturally, this affected the topics that were discussed during the sessions. One such area was privacy, however, this theme emerged naturally from both the student groups and the working groups. More discussions that emerged naturally were about data and data vulnerability, behavioral changes, and user preferences. The resulting themes and sub-themes are presented more thoroughly below.

4.2 Privacy Concerns

The first theme that was identified in this study was privacy concerns. Respondents from both the student groups and the working groups raised questions regarding privacy and consent when it comes to the use of AI-enhanced smart glasses. This theme was discussed frequently among the participants, and while the working group was very protective of their privacy, the student groups did not see this as an equally big concern.

4.2.1 Recording Without Consent

One topic that was discussed during the focus groups was the risk of being recorded without consent. While actors such as Meta has taken action to mitigate this risk by introducing a flashing light as one records with their AI-enhanced smart glasses, the participants expressed concern that this flashing light is not a sufficient warning. Respondent 7 from a student group stated that the flashing light to indicate if someone is recording could be more visible, while respondent 12 from a working group mentioned that the flashing light can easily be covered to make it more difficult for bystanders to know whether the user is recording or taking a picture of them. With a traditional camera or a smartphone, it is quite easy to tell whether someone is recording, as they have to point the camera towards you, but having a camera integrated into a pair of glasses, it becomes more difficult to tell, raising concerns about consent. When asked if the participants in the focus groups thought that being recorded without realizing it our without giving consent, respondent 2 from a working group remarked that this can be problematic:

> *"[...] It feels like a little bit of spy also. They can record you, they can take your picture. At least when they do it with their phone, you see the phone, you*

can really sense if somebody's recording you, you can react to that. But with these glasses, it gets even harder and out of your control." (Respondent 13)

While respondent 9 from a working group mentioned that being recorded without consent, through discrete AI-enhanced smart glasses, can be used for exposing individuals or blackmail:

"Even though I don't like my photo being on the Internet all the time, I'm more cautious on the recording thing. And then it's like you were in a party, probably talking or something, and then you get exposed by the recording for the voice and the communication." (Respondent 9)

It is important to emphasize that one can record audio and video without consent with existing smartphones, but as respondent 13 stated, AI-enhanced smart glasses makes it easier and more difficult to recognize: "All those things I think are still possible today, but this type of technology makes it even easier, it accelerates the whole process". There were varying opinions among the participants about the camera, where some participants felt that the risk of being recorded without one's knowledge is more acceptable in a public environment, as respondent 3 from student group 1 states, "For my part, it doesn't matter much if they're filming on the street. No, it's more if they're filming in personal environments, that would be bothersome." respondent 5 from student group 2 agrees, stating that "There are a lot of surveillance cameras in society in general. You're probably being watched. But what feels strange is that it's a private individual using this. And that you don't know for what purpose.". Surveillance in public seems to be more accepted among the participants, but when it's done by private individuals or at private events, it is more problematic. Respondent 10 states that:

"[...] I mean, I'm acutely aware, I notice them all over the place and it's like, OK, there's a camera too, there's a camera too etc. And I think, I don't know, of course my behaviour is not really affected too much because I normally, you know in public, I behave normal anyway. So in that sense, it's OK, but if this was at work or at a street that's kind of a public environment, then I'm less worried, but you know, at a private party. If someone walks down with these and records everything, that might be a bit more cumbersome." (Respondent 10)

However, even if some participants expressed concern over the integrated camera, many participants emphasized that this camera is a must to make the glasses usable, as many of the core functions, such as the integrated AI-assistant, use the camera. When asked if the participants would prefer to have or not have a camera, respondent 11 from working group 1 mentions that, without a camera, "Why would I use them then? [...] Especially when I

don't wear glasses normally" which is further emphasized by respondent 16 from working group 2: "It all works on the camera. For example, reading all the labels, it needs to take a photo. If we just remove the camera, then it will be useless or something like that, only for voice AI assistant.". There seems to be a consensus among the student groups and working groups that AI-enhanced smart glasses require a camera to function and make them usable, even if some participants raise concerns about surveillance, privacy, and bystander privacy.

The discussion of privacy and bystander privacy is also present among developers. SKUGGA, a Swedish company that has developed a miniaturized smart module that can be embedded in any fashion eyewear frames, believes that an integrated camera is not a unique selling point for smart glasses. As a representative from SKUGGA put it: "[...] I think the camera will be banned for a while going forward. It won't be socially acceptable for people to walk around filming all the time". Instead, SKUGGA is positioning smart eyewear as a privacy-first alternative, not built for surveillance, but for support. The unique selling point lies in using sensor data (motion, light, air quality, etc.) to enable a new class of personal AI agents that understand context without watching you. SKUGGA believes that eyewear – as something we already wear and trust – is the ideal form factor for a physical AI layer that protects identity, enhances awareness, and integrates discreetly into everyday life.

4.2.2 Bystander Privacy

Closely related to the above discussions on being recorded without consent is the term bystander privacy. In a future where AI-enhanced smart glasses are more widely adopted, the privacy of third parties will be of greater importance. As these glasses collect a lot of sensor data (image, voice, video), third parties easily become targets for data collection. The participants in this study were asked how they would feel if they met someone with AI-enhanced smart glasses whose recording light has been "blurred" or covered, where respondent 3 reacted and mentioned that she would be very uncomfortable in such a situation:

> *"Uncomfortable. Yeah, very uncomfortable. I want to know if I'm being recorded, otherwise I would probably limit myself and what I'm saying, and maybe not be so open also. I would not like this."* (Respondent 3)

Later in the same group, participants note that even when conventional cameras are everywhere, being recorded by an inconspicuous, always-on device feels more invasive, as respondent 10 mentioned: "Well, that's the thing. If it's obvious, you can always tell them", implying that it is more difficult to tell if you are being recorded or observed by someone wearing AI-enhanced smart glasses.

The participants in this study stated that being recorded in a public environment is more acceptable, but being recorded in a private environment without being aware is problematic. Respondent 3 from a student group mentioned that: "For my part, it doesn't really matter if they're filming on the street. No, it's more if you're filming in someone's personal environment, that would be uncomfortable.". The participant's of this study suggest that it might be more acceptable to record without consent in a public environment, but not in a private one, and respondent 12 even goes as far as suggesting that, in a future with smart wearables, private events or parties should be required to inform whether it is allowed or not to film at this private event.

4.3 Data Vulnerability

Building on the concerns and questions relating to privacy, both the student groups and working groups expressed concerns regarding their data, where it is stored, and for what purpose it is collected.

4.3.1 Data Ownership

When using AI-enhanced smart glasses, the user inevitably has to give the corporation behind the glasses access to their data. This data can be captured in a variety of ways, but predominantly from position-tracking, the microphone, the camera, and prompts used with the AI-assistant. When it comes to data ownership, there were varying opinions between the participants of the student groups and working groups. The first working group, with individuals very aware of the data collection that goes on by large corporations, was concerned about the amount of data that AI-enhanced smart glasses capture and expressed discomfort. As respondent 10 stated:

> *"[...] you know, if it wasn't owned by Meta and if the back-end was sort of my own cloud instance, in some sense, then I'd be much more comfortable with it."* (Respondent 10)

This was followed up by respondent 9 from the same group, who mentioned that their generation thinks in this way, but stated that a younger generation might think differently concerning privacy and data collection:

> *"Take 7-8 years old, they are living in a completely different world where sharing is not a problem, and they love it and they are connected to their friends all the time"* (Respondent 9)

The future will tell whether younger users are more willing to adapt to AI-enhanced smart glasses, but as of today, more senior users seem to think that the data collection is an

issue. Student group 2 discussed that they usually do not think about where their data is stored and who controls it, which contradicts the discussion in the first working group, but mentioned that with the recent turmoil in the world, they do not feel safe storing their data in the US. Instead, they would be more comfortable using AI-enhanced glasses if their data was stored in Europe instead, as expressed by respondent 4: "Right now I maybe feel more like the US - no, then I would probably rather have my data in Europe. Because right now it's so chaotic. But if it had been as stable as before, then it would probably not have been an issue". This statement very much aligns with the quote above from respondent 10, emphasizing that the trust in a certain brand or actor, in this case Meta, can affect adoption.

Besides the findings on data ownership, the student groups and working groups also mentioned that being steered and controlled by third parties is another potential data-related issue, especially in a future where AR-glasses will allow for advertisement in the glasses.

4.3.2 Controlled by Data

In a future scenario where we have fully immersive AI-enhanced glasses, integrated with an AI-assistant, the participants in this study raised concerns about them being unconsciously affected and steered into certain behavior through recommendations and ads that appear digitally in their glasses. Respondent 9 from working group 1 stated that "I think it depends on how much AI is built in, to combine that information with your own taste, because what I don't like right now in Google is that everything became super review oriented" which respondent 12 also agreed with, expressing a fear of being tricked into consuming by these corporations. A quote from respondent 10 in the same group agrees with this issue:

> *"I mean it's already happening. That's exactly what I was gonna say. So if this is backed by my own AI that knows me, knows my taste, and it happens to know I've seen good reviews or whatever, or friends that have been here, and then I think it's, hey, you know your friend was here and they really liked it, do you wanna try? That's one thing. Another thing is when it's all steered by Meta and Google and all these other places. And the reason I got this recommendation is because the place put an ad and paid for it. And I think those are very different scenarios. And what I'm afraid of is that we are actually moving into the second direction, not the first"* (Respondent 10)

However, that companies are selling the user's data to third parties who are using the data to influence consumers is nothing new and is already happening with the smartphone and app economy that exists today. On the other hand, as AI-enhanced smart glasses can hear

what we hear and see what we see, and can follow us everywhere and all the time, this allows for a new, even more intrusive, way of collecting data about the users.

Relating to data collection, some participants stated that AI-enhanced smart glasses are the ultimate tool to collect data about the user and their surroundings. Instead of AI-enhanced smart glasses being a product for the consumer, respondent 1 expressed that smart glasses are rather a way for corporations to collect more data about consumers:

> *"It feels like this technology, in this case enhanced with AI, it sounds cool and all, but it's very niche, and to me it just seems like yet another tool for data collection. It makes things more convenient, sure, but fundamentally, I see this as a pretty big problem."* (Respondent 1)

4.4 Behavioral Shifts

While AI-enhanced smart glasses can translate conversations and help us navigate through new cities or countries, the participants of the student groups and working groups discussed that smart wearables might affect how we interact with each other, how we communicate, and how we learn.

4.4.1 Behavioral Changes

In a potential scenario where AI-enhanced smart glasses reach mass market adoption and are widely accepted, the participants of this study raised concerns over a more individualistic world where, instead of asking someone for directions or asking them where they have purchased their jacket, one can simply use their AI-assistant, which can, with the integrated camera, give directions or answer at which store a certain jacket is from. Respondent 2 from student group 1 mentioned that "I almost think it feels a bit dystopian that you'd ask a pair of glasses instead of just going up to someone and asking them directly.", and similar quotes can be found in student group 2, where respondent 4 states: "I think there's a risk that you become a bit disconnected from your surroundings. Like, you get so caught up in yourself. Like, you could be having a conversation with your glasses or something.".

However, not all participants were as concerned, mentioning that AI-enhanced smart glasses will help us stay connected with the world around us, without the distraction of constantly checking a smartphone. Respondent 2 expressed that always having to look down at your phone can be frustrating: "It's also frustrating that you have to look down at your phone when you still want to be in the present, and at the same time be aware of what's going on around you.", respondent 13 from working group 2 expressed that she also would prefer to interact with a pair of glasses, rather than with a smartphone "I think

it would be better, I would prefer that over looking into a phone".

4.4.2 AI-interaction

A participant in one of the working groups mentioned that AI-enhanced smart glasses in their current form, where the AI sometimes gives the wrong answer, and the user has to speak very directly and clearly for the AI to pick up the questions, might affect behavioral dynamics and how we communicate. Respondent 10 states that when communicating with an AI assistant our communication becomes very direct, which is not natural and something that we might see more of in the future, as AI is becoming more integrated into our everyday life.

> *"[...] you become a little bit robotic and the conversation that you developed with the machine can be a bit too direct, you know you change your communication style to more exact question to exact answer, instead of more philosophical discussions"* (Respondent 10)

This is further emphasized by respondent 12 from the same working group, stating that it is an issue that LLM's and AI models are used to deliver answers, reducing our need to think for ourselves.

> *"But I think it's a problem with LLM's and AI in general. It's kind of dumbifying us a bit. I mean, sure, it helps us to solve even harder problems, but to really learn something you do that when you solve it yourself, right now, when we get the solution delivered, we do not learn in the same way"* (Respondent 12)

Having AI assistants that we can reach out to at any given time is a very new and unique phenomenon, and the student groups also mentioned the possibility of asking AI rather than asking people, colleagues or lecturers, as respondent 3 put it: "I think it's more that people don't dare to ask the lecturer, and instead they ask AI. It probably won't give the right answer in quite the same way, or at least not as nuanced an answer, as if you were to ask the lecturer.". Of course, this concern is not specific to AI-enhanced smart glasses, but AI in general, nonetheless it it is important to be aware of. Having access to an AI assistant at all times might result in over-reliance, where one uses AI to answer any question, no matter how easy, difficult, or sensitive.

4.4.3 The "Hey Meta" Stigma

The participants in the student groups and working groups found it awkward that one has to say "Hey Meta" to activate the AI assistant or to navigate the wearables hands-free. Using voice commands is nothing new and is frequently used with examples such as "Hey

Siri", "Hey Alexa", and "Okay Google"; however, the participants found it a bit awkward to always have to say "Hey Meta". This command can be changed in the Meta view app to "Okay Meta" but you can't get around using voice commands to activate and control the glasses. However, after a while people might get used to this, as respondent 5 states that "[...] people in society will have to start saying things like 'Hey Meta' out loud, and eventually get used to it. However, I don't think I'll be the first one to walk around town talking to myself.". Respondent 6 has a desire for gesture commands, similar to the Apple Vision Pro mixed reality glasses. As they put it: "Like what Apple has. That you can control it with your eyes so you don't have to speak. It would feel strange to just sit on the train saying, 'Hey Meta,' 'Who's in front of me?' or 'What am I reading?'". Respondent 13 from working group 2 also mentioned that having to say "Hey Meta" to activate the glasses feels "This is like very first generation of Siri". Also, it was difficult to tell whether the glasses were listening and observing even before the user said "Hey Meta", which ties a lot into section 4.3 about data ethics and data usage.

This persistent need to vocalize "Hey Meta" in public not only feels awkward according to the participants but also creates a certain stigma, meaning that potential early adopters of AI-enhanced smart glasses may experience self-consciousness or even ridicule before the behavior becomes normalized.

4.5 From User Preferences to Specific Markets

Although the participants had concerns regarding privacy, data vulnerability, and the potential effects on social dynamics, AI-enhanced smart glasses proved to be practical and seemed promising for specific use cases.

4.5.1 Interface Preferences

While the participants in the student groups and working groups found it awkward to have to say "Hey Meta" to activate the glasses, as mentioned above, they were more positive towards the hands-free capabilities that AI-enhanced smart glasses offer. Respondent 13 states that:

> *"I think apart from people with disability and old people, who can use these in many different ways, for people like us, in my own case, I would use it more for like multitasking. So my hands are really busy with something, and I want to do something else, so for multitasking I would prefer these [AI-enhanced smart glasses]."* (Respondent 13)

While respondent 14 appreciates that one can use smart glasses as a substitute for your smartphone, thereby reducing the time spent on the phone, "I think I'm a bit sick of using

my phone. I try to decrease the amount of time I spend on my phone, but everything feels dependent on it. So every time I need my phone when I want to check things. I don't like this. Yeah, these [AI-enhanced smart glasses] could help me, I guess, to get rid of the phone to some extent.". As the hands-free feature allows the user to quit looking down into the phone, it opens up opportunities for more natural interactions with their surroundings, enhancing situational awareness. This is further emphasized by respondent 9:

> *"But I think it goes back to people as well. Who are the ones wearing high-end technology today? Because like, if I think about myself, I have my watch, I have the phone and so on. And then if I just have one glass that can connect to everything, and I don't need to be looking at all these devices all the time, I think it's unlocking, you know, and I see that as an advantage."* (Respondent 9)

While the possibility to control your AI-enhanced smart glasses hands-free is unlocking and helps with situational awareness, compared to using a smartphone, this alone was not enough to convince the participants to potentially buy AI-enhanced smart glasses.

Besides the hands-free control, the AI-enhanced smart glasses used in this study also have a camera and speakers integrated into the frame. However, having speakers in the frame did not seem to be a driver in adoption by potential early adopters, as respondent 9 stated:

> *"And again, in terms of sound, I think the AirPod is so much better sound that I would rather use them, and it's more private. As well, so I would rather not having any sound coming from there [the speakers] and have something connected to my ear."* (Respondent 9)

However, respondent 16 from a working group mentioned one benefit of having speakers integrated into the frame: "But from health point of view, eardrums are safer in this rather than wearing airpods or something like that." While respondent 15, from the same working group, mentioned that he would have liked the integrated speakers in the glasses to isolate him from the surrounding noise, and mentioned that bone-conduction technology could be a possible solution: "But I've tried, which I think is a really fun format, where they like vibrate in your skull and then it's more isolated".

4.5.2 Desired Visual Aid

Almost every participant in both the student groups and working groups expressed a desire for an augmented interface, where the user has digital overlays and receives arrows for directions directly in the glasses, or their messages show as a pop-up in the glasses. Respondent 14 from working group 2 mentions digital overlays for navigation as one

desired use case: "I think the maps, if you, someone already said this, but if you can have the visual aid on the glasses and give directions, that would be super helpful", while respondent 10 from working group 1 mentions that a digital dashboard that appears in your glasses would be useful "I would prefer to have sort of, an online view dashboard, whatever, that I can interact with".

Having a mixed reality feature, that combines the physical world with digital overlays, will also help in unlocking us, according to respondent 9:

> *"[...] assume you have a glass which you can have a screen on, or something moving in front of you in the glasses, or a video of a personal trainer instructing you through a video in the glasses, I think this will make you less locked into a small device [a smartphone] and you open up to the environment around you"* (Respondent 9)

However, respondent 7 from a student group disagrees, mentioning that having digital overlays in smart glasses creates the risk for distractions and we won't be as aware, as we are focusing on what's being displayed on our glasses, and not in the physical world, as respondent 7 puts it: "Then it also feels really hard to be social [...] I'm sitting here watching YouTube meanwhile, I am also sitting here talking to you. It feels like people would have an even harder time switching their attention between the digital world and the physical world.". This is also mentioned by respondent 12 from a working group, who sees it more as an obstacle then something enhancing our ability to make personal connections: "I see it more as an obstacle rather than something enhancing in your personal connection".

4.5.3 Target Segments

While AI-enhanced smart glasses can help us in our everyday tasks, and a future scenario with mixed reality features would make them more attractive, according to the participants in this study, some specific markets and use cases were thought to be more suitable than others. Respondent 1 states that:

> *"[...] this is a type of interface that also requires less from the user in terms of technological ability. So I think the two main use cases that I find most relevant for smart glasses are: the elderly and people with disabilities. This interface [AI-enhanced smart glasses] opens up the whole smart world in a different way, which otherwise isn't really accessible. Even if you have really big buttons on the phone, just picking it up can be difficult for some."* (Respondent 1)

These specific markets are targeting individuals who could benefit greatly from the hands-

free control and the integrated AI assistant that AI-enhanced smart glasses offer. With AI-enhanced smart glasses that has a camera, the user can capture its surroundings and the built-in speakers can explain for the user what's around them, making AI-enhanced smart glasses a great product for the visually impaired, as respondent 13 put it: "But it would be helpful to blind people [...] Constantly telling you what's around is very important". And for the elderly, interacting with technology through voice command rather than through a small phone makes technology more accessible, as respondent 1 previously stated.

While the elderly and visually impaired are two promising markets for AI-enhanced smart glasses, some participants emphasize that at this stage, these glasses are only suitable for specific use cases. Respondent 10 mentioned that "But it's only for the specific use cases. I wouldn't, you know, run around with these in public now probably", emphasizing their novelty and early stage adoption.

5 Discussion

In this chapter, a recap and interpretation of the key findings are presented, structured on the identified themes privacy, data vulnerability, behavioral changes, and user preferences, from chapter 4. The study's results are analyzed within the DOI framework, considering its five key determinants of an innovation's potential and the role of early adopters in connecting early-stage markets to widespread adoption. Additionally, the TAM2 model is employed, focusing on its core elements of perceived usefulness and perceived ease of use, alongside the supplementary factors of subjective norm and image, to evaluate the acceptance of an innovation. To investigate this, the following research questions were asked: (1.) How are AI-enhanced smart wearables perceived by potential early adopters? (2.) How do potential early adopters perceive the drivers and barriers to adopting AI-enhanced smart wearables?

5.1 The Privacy Paradox

The findings of this study show that privacy concerns remain a big issue in the adoption of AI-enhanced smart glasses. Potential early adopters expressed concerns about the risk of being recorded without consent and how bystanders might accidentally be captured on recordings. Paradoxically, the camera acts as both a driver and a barrier in the adoption of AI-enhanced smart glasses. While removing the camera would mitigate a lot of the privacy concerns, participants in this study stated that without a camera, there would not be enough use cases to motivate the use of AI-enhanced smart glasses.

These issues relate to one of the main factors in TAM2 (Venkatesh & Davis, 2000), perceived usefulness. Being concerned not only about the user's privacy but also about how people around the user perceive them, as they might disapprove of being recorded without consent, feeds directly into the TAM2 constructs of subjective norm and image, undermining perceived usefulness. Furthermore, through the lens of compatibility, defined as how consistent the new innovation is with the values and needs of potential adopters (Rogers, 1962), AI-enhanced smart wearables face problems with compatibility. As the participants discussed the possibility of being recorded by someone else, without their consent, bystander-privacy concerns signal a misalignment between smart glass capabilities and existing social norms. Potential early adopters of AI-enhanced smart wearables are not comfortable having a pair of glasses observing them without their knowledge. While Rauschnabel and Ro (2016) found in their study of German consumers that privacy concerns have a surprisingly limited impact on the adoption intention, the results from this study suggest otherwise. Perhaps this can be explained by the increased awareness among consumers on how their data is being handled, or the difference in attitudes could be explained by the AI capabilities that the latest generation of smart

glasses includes.

Based on the findings, the perceived opinion by potential early adopters of AI-enhanced smart wearables is that privacy remains an even larger concern with the introduced AI features. To truly reach mass market adoption and gain acceptance among consumers, the integrated AI assistant could be a potential driver of adoption. The use of generative AI has exploded with LLMs such as ChatGPT, and having your own LLM integrated in a pair of glasses, easily accessible through voice command and always with you, could revolutionize how we interact with AI and the possible use scenarios of these glasses. As the AI capabilities increase the relative advantage, the degree to which an innovation is seen as better than the existing (Rogers, 1962), it might act as one of the primary drivers in the adoption of these glasses, much like the founder of Meta and co-founder of Google previously has stated (Honan, 2024). The incorporation of AI might become a new construct in acceptance models for smart glasses. Although TAM2 includes the additional constructs of subjective norm and image (Venkatesh & Davis, 2000), technological features such as AI could emerge as a construct in future models for smart glass adoption.

Including factors such as perceived trust and perceived risk in acceptance models has been discussed in previous research (Koutromanos & Kazakou, 2023). However, bystander privacy is a new concern specifically relating to the contextual awareness of smart glasses enhanced with AI. As bystander privacy was one of the main reasons that the Google Glass failed (Haque, 2015), it is a potential barrier that should be included in future acceptance models on smart glasses. At the same time, one could argue that bystander privacy is related to the existing construct of image, the degree to which use of an innovation is perceived to enhance one's status in one's social system (Venkatesh & Davis, 2000). Nevertheless, concerns regarding bystander privacy are a barrier negatively affecting the adoption of AI-enhanced smart glasses.

While the participants in this study thought that an integrated camera was a necessity for AI-enhanced smart glasses, other actors think differently. As the company SKUGGA stated, they think that the camera will be banned for a while going forward. It won't be socially acceptable for people to walk around filming all the time. Whether this is the case or not is outside the scope of this qualitative study, but it remains highly relevant for future research, as it will greatly impact the future use cases of AI-enhanced smart glasses.

5.2 Behind the Lens

This study found that the participants had varying trust in AI-enhanced smart wearables, much related to the company or brand behind the glasses. From the perspective of trust theory (Stewart, 2003), it seems that the acceptance and adoption of smart glasses

is strongly related to the company that has developed the glasses. As some participants stated, the company behind the product very much forms their beliefs and attitudes towards the product. As AI-enhanced smart wearables collect a lot of sensor data about the user and their surroundings, there is a growing concern about what goes on behind the lens, and potential early adopters fear that their data is being misused. From the perspective of TAM2, the themes relating to data vulnerability undermine perceived usefulness and raise trust issues, variables that are critical in forming positive usage intentions (Venkatesh & Davis, 2000). As argued by Renner et al. (2022), trust in the context of technology acceptance and adoption is a dual perspective, and consumers need to trust the people or the organization behind the technology (Lankton et al., 2015), but consumers also need trust in the technology itself (Lankton et al., 2015). The potential early adopters in this study stated that they had a lack of trust in an organization such as Meta, probably due to earlier fines relating to data breaches and fines relating to GDPR, which can act as a barrier to the adoption of AI-enhanced smart glasses. However, the much of the concerns were related to the brand/actor, and while this also affects trust in the technology developed by this actor, no other concerns relating to the trust of the technology were discussed.

The findings also indicate that a few participants perceived AI-enhanced smart glasses as yet another, even more intrusive, tool to collect data about the user. In terms of image, relating to TAM2 (Venkatesh & Davis, 2000), this distrust is a barrier that might negatively affect the acceptance of smart glasses. From this perspective, it seems that smart glasses lack relative advantage, one of the five factors determining the potential of an innovation (Rogers, 1962).

The findings of this study emphasize the need to update traditional acceptance models with variables such as perceived risks and perceived trust, very much aligning with the results of Koutromanos and Kazakou (2023). Perhaps, with the integrated AI features, the need to include trust as a variable in consumer acceptance of new technologies has become even greater. Interestingly, brand trust seems to be a contextual variable in the acceptance of AI-enhanced smart wearables and could be included in future acceptance models of smart glasses.

Relating to the above discussion on trust in the organization and in the technology itself, a new interesting topic was discussed during the focus groups. During the recent turmoil in the world, some participants would have been more comfortable adopting AI-enhanced smart glasses if their data had been stored in Europe, compared to the US, and while it is out of the scope of this study, future research could investigate how geopolitical factors affect the adoption and acceptance of smart glasses.

5.3 Behavioral Shifts in an Extended Reality

While the potential early adopters in this study were intrigued by the hands-free capabilities and related use cases that AI-enhanced smart glasses offer, concerns were raised about the behavioral changes they bring about. For the integrated LLM to react, participants had to speak very directly, with a robot-like tone. And for the camera to recognize specific objects, one had to move their body in an unnatural way. From the perspective TAM2, with its two main variables, perceived ease of use and perceived usability (Venkatesh & Davis, 2000), today's AI-enhanced smart wearables had a hard time convincing the participants of this study. Perceived ease of use was low as participants felt they needed to speak in a certain way for the glasses to react, and they needed to move in a certain way for the camera to recognize what they were looking at, leaving frustration among the participants, and acting as a potential barrier for adoption. However, as technology evolves, these issues will most likely go away.

In addition to our communication becoming very direct when wearing AI-enhanced smart glasses, one has constant access to an AI assistant through a simple tap on the frame, or it can be activated with voice-command. As LLMs such as ChatGPT are becoming more frequently used, for every type of question, the participants expressed concerns that the LLMs are dumbifying us, as AI delivers the solution directly and the user does not have to think for themselves in the same extent. Other participants thought that this over-reliance on AI was quite dystopian, suggesting that we should interact with our peers instead of an AI assistant. From the perspective of observability, the degree to which the results of an innovation are visible to others (Rogers, 1962), a future world where everyone interacts with their AI assistant can result in both a high and low observability, acting as both a driver and barrier for adoption.

The findings also indicate that potential early users found it uncomfortable to say "Hey Meta" when operating the glasses. While tapping the frame to activate them is an option, it compromises the intended hands-free experience. The social stigma of verbally saying "Hey Meta" seems to be a barrier to adoption. Whether the stigma is specifically related to a brand or the actual need to vocalize a prompt to activate the glasses was not covered in this study's scope, but it presents an intriguing avenue for future research.

Building on the discussion of extended reality features, owning a single intelligent wearable gadget, like AI-powered smart glasses, which consolidates the functionalities of both a smartphone and a smartwatch, prompts the question of whether this will result in increased connectivity or, conversely, lead to greater disconnection. Although outside of this study's scope, this is an interesting development for future research.

5.4 Breaking into Mainstream

As the AI-enhanced smart wearables used in this study were in the form of glasses, the shape factor was discussed in the focus groups. The shape factor was not a big issue for participants already using regular glasses. Earlier studies have shown that having a fashionable and sleek design is important in the acceptance of smart glasses (Haque, 2015). Interestingly, this study found that non-users of glasses thought that wearing smart glasses was acceptable, as long as they brought enough relative advantage compared to other smart wearables. From the perspective of TAM2, as long as the perceived usefulness is high enough, factors such as form and social acceptance seem to matter less.

The majority of potential early adopters in this study expressed a desire for extended reality (XR) features. Integrating extended reality, making the glasses truly immersive, where users could get navigation through arrows pointing in their glasses, or interact with a digital dashboard that appears on the glass, was a big selling point for the potential early adopters in this study. In this way, we no longer need to stare into our phones or even bother picking up our phones; instead, the user has AI-enhanced smart wearables that unlock the environment around us. Through the lens of the five adoption factors, AI-enhanced smart wearables combined with extended reality seem to have a strong relative advantage, that is, the degree to which an innovation is seen as better than the existing product that it replaces (Rogers, 1962). However, the current AI-enhanced smart wearables did not seem as intriguing to potential early adopters, as some participants found the glasses too complex and immature, which can be related to the complex factor in Rogers (1962)'s model. The high complexity has a negative impact on the acceptance and adoption of these glasses.

The participants in this study stated that they prefer to interact with technology in this way compared to a smartphone; they liked the fact that smart glasses open you up more to your surroundings, compared to staring down at a phone. In terms of the five factors explaining the potential of a new innovation, the complexity of smart glasses is perhaps lower compared to the complexity of today's smartphone. The hands-free control and direct availability were seen as two benefits of smart glasses. The elderly and visually impaired were frequently mentioned in the study as two possible target markets, or beachhead markets (Rogers, 1962), where practitioners should focus their efforts towards. When the product has gained traction and received good reviews from the beachhead market, this market segment can help in convincing the mass market of the product's benefits (Rogers, 1962). However, it is not certain that the elderly and visually impaired are the beachhead target markets that will help AI-enhanced smart glasses reach mass market adoption. One could argue that these groups are slow in adopting new technology, and to reach mass market adoption, companies should rather focus their efforts on a younger generation that

is fast to adopt new technologies, and has a wide reach in the social network. Other authors, such as Kristensson et al. (2020), have argued that the chasm, as seen in figure 3, has shifted. Whether this is the case or not is out of this study's research scope; however, this study can contribute to existing research with the insights of a potential beachhead market for AI-enhanced smart wearables. While other studies have emphasized their importance in the health sector (Aekanth & Tillinghast, 2023; Iovanel et al., 2023), well-being (Tikkanen et al., 2023), and education (Al-Emran et al., 2023), this study concludes that the visually impaired is a potential beachhead market for AI-enhanced smart wearables in the form of glasses.

Considering the great interest in extended reality features, such as integrating immersive technologies like AR, future acceptance models of smart glasses need to include these technological parameters, as they seem to have great importance in the adoption of smart glasses.

6 Conclusions

The purpose of this study has been to explore consumer acceptance and diffusion of emerging technologies. To explore this purpose, this study has investigated how AI-enhanced smart wearables, in this case in the form of glasses, are perceived among potential early adopters of the technology, and what drivers and barriers affect acceptance and adoption among potential early adopters. With the explorative study design in mind, this study has conducted interviews and focus groups with potential early adopters of AI-enhanced smart glasses, in which the participants had the possibility of interacting with the glasses before forming their opinion.

The findings of this study show that potential early adopters had quite a skeptical attitude towards AI-enhanced smart wearables in the shape of glasses. While working professionals tended to emphasize the technological challenges and privacy concerns that these glasses need to overcome to reach mass market adoption, the student groups tended to focus more on the form-factor and social acceptability. The participants valued context-aware assistance, object recognition, and hands-free capabilities, which aligns with TAM2's perceived usefulness and DOI's relative advantage. The participants perceived that AI-enhanced smart glasses opened them up more to their surroundings, not being as locked into a small device, such as a smartphone. While the participants in this study perceived today's AI-enhanced smart glasses as too complex, not bringing enough relative advantage, and faced issues with social norms, future versions that integrate AR techniques, making them truly immersive, were seen as an appealing choice.

This study can conclude that, paradoxically, the integrated camera acts as both a driver and a barrier in the adoption of AI-enhanced smart glasses. While removing the camera would mitigate a lot of the privacy concerns, participants in this study stated that without a camera, there would not be enough use cases to motivate the use of AI-enhanced smart glasses. To truly reach mass market adoption and gain acceptance among consumers, the integrated AI assistant proved to be a potential driver of adoption. Also, the hands-free capabilities that let the user be aware of their surroundings while interacting with the glasses were a frequently mentioned driver in the adoption of current AI-enhanced smart glasses. The findings show that privacy acts as a critical barrier, where consent and bystanders' privacy undermine DOI's compatibility dimension and fuel negative subjective norms in TAM2, reducing users' perceived social acceptability and willingness to adopt. Trust in the company behind the product likewise proved pivotal; participants who doubted the brand or the company's integrity showed a diminished sense of relative advantage (DOI) and a lower perceived usefulness (TAM2), underscoring trust as a necessary factor to both acceptance and sustained use. Another barrier to the acceptance and adoption of current AI-enhanced smart glasses was behavioral shifts, as the LLM used with the AI

assistant required a direct and robotic tone, which potential early adopters saw as a barrier. Additionally, the need to say "Hey Meta" to interact with these glasses hands-free seemed to be a barrier to adoption among potential early adopters.

As the participants of this study interacted with the glasses before forming their opinion, this enriched our qualitative understanding of the perceived drivers and barriers of AI-enhanced smart wearables. Having identified a potential beachhead market, this being the visually impaired, these insights can help marketers in crossing the chasm. Together, these results address our research questions by demonstrating that the inclusion of AI in smart wearables requires adherence to social norms and trust in the technology and the brand responsible for the product. Moreover, it offers a novel method of engaging with technology via an innovation that comprehends the user's context, assists daily life with an integrated AI assistant, and allows for user connectivity with their environment, resulting in a more enhanced experience.

6.1 Theoretical Implications

The first major theoretical contribution of this study is the insights into acceptance and adoption by actual users of AI-enhanced smart glasses. While previous research has mainly been quantitative studies about potential users and their perceptions about AI-enhanced smart glasses (Koutromanos & Kazakou, 2023), this research relies on information collected from real users who had the chance to engage with a pair of Meta Ray-Bans before forming their opinions. Secondly, this study emphasizes the need to update traditional acceptance models with variables such as perceived risks and perceived trust. Perhaps, with the integrated AI features these glasses offer, the need to include trust as a variable in consumer acceptance of new technologies has become even greater. The incorporation of AI might become a new construct in acceptance models for smart glasses. Although TAM2 includes the additional constructs of subjective norm and image (Venkatesh & Davis, 2000), technological features such as AI could emerge as a construct in future models for smart glass adoption.

Thirdly, while previous research on smart glasses concluded that privacy concerns have a surprisingly limited impact on adoption intention (Rauschnabel & Ro, 2016), this study suggests otherwise. Privacy risks relating to consent and bystander privacy were perceived as major barriers in the adoption of AI-enhanced smart glasses. Fourthly, although concerns have been raised regarding the relevance of DOI and the five factors determining the potential of an innovation (Kristensson et al., 2020), the framework proves to be functional in determining how smart wearables, enhanced with AI, are perceived by potential early adopters. Finally, this study does not aim to research if the chasm has moved (Bussgang, 2021). However, it can offer insights into a potential initial market

segment for AI-enhanced smart glasses, namely the visually impaired, as these glasses offer substantial benefits for this audience.

6.2 Practical Implications

The main practical implications of this study address insights on how potential early adopters perceived AI-enhanced smart glasses and what drivers and barriers they identified. These insights can be used by marketers, manufacturers, or future research on AI-enhanced smart glasses. The participants who interacted with the Meta Ray-Bans used in this study stated that privacy remains a large challenge for AI-enhanced smart glasses. Because these devices integrate a camera directly into the frame, participants raised strong concerns about being recorded without their knowledge or consent. While smartphones today can also capture photos and videos, their use is often obvious; in contrast, smart glasses make it far easier to conceal when recording against someone's consent. The participants felt that recording in public spaces was somewhat acceptable, given the ubiquity of surveillance cameras, but expressed deep unease about use during private moments or at personal events.

Concerns around data collection practices and purposes were often mentioned among our working groups. Participants feared that smart glasses would serve as yet another, and even more intrusive, means for enterprises to collect personal data. They suggested that younger generations, being more used to sharing online, might unknowingly consent to extensive data collection. Importantly, our findings underscored the critical role of brand reputation and transparency in adoption. Participants indicated they would be more comfortable adopting smart glasses if the manufacturer were a trusted brand and if data storage locations were clearly communicated. Thus, building and maintaining trust through transparent data policies is essential.

Interacting with today's AI-smart glasses can feel awkward. To activate the device, users must speak in a very direct, almost robotic tone, which undermines willingness to adopt. Moreover, today's AI-enhanced smart glasses require the user to lean in close to objects so the camera can properly recognize them, leading to unconventional body movements. Participants also worried that easy access to an AI assistant might result in over-reliance, where users ask the glasses rather than consulting with peers or experts, which could encourage laziness or increase algorithmic bias. Although voice activation ("Hey Meta") is an option, many found it embarrassing to use in social settings, further dampening enthusiasm.

Despite these reservations, participants recognized the unique advantages of hands-free interaction. Voice commands combined with AI assistance allow users to perform

smartphone-like functions while remaining visually and socially engaged with their environment. Some suggested that removing the camera might reduce privacy concerns, but most agreed that a camera is required for interesting use cases. Interestingly, non-glasses wearers were open to adopting smart glasses provided the devices delivered clear value. While current models generated limited excitement, the idea of future versions, including AR overlays such as navigational arrows or digital dashboards, captured participants' interest. Sleek, fashion-forward designs that integrate AR capabilities emerged as significant drivers for next-generation smart glasses adoption.

6.3 Limitations and Future Research

Although the insights from potential early adopters of this technology can be valuable for practitioners, one must keep in mind that this study was conducted in one country, and with one pair of AI-enhanced smart glasses, which might limit the ability to extrapolate the findings. Also, as smart wearables enhanced with AI, in the shape of glasses, represent a novel technology, their imagination might have affected the possible use cases and opinions that were formed by the participants. In addition, the qualitative study allowed this study to capture the depth and complexity of individual experiences, but the sample size and scope of this study have limited the generalizability.

Future research should investigate whether owning a single intelligent wearable gadget, like AI-powered smart glasses, which consolidates the functionalities of both a smartphone and a smartwatch, prompts the question of whether this will result in increased connectivity or, conversely, lead to greater disconnection. Considering the great interest in extended reality features, such as integrating immersive technologies like AR, future acceptance models of smart glasses need to include these technological parameters, as they seem to have great importance in the adoption of smart glasses. Relating to the above discussion on trust in the organization and in the technology itself, a new interesting topic was discussed during the focus groups. During the recent turmoil in the world, some participants would have been more comfortable adopting AI-enhanced smart glasses if their data had been stored in Europe, compared to the US, and while it is out of the scope of this study, future research could investigate how geopolitical factors affect the adoption and acceptance of smart glasses. Finally, future research should extend this study to cover consumers across different countries and different groups, beyond potential early adopters, and by doing so, add to the existing knowledge on acceptance and adoption of AI-enhanced smart glasses.

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Appendix A – Invitation

Invitation to Participate in a Focus Group on Smart Glasses – M.Sc. thesis

Are you interested in smart glasses and how this technology is evolving? If so, I would love to hear your thoughts. As part of a thesis project on AI-enhanced smart glasses, we are organizing focus groups to hear your opinion. You will have the opportunity to test a pair of Ray-Ban Meta smart glasses and then discuss your experience with other participants.

The purpose of this study is to explore the risks and social acceptance of smart glasses, and your opinions will contribute to a deeper understanding of the development of this technology.

If this sounds interesting and you'd like a unique opportunity to try the latest generation of smart glasses, don't hesitate to reach out to me via email. I will follow up with more information.

Contact Information: emil.vendlegard@ericsson.com

Location? House 5 – more specific details in a separate invitation

When? End of April / early May

Duration? 2 hours

Why Participate? A unique chance to test the latest smart glasses, enjoy some snacks, and discuss your experience!

I look forward to hearing from you/ Emil GFTL ER IndustryLab

Appendix B – Screener

Screener – M.Sc. thesis AI-Enhanced AR

Thank you for your interest in participating in this study on AI-enhanced smart glasses. The purpose of this screener is to identify individuals who qualify as early adopters of smart glasses. Your responses will help determine if you are eligible for the study. The information you provide will be anonymized and used solely for research purposes.

Section 1: General Information

1. Full Name: _____
2. Age group:

   ☐ 18–29 years
   ☐ 30–41 years
   ☐ 42–53 years
   ☐ 54–65 years
   ☐ 66–77 years
   ☐ 78–90 years
3. Gender (Optional): ☐ Male ☐ Female ☐ Prefer not to say
4. Occupation: _____
5. Contact Email: _____
6. Do you currently own or have you previously used smart glasses? ☐ Yes ☐ No
7. If yes, which brand/model have you used? (Check all that apply)
   ☐ Google Glass
   ☐ Microsoft HoloLens
   ☐ Apple Vision Pro
   ☐ Ray-Ban Meta Smart Glasses
   ☐ Other (Please specify): _____
8. Do you wear regular glasses today? ☐ Yes ☐ No

Section 2: Technology Adoption Habits

10. How soon after the release of new technology (smartphones, smart watches, ChatGPT to name a few) do you usually adopt it?
☐ Immediately (within the first few months)
☐ Within the first year
☐ After it has become widely used
☐ Only if it becomes essential

Section 3: Experience with AI and XR

12. What are your primary use cases for Generative AI? (Check all that apply)
☐ I use and subscribe to premium functions of AI tools
☐ I use it as a search engine instead of Google, Safari, etc.
☐ I use it to work on complex issues and create projects
☐ ---
☐ Other (Please specify): _____

13. How often do you use Generative AI?
☐ Daily
☐ Weekly
☐ Occasionally
☐ Have used but no longer do

14. What are your primary use cases for XR (extended reality) tools? (Check all that apply)
☐ Virtual reality glasses / Smart Glasses
☐ XR apps on my smartphone
☐ Entertainment (e.g., AR gaming, media)
☐ Health and fitness tracking
☐ Other (Please specify): _____

15. How often do you use XR?
☐ Daily
☐ Weekly
☐ Occasionally
☐ Have used but no longer do

Thank you for completing this screening questionnaire. If you qualify for the study, I will reach out to you with further details.

Appendix C – Consent Letter

Consent Letter

Participation in Focus Groups – M.Sc. thesis on AI-enhanced Augmented Reality

I, _____, hereby consent to participate in a focus group conducted as part of a master's thesis by Emil Vendlegård, in collaboration with Ericsson and Uppsala University.

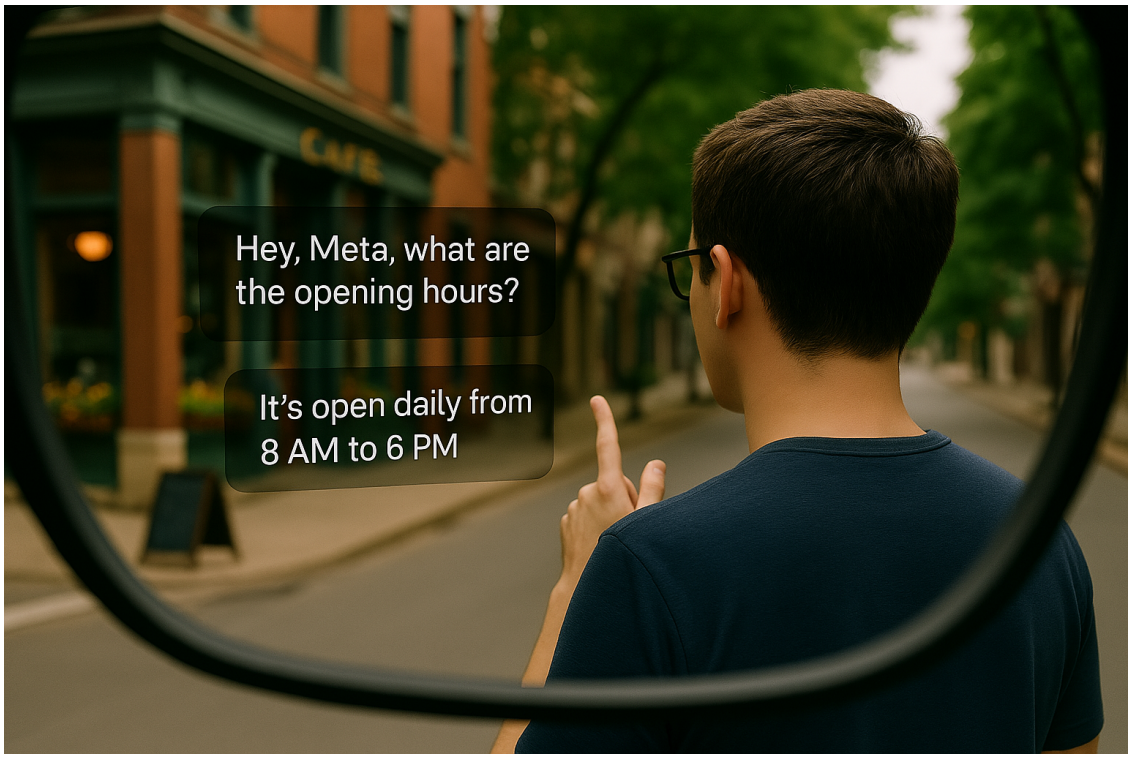
I understand and agree to the following:

- The information I share during the focus group may be used as research data for the master's thesis.
- My participation is voluntary, and I may choose to withdraw at any time without any negative consequences.
- My identity will be kept confidential. Any quotes or data used in the thesis will be anonymized so that I cannot be personally identified.
- The focus group will be audio recorded and video recorded, and the recordings will only be used for research purposes.
- The results of this study may be published in the thesis and potentially other academic outputs, but my identity will remain protected.

Date _____ Signature _____

Appendix D – Scenarios




Hey, Meta, what are the opening hours?
It’s open daily from 8 AM to 6 PM