Title: AR Smart Glasses: The Feeling of Groundedness Mediator Effect

Author's name

Sara Quintal [1]

Ricardo F. Ramos* [2, 3, 4]

Paulo Rita [1]

Pedro Miguel Oliveira [5]

Abstract

Augmented Reality (AR) smart glasses strengthen user interaction by merging real-world visuals with digital information. This study explores the impact of wearability, usability, and social influence on the feeling of groundedness and purchase intentions for AR smart glasses moderated by privacy concerns. Text mining and PLS-SEM were employed to analyze 3,164 Amazon smart glasses online reviews. Results suggest that the feeling of groundedness is influenced by usability and social influence, while wearability showed no significant effect. Privacy concerns moderate the relationship between groundedness and purchase intentions, emphasizing the need for privacy measures to improve user trust. These findings suggest that AR smart glasses create meaningful connections for users, affecting their preferences, choices, and willingness to pay.

Keywords: Smart Glasses; Augmented Reality; Feeling of Groundedness; Amazon reviews.

[1] NOVA Information Management School (NOVA IMS), Universidade NOVA de Lisboa, Portugal;
[2] Instituto Politécnico de Coimbra, ESTGOH, Rua General Santos Costa, 3400-124 Oliveira do Hospital, Portugal;
[3] Research Centre for Natural Resources Environment and Society (CERNAS), Polytechnic Institute of Coimbra, Bencanta, 3045-601 Coimbra, Portugal;
[4] ISCTE – Instituto Universitário de Lisboa, ISTAR, Av. Forças Armadas, 1649-026 Lisboa, Portugal;
[5] ISCTE – Instituto Universitário de Lisboa, Business Research Unit (BRU-IUL), Av. Forças Armadas, 1649-026 Lisboa, Portugal
* Corresponding author: ricardo.ramos@estgoh.ipc.pt

1. Introduction

Augmented Reality (AR) is emerging as the next-generation display platform, facilitating deeper interactions between humans and digital interfaces (Xiong et al., 2021). The AR market is on a continuous upward trajectory, with projections indicating a 67% increase between 2023 and 2027 (Alsop, 2023), driven by the rise of a new technology that is termed 'Wearable AR Devices', with AR smart glasses like Microsoft HoloLens or Google Glass as prominent examples (Ro et al., 2018). Wearable technology is also experiencing exponential growth (Huang et al., 2023). There is an ongoing debate about the potential market reach of AR smart glasses (Pfeifer et al., 2023). Such real-world applications highlight the potential of AR smart glasses to change various industries. However, despite its promising potential, the acceptance and adoption of this technology will strongly depend on its wearability, usability, and social influence (Chaniaud et al., 2020; Tan et al., 2024).

AR smart glasses enrich the user experience by blending real-world visuals with computer-generated information (Krasovsky et al., 2023). This enables (1) limitless potential in how users experience and interact with the world around them and (2) a greater connection with the place, people, and past, giving them a feeling of groundedness (Eichinger et al., 2022).

These glasses are designed for daily use, making usability crucial for extended wearability (Xi et al., 2024). AR smart glasses enable users to instantly capture photos, videos, and audio with a touch, gesture, or voice command without pausing their activities to handle the device (Amorim et al., 2022; Loureiro et al., 2020). Therefore, efficiency, efficacy, and satisfaction are also critical for a positive performance and user experience, merging usability and, consequently, the grounding experience (Herrera-Valenzuela et al., 2024). These wearables enable higher connectivity with social media, generating greater interest among potential users. This trend-setting product can attract new users through social influence, incrementing the connection with personal relationships (Zuidhof et al., 2024). Despite substantial growth in sales and increasing market potential of AR smart glasses (Alsop, 2023; Zuidhof et al., 2024), meeting consumers' experiential needs is vital to overcome adoption challenges and fostering consumer interests and sustained technology usage.

Nevertheless, the implications of wearability and usability in the AR context have captured academia's attention (Ferreira et al., 2021; Hu et al., 2024; Kao & Ruan, 2022). While previous

studies have explored the AR device's wearability (Kim et al., 2021), usability (Wang et al., 2023), and social influence (Pimentel & Vinkers, 2021), they have primarily focused on technological enhancements and individual performance factors and have not adequately addressed how these dimensions influence the feeling of groundedness and purchase intentions. This gap limits the understanding of effective strategies to meet customers' expectations of the immersiveness of AR environments, particularly in AR smart glasses.

To address this gap, this study explores wearability, usability, and social influence's impact on the feeling of groundedness and purchase intentions on AR smart glasses moderated by privacy concerns. To accomplish this objective, online reviews of AR smart glasses were gathered from the largest online retailer, Amazon. The data was analyzed using a mixed approach that combines text mining and Partial Least Squares – Structural Equation Modeling (PLS-SEM). With the present research, we expect to enrich the knowledge of the customers' feelings of groundedness and purchase intentions, providing AR smart glasses managers and marketers with insights to strengthen their business.

2. Literature review

AR technology has advanced to create immersive experiences, bridging the gap between digital and physical worlds (Tang et al., 2024). However, achieving a consistent AR experience that meets users' expectations requires a deeper understanding of several key elements, including wearability, usability, social influence, and privacy. Together, these factors stimulate a sense of groundedness, a fundamental aspect that impacts users' emotional engagement and buying intentions.

2.1. Wearability and the feeling of groundedness

Wearable devices are becoming essential elements of our daily routines, and this requires manufacturers and designers to prioritize specific vital attributes, including physical and multi-functional capabilities, in their design and production processes to appeal to consumers (Xi et al., 2024). Wearability is a crucial aspect of a device design, enhancing user comfort,

convenience, and the overall user experience. A well-designed wearable device fosters user satisfaction by easily integrating the novel technology into daily activities and routines (Adilkhanov et al., 2022).

Wearability refers to a particular item or device's comfort, convenience, and practicality (Lakhdhir, 2024). It encompasses the ease with which a device can be worn during everyday activities, its comfort to the user, and its ability to function effectively without disrupting normal behavior or causing discomfort (Guo et al., 2024). Wearability can create innovative technologies that enhance daily life through thoughtful, human-centered design (Hu et al., 2024).

A technological device with excellent wearability boosts user satisfaction by improving comfort and practicality, which helps users feel more connected to their environment. Intuitive interfaces and accessible controls can contribute to user immersion in the device (Naceri et al., 2021). The outcome may lead a user into continuous involvement, where digital elements and the natural environment coexist and interact intuitively and fluidly (Daassi & Debbabi, 2021). The immersion theory explains that this experience enhances user engagement by fully engaging sensory and mental processes, creating a harmonious blend of digital and physical elements (Parong & Mayer, 2021). This state improves sensorial adoption by overlaying useful information or images that complement the natural environment and reinforces the sensation that the digital elements are part of the physical environment (Dudhee & Vukovic, 2023), creating a feeling of groundedness. For instance, by providing information about a particular context, including a public place with a historic building, the content may connect the user to the physical, social, and historical environment.

However, a deeper understanding of the relationship between wearability and the feeling of groundedness is needed. The previous discussion indicates that wearability improves sensory adoption and creates a smooth blend of digital and physical elements, improving the grounded experience. Hence, the following hypothesis is formulated:

H1: AR smart glasses' wearability positively impacts the feeling of groundedness.

2.2. Usability and the feeling of groundedness

The role of usability is evident in its ability to enhance user experience, satisfaction, and overall productivity (Ferreira et al., 2020). Devices with optimal usability attract and retain users, boost efficiency and satisfaction, and shape the success of technological products in today's competitive market (Jing et al., 2024).

Usability measures how well users can use a product to achieve predetermined goals with efficacy, efficiency, and satisfaction within a specified use context (Ramos et al., 2019). The concept of usability refers to methodologies to improve ease of use during a device's design (Kivijärvi & Pärnänen, 2023).

The significance of usability lies in its direct influence on user engagement with technology and the attainment of individual objectives (Esposito et al., 2024). A user-friendly, intuitive device allows users to interact seamlessly with the digital and physical worlds without distraction (Goundar et al., 2024). Thereby, usability enables users to feel adapted and engaged with their environment by providing more intuitive interactions. The ease of use reduces frustration and cognitive load, allowing users to focus on their tasks and objectives (Clode et al., 2024). Consequently, users feel more grounded as they connect more deeply with their environment, including people and experiences. This highlights the strong correlation between usability and the feeling of groundedness.

Previous studies focused on usability principles (Wang et al., 2023) but failed to provide a detailed examination of how these principles contribute to the groundedness of technology in real-world contexts. As a result, practical usability in a wearable device boosts the user's feeling of groundedness, increasing their connection and engagement with their surroundings (Xu et al., 2024). Following this premise, the following hypothesis is postulated:

H2: AR smart glasses' usability positively impacts the feeling of groundedness.

2.3. Social influence and the feeling of groundedness

Social influence involves intentional and unintentional actions influencing someone else's beliefs, attitudes, or behaviors (Bhukya & Paul, 2023). Understanding social influence reveals how peer pressure, media, social norms, and authority figures can shape decision-making

processes (Butera et al., 2024). This shows how individuals and groups adapt behaviors to conform to societal expectations or resist conformity.

Social influence is the tendency to conform or agree with others or a noticeable majority (Spears, 2021). Consumers rely on social interactions with reference groups, opinion leaders, and families to gather product information and decision approval. These interactions influence individual behavior while affecting buying decisions. A favorable product/service experience, when shared with others (word of mouth effect), can impact consumption patterns, as individuals recommend products to others based on their perceived benefits (Filimonau et al., 2024).

From a social cognitive perspective, the theory of human motivation and action highlights the significant role of observational learning and social modeling in shaping individuals' behaviors (Lim, 2022). When people receive validation for their use of technology from peers or society, it reinforces their sense of belonging in their social environment. It cultivates a deeper emotional connection to the technology, integrating it into their daily lives (Hameed et al., 2024). This social influence may be relevant to how users emotionally connect with people, places, and past. In practical terms, AR devices facilitate user interactions (Kao & Ruan, 2022). Users can share real-time experiences with others, provide personalized information regarding a place based on the user's historical or others' recommendations, and receive old photos and videos promoting a connection with the past. This social dimension of AR, known as social AR, improves user engagement by stimulating direct social interactions and community integration (Sung, 2021). Thus, these insights highlight the role of social influence in adopting and using technology, particularly AR, where interpersonal interactions contribute to user experience and integration into social contexts. This integration amplifies their feeling of groundedness, as the product connects consumers to their physical, social, and historical environment (Eichinger et al., 2022).

Therefore, the following hypothesis is proposed:

H3: The social influence of AR smart glasses positively impacts the feeling of groundedness.

2.4. The feeling of groundedness and consumer purchase intentions

The concept of groundedness has been gaining prominence across various domains due to its significant impact on consumer behavior and well-being (Correia, 2023). Nowadays, customers actively seek and appreciate grounding products that provide an emotional bond, optimizing user experience (Bruckberger et al., 2023).

Groundedness can be defined as the feeling of emotional rootedness that emerges from connections to one's physical, social, and historical surroundings, including place, people, and past. This feeling of groundedness provides strength, security, and stability. Products that connect customers to a physical location, past experiences, and other individuals develop this feeling (Eichinger et al., 2022). Initially introduced by the grounded theory method (GTM) in sociology during the 1960s, it gained popularity and expanded into diverse disciplines throughout the 1980s (Owen Lo, 2014), with primary influence seen in philosophy (Locke, 2003; Weil et al., 1952), and psychology (Henwood & Pidgeon, 2003).

The feeling of groundedness influences these purchase intentions by developing a deep emotional connection to products that link consumers to a place, people, and their past (Eichinger et al., 2022). This emotional bond increases the perceived value of such products, making consumers more willing to invest in them. An incentive-compatible measure of willingness to pay revealed that customers were willing to spend 60% more on products that provided this feeling of groundedness (Eichinger et al., 2022). This heightened willingness to pay reveals how the feeling of groundedness improves emotional attachment and drives purchasing decisions, making it a crucial factor in shaping consumer behavior.

Understanding and analyzing purchase intentions gives businesses valuable insights into customer preferences, motivations, and expectations, enabling them to adjust their marketing strategies and product offerings to better align with consumer desires (Akkaya, 2021; Peña-García et al., 2020).

In this context, the following hypothesis is postulated:

H4: Feeling of groundedness towards the use of AR smart glasses positively impacts consumer purchase intentions.

2.5. The moderating role of privacy concerns

Privacy and security are fundamental factors that prevent consumers from adopting technological products (Butera et al., 2024). As the digital economy expands, the rapid advancement of technology brings significant concerns about data protection and the potential misuse of personal information. Consumers are increasingly wary of how their data is collected, stored, and used, fearing breaches and unauthorized access (Knight et al., 2024). These concerns can create substantial barriers to adoption, as individuals prioritize their privacy and seek assurance about safeguarding their data.

Privacy concerns refer to potential privacy loss, protection against unwanted communication, and the misuse of personal information (Zhao et al., 2023). The result of an individual's perspective on privacy and contextual cues empowers them to evaluate the potential consequences of disclosing information (Paul et al., 2023).

Privacy concerns are associated with modern technology products, particularly advanced surveillance features like cameras and motion detectors (Parihar et al., 2024). These devices offer conveniences such as remote monitoring and voice-activated controls but also raise issues regarding unauthorized access and data misuse (Iqbal & Campbell, 2023). These privacy concerns are crucial in shaping consumer attitudes and their willingness to adopt new technologies, emphasizing the need for data protection measures (Putri et al., 2024). When consumers feel grounded, their trust in the product increases, positively influencing their purchase intentions (Eichinger et al., 2022). However, intense privacy concerns can undermine this trust, diminishing the positive effect of the feeling of groundedness on purchase intentions. Therefore, addressing privacy concerns is essential to fully leverage the benefits of groundedness in raising consumer adoption of new technologies (Dhagarra et al., 2020). Privacy concerns can affect consumers' perception of security and trust in technology products (Quach et al., 2022). Examining how these concerns influence the feeling of groundedness makes it possible to comprehend how to address privacy issues effectively. This, in turn, can boost consumer trust and attachment to the product, increasing their willingness to purchase (Mathavan et al., 2024).

Hence, the following hypothesis is formulated:

H5: Privacy concerns moderate the relationship between the feeling of groundedness and purchase intentions.

The hypothesized model is presented in Figure 1:

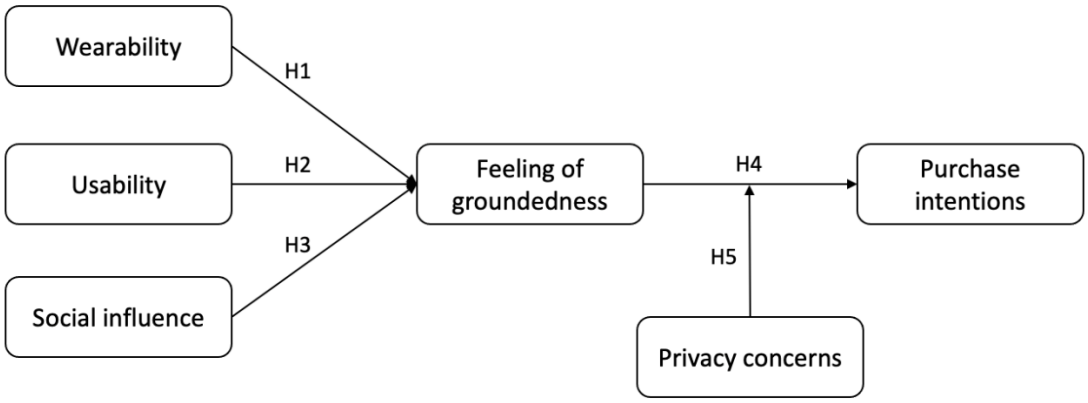

Figure 1. Hypothesized model based on the UTAUT model

3. Methodology

This study used an integrated approach combining text mining and PLS-SEM (Ramos et al., 2023). Instead of relying on primary data from a traditional survey, choosing secondary data aligns with the focus on online reviews from multiple brands of AR Smart Glasses. Data were collected from the e-commerce platform Amazon to capture the feeling of groundedness, privacy concerns, and purchase intentions regarding the device's attributes.

3.1. Data collection and preparation

We undertook an extensive data collection process, gathering 3,164 reviews posted between 2019 and 2024 from the nine major Smart Glasses brands sold on Amazon. Amazon, one of the largest e-commerce platforms, provides a rich source of reviews for a wide range of products (Lembregts et al., 2023; Yun et al., 2024). These nine brands were selected based on their

relevance and the number of reviews available on Amazon.com, Amazon.co.uk, and Amazon.de, among other domains, ensuring representation from the most significant players in the market. The reviews, which reflect users' experiences with the product, were collected using the platform Apify. This platform is known for its comprehensive suite of tools and services for automating web tasks, including web scraping and data extraction (Apify, 2024), simplifying the extraction of substantial amounts of data from web pages, and organizing it into structured spreadsheets for straightforward management in subsequent analysis. The selected brands and the number of reviews collected are displayed in Table 1.

Table 1. Selected brands

Brands	**Number of Extracted Reviews**
Oho	1,386
RayBan	737
Razer Anzu	503
Xreal	197
Rokid Max	112
Real Air	109
Echo Frames	44
Rayneo	39
Doviico	37
Total	3,164

Before data analysis, the data were subject to a pre-process analysis (Ribeiro et al., 2024). This stage is crucial to improve the model's accuracy as it prepares the text, words, and documents for subsequent processing. The Python NLTK package, the Natural Language Toolkit package supplied by Python for Natural Language Processing (NLP) tasks, was used to run this process (Wedjdane et al., 2021). The NLP technique enables categorizing textual data from the collected online reviews (Delhaes et al., 2024). The occurrence of each user's word was organized to structure the generated data and effectively manage the study's scope (Galhoz et al., 2024). Individual words that occurred at least ten times were retained and linked to theoretical concepts (e.g., expensive, discount, cheap = price) to form a dictionary (Table 2).

Table 2. Dictionary with sampled terms by construct

Construct	Items	Example Terms
Wearability	Wearability	Comfort, convenience, practicality
Usability	Efficacy	Work, performance, power
	Efficiency	Fast, quick, capable
	Satisfaction	Love, nice, amazing
Social influence	Social influence	Influence, popular, media
Feeling of groundedness	Place	Home, outdoor, train
	People	Person, friend, user
	Past	Memory, old, remember
Privacy concerns	Privacy Concerns	Allow, protect, access
Purchase intentions	Attractiveness	Design, style, fashion
	Perceived value	Price, money, cost
	Readiness	Adaptable, prompt, available

Two methods were employed to mitigate the subjectivity of creating a dictionary. Firstly, following the approach of Lima et al. (2024), 5% of the dataset was randomly checked to confirm whether the terms were associated with the items. Secondly, three independent marketing experts validated the dictionary, following a standard procedure in the literature (Lima et al., 2024; Ramos et al., 2023). The experts were briefed on the study's objective and analysis method and had the possibility of adding, eliminating, or reallocating the terms. After receiving their feedback, the authors discussed the divergencies, checking the context where the terms were mentioned in the reviews to support the final decision.

The dictionary was cross-referenced with the online reviews, creating a term-frequency matrix, and each term from the online review was assigned to the corresponding theoretical item in the dictionary (Lima et al., 2024). Each row in the term-frequency matrix represents each collected review, and each column represents an item regarding a model's construct. Hence, every cell within the term-frequency matrix reflects the frequency of an element's occurrence in a specific review. Whenever an element was frequently referenced, it was deemed pertinent to the individual. For instance, the review "I love its design and especially the performance" captured one term from 'satisfaction' (*love*), one term from 'attractiveness' (*design*), and one term from 'efficacy' (*performance*). Subsequently, the term-frequency matrix served as the input for estimating the model's pathways using the PLS-SEM technique, mimicking individual responses to a survey constructed using diverse and rigorously tested measurement scales for

each component (Galhoz et al., 2024). This method captures the real essence and variations of the experience more accurately than a Likert scale, which is limited to a few discrete categories (Lima et al., 2024).

3.2. Data Analysis

The term-frequency matrix was input for PLS-SEM analysis to assess the relationships between the collected data and the model's components. PLS-SEM methodology facilitates the integration of theory and data (Becker et al., 2023), enabling the estimation of complex models encompassing multiple components, indicators, and structural paths without imposing assumptions on data distribution (Alshurideh et al., 2023). PLS-SEM allows for the flexible utilization of single-item and formative measurement models and is considered preferable for secondary data analysis (Guenther et al., 2023). The conceptual model's evaluation was carried out using SmartPLS 4, a software designed for data analysis employing the PLS-SEM approach.

The PLS-SEM analysis employed a formative measurement model, as the model's constructs were formulated based on the cumulative term frequencies of each distinct indicator within the established dictionary. Formative models enable the inclusion of distinctive indicators without the requirement for conceptual interchangeability or correlation, as they represent composite expressions derived from a set of indicators that collectively define the construct (Hair et al., 2020).

A Bootstrap test of 10,000 subsamples was utilized to evaluate the coefficients and significance of the path model. A significance threshold of 5% was defined to analyze the crucial t-values of path coefficients. The model's internal multicollinearity and direct effects were assessed using regression analysis. This involved examining the strength and statistical significance of the connections between variables represented by the path coefficients. The R^2 statistic was calculated to determine the percentage of endogenous latent variables' variability, explained by its exogenous latent variables. Q^2 values were generated using the PLSpredict algorithm to assess predictive power, employing a ten-fold cross-validation approach (Hair et al., 2019; Shmueli et al., 2019). The overview of the methodological approach is presented in Figure 2.

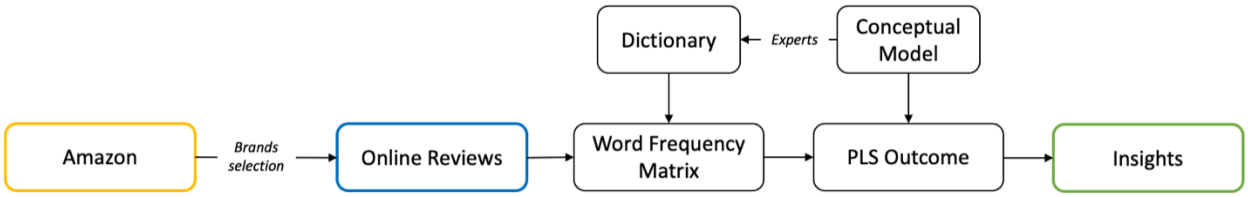

Figure 2. Methodological approach

4. Results

4.1. Formative measurement model evaluation

Table 3 showcases the descriptive statistics for each indicator, including the frequency variation range for each review, its mean, and standard deviation.

Table 3. Model's indicators descriptive statistics

Formative Variable	Min - Max	M (SD)
Usability		
Efficacy	0-47	0.682 (2.218)
Efficiency	0-48	0.138 (1.992)
Satisfaction	0-29	2.373 (3.074)
Feeling of groundedness		
Past	0-46	0.253 (1.969)
People	0-37	1.255 (2.507)
Place	0-21	0.421 (1.301)
Purchase intentions		
Attractiveness	0-35	0.537 (1.856)
Perceived value	0-24	0.732 (1.566)
Readiness	0-49	0.213 (2.118)
Wearability		
Wearability	0-49	2.193 (3.875)
Social influence		
Social influence	0-44	0.816 (2.384)
Privacy concerns		
Privacy concerns	0-46	0.993 (2.505)

Note: Min = Minimum; Max = Maximum; M = Mean Score; SD = Standard Deviation

The validity assessment indicates that while one outer loading fell below the recommended threshold of 0.50 (Hair et al., 2021), it remained statistically significant for the formative usability measures (Table 3). The collinearity among the model's indicators was also examined by calculating the variance inflation factor (VIF) using the PLS algorithm to assess the validity of the formative measurement model. VIF values below the critical threshold of 5 are recommended (Sarstedt et al., 2022; Shmueli et al., 2019). As $1.000 \leq VIF \leq 4.440$, multicollinearity is not considered an issue (Hair et al., 2019). A comprehensive analysis of each formative indicator's importance and statistical significance was performed to evaluate the model's validity. This assessment was conducted through bootstrap estimation utilizing 10,000 samples (Table 4).

Table 4. Summary of percentile bootstrapping estimation

Formative Variable	**Outer weights (Outer loadings)**	**t-values (*p*-value)**	**95% Percentile confidence interval**
Usability			
Efficacy	0.148 (0.911)	4.518 (0.000)	[0.104 ; 0.229]
Efficiency	0.830 (0.984)	11.665 (0.000)	[0.715 ; 0.875]
Satisfaction	0.139 (0.343)	1.816 (0.069)	[0.087; 0.349]
Feeling of groundedness			
Past	0.884 (0.994)	14.073 (0.000)	[0.767 ; 0.932]
People	0.080 (0.669)	1.375 (0.169)	[0.034 ; 0.223]
Place	0.089 (0.763)	2.209 (0.027)	[0.045 ; 0.187]
Purchase intentions			
Attractiveness	0.261 (0.865)	4.170 (0.000)	[0.182 ; 0.410]
Perceived value	0.094 (0.688)	2.962 (0.003)	[0.055 ; 0.171]
Readiness	0.726 (0.978)	15.508 (0.000)	[0.630 ; 0.802]
Wearability			
Wearability	N/A	N/A	N/A
Social influence			
Social influence	N/A	N/A	N/A
Privacy concerns			
Privacy concerns	N/A	N/A	N/A

Note: N/A = Not applicable

At a significance level of 5%, a formative item is considered significant if its p-value is less than 0.05. Upon examination, only the items "people" (*p*-value: 0.169) and "satisfaction" (*p*-value: 0.69) do not meet this criterion (Table 4). Consequently, it becomes imperative to scrutinize the outer loadings to ascertain their importance. If the outer loadings exceed 0.5, it is advisable to retain the items. While "people" (0.669) demonstrated validity, "satisfaction" (0.343) hovered near the threshold. However, it is crucial to recognize that eliminating a formative indicator should not solely be based on statistical criteria (Coltman et al., 2008; Hair et al., 2021). Therefore, despite its borderline statistical significance, the item "satisfaction" was retained due to its relevance to the study. Efficiency and place were identified as the predominant indicators in shaping the usability and feeling of groundedness, respectively, with corresponding outer weights of 0.830 and 0.884. In forming the purchase intentions composite formative construct, readiness stands out as the most relevant indicator.

Confidence intervals were computed using the percentile bootstrapping technique to assess the model's stability. This method was chosen for its superior performance in terms of both coverage and balance (Aguirre-Urreta & Rönkkö, 2018). Additionally, since the estimated values of outer weights do not extend beyond the range of -2.0 to +2.0, there is no necessity to employ the bias-corrected and accelerated bootstrap method (Hair et al., 2021). The stability of the model was confirmed as all outer weights fell within their respective confidence intervals.

4.2. Structural model evaluation

The structural model estimation results are presented in Figure 3 and detailed in Table 5. All path coefficients were found to be statistically significant, providing support for all hypotheses formulated in the study. The analysis confirmed the statistical significance of all path coefficients, endorsing every hypothesis outlined in the study. However, it was observed that wearability does not contribute to the feeling of groundedness ($\beta = 0.024$, $p = 0.310$), leading to the rejection of H1. Conversely, usability ($\beta = 0.907$, $p < .001$) emerged as a strong positive predictor of groundedness, thus supporting H2. Social influence demonstrates statistical significance at the standard 5% level ($\beta = 0.063$, $p < 0.05$), supporting H3. Groundedness positively correlated with purchase intentions ($\beta = 0.242$, $p < .001$), supporting H4. Additionally, privacy concerns ($\beta = 0.037$, $p < .001$) were identified as another significant predictor of groundedness, reinforcing H5.

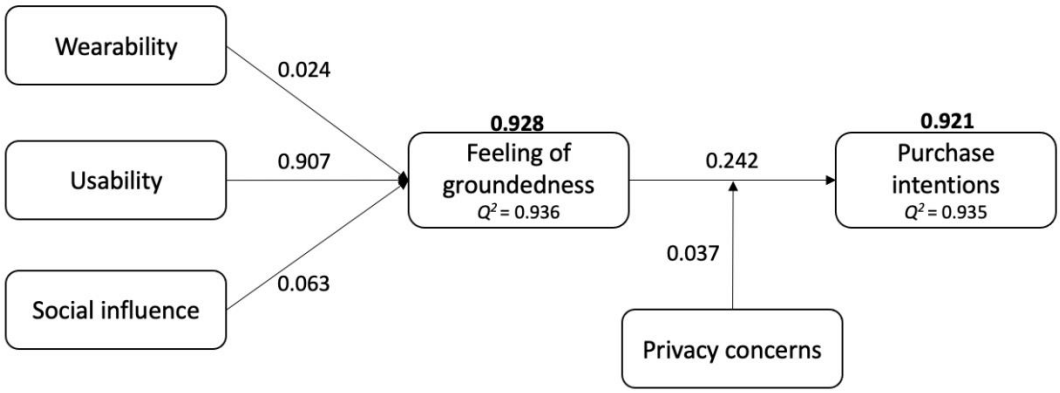

Figure 3. Summary results of the structural model.

Table 5. Structural model results and hypotheses decision

Hypothesis	**Path**	***β***	***t*-value**	***p*-value**	**Decision**
H1	Wearability → Feeling of groundedness	0.024	1.016	0.310	Not Supported
H2	Usability → Feeling of groundedness	0.907	16.310	0.000	Supported
H3	Social influence → Feeling of groundedness	0.063	2.480	0.013	Supported
H4	Feeling of groundedness → Purchase intentions	0.242	4.482	0.000	Supported
H5	Privacy concerns × (Feeling of groundedness → Purchase intentions)	0.037	5.139	0.000	Supported

Note: β = Path coefficient

The structural model accounted for approximately 92.8% (R^2 = 0.928) of the feeling of groundedness variance and 92.1% (R^2 = 0.921) of purchase intentions. It is essential to contextualize R^2 values (Hair et al., 2019), especially in consumer behavior research, where values around 0.20 are considered substantial. Thus, these results indicate a substantial explanatory power of the model for the feeling of groundedness and a slightly weaker but still significant explanatory power for purchase intentions. Furthermore, Q^2 values for these variables were above 0, demonstrating the model's predictive capability (Figure 3).

5. Discussion

This study explored the impact of wearability, usability, and social influence on the feeling of groundedness and purchase intentions for AR smart glasses moderated by privacy concerns.

This study's findings suggest that wearability does not influence the feeling of groundedness, rejecting H1. This finding contradicts several prior studies that have emphasized the positive impact of wearability on user experience and engagement (Adilkhanov et al., 2022; Guo et al., 2024). Wearable technology, when offering excellent wearability and intuitive interfaces, enhances user satisfaction and improves the feeling of groundedness by integrating digital and physical elements (Daassi & Debbabi, 2021; Naceri et al., 2021). While wearability improves comfort and practicality (Lakhdhir, 2024), factors such as weight, adjustment, or pressure distribution in the user's face may not be adequate for all users. Physical discomforts may distract a user and prevent the feeling of groundedness. This divergence indicates that while wearability is essential for user satisfaction and comfort, other elements are likely more critical in improving the feeling of groundedness.

Results suggest that usability impacts the feeling of groundedness, confirming H2. This result aligns with existing research that confirms usability enables users to feel more integrated and engaged with their environment (Clode et al., 2024). Usability highlights how customer experiences attract and retain users (Hu et al., 2024), increasing their efficacy, efficiency, and satisfaction. These contributions deepen our comprehension of the connection between usability and groundedness within AR smart glasses. It suggests that prioritizing usability in design and development processes can improve user experience and groundedness, paving the way for more practical applications of AR smart glasses.

Our study suggests that social influence impacts the feeling of groundedness, confirming H3. This result aligns with the theory of observational learning and social modeling, which emphasizes how social interactions shape technology adoption and emotional connections (Hameed et al., 2024; Lim, 2022). Additionally, social AR improves user engagement by facilitating direct social interactions and community integration, thereby amplifying the feeling of groundedness (Sung, 2021). This finding suggests that interpersonal dynamics and social validation shape user experiences with AR technology. It highlights the significance of

facilitating social interactions to deepen users' emotional connections and integration into their environments.

Results suggest that the feeling of groundedness towards using AR smart glasses positively impacts consumer purchase intentions, supporting the fourth hypothesis. This result argues that the feeling of groundedness is a fundamental factor in shaping consumer purchase intentions for AR smart glasses, confirming the existing literature on consumer behavior and emotional connections to products. Previous studies indicate that emotional bonds, such as those created by feelings of groundedness, influence purchase intentions by increasing perceived product value and emotional attachment (Eichinger et al., 2022). Thus, our results support that emotional connections are crucial in shaping consumer behavior and purchasing decisions. The significant positive impact of groundedness suggests that consumers are more likely to invest in products that offer meaningful and emotionally resonant experiences. Therefore, AR smart glasses that successfully integrate users into their physical, social, and historical contexts will likely see higher purchase intentions.

The findings indicate that privacy concerns moderate the relationship between the feeling of groundedness and purchase intentions, confirming H5. This result confirms the influence of privacy concerns on consumer behavior and technology adoption as explored in existing literature (Dhagarra et al., 2020; Putri et al., 2024). While the feeling of groundedness improves consumers' purchase intentions by deepening trust and emotional connection to the product, privacy concerns can disrupt this positive effect. This indicates that consumers are willing to invest in products that make them feel grounded, but only if their privacy concerns are adequately addressed. This is consistent with the literature, suggesting that data protection measures are essential to maintaining consumer trust and promoting technology adoption concerns (Quach et al., 2022). This highlights the necessity of addressing privacy concerns to realize the benefits of groundedness on purchase intentions. Intense privacy concerns can deteriorate trust and diminish the positive impact of groundedness on purchase intentions (Mathavan et al., 2024). Therefore, it is crucial to implement and communicate strong privacy protections for AR smart glasses and similar technologies to alleviate consumer fears.

6. Conclusions

The present study combined a text-mining approach with a structural model to explore the correlations between wearability, usability, social influence, feeling of groundedness, and purchase intentions. Overall, the results indicate that usability and social influence are crucial characteristics of AR smart glasses for enhancing the consumer's feeling of groundedness and purchase intention. However, no evidence was found to support a positive influence of wearability on the feeling of groundedness. Privacy concerns were found to have a moderation role in the relationship between the feeling of groundedness and purchase intentions.

These outcomes support spreading knowledge about AR smart glasses' attributes related to the feeling of groundedness and their subsequent impact on purchase intentions. Practically, AR smart glasses managers can use this knowledge to strengthen their business strategies and identify the measures that can be implemented to achieve purchase intentions.

6.1. Theoretical contributions

This study amplifies theoretical understanding by offering a new perspective on how the feeling of groundedness influences customers' purchase intentions. Specifically, it reveals theoretical insights regarding user interaction with AR smart glasses, emphasizing that usability and social influence impact the feeling of groundedness. Similarly, acknowledging the role of social influence can guide marketing strategies to leverage social proof and peer recommendations. Additionally, this study highlights privacy concerns, revealing the complex adoption of personal technologies where perceived security and trust play a relevant role. In summary, this study provides a comprehensive understanding of the various factors influencing the adoption of AR smart glasses. By integrating usability, social influence, and privacy concerns into the design and marketing strategies, companies can better meet the needs and expectations of their customers, enhancing technological acceptance and driving purchase intentions.

6.2. Managerial implications

Regarding practical contributions and implications, this study highlights the essential role of usability, social influence, and purchase intentions in intensifying the grounding experience.

By prioritizing these factors, we can improve the user experience with AR smart glasses, enabling users to develop meaningful connections with places, people, and past experiences (Zhao et al., 2023).

The finding that wearability does not impact the feeling of groundedness suggests that user experience strategies must extend beyond physical comfort and ease of use. Designers are encouraged to adopt a more comprehensive approach that integrates various aspects, such as interactive capabilities, personalization options, and user environment integration.

The validation of the second hypothesis emphasizes the importance of prioritizing usability in the design and development phases. By focusing on efficiency and user satisfaction, manufacturers can improve user experience, leading to better integration and engagement with the augmented environment. However, the study's focus on specific usability dimensions may need to pay more attention to individual preferences and the potential contributions of other design elements.

Understanding the role of social influence enables marketers to develop strategies that utilize social proof, such as testimonials and influencer endorsements, to enhance consumer trust and interest. Additionally, companies can foster user communities and social platforms where individuals share experiences and recommendations, further amplifying social influence on potential buyers. These strategies lead to improved engagement, effectively leveraging social influence to drive sales by taking advantage of the power of social networks and peer recommendations, thus demonstrating its significant impact on consumer behavior and market outcomes.

The finding that groundedness influences AR smart glasses can guide product design to deepen emotional connections with users, such as incorporating features that improve immersion and contextual relevance. Marketers can leverage these insights to craft messages emphasizing AR smart glasses' emotional and experiential benefits, appealing to consumers seeking meaningful and engaging experiences. These strategies are crucial as they can lead to increased purchase intentions, higher sales, and revenue. Also, cultivating emotional connections through groundedness can strengthen brand loyalty, encourage repeat purchases, and deepen consumer attachment to the brand.

The study highlights the fundamental role of privacy features in AR smart glasses. Manufacturers can prioritize data protection and transparency to address consumer concerns

effectively. Additionally, educating consumers about privacy measures and demonstrating how their data is safeguarded can improve trust and alleviate privacy-related apprehensions. These efforts enhance consumer confidence in the product and contribute to a more positive perception of groundedness, potentially increasing purchase intentions.

6.3. Limitations and future research

Our study has several limitations that influence our findings and should be considered for future research. Firstly, customer reviews of AR smart glasses were gathered from the top nine brands on Amazon. Even considering different Amazon domains, AR smart glasses represent a very recent product with approximately 3k reviews. This limited dataset constrains the study's objective and inherent conclusions. However, as more reviews become available in the future, the potential for improved results and insights is expected to grow. Secondly, despite the validation of the dictionary by an independent panel of experts, it is essential to acknowledge that this process inherently involves subjectivity (Lima et al., 2024; Ramos et al., 2023). Using both survey-based and review-based results for analysis would add depth to our research, ensuring a more comprehensive understanding of the topic and making our findings more reliable.

Additionally, the collection of comments exclusively from Amazon is a limitation, and future studies could extend the research to other social media platforms to obtain more diverse insights. Future research should also consider including other constructs to explain the phenomenon better. Constructs such as technology acceptance and user engagement could be interesting additions to provide an additional understanding of the factors influencing the adoption and satisfaction of AR smart glasses.

Acknowledgments: None

Disclosure statement: The authors report there are no competing interests to declare.

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