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Revolutionizing Retail:
The Role of Augmented Reality-Driven Information Systems in
Enhancing Customer Experience and Engagement

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ABSTRACT (MAX. 200 WORDS):

Augmented reality (AR) is increasingly being adopted in fashion retail to enhance customer experience, boost engagement, and reduce uncertainty in online shopping environments. While AR offers both hedonic and utilitarian value, its implementation across large multinational fashion companies remains inconsistent due to financial, technological, and organizational barriers. This study investigates how Augmented Reality-driven information systems can be strategically implemented to improve customer engagement and experience in retail environments. A qualitative, interpretivist approach was used, combining semi-structured interviews with professionals and open-text surveys to explore the perceptions, challenges, and outcomes of AR adoption. Thematic analysis revealed five key themes, including current use cases, customer motivation, barriers to adoption, decision-making support, and future outlooks. The study also introduces a Strategic AR Implementation Framework to guide retail organizations in aligning AR technologies with enterprise systems and customer needs. While the findings confirm key patterns in existing literature, they also highlight gaps related to system readiness, user resistance, and integration challenges. The research concludes that AR's value lies not only in its novelty but in its ability to deliver measurable outcomes through thoughtful, context-sensitive

implementation. Future research is recommended to explore AR in other sectors and in combination with emerging technologies.

Content

1	Introduction.....	9
1.1	Background.....	9
1.2	Problem.....	11
1.3	Purpose	12
1.4	Research Questions.....	13
1.5	Delimitations	13
2	Literature Review.....	14
2.1	Augmented Reality (AR) in Retail	14
2.1.1	Defining Augmented Reality (AR).....	14
2.1.2	Evolution of AR: From Concept to Consumer Technology	15
2.1.3	Types of AR Technologies in Fashion Retail	17
2.2	Business Value and Competitive Advantage of AR.....	21
2.3	Consumer Behaviour and AR Adoption.....	23
2.4	Challenges and Barriers to AR Implementation.....	26
2.4.1	Technological Constraints.....	26
2.4.2	Financial Concerns.....	27
2.4.3	Consumer Barriers	27
2.5	Theoretical Frameworks Guiding AR Adoption	29
2.5.1	Technology Acceptance Model (TAM).....	29
2.5.2	Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2).....	30
2.5.3	Technology Organization Environment (TOE)	32
2.6	Literature Summary & Potential Gaps	35
2.6.1	Literature Summary	35
2.6.2	Potential Literature Gaps	37
3	Methodology	38
3.1	Research Philosophy.....	38
3.2	Research Approach.....	39
3.2.1	Literature Review Approach.....	40
3.3	Data Collection Methods	42
3.3.1	Qualitative Research Approach	42
3.3.2	Respondent Selection.....	42
3.3.3	Design of the Interview Guide.....	44
3.3.4	Transcribing	46
3.4	Data Analysis Method	47
3.5	Ethical Considerations.....	50
3.6	Scientific Quality.....	51
4	Findings	53

4.1	Interview Responses – Interpretation & Analysis	53
4.1.1	AR Implementation and Use Cases (ARIM)	55
4.1.2	Customer Engagement and Hedonic Motivation (CEHM).....	58
4.1.3	Adoption, Barriers and Resistance (ADRB).....	60
4.1.4	Customer Decision Support and Uncertainty Reduction (CDSU).....	62
4.1.5	Organizational Strategy and Future Outlook (ORGSTR).....	65
4.2	Interview Responses - Iterative Coding & Analysis	67
4.2.1	Selective AR Adoption (SARA).....	68
4.2.2	Internal Skills Gaps (ISG).....	68
4.3	Survey Responses – Open Coding & Analysis	69
4.3.1	Shopping Confidence & Trust (SCT)	72
4.3.2	Perceptions of AR Technology (PAT).....	72
4.3.3	Adoption & Use of AR (AUA).....	73
4.3.4	AR Concerns & Barriers (ACB).....	73
4.3.5	AR in the Broader Tech Landscape (ATL).....	73
4.4	Survey Responses – Iterative Coding & Analysis.....	74
4.4.1	Customer Decision Support and Uncertainty Reduction (CDSU).....	76
4.4.2	Adoption Barriers and Resistance (ADRB).....	77
4.4.3	AR Implementation and Use Cases (ARIM)	77
4.5	Theme Presence Summary Table	78
5	Discussion	79
5.1	Revisiting the Research Question: Strategic Implementation and Customer Engagement..	79
5.2	Implementation — Balancing Innovation and Scalability	80
5.3	Customer Experience—Engagement, Motivation, and Satisfaction	81
5.4	Cross-Sector Themes: Common Drivers and Challenges	82
5.5	Comparative Insights: Fashion and Aerospace	83
5.5.1	Implementation and Use Case.....	84
5.5.2	Hedonic Motivation and Engagement.....	84
5.5.3	Adoption Barriers.....	85
5.5.4	Decision Support and Uncertainty Reduction.....	86
5.5.5	Organizational Strategy and Future Outlook	87
5.5.6	Summary	87
5.6	Strategic AR Implementation Framework.....	89
5.6.1	Strategic and Organisational Alignment.....	91
5.6.2	AR Implementation Readiness.....	92
5.6.3	Adoption Resistance	93
5.6.4	Hedonic Enjoyment.....	94
5.6.5	Decision Support.....	94
5.6.6	AR Implementation Success	95

6 Conclusion 96

6.1 Further Research..... 97

7 AI Contribution Statement 99

8 References..... 100

Figures

Figure 1. Milgram’s Reality-Virtuality Continuum (Milgram & Kishino, 1994)	14
Figure 2. Classifications of Augmented Reality Use Cases (Rauschnabel et al., 2022)	20
Figure 3. Framework of consumer behavior with AR (Lavoye et al., 2021).....	26
Figure 4. TAM Framework (Alshare, Grandon & Miller, 2011, p.3).....	30
Figure 5. UTAUT Framework (Venkatesh et al., 2003).....	31
Figure 6. UTAUT2 Framework (Venkatesh et al., 2012).....	32
Figure 7. Technological innovation decision making process (Oliveira & Martins, 2011).....	33
Figure 8. Strategic AR Implementation in Fashion Retail Framework	92

Tables

Table 1. Summary of augmented reality categories and types (Edwards-Stewart et al., 2016)	19
Table 2. Types of AR Technology, Description, and Examples.....	20
Table 3. Overview of Literature Themes, Sub-Themes, and Key References.....	35
Table 4. Interview List.....	43
Table 5. Interview Guide (R1-R4)	45
Table 6. Interview Guide (R5-R7)	46
Table 7. Thematic Coding Framework	49
Table 8. Survey Question Coding Framework.....	49
Table 9. Thematic Coding of Interviews R1-R4.....	54
Table 10. Thematic Coding of Interviews R5-R7.....	55
Table 11. Iterative Thematic Coding of Interviews R1-R7	67
Table 12. Thematic Coding of Survey Responses	70
Table 13. Iterative Thematic Coding of Survey Responses.....	74
Table 14. Summary Thematic Coding of Interviews R1-R7	79
Table 15. Summary Thematic Coding of Surveys.....	79

1 Introduction

This chapter provides an overview of our study by introducing augmented reality (AR) and its potential impact on the retail industry. The chapter begins with the background, followed by the research purpose, research questions, and specific delimitations that define the focus and scope of this study.

1.1 Background

E-commerce has undergone significant transformation since its emergence in the late 20th century, fueled by advancements in internet technology, secure payment systems, and growing consumer adoption (Ildikó and Keresztes, 2024). Initially, e-commerce was limited to basic online catalogues and transactions (Ildikó and Keresztes, 2024). However, the rise of mobile commerce, social media integration, and virtual technologies has propelled the evolution of consumer engagement, particularly in the retail industry, which has embraced innovations like augmented reality (AR) over the past decade (Ildikó and Keresztes, 2024). Today, retail e-commerce stands as a booming global market, with projections suggesting it will reach \$781 billion by 2024, and the U.S. market alone is expected to grow by 8.8% annually through 2030 (Capital One Shopping, 2024).

The retail industry's rapid digitization has transformed not only how consumers shop but also how brands connect with their audiences. E-commerce, once a transactional medium, has evolved into a critical platform for brand storytelling, personalized marketing, and immersive shopping experiences (Chen et al., 2022). As e-commerce continues to dominate, the need for innovative solutions to enhance the online shopping experience has placed AR at the forefront of retail technology (Chen et al., 2022).

AR provides a novel way to tackle the inherent challenges of online shopping by allowing customers to visualize products in real time, virtually try on clothing, and preview how items would appear in their own environments (Chen et al., 2022; Varshney and Chaudhary, 2023). These features not only empower consumers to make more informed purchasing decisions but also foster deeper emotional connections with brands, driving loyalty and repeat purchases (Thakkar, Joshi and Kachhela, 2023; Joy Onma Enyejo et al., 2024).

Despite its potential, online shopping has inherent limitations, particularly in the context of apparel (Chan, 2023). One of the most significant challenges facing retail e-commerce today is the high rate of returns, with improper fit being a primary driver (Chan, 2023). In 2023, U.S. online apparel returns were estimated at \$38 billion, highlighting the pressing need for solutions that can reduce this costly trend (Chan, 2023). As a result, retailers are turning to AR technologies, such as virtual try-ons and size-recommendation tools, to improve purchase confidence and reduce the likelihood of returns (Chan, 2023). Beyond addressing returns, AR offers retailers the ability to reimagine customer experiences through gamified interactions, virtual pop-up stores, and augmented campaigns, aligning with modern consumers' expectations for engaging and dynamic shopping journeys that enhance customer experiences and drive sales conversion (Muthumanickam and Vs, 2021; Thakkar, Joshi and Kachhela, 2023; Varshney and Chaudhary, 2023; Joy Onma Enyejo et al., 2024).

The potential of AR in retail e-commerce is especially relevant as online shopping continues to outpace traditional retail (Capital One Shopping, 2024). Currently, 80.7% of retail e-commerce traffic comes from mobile devices, with younger consumers, such as Gen Z and Millennials, leading the adoption of these new technologies (Capital One Shopping, 2024). This shift in consumer behavior presents an exciting opportunity for retail brands to engage with their customers in innovative and interactive ways, transcending the limitations of traditional e-commerce. Furthermore, AR's ability to bridge the gap between online and offline retail environments represents a pivotal shift in how fashion companies' approach omnichannel strategies, enabling seamless integration across physical stores, websites, and mobile apps.

According to Velasquez et al. (2025), a multinational corporation (MNC) is an enterprise headquartered in one country that operates and generates revenue through subsidiaries or branches in multiple other countries. MNCs have played a pivotal role in shaping the global economy by facilitating the movement of capital, goods, and services throughout the long arc of globalization (Velasquez et al., 2025). Their expansion in recent decades has been driven by reduced trade barriers, the pursuit of new markets, the globalization of supply chains, and the outsourcing of operations to cost-effective regions (Velasquez et al., 2025). In the context of fashion retail, multinational companies face particularly high stakes in digital transformation. Their broad geographic presence, complex logistics networks, and culturally diverse consumer bases require more than standard technological adoption. Implementing AR-driven systems at scale

demands not only operational agility but also sensitivity to varying cultural expectations and compliance with regional regulations. Therefore, understanding how these global retailers can strategically deploy AR to deliver consistent, yet locally relevant customer experiences is essential for sustaining competitiveness and cultivating long-term brand loyalty.

This research aims to explore how multinational retail companies can leverage AR driven information systems to enhance customer experiences and increase engagement in retail environments. By examining the current state of AR in retail e-commerce and its potential to drive both customer satisfaction and business performance, this study seeks to contribute to the growing body of literature on digital transformation in retail and offer insights into the future of shopping. It also aims to provide practical recommendations for AR adoption, shedding light on how retail companies can overcome technological, organizational, and financial challenges to fully realize the transformative potential of this technology.

1.2 Problem

The rapid advancement of technology and evolving consumer preferences have significantly transformed the retail landscape, particularly in the fashion industry (Varshney and Chaudhary, 2023). Among these innovations, augmented reality (AR) has emerged as a promising tool to enhance customer experiences. However, there is a notable gap in the literature regarding the systematic implementation of AR within retail. This gap is particularly pronounced in the context of AR-driven information systems (IS), which have the potential to create seamless and immersive shopping experiences by bridging digital and physical retail environments (Chen et al., 2022).

Chen et al. (2022) highlight several underexplored areas, including the adoption of AR by older demographics and non-digital natives, ethical considerations around data privacy (Wood, 2023), and the implications of AR use for vulnerable populations. Additionally, the integration of AR into omnichannel retail strategies, particularly its role in driving customer acquisition, loyalty, and value across diverse product categories, remains inadequately studied (Chen et al., 2022; Clara, 2023).

While existing research primarily examines factors influencing AR adoption and use in the retail sector (Alam et al., 2021; Ildikó and Keresztes, 2024), limited attention has been given to

the strategic and operational implications of AR-driven IS for retailers (Chen et al., 2022; Yu et al., 2024). Specifically, there is a lack of comprehensive studies exploring how AR can be effectively designed and integrated into omnichannel strategies to improve operational efficiency, customer engagement, and brand loyalty (Chen et al., 2022). Addressing this gap, this research investigates the interplay between AR-driven IS adoption, customer behavior, and strategic alignment in retail, offering practical insights for retailers. By contributing to IS design principles and strategies, this research enhances understanding of AR's role in bridging online and offline environments, driving competitiveness, and supporting sustainability in an increasingly digital marketplace.

1.3 Purpose

This research aims to explore the ways in which multinational retail companies can leverage AR-driven information systems to enhance customer experiences and increase engagement in retail environments. The strategic implementation of mobile-based augmented reality (AR) systems in the fashion retail industry allows customers to see how clothes will look on them using their smartphones, providing a seamless and immersive shopping experience that bridges online and offline environments. While AR has demonstrated significant potential in enhancing customer experiences, the adoption of AR in fashion retail remains inconsistent due to technological, financial, and organizational barriers (Zak, 2020; Johnson, 2021; Garg et al., 2024).

This study aims to provide large multinational fashion companies with actionable insights for effectively integrating AR-driven IS into their omnichannel strategies. Specifically, it seeks to:

- Identify key challenges in optimizing the operational efficiency of implementing augmented reality (AR) systems in the fashion retail industry and propose solutions to improve these processes.
- Analyze the impact of AR technology on customer engagement, decision-making, and shopping behavior in fashion retail.

By addressing these aspects, this research contributes to the growing body of knowledge on AR-driven retail innovation and equips fashion retailers with the tools needed to remain competitive and adaptable in an increasingly digital marketplace.

1.4 Research Questions

To explore the strategic integration of AR-driven information systems (IS) in fashion retail, this study seeks to address the following research question.

How can large multinational fashion companies implement AR-driven information systems to enhance customer experiences and increase engagement in retail environments?

1.5 Delimitations

While this research aims to provide valuable insights into the adoption and implementation of AR driven information systems in fashion retail, there are several potential limitations.

First, the study will primarily focus on large multinational fashion companies such as H&M and Zara, which may not be representative of smaller or independent fashion retailers. These companies may have different technological and financial constraints that could influence their ability to adopt AR. Therefore, the findings may not be universally applicable across all segments of the fashion retail industry.

Second, the research will focus on AR as a standalone technology without considering its integration with other emerging technologies such as artificial intelligence, machine learning, or big data analytics. The interaction between these technologies could provide a more comprehensive view of how AR can enhance customer experiences, but this is outside the scope of this study.

Third, while the study will include primary data from retail managers or consumers, there may still be challenges in generalizing the findings across the broader fashion retail sector due to variations in market conditions, cultural differences, and consumer behavior. Additionally, the sample size and scope of the primary data collection may limit the ability to draw definitive conclusions applicable to all contexts.

Finally, given the rapid pace of technological innovation, the relevance of the study's findings may diminish over time as new AR applications or retail trends emerge. Future research may need to revisit this topic to account for these advancements.

2 Literature Review

Previous research in the fields of augmented reality (AR), consumer behavior, and retail technology is presented alongside relevant theories of customer experience and digital transformation.

2.1 Augmented Reality (AR) in Retail

2.1.1 Defining Augmented Reality (AR)

Augmented Reality (AR) is a technology that enhances a user's perception of the real world by overlaying computer-generated content, such as images, sounds, text, or 3D models, onto their physical environment in real time (Hayes, 2025). This fusion of digital and physical elements enables users to interact with both simultaneously, offering a blended experience that distinguishes AR from Virtual Reality (VR), which creates and immerses users in a completely artificial environment (Hayes, 2025; Agarwal & Thakur, 2014). AR systems typically meet three key criteria: (1) they combine real and virtual content within the same environment, (2) they allow for real-time interaction, and (3) they accurately register virtual objects in three-dimensional space (Agarwal & Thakur, 2014; Garg et al., 2021).

Milgram and Kishino's (1994) "reality–virtuality continuum" positions AR within the broader concept of mixed reality, highlighting its role as an intermediary between the physical and virtual worlds, and distinguishing it from fully immersive virtual environments.

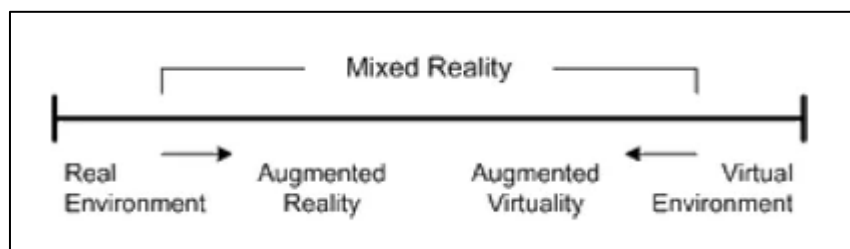


Figure 1. Milgram's Reality-Virtuality Continuum (Milgram & Kishino, 1994)

According to Alkhamisi and Monowar (2013), the primary objective of AR is to enhance user interaction by embedding digital information directly into the user's immediate surroundings or indirectly through live video streams. Both Garg et al. (2021) and Alkhamisi and Monowar (2013) characterize AR as a real-time interface that merges digital content with the physical world, emphasizing its interactive nature and precise 3D spatial registration. Expanding on this perspective, Alkhamisi and Monowar (2013) also note that AR plays a vital role in improving users' understanding of their physical environment by seamlessly integrating virtual elements into their real-world experiences.

AR technology operates through devices equipped with cameras, sensors, and displays, such as smartphones, tablets, or smart glasses, that capture the physical world and overlay digital content onto it (Hayes & Downie, 2024). The widespread adoption of smartphones, which include built-in GPS, accelerometers, and gyroscopes, has made mobile AR increasingly accessible (Hayes & Downie, 2024). Additionally, the launch of development platforms like Apple's ARKit and Google's ARCore has significantly accelerated mobile AR application development by enabling real-time environmental detection and digital augmentation (Hayes & Downie, 2024).

2.1.2 Evolution of AR: From Concept to Consumer Technology

The evolution of augmented reality (AR) spans more than a century, beginning with conceptual roots and culminating in the sophisticated, interactive experiences we see today. At its core, AR is a view of the real world enhanced with computer-generated elements such as visuals, sounds, graphics, or GPS data (Arasu et al., 2018; Hayes, 2025; Rauschnabel et al., 2022).

The earliest conceptualization of AR can be traced back to 1901, when Frank L. Baum imagined a pair of electronic glasses called a "character marker" in his novel, which would map data onto people (Rauschnabel et al., 2022). Decades later, in 1957, Morton Heilig created the Sensorama, an immersive multi-sensory experience that, while not computer-controlled, introduced the idea of enhancing human perception through external input (Akinola et al., 2020; Cardoso et al., 2018; Markopoulos, 2019).

In the 1960s, Heilig further developed the Telesphere Mask, the first head-mounted display (HMD) capable of providing stereoscopic 3D visuals and sound, although it lacked electronic interactivity (Adamska, 2023; Akinola et al., 2020; Cardoso et al., 2018). This innovation laid the foundation for future developments. In 1968, Ivan Sutherland and his student Bob Sproull

introduced the Sword of Damocles, a head-mounted AR/VR display capable of overlaying simple wireframe graphics onto the real world (Adamska, 2023; Akinola et al., 2020; Mann, 1997). Though large and impractical, it marked the first real integration of virtual data with physical environments (Akinola et al., 2020).

Throughout the 1970s and 1980s, significant research was conducted by institutions such as the U.S. Air Force's Armstrong Laboratory, NASA Ames Research Center, MIT, and the University of North Carolina (Agarwal & Thakur, 2014; Cardoso et al., 2018). A key breakthrough occurred in 1975 when Myron Krueger developed Videoplace, a system that enabled users to interact with virtual objects in real time (Ambrosio & Fidalgo, 2020; Cardoso et al., 2018; Ellis, 1995). This era also saw Steve Mann introduce wearable computing in 1980, an essential step toward the mobile AR systems of today (Mann, 1997).

The terminology surrounding AR began to solidify in the late 1980s and early 1990s. While Jaron Lanier coined "virtual reality" in 1989, the term "augmented reality" was introduced in 1990 by Boeing researcher Thomas Caudell, who used it to describe a digital system aiding in aircraft wiring assembly (Adamska, 2023; Cardoso et al., 2018). Around the same time, Louis Rosenberg developed Virtual Fixtures at the USAF Armstrong Research Lab in 1992, a robotic AR system that compensated for limited 3D graphics power by overlaying sensory information to improve human performance (Rosenberg, 1992).

AR continued evolving in the 1990s with innovations such as Columbia University's KARMA system, which used head-mounted displays to assist with maintenance tasks by overlaying diagrams and instructions (Adamska, 2023; Cardoso et al., 2018). As computing power increased, AR research extended into multi-user environments and predictive tracking systems, pushing the technology beyond research labs (Adamska, 2023).

The early 2000s marked the shift from academic to consumer applications. In 2000, Bruce Thomas developed ARQuake, one of the first outdoor mobile AR games (Cardoso et al., 2018). In 2008, the first commercial AR app emerged, developed in Munich for a BMW Mini ad that allowed users to manipulate a 3D model using a printed magazine page (Javornik, 2016a; Singh, 2023). That same year, Wikitude became the first mobile AR app, overlaying real-time information onto smartphone displays (Adamska, 2023; Arth et al., 2015).

During the early 2010s, AR applications expanded significantly. Tools like ARToolkit in Flash (2009), interactive campaigns by National Geographic (2011), Coca-Cola (2013), and Disney (2011) introduced the public to AR through public events and installations (Javornik, 2016a). Brands began using AR for customer engagement, including virtual try-on experiences for watches, jewelry, and later makeup (Javornik, 2016a). Agencies like Holition, ModiFace, and Total Immersion advanced real-time facial recognition and face-tracking technologies, enabling customers to realistically preview cosmetic products (Javornik, 2016a).

In 2013, Google Glass brought AR to wearable consumer tech (Koutromanos & Kazakou, 2023) and, in 2015, Microsoft introduced the HoloLens, offering a more advanced and immersive AR headset (Furlan, 2016). That same year, Skoda's AR mirror campaign allowed users in a London train station to customize and virtually "drive" a car in real-time (Javornik, 2016). A major cultural milestone occurred in 2016 with the release of Pokémon GO, which used AR to project digital creatures into the real world via smartphones, introducing millions to the concept and applications of AR (Adamska, 2023).

Today, AR has become a mainstream tool across industries. In retail, apps like IKEA's AR tool help customers visualize furniture in their homes. In beauty, brands continue refining AR try-on technology to offer personalized, real-time experiences. In healthcare, automotive, education, and beyond, AR enhances training, decision-making, and user interaction (Adamska, 2023). These developments have been fueled by progress in AI, machine learning, and computer vision, promising a future where AR seamlessly blends digital and physical realities.

2.1.3 Types of AR Technologies in Fashion Retail

Augmented Reality (AR) has emerged as a prominent technological trend over the past decade, increasingly shaping consumer experiences across industries such as gaming, education, and retail (Riar et al., 2021). Although the technology has seen widespread adoption in entertainment, for instance, through applications like Pokémon Go, its integration into online retail has been more gradual (Riar et al., 2021). Traditional web-based retail continues to face limitations regarding product presentation, sensory experience, and the ability to try products virtually, which may lead consumers to visit physical stores for high-involvement purchases like furniture to reduce perceived risk (Riar et al., 2021).

The growing availability of mobile devices and the rise of immersive technologies have opened new opportunities for retailers to enrich the shopping experience through increased multimodality, richer product information, and place independence (Nikhashemi et al., 2021; Riar et al., 2021). AR technology, when implemented via mobile applications, enables customers to visualize products in their real-life environment, improving product evaluation and reducing uncertainty (Tan et al., 2022). Companies such as IKEA, Amazon, Walmart, L'Oréal, and Sephora have embraced AR in their retail strategies (Nikhashemi et al., 2021; Riar et al., 2021; Tan et al., 2022). For example, IKEA's app allows customers to virtually place furniture in their own homes, while beauty brands like L'Oréal and Sephora offer AR-driven try-on tools to simulate the application of makeup (Tan et al., 2022).

Mobile AR apps have become a key component of "smart retail," allowing retailers to deliver engaging and personalized experiences that align with modern consumers' digital lifestyles (Nikhashemi et al., 2021). These apps combine the real and virtual worlds to provide interactive, on-the-go retail experiences that can drive favorable behavioral and attitudinal responses, such as enhanced product engagement, increased purchase intention, and stronger brand connections (Dacko, 2017; Nikhashemi et al., 2021). For instance, Gap's AR app lets users select clothing and view a 3D virtual try-on using their body dimensions, while IKEA's app facilitates spatial product visualization at home, features that have contributed to high adoption rates among consumers (Nikhashemi et al., 2021).

As the global retail industry adapts to increasingly digital consumer behaviors, the integration of AR into mobile platforms is expected to play a central role in shaping the future of retail by enabling immersive, efficient, and enjoyable customer journeys (Cruz et al., 2019; Dacko, 2017; Nikhashemi et al., 2021; Pantano & Timmermans, 2014).

Augmented Reality (AR) technologies in retail can be broadly categorized into two types: triggered augmentation and view-based augmentation (Edwards-Stewart et al., 2016). Triggered augmentation is activated by specific environmental cues known as triggers, which include printed markers, physical objects, GPS-based locations, or dynamically recognized items (Edwards-Stewart et al., 2016). When dynamic object recognition is combined with geolocation data, the result is referred to as complex augmentation (Edwards-Stewart et al., 2016). This type of AR is commonly employed in marketing campaigns, for example, Snapchat filters and

geofilters use triggered augmentation to overlay digital content such as avatars or branded imagery onto real-world scenes (Boardman et al., 2020).

In contrast, view-based augmentation does not rely on external environmental triggers (Edwards-Stewart et al., 2016). Instead, it enhances either a real-time live view or a static pre-recorded scene independently of any physical reference point (Edwards-Stewart et al., 2016). One common application of view-based AR in fashion retail is the use of smart mirrors in stores, which allow customers to virtually try on garments in various colors and sizes, in real-time, without requiring any physical marker (Boardman et al., 2020).

Table 1. Summary of augmented reality categories and types (Edwards-Stewart et al., 2016)

Table 1. Summary of augmented reality categories and types.			
Category	Type	Examples	Characteristics
Triggered	1a. Marker-based: Paper	String (string.co) Blippar (blippar.com)	Paper marker activates stimuli.
	1b. Marker-based: Object	Aurasma (aurasma.com)	Most objects can be made into markers.
	2. Location-based	Yelp (yelp.com) PAJ (t2health.dcoe.mil/ positiveactivityjackpot) Instagram (instagram.com)	Overlay of digital information on a map or live camera view. GPS may activate stimuli.
	3. Dynamic Augmentation	Video Painter (itunes.apple.com/us/app/video-painter/id581539953?mt=8) Swivel (Motion; facecake.com)	Meaningful, interactive augmentation with possible object recognition and/or motion tracking.
	4. Complex Augmentation	Google Glass (google.com/glass)	Augment dynamic view and pull internet information based on location, markers, or object recognition.
View-Based	5. Indirect Augmentation	Wall Painter (itunes.apple.com/us/app/wall-painter/id396799182?my=8)	Image of the real world augmented intelligently.
	6. Non-specific Digital Augmentation	Swat the Fly (inengy.com/swatthefly) Bubbles (virtualpopgames.com)	Augmentation of any camera view regardless of location.

While this binary classification is useful, it is important to note that the literature presents a variety of overlapping, and at times contradictory, taxonomies of AR technologies (Rauschnabel et al., 2022). Figure 2 illustrates a widely adopted classification system that organizes AR characteristics based on dominant device types, enabling technologies, and display formats specific to visual AR (Rauschnabel et al., 2022). Non-visual AR categories are addressed separately.

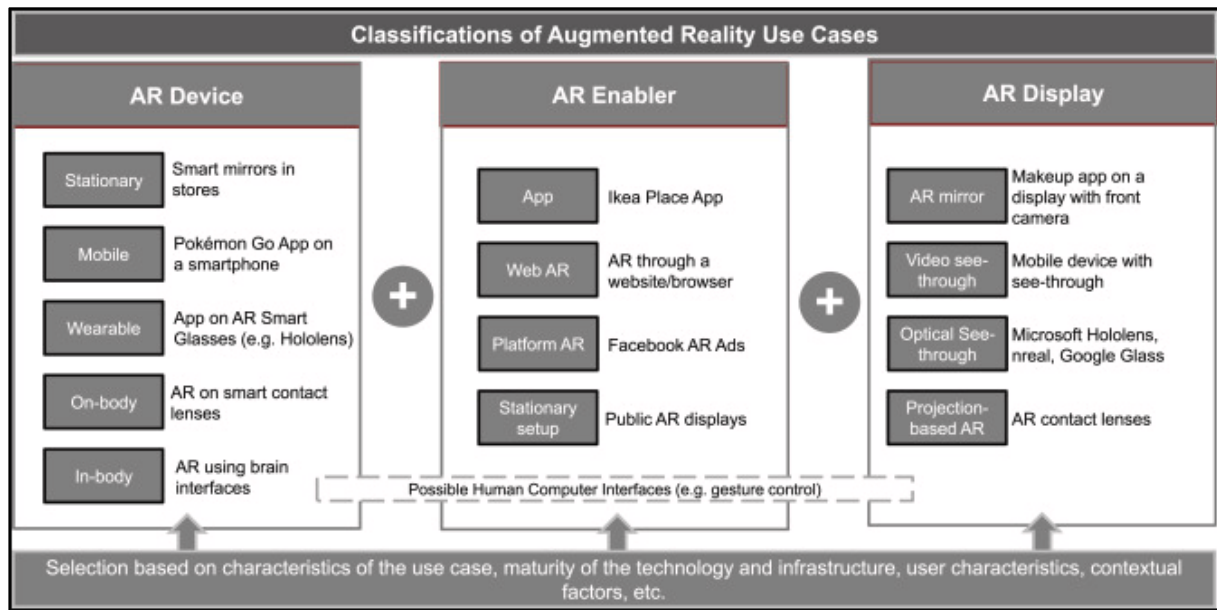


Figure 2. Classifications of Augmented Reality Use Cases (Rauschnabel et al., 2022)

Newer, dedicated AR devices often feature advanced hardware components such as depth sensors, eye-tracking technology, and retinal or see-through displays (Rauschnabel et al., 2022). These capabilities enable novel forms of human-computer interaction, including gesture-based controls, voice commands, hand and finger tracking, retinal navigation, and even brain-computer interfaces (Rauschnabel et al., 2022). These specialized devices are typically more immersive, offering a higher degree of embodiment by closely integrating the AR system with the user's physical presence (Rauschnabel et al., 2022). In contrast, widely accessible AR platforms, like smartphone apps or WebAR accessible via browsers, rely on more ubiquitous technologies and are characterized by their broad market reach and lower hardware requirements (Rauschnabel et al., 2022).

Table 2. Types of AR Technology, Description, and Examples

Type of AR Technology	Description	Example
Marker-Based AR (Image Recognition AR)	Uses a physical marker (like a QR code or printed image) to trigger AR content. The camera scans the marker, and digital objects appear in relation to it.	IKEA Place app (scanning a catalogue page to see 3D furniture)
Markerless AR (Location-Based AR)	Does not require predefined markers. Instead, it uses GPS, accelerometers, and gyroscopes to place AR objects in the real world. Allows for more flexible and dynamic experiences.	Pokémon GO (placing virtual creatures based on your location)

Projection-Based AR	<p>Uses light projections onto surfaces without the need for screens or headsets.</p> <p>Often used for interactive holograms and real-world manipulation.</p>	Microsoft HoloLens projecting interactive blueprints on workstations.
SLAM-Based AR (Simultaneous Localization and Mapping)	<p>Uses real-time mapping and environment scanning to place AR objects accurately in 3D space.</p> <p>Works without markers, making it useful for dynamic environments.</p>	Snapchat’s AR filters that track facial features.
Web-Based AR (WebAR)	<p>Runs AR experiences directly in a web browser (no need for an app).</p> <p>Uses JavaScript and WebGL for rendering AR content.</p>	Online retail sites allowing virtual try-ons using a phone’s browser.
Wearable AR (Smart Glasses & Headsets)	<p>Uses AR glasses, headsets, or lenses to overlay digital content onto the real world.</p> <p>Provides hands-free AR interaction, often used in industrial and medical fields.</p>	Microsoft HoloLens, Google Glass, Magic Leap.
Spatial AR (Holographic AR)	<p>Combines projection-based AR with advanced spatial mapping. AR objects appear in a shared environment rather than just on a screen.</p>	Holograms used in medical training or retail displays.

2.2 Business Value and Competitive Advantage of AR

Augmented Reality (AR) delivers business value primarily in two ways: by being embedded into products themselves and by enhancing performance across the value chain, including areas such as product development, manufacturing, logistics, field service, and customer experience (Porter & Heppelmann, 2017; Dacko, 2017; Tan et al., 2022). In industrial contexts, AR facilitates immersive product development by overlaying computer-aided designs (CAD) onto physical prototypes, thereby enhancing engineers' spatial understanding and enabling more refined designs (Porter & Heppelmann, 2017). For instance, engineers can walk around a life-sized hologram of machinery to assess ergonomics and sightlines, comparing CAD models with physical prototypes for improved quality control, as seen at Volkswagen where digital alignment checks became up to ten times faster (Porter & Heppelmann, 2017).

In manufacturing, AR streamlines complex tasks by providing contextual, real-time information directly in workers’ fields of view, reducing errors and increasing task execution speed

(Porter & Heppelmann, 2017; Tan et al., 2022). Maintenance is similarly enhanced, with AR integrating sensor data and automation systems to support proactive diagnostics (Porter & Heppelmann, 2017). Companies like Iconics align data visualization with physical environments through AR interfaces, improving monitoring and response (Porter & Heppelmann, 2017). Logistics operations also benefit significantly: DHL reported a 25% productivity gain with AR-assisted picking, and Intel achieved a 29% reduction in picking time, with new hires performing 15% faster than traditionally trained employees (Porter & Heppelmann, 2017).

AR also transforms field service by offering real-time repair guidance, predictive analytics, and remote expert collaboration, boosting efficiency and service quality (Porter & Heppelmann, 2017). For example, KPN's use of AR smart glasses led to an 11% cost reduction, a 17% decrease in error rates, and improved repair quality, while Xerox's implementation increased first-time fix rates by 67%, improved efficiency by 20%, and reduced problem resolution time by two hours (Porter & Heppelmann, 2017). Furthermore, AR-enabled remote support allowed Xerox to resolve 76% of issues without dispatching technicians, raising customer satisfaction to 95% (Porter & Heppelmann, 2017). Overall, firms leveraging AR have reported up to 32% productivity improvements and a 46% reduction in task completion time (Fillmore & Storr, 2020).

From a business value perspective, AR contributes not only to operational efficiency but also to customer satisfaction by providing immersive product experiences without requiring physical inventory (Dacko, 2017; Nikhashemi et al., 2021; Tan et al., 2022). It supports smart retail environments aiming to deliver greater experiential and informational value (Dacko, 2017; Huang & Liu, 2014; Pantano & Timmermans, 2014). Studies show that AR enhances the overall shopping experience by enabling informed decision-making, increasing purchase confidence, and fostering personalization through interactivity (Cruz et al., 2019; Schmalstieg & Hollerer, 2016).

Retailers such as IKEA and Wayfair use AR to allow customers to visualize products in their own homes, bridging the gap between digital and physical shopping while collecting valuable consumer preference data (Porter & Heppelmann, 2017; Tan et al., 2022). These immersive experiences increase engagement and conversion rates (Huang & Liu, 2014; Nikhashemi et al., 2021). AR also enables real-time customer behavior analytics that inform marketing and product strategies (Porter & Heppelmann, 2017; Vieira et al., 2022). Additionally, AR facilitates

personalized experiences that blend symbolic and rational elements, supporting both hedonic (entertainment-driven) and utilitarian (function-driven) values (Vieira et al., 2022).

Retailers are increasingly adopting AR to build stronger consumer-brand relationships and enhance perceptions (Vieira et al., 2022). As value becomes co-created and customer-controlled, AR supports natural information processing in service interactions (Dacko, 2017; Grönroos, 2008, 2011). Mobile AR (MAR) apps free users from time and place constraints, enrich shopping experiences with sensory and escapist features, and improve decision-making at the point of sale (Dacko, 2017). According to Mathwick et al.'s value matrix, AR provides return on investment, service excellence, playfulness, and aesthetics, dimensions that foster app adoption among experience-oriented consumers (Dacko, 2017; Kang et al., 2015; Mathwick et al., 2001). Tailored MAR experiences increase customer satisfaction and loyalty (Dacko, 2017).

The market potential of AR is significant. AR investment is growing at an annual rate of 55.71%, with the market projected to reach \$50 billion by 2024 (Vieira et al., 2022). In the U.S., 83 million consumers already use AR, contributing to a 40% higher conversion rate for businesses (Vieira et al., 2022). While AR clearly offers both symbolic and functional value, empirical validation is still limited regarding how hedonic and utilitarian values mediate consumer responses (Vieira et al., 2022).

Ultimately, AR delivers substantial competitive advantage by allowing firms to innovate, streamline operations, and deliver superior customer experiences. It differentiates businesses in increasingly digital, experience-driven markets and enables early adopters to position themselves as leaders responding to evolving consumer expectations for personalization, immersion, and convenience (Porter & Heppelmann, 2017; Dacko, 2017; Tan et al., 2022; Cruz et al., 2019; Vieira et al., 2022).

2.3 Consumer Behaviour and AR Adoption

Understanding how consumers engage with Augmented Reality (AR) is essential for its successful implementation in retail. AR enhances both utilitarian and hedonic value, which are central to consumer adoption (Lavoye et al., 2021). Utilitarian value refers to functional benefits

such as usefulness, ease of use, and informativeness, while hedonic value captures the experiential and emotional enjoyment of interacting with AR (Hilken et al., 2017; Lavoye et al., 2021; Poushneh, 2018; Rauschnabel et al., 2019). Both types of value have been shown to positively influence consumers' attitudes toward AR apps and brands, predicting continued usage and long-term brand loyalty (Lavoye et al., 2021).

AR also improves consumer decision-making by facilitating immersive experiences characterized by flow, local presence, and vivid mental imagery (Hilken et al., 2017; Javornik, 2016b; Lavoye et al., 2021). These immersive qualities reduce cognitive load, increase decision comfort, and enhance purchase intentions (Hilken et al., 2017; Lavoye et al., 2021). Furthermore, Mobile AR (MAR) apps enable consumers to interact with digital content in physical environments, positively impacting store evaluations and consumer satisfaction (Dacko, 2017; M & Stepheno, 2024).

Importantly, AR enables self-referencing, allowing users to visualize themselves with products by superimposing digital content onto their own image (Lavoye et al., 2021). This personalization fosters stronger self-brand connections, enhances brand congruity, and increases purchase intentions particularly among consumers with higher levels of narcissism (Baek et al., 2016; Huang, 2019; Lavoye et al., 2021). These psychological effects position AR as a valuable tool in creating emotionally resonant and personally meaningful shopping experiences (Fan et al., 2020).

AR's impact is further influenced by individual traits. For example, consumers with low media experience, high cognitive innovativeness, or unfavorable body image show stronger positive responses to AR experiences, indicating that personal characteristics significantly moderate both adoption and satisfaction (Huang & Liao, 2015; Lavoye et al., 2021; Yim & Park, 2019). From a broader user experience lens, AR influences consumer behavior across both cognitive and emotional dimensions. The availability of product information and enhanced enjoyment increases consumer satisfaction and decision confidence (Fan et al., 2020). For example, Virtual Fitting Rooms (VFRs) significantly boost product curiosity and intention to purchase, both online and offline, by stimulating consumer exploration (Beck & Crié, 2018; M & Stepheno, 2024).

Studies have also emphasized the role of realism, simplicity, and feature sophistication in shaping positive user experiences (M & Stepheno, 2024). Immersive AR features like virtual try-ons and 3D depictions lead to higher consumer satisfaction and more favorable brand impressions (M & Stepheno, 2024). Similarly, novelty, interactivity, and vividness have been identified as key drivers of brand engagement and app reuse intentions (M & Stepheno, 2024).

The Technology Acceptance Model (TAM) still plays a role in explaining AR adoption through perceived ease of use and usefulness, especially in fashion retail settings (M & Stepheno, 2024; Wu & Kim, 2022). However, it has limitations in fully capturing AR's influence on consumer attitudes and behaviors (Fan et al., 2020), prompting scholars to incorporate psychological, emotional, and behavioral constructs beyond TAM (Fan et al., 2020).

Moreover, AR fosters intimate consumer-brand relationships by integrating branded experiences into users' personal and physical spaces (Scholz & Duffy, 2018; Fan et al., 2020). This intimacy can be strengthened when AR applications use anthropomorphism, as consumers develop more positive attitudes toward humanized brand experiences (Fan et al., 2020; Van Esch et al., 2019). Inspiration also plays a mediating role; when consumers perceive AR as high-quality and beneficial, it can evoke inspiration and significantly elevate brand attitudes (Fan et al., 2020; Rauschnabel et al., 2019).

Nevertheless, privacy concerns and media irritation remain barriers to AR adoption (Lavoye et al., 2021). Consumers may feel uneasy with AR applications that require access to cameras or real-world surroundings, especially in public spaces (Lavoye et al., 2021; Poushneh, 2018; Van Esch et al., 2019). Despite this, studies show a surprising willingness to share personal information, particularly when the perceived value of the AR experience outweighs concerns about intrusiveness (Lavoye et al., 2021).

To consolidate the key findings on consumer behavior and AR adoption, the following framework illustrates how AR usage and its specific features influence consumer decision-making, emotional and psychological engagement, and various behavioral outcomes.

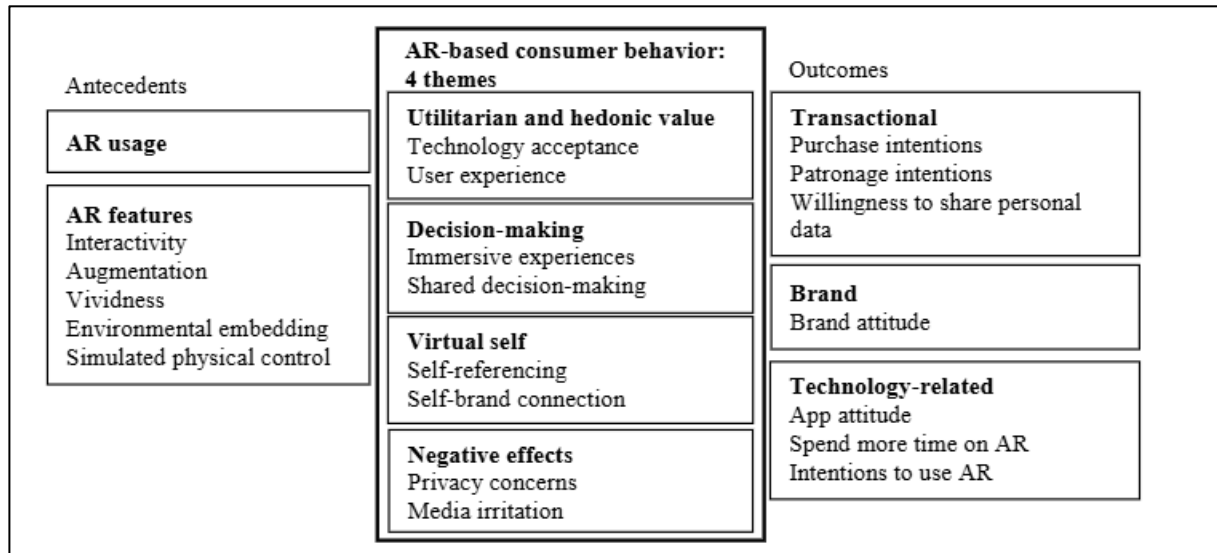


Figure 3. Framework of consumer behavior with AR (Lavoye et al., 2021)

2.4 Challenges and Barriers to AR Implementation

While augmented reality (AR) presents significant opportunities for retailers to enhance customer engagement and transform digital experiences, its implementation is often accompanied by several challenges that can undermine its potential. This section explores the key barriers to AR integration in retail, focusing on three critical dimensions: technological constraints, financial concerns, and consumer-related adoption challenges.

2.4.1 Technological Constraints

The successful deployment of AR-driven information systems in retail environments is often set back by technological limitations that impact system performance, scalability, and user experience. AR technologies are inherently complex, requiring the seamless integration of multiple system components, including sensors, cameras, computer vision algorithms, display interfaces, and backend data infrastructures. Early foundational work by Azuma (1997) identified several critical limitations of AR systems such as tracking instability, registration errors, and latency and many of these issues continue to influence modern applications. These issues are particularly clear in the retail industry, where users expect real-time, responsive, and personalized experiences such as virtual try-ons or 3D product visualizations. Further expanding upon these technical issues, Carmigniani et al. (2011) provide a detailed overview of the systems architecture that underpins AR, highlighting the dependency on device performance, environmental mapping accuracy, and stable internet connectivity. These infrastructural requirements

can present serious barriers for retailers aiming to implement AR across different platforms, devices, and geographies. From an IS perspective, the integration of AR into existing enterprise systems can also pose compatibility issues, particularly where legacy IT infrastructures are not designed to support interactive, graphics-intensive applications. These limitations create friction in realizing the full potential of AR technologies in omnichannel strategies, where system synchronization between online and the physical world is essential.

2.4.2 Financial Concerns

Beyond the technical challenges, AR implementation also requires significant financial investment, which can act as a major deterrent, particularly in cases where the return on investment (ROI) is uncertain or difficult to quantify. The development of AR-driven applications often involves high upfront costs associated with software engineering, 3D modelling, user interface design, and ongoing system maintenance (Hilken et al., 2018). Even among large retailers, strategic investment decisions are often influenced by broader concerns about cost-efficiency and risk. When AR systems are viewed primarily as marketing tools rather than core components of the IS infrastructure, they may struggle to secure long-term organizational support and stakeholder buy-in (Bonetti, Warnaby & Quinn, 2018). Hilken et al. (2018) argue that part of the financial hesitation stems from a lack of standardized evaluation metrics to assess the contribution of AR systems to key business outcomes such as conversion rates, customer retention, or brand equity. This lack of clarity around measurable benefits may cause managers to deprioritize AR in favor of more immediately tangible digital tools. From an IS perspective, this points to a strategic misalignment between AR implementation and enterprise-level information systems planning. Without robust integration into organizational IS strategy, AR risks remain a niche innovation rather than a transformative digital solution.

2.4.3 Consumer Barriers

While technological and financial issues are significant, consumer acceptance remains a critical determiner of AR's success in the retail environment. Within the IS literature, the adoption of new technologies by end users is often analyzed through models such as the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT), both of which highlight perceived usefulness, ease of use, and trust as key variables (Davis, 1989; Venkatesh, Thong & Xu, 2016). In the case of AR, several studies have shown that user perceptions of utility, complexity, and privacy risks significantly influence adoption

behavior. One major concern is the perceived intrusiveness of AR systems, particularly those requiring access to device cameras or personal data. Poushneh (2018) notes that while AR can enhance interactivity and engagement, users may be reluctant to adopt it if they feel that their privacy is compromised. This issue is especially relevant in fashion retail, where virtual try-on features involve real-time body scans or facial tracking technologies that may raise concerns about surveillance or data misuse. Such concerns tend to reflect broader issues of trust and system transparency, which are vital for successful technology integration.

In addition to privacy, usability and cognitive load present significant adoption barriers. Fan et al. (2020) found that consumers often have trouble navigating AR interfaces, especially when the systems are not intuitively designed or require multiple steps for activation. These user experience issues are not just poor UX, but they represent key system attributes that influence perceived ease of use and behavioral intention. If an AR application is difficult to understand or causes delays in the shopping process, users are unlikely to continue using it, regardless of its novelty or perceived value. He and Ro (2018) investigated the adoption of AR smart glasses and found that perceived privacy risks and a lack of trust in system providers significantly reduced willingness to use the technology. While smart glasses represent a different AR type versus mobile-based retail apps, the underlying concerns remain the same: users demand control over their digital experiences and are sensitive to how their data is collected and used. These findings reinforce the importance of aligning AR system design with user expectations and ethical standards in IS development.

The challenges facing AR implementation in retail are numerous, extending beyond surface-level technical issues to encompass deeper IS concerns around financial viability, strategic alignment, and user-system interaction. Technological constraints such as tracking reliability and platform integration remain persistent issues, while financial concerns around cost justification and long-term ROI limit organizational adoption. While consumer acceptance hinges on perceived usability, trust, and privacy factors. All of which are well documented in the IS adoption literature.

2.5 Theoretical Frameworks Guiding AR Adoption

Understanding how and why retailers adopt augmented reality (AR)-driven information systems requires you to consider both consumer interaction and organizational decision-making perspectives. This section examines the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology UTAUT (with its extension, UTAUT2), along with the Technology Organization Environment (TOE) framework. Together, these frameworks offer a solid foundation for analyzing the behavioral, organizational, and strategic factors that influence AR adoption in retail.

2.5.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1989 and is one of the most widely cited frameworks in information systems (IS) research. TAM offers a simplified explanation for why users adopt new technologies and how their beliefs may shape attitudes toward and use of the system. The two beliefs are;

- **Perceived Usefulness** – How much an individual believes that using a technology will improve their job or task performance.
- **Perceived Ease of Use** – The degree to which the technology is expected to be free of effort.

These two beliefs help to define a user's attitude towards using the technology (A) and how positively or negatively they feel about engaging with it. A positive attitude is more likely when the system is seen as both useful and easy to use. This attitude then influences the user's behavioral intention, which reflects how likely they are to engage with the technology (Davis, 1989). Figure 4 illustrates the Technology Acceptance Model (TAM) (Alshare, Grandon & Miller, 2011).

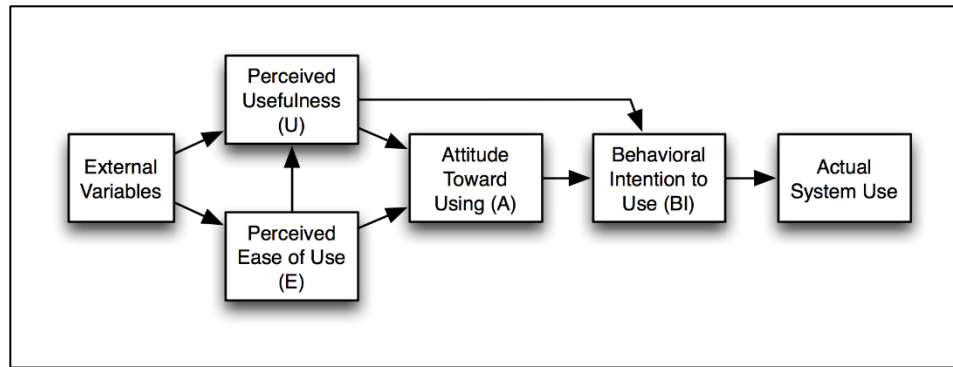


Figure 4. TAM Framework (Alshare, Grandon & Miller, 2011, p.3)

TAM has been widely applied in structured environments such as enterprise systems, where technology adoption is often tied to clear performance outcomes (Venkatesh & Davis, 2000). However, TAM's scope is limited when applied to more experiential or consumer-oriented technologies. In the case of augmented reality (AR) in retail, user engagement is less about productivity and more about immersion, and the social experience. These motivations fall outside the model's originally defined principles (Benbasat & Barki, 2007).

While TAM continues to lay the foundation of technology adoption research, it is increasingly viewed as a conceptual steppingstone toward more inclusive and robust models. Frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extension UTAUT2 build upon TAM principles by incorporating social, hedonic, and habitual factors, making them better suited for analyzing AR use in retail environments.

2.5.2 Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2)

The UTAUT model was introduced by Venkatesh et al. (2003) as a means of consolidating insights from previous adoption theories such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and the Diffusion of Innovation theory (DOI). It identifies four core pillars that influence a user's behavioral intention and actual system use:

- **Performance Expectancy** – The belief that using a system will lead to beneficial outcomes (e.g. increased efficiency or enhanced decision-making).
- **Effort Expectancy** – The ease associated with using the system.
- **Social Influence** – The perception that others (e.g. peers, influencers) believe the system should be used.

- **Facilitating Conditions** – The belief that necessary infrastructure and resources exist to support system use.

These pillars are then influenced by age, gender, experience, and voluntariness of use, making the model adaptable across different user groups and contexts. Figure 5 outlines the interactions between each pillar of UTAUT (Venkatesh et al., 2003). This framework has been widely applied in structured environments such as enterprise software and e-government systems, where technology use is often mandatory and linked to organizational goals (Venkatesh et al., 2003).

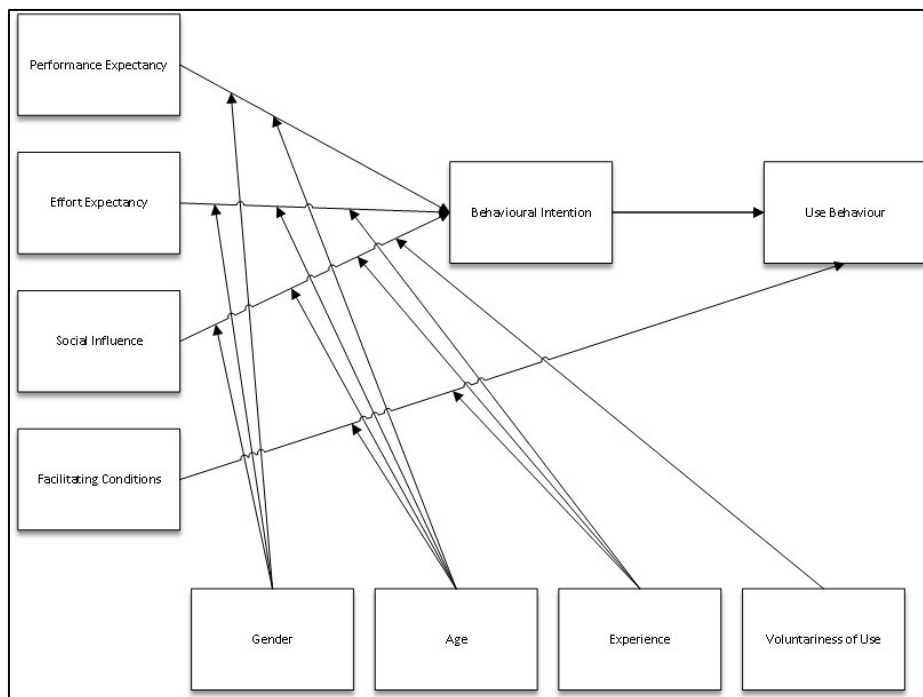


Figure 5. UTAUT Framework (Venkatesh et al., 2003)

However, AR in retail is used in more voluntary, consumer-driven contexts, where motivations are not tied to productivity. Shoppers interact with AR applications to explore products, visualize options, or enjoy experiences, behaviors of which are not easily explained by utility alone. To address this limitation, Venkatesh, Thong and Xu (2012) proposed UTAUT2, an extended model tailored towards consumer technology adoption.

UTAUT2 introduces three additional pillars:

- **Hedonic Motivation** - The enjoyment derived from using the technology.
- **Price Value** - Reflects a user's evaluation of benefits relative to costs.
- **Habit** - The extent to which repeated use leads to continued engagement.

These additions make UTAUT2 particularly well suited to understanding adoption of AR in retail, where immersive-ness and novelty often play a central role in user engagement. For example, a consumer may repeatedly use a virtual feature not only because it is useful, but because it is fun and has become part of their shopping routine. Figure 6 explains how the additional pillars affect the UTUAT model (Venkatesh et al., 2012)

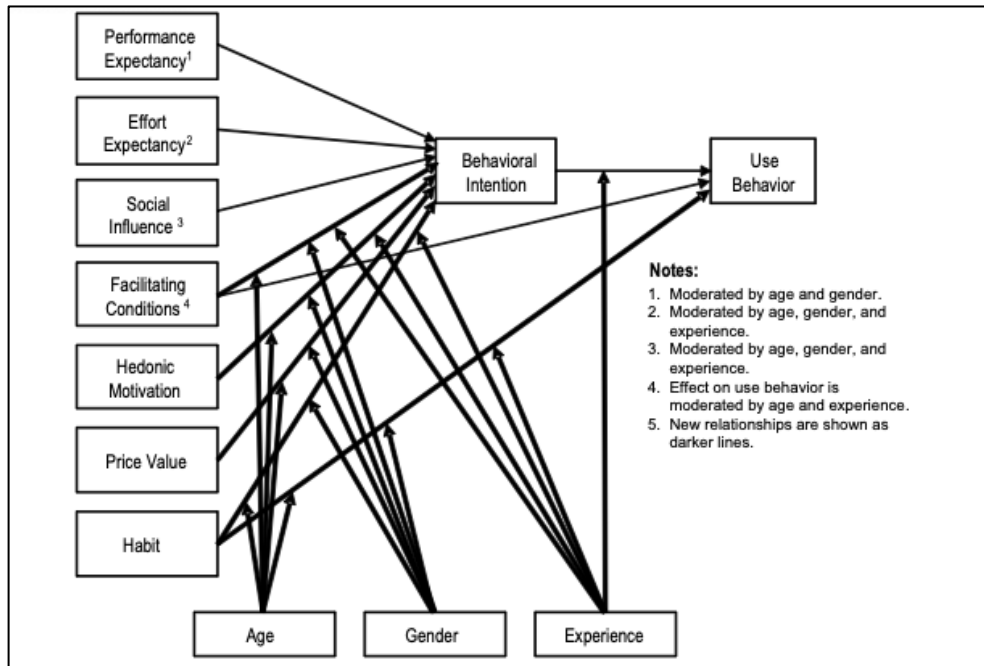


Figure 6. UTAUT2 Framework (Venkatesh et al., 2012)

While UTAUT2 improves upon UTAUT by capturing more experiential factors, it has also been critiqued for being applied too rigidly across technology types. Dwivedi et al. (2019) argue that adoption models should be adapted to reflect the specific characteristics of emerging technologies. In the case of AR, user behavior may be shaped by contextual factors such as visual realism, sensory feedback, or privacy concerns, which are not always fully accounted for in the model.

2.5.3 Technology Organization Environment (TOE)

Whereas UTAUT2 focuses on individual behavioral intention, the TOE framework aims to explain the conditions under which a firm decides to adopt a new technology. Originally developed by Tornatzky and Fleischer (1990), TOE proposes that the likelihood of technology adoption is influenced by three contextual dimensions:

- **Technological** – The perceived characteristics of the technology (e.g. complexity, compatibility, and usefulness).
- **Organizational** – Internal factors (e.g. firm size, leadership support, and resources).
- **Environmental** – External influences (e.g. trends, customer expectations, and competitors).

This model is widely used in IS research to explain innovation adoption in firms, particularly in cases where the decision to adopt involves cross-functional coordination and long-term investment (Baker, 2012). In the context of AR in retail where technologies such as virtual product tours or in-store AR displays require significant resourcing and systems integration; TOE can provide a useful framework for analyzing strategic implementation. Figure 7 outlines the factors that influence the technological innovation decision making process (Oliveira & Martins, 2011).

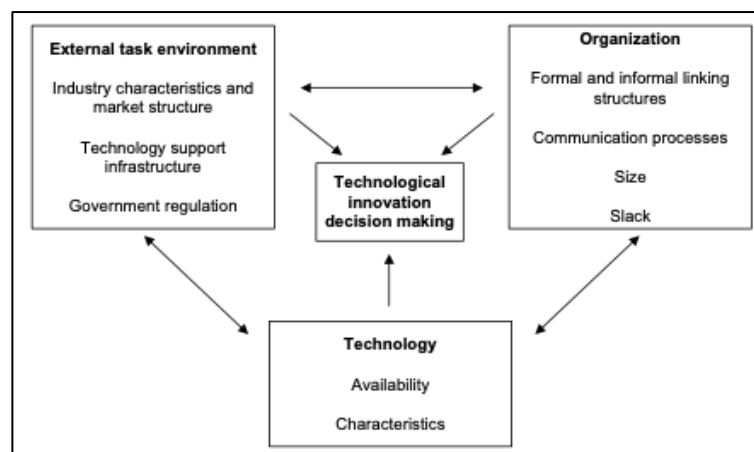


Figure 7. Technological innovation decision making process (Oliveira & Martins, 2011)

The technological context captures the perceived characteristics of the innovation itself, including its complexity, compatibility with existing systems, and relative advantage (Oliveira & Martins, 2011). AR-driven systems are often times technically demanding and require real-time image processing, 3D modelling, and integration with mobile platforms and retail databases. These requirements can act as barriers, particularly when the technology challenges existing IT infrastructure or creates friction with legacy systems. Retailers may evaluate AR based on whether it enhances customer experience or delivers clear business value. If an AR solution is perceived as unreliable, costly to maintain, or incompatible with current systems, adoption may be delayed or avoided even if the technology is well received by consumers.

The organizational context includes internal factors such as leadership commitment, financial resources, organizational structure, and digital capabilities (Baker, 2012). In large retailers, AR adoption typically involves multiple departments including marketing, operations, and IT who must work together to deliver a seamless experience. Without coordination or strategic buy-in, these initiatives can stall. Leadership also plays an important role in shaping adoption outcomes. When senior management views AR as a strategic investment rather than a marketing novelty, it is more likely to receive the long-term funding and integration needed for successful deployment. This aligns with broader IS findings that highlight top management support as a critical enabler of digital innovation.

Finally, the environmental context refers to external forces such as consumer expectations, industry competition, and technological trends (Ifinedo, 2011). In the retail sector, competitive pressure to innovate is strong, particularly in response to rapidly shifting consumer preferences and the influence of social media. Retailers that fail to offer interactive, personalized, or immersive experiences may risk falling behind market leaders. Environmental factors also include technological enablers such as the increasing accessibility of mobile AR development platforms, 5G networks, and AI-based visualization tools, which can reduce adoption costs and improve performance. These developments can make AR systems more attractive to firms that previously viewed them as experimental or niche.

While UTAUT2 provides insight into how and why individual users adopt or reject AR applications, it does not fully account for the organizational conditions that enable these technologies to be introduced in the first place. To address this, the TOE framework complements UTAUT2 by shifting the focus from consumer behavior to the internal and external factors that shape firm-level adoption decisions. TOE helps explain how organizations assess the feasibility of AR-driven information systems based on technological fitness, organizational readiness, and environmental pressures. Together these models provide a holistic understanding of both the user, strategic and structural dynamics that influence AR adoption in the retail industry.

2.6 Literature Summary & Potential Gaps

2.6.1 Literature Summary

This literature review chapter aims to provide a comprehensive overview of the existing research and theoretical perspectives related to the adoption and impact of Augmented Reality (AR) technologies within the retail industry. By synthesizing findings from foundational and peer-reviewed literature sources, the chapter establishes a foundation for understanding the technical, behavioral, and strategic dimensions of AR in consumer-facing environments.

The chapter opens by defining Augmented Reality (AR) and tracing its historical development including the technological milestones and classifications that have shaped its evolution. It then turns to the application of AR in fashion and beauty retail, considering how mobile platforms and smart retail environments are being used to enhance customer experience through virtual try-ons, spatial product visualization, and interactive engagement. Following this, the business value of AR is explored, with emphasis on its potential to increase operational efficiency, inform decision-making, and deepen customer-brand relationships. Next, consumer behavior literature is examined to understand how both functional and emotional dimensions influence AR adoption, alongside factors such as personalization and psychological involvement. These insights are then considered alongside the practical barriers to implementation, including technical complexity, cost, and consumer concerns around privacy and usability. Finally, the chapter reviews established technology adoption models, such as TAM, UTAUT/2, and TOE as a means of understanding how AR systems are adopted by users and embedded within organizations.

Table 3. Overview of Literature Themes, Sub-Themes, and Key References

Sub-Theme	Description	References
Foundational Concepts		
Definition and Evolution of AR	Outlines the conceptual history and technical development of AR, from early theoretical roots to consumer-ready applications like Pokémon GO and Google Glass.	Hayes, 2025; Agarwal & Thakur, 2014; Garg et al., 2021; Milgram & Kishino, 1994; Alkhamisi & Monowar, 2013; Rauschnabel et al., 2022; Adamska, 2023; Akinola et al., 2020; Cardoso et al., 2018; Mann, 1997; Rosenberg, 1992; Javornik, 2016

Types of AR Technologies	Categorizes AR into marker-based, markerless, projection-based, SLAM, wearable, and WebAR systems, with applications in retail like smart mirrors and virtual try-ons.	Edwards-Stewart et al., 2016; Boardman et al., 2020; Rauschnabel et al., 2022
AR in Retail		
AR Integration in Fashion and Beauty Retail	Discusses how AR enhances digital product experiences in retail through virtual try-ons, product placement, and customer engagement strategies.	Riar et al., 2021; Nikhashemi et al., 2021; Tan et al., 2022; Dacko, 2017; Cruz et al., 2019; Pantano & Timmermans, 2014
Smart Retail and Mobile AR	Focuses on mobile AR applications that support omnichannel retail strategies, enhancing product visualization and consumer engagement on the go.	Dacko, 2017; Nikhashemi et al., 2021; Cruz et al., 2019
Business Value		
Operational Efficiency and Competitive Advantage	Examines how AR improves logistics, manufacturing, and field service efficiency while providing companies with strategic differentiation.	Porter & Heppelmann, 2017; Fillmore & Storr, 2020; Dacko, 2017; Tan et al., 2022
Consumer Engagement and ROI	Explores AR's impact on customer satisfaction, emotional connection, and conversion rates through immersive and informative experiences.	Nikhashemi et al., 2021 ; Huang & Liu, 2014 ; Vieira et al., 2022 ; Grönroos, 2008, 2011 ; Kang et al., 2015 ; Mathwick et al., 2001
Consumer Behavior		
Hedonic and Utilitarian Value	Highlights AR's dual role in delivering functional and experiential benefits, driving app engagement and brand loyalty.	Lavoye et al., 2021; Hilken et al., 2017; Poushneh, 2018; Rauschnabel et al., 2019
Psychological Effects and Personalization	Analyses how self-referencing and narcissism influence emotional responses to AR, boosting personalization and purchase intent.	Baek et al., 2016; Huang, 2019; Fan et al., 2020
Individual Traits and User Experience	Examines how user characteristics (e.g., innovativeness, body image) and interface usability shape satisfaction and behavioral intentions.	Huang & Liao, 2015; Yim & Park, 2019; Beck & Crié, 2018; M & Stepheno, 2024
Privacy, Trust, and Media Irritation	Covers privacy concerns, system transparency, and irritation factors influencing trust and willingness to engage with AR systems.	Lavoye et al., 2021; Poushneh, 2018; Van Esch et al., 2019
Challenges and Barriers		
Technological Constraints	Identifies performance limitations, such as latency and device compatibility, that hinder AR scalability and seamless deployment.	Azuma, 1997; Carmigniani et al., 2011
Financial Concerns	Outlines the cost-related challenges of AR adoption, including ROI uncertainty, development expenses, and funding prioritization.	Hilken et al., 2018; Bonetti, War-naby & Quinn, 2018
Consumer Adoption Issues	Discusses user resistance caused by privacy concerns, low perceived usefulness, and complex UX in AR applications.	Davis, 1989; Venkatesh, Thong & Xu, 2016; Poushneh, 2018; Fan et al., 2020; He & Ro, 2018
Adoption Frameworks		
Technology Acceptance Model (TAM)	Explains technology adoption through perceived usefulness and ease of use, with limitations in consumer-oriented AR contexts.	Davis, 1989; Venkatesh & Davis, 2000; Benbasat & Barki, 2007; Alshare, Grandon & Miller, 2011
UTAUT & UTAUT2	Builds on TAM by adding social influence, hedonic motivation, and habit, offering better insight into AR.	Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012; Dwivedi et al., 2019

Technology-Organization-Environment (TOE)	Examines organizational AR adoption through internal readiness, technological fitness, and environmental pressures.	Tornatzky & Fleischer, 1990; Baker, 2012; Oliveira & Martins, 2011; Ifinedo, 2011
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2.6.2 Potential Literature Gaps

Although frameworks like TAM, UTAUT/2, and TOE offer insights into AR adoption, they often treat AR as a uniform technology. As shown in this review, there are multiple different AR types such as marker-based, SLAM, projection-based, and wearable which all enable distinct use cases and interaction styles. Yet the existing models do not account for these differences or adapt their evaluation criteria accordingly. This creates a gap in understanding how user engagement and adoption behaviors may vary depending on the AR modality being used.

There is also limited research on how AR integrates into broader enterprise systems. Most studies focus on consumer-facing applications, overlooking how AR connects with back-end infrastructure such as CRM, inventory, and analytics platforms. This narrow focus risks treating AR as a standalone tool, rather than as part of a wider digital ecosystem. As retailers move toward more integrated omnichannel strategies, this systems-level view becomes increasingly important.

Finally, current research tends to focus on initial adoption, with little attention paid to long-term use. Few studies track how AR engagement may develop over time, or whether users continue interacting with AR once the novelty fades. Understanding continued use is essential for evaluating the long-term impact and return on investment of AR in retail environments.

3 Methodology

In this chapter, the chosen methodology for the study is presented. It begins by outlining the research philosophy and approach, including the approach to the literature review. This is followed by a detailed explanation of the data collection methods, which encompass the qualitative research model, respondent selection, the design of the interview guide, and the transcription process. The chapter then describes the data analysis method used to interpret the findings. Finally, ethical considerations and the scientific quality of the study are addressed to ensure transparency and academic rigor.

3.1 Research Philosophy

To address the research problem and align with the interpretivist stance adopted in this study, a qualitative research approach has been selected. This approach is appropriate for exploring how individuals perceive and experience AR-driven information systems within the context of retail. Rather than seeking to quantify behavioral trends or system performance, this study aims to understand how users and professionals make sense of the benefits, limitations, and strategic roles of AR technologies in retail environments (Recker, 2021).

Qualitative research is widely used in Information Systems (IS) to explore how people and technology interact in specific contexts, interactions that are difficult to measure or generalize (Myers, 2013). This approach enables the researcher to uncover subjective understandings and meaning by engaging directly with participants in real-world environments (Walsham, 2006). It is particularly well-suited to studies investigating novel technologies, such as AR, whose implementation and impact may vary across user groups and contextual settings.

As this research is grounded in a constructivist ontology and interpretivist epistemology, the goal is to uncover the meanings that individuals assign to their experiences with AR-driven information systems. In this view, AR systems are understood not simply as technical solutions with fixed functions, but as information system artefacts whose use, meaning, and value are

shaped by users' interpretations and the context in which they are implemented. The research will utilize a combination of semi-structured interviews and qualitative surveys to collect data. These methods are appropriate because they allow participants to express their perspectives in their own terms while giving the researcher flexibility to probe further into specific areas of interest. Importantly, these techniques are not selected simply for their practicality, but because they align with IS interpretive research traditions, which emphasize depth, context, and flexibility in data gathering (Klein & Myers, 1999).

This approach also supports what is known in IS research as exploratory theory-building. Unlike hypothesis testing, which seeks to validate pre-existing models, exploratory theory-building involves developing conceptual insights or frameworks directly from empirical data (Recker, 2021). This is especially appropriate in emerging research areas, such as AR in retail, where the aim is to understand evolving practices and generate new theoretical understandings based on the experiences of users (Walsham, 2006). Ultimately, the qualitative research approach enables the study to investigate how AR-driven information systems are used, understood, and integrated in retail environments, not only in terms of system functionality, but also in relation to broader organizational strategies and user experiences.

3.2 Research Approach

This study adopts a qualitative and exploratory research approach, grounded in the interpretivist tradition of Information Systems (IS) research. This approach was chosen because it allows for a deeper understanding of how AR-driven information systems are experienced and understood by both consumers and professionals in the fashion retail sector. AR is still an emerging technology in this space, and its implementation and impact are often context-specific, requiring a flexible, meaning-oriented research design (Myers, 2013; Recker, 2021).

Qualitative research is particularly well-suited to studies of this nature, where the goal is not to measure fixed outcomes, but to explore how individuals interpret, interact with, and assign value to new technologies within complex environments. In this study, AR is treated not as a static technical artefact, but as a socio-technical system embedded within organizational strategies and consumer behaviors. This interpretivist stance assumes that the realities of AR use are shaped through human experiences and situated interactions, rather than being universally measurable or generalizable (Klein & Myers, 1999; Walsham, 2006). The exploratory nature

of the study reflects the relatively limited body of IS research on the strategic use of AR in fashion retail. Rather than testing predefined models, the aim is to build new conceptual understanding by analyzing how different user groups, both industry professionals and consumers, make sense of AR in practice. This aligns with theory-building objectives in IS research, where understanding emerging technologies often involves mapping user narratives, system affordances, and organizational contexts (Recker, 2021). As such, the research is designed to support a contextual and interpretive analysis of how AR is implemented and experienced in real-world retail settings. Through the collection of open-ended data via semi-structured interviews and fully open-ended surveys, the study seeks to identify patterns, perspectives, and themes that can inform both theoretical development and practical application. This approach reflects a broader commitment within IS to producing knowledge that is both rigorous and relevant to complex, evolving digital environments.

3.2.1 Literature Review Approach

The purpose of the literature review is to establish a theoretical and contextual foundation for the investigation of AR-driven information systems in retail. This study employs a structured narrative review approach, which enables both depth and breadth in exploring diverse perspectives, theoretical frameworks, and technological developments within the chosen research domain. A narrative approach is particularly well suited for identifying conceptual patterns, tracing the evolution of technology, and synthesizing IS research around emerging technologies such as augmented reality (Recker, 2021).

The review process involved several key steps. First, three academic databases were selected for their disciplinary relevance and coverage of IS, technology, and business literature:

- LUBSearch Discovery
- LUBCat
- Google Scholar

These databases enabled access to a range of peer-reviewed journal articles, books, e-books, and academic conference proceedings relevant to the intersection of AR, IS, and retail. To ensure the review was focused yet comprehensive, a set of targeted keywords and Boolean operators were employed. Keywords were grouped around core themes of the review:

- “Augmented Reality” AND “Information Systems”
- “AR in retail” OR “AR retail” OR “AR shopping experience”
- “Virtual try-on” OR “AR applications” AND “consumer behavior”
- “Technology acceptance” AND “AR” OR “UTAUT” OR “TOE framework”
- “AR adoption challenges” OR “AR barriers” AND “retail” OR “ecommerce”

Boolean connectors such as AND, OR and quotation marks were used to narrow or expand search results. Filters were applied to prioritize peer-reviewed publications from the last 10–15 years, with an emphasis on recent developments from 2014 onward, aligning with the growing commercialization of mobile-based AR. Foundational or conceptual texts were included where necessary to define key concepts.

Inclusion criteria focused on studies that:

- Address AR in the context of Information Systems, consumer interaction, or retail system design
- Are published in peer-reviewed journals, academic books, or reputable conference proceedings
- Offer conceptual, technical, or empirical insights into the use, perception, or implementation of AR technologies

Exclusion criteria eliminated:

- Studies focused purely on AR marketing campaigns without IS/system implications
- Articles without full-text access or with unclear methodological relevance
- Outdated sources (prior to 2010), unless foundational

The resulting literature provided the basis for the review themes developed in this thesis: the evolution and definition of AR, AR technologies in retail, its business and strategic value, consumer adoption behavior, key implementation barriers, and the application of adoption theories such as TAM and UTAUT within the IS domain. This approach ensures that the review is directly relevant to the strategic use of AR as an information system in retail environments.

3.3 Data Collection Methods

3.3.1 Qualitative Research Approach

To address the research problem, we employed a qualitative research methodology, using semi-structured interviews and open-text surveys as the primary data collection methods. This approach is well-suited for investigating the subjective experiences and perceptions of consumers and professionals in the context of AR-driven information systems (Patton, 2015). Unlike quantitative methods, which prioritize measurable and generalizable outcomes, qualitative research values depth and context, making it ideal for exploring the complex realities surrounding AR technologies realities often shaped by cultural, generational, and social factors (Patton, 2015).

Aligned with our interpretivist stance, semi-structured interviews enabled flexible, yet focused exploration of participants lived experiences (Recker, 2021; Patton, 2015). Open-text surveys complemented these interviews by capturing unprompted, descriptive responses that revealed broader patterns and context-specific nuances (Recker, 2021). Together, these methods offered both granular insights and cross-sectional perspectives on AR system engagement.

3.3.2 Respondent Selection

Participant selection and sampling are critical components of the data collection process, ensuring the relevance and depth of insights (Patton, 2015). This study used purposive sampling to target individuals either directly involved in or impacted by AR in retail contexts. The aim was to capture a range of informed perspectives while maintaining a consistent focus on experience with AR technologies.

Two distinct groups were identified for the semi-structured interviews:

1. **Implementation Professionals** - Responsible for deploying or managing AR systems.
2. **Marketing and Brand Professionals** - Involved in customer experience, digital engagement, or immersive technology strategy.

This approach enabled a dual focus on both strategic vision and operational execution.

Following initial research, organizations with active AR deployments were identified and contacted. Four implementation professionals (R1–R4) working directly with in-house AR systems agreed to participate. To complement these operational views, three senior marketing leads (R5–R7) from multinational e-commerce programs in the fashion, lifestyle, and automotive sectors were also interviewed. While not directly hands-on with AR technology, these participants provided insight into when and why immersive technologies are integrated into customer journeys.

Potential participants were contacted via personalized emails outlining the study purpose, enclosing the interview guide, and requesting consent for recording. French-language invitations were sent to respondents R1–R4 (Appendix 1), and English invitations to R5–R7 (Appendix 9). This process yielded seven interviewees, listed in Table 3. Additional outreach to fashion retailers with public-facing AR deployments such as Burberry, H&M, Oreal, and Zara yielded no further responses.

All interviews were conducted online (via Microsoft Teams or Google Meet) between 24 March and 1 May 2025, lasting 15–35 minutes. Interviews conducted in French were translated into English during transcription to preserve nuance while ensuring consistency in analysis.

For the qualitative surveys, we targeted consumers who engage in either online or in-store shopping at least semi-regularly. The survey reached 50 participants across diverse age groups, regions, and levels of digital familiarity. This demographic breadth supported the study’s aim to explore generational, cultural, and behavioral variation in perceptions of AR. Surveys were distributed via Qualtrics, which enabled participant screening and ensured a user-friendly interface for geographically diverse respondents. The responses helped triangulate and contextualize the interview findings by highlighting broader behavioral patterns across demographics.

Table 4. Interview List

Respondent	Role	Duration	Date	Type
R1	Lead Strategy Pre-FAL & Industrial Innovation	30 minutes	2025/03/24	Microsoft Teams
R2	HO Engineering design – Tooling	30 minutes	2025/03/24	Microsoft Teams
R3	AR/VR Team Leader	30 minutes	2025/03/28	Microsoft Teams

R4	Analyst, Strategy and Business Development	35 minutes	2025/04/09	Microsoft Teams
R5	Digital Marketing Manager	20 minutes	2025/05/01	Google Meet
R6	Digital Performance Manager	15 minutes	2025/05/01	Google Meet
R7	Digital Brand Strategist	15 minutes	2025/05/01	Google Meet

3.3.3 Design of the Interview Guide

The interviews were conducted in a semi-structured format using an interview guide developed in alignment with the central research question and research aim. The guide's themes and question areas were informed by the key theoretical frameworks outlined in the literature review, including the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT2), and the Technology-Organization-Environment (TOE) framework. These models provided a structured lens for examining both individual user adoption and organizational integration of AR in retail.

In keeping with the study's interpretive stance, the guide prioritized open-ended, exploratory prompts that allowed participants to reflect on their own experiences. However, the underlying theoretical foundations ensured a consistent focus across interviews.

The guide was structured around five core themes:

1. **AR Implementation and Use Cases** - These questions explored how and why AR was introduced, how it fits with internal processes, and its perceived benefits aligned with the TOE framework's focus on technological and organizational contexts.
2. **Customer Engagement and Immersion** - Questions here focused on how AR supports interactivity, personalization, and emotional engagement concepts strongly linked to UTAUT2 constructs such as hedonic motivation and social influence.
3. **Challenges and Barriers to Adoption** - This theme addressed perceived constraints to AR adoption, such as usability, technical readiness, cost, or internal resistance areas previously identified in both TAM and TOE-based adoption studies.
4. **AR's Influence on Customer Decision-Making** - This section investigated how AR shapes customer confidence, reduces uncertainty, and enhances product understanding

concepts often linked to perceived usefulness and decision-support in immersive tech research.

5. **Best Practices, Strategic Fit, and Future Outlook** - These prompts encouraged reflection on lessons learned, internal advocacy, and future planning. This thematic area links to organizational readiness and innovation management within broader digital transformation literature.

Two versions of the interview guide were created to reflect the professional focus of the respondents. For implementation professionals (R1–R4), the guide emphasized technical integration, internal adoption, and system performance. For marketing and brand professionals (R5–R7), the focus shifted to campaign strategy, consumer expectations, platform readiness, and the perceived value of immersive experiences. This dual perspective enabled the study to capture both the operational and strategic dimensions of AR adoption.

Table 5. Interview Guide (R1-R4)

AR Implementation and Use Cases	1. Can you describe how your organization currently utilizes AR technology in its operations?
	2. What were the main objectives behind adopting AR?
	3. How has AR transformed traditional workflows or customer interactions?
AR for Customer Engagement	4. In what ways is AR used to enhance customer engagement and experience?
	5. Have you observed any changes in customer behavior or satisfaction since implementing AR?
	6. Are there any specific AR applications that customers respond to most positively?
Challenges & Barriers to Adoption	7. What were the biggest challenges faced when integrating AR technology?
	8. How was resistance to AR adoption addressed, both internally and externally?
	9. What technical or financial constraints should companies consider before implementing AR?
AR’s Influence on Decision-Making	10. How does AR influence customer purchasing decisions?
	11. Have you noticed any patterns in how customers engage with AR?
	12. Does AR help reduce uncertainty or increase confidence during purchasing?
Best Practices & Industry Lessons	13. What best practices have emerged from your AR implementation that could benefit other industries?
	14. If advising a company in the fashion industry, what key AR strategies would you recommend?
	15. Are there common misconceptions about AR that businesses should be aware of before adopting it?
Outlook of AR	16. How do you see AR evolving within your organization over the next five years?

	17. Are there emerging AR trends that could further enhance customer engagement?
	18. Do you believe AR could become a standard tool across industries in the near future?

Table 6. Interview Guide (R5-R7)

Consumer Experience and Engagement	1. Can you describe how your organization currently utilizes AR technology in its operations?
	2. What types of digital experiences do you think today’s fashion consumers expect across platforms?
	3. How important is personalization and interactivity in driving loyalty or conversions in your current campaigns?
Platform Capabilities and AR Readiness	4. From your perspective, do your existing marketing platforms (e.g., Shopify, Meta Ads, CRM, mobile apps) have the technical capability to support immersive or interactive features like AR?
	5. If AR features became more integrated in your tools, how do you envision them being used to enhance product presentation or brand storytelling?
	6. What would be essential requirements or constraints (technical, organizational, UX-related) before integrating AR features into your marketing stack?
Consumer Behavior Expectations	7. Do you believe consumers in your market segment are ready for immersive technologies like AR? Why or why not?
	8. What age or demographic groups do you think would engage most with AR-driven experiences, and what factors might limit adoption (e.g., usability, data privacy)?
Perceived Value and Use Cases	9. How do you perceive the potential value of AR (e.g., virtual try-ons, product visualization, gamified shopping) in retail marketing?
	10. Which use case do you think would offer the highest ROI or customer impact if implemented today — and why?
Organizational and Strategic Fit	11. How open do you think your organization would be to adopting AR if the features were readily available on your platforms?
	12. What barriers do you foresee to integrating AR — cost, leadership buy-in, lack of internal knowledge, measurement difficulties, or something else?
	13. Do you think AR should be a marketing initiative or an IT-led project within your company?
Future Outlook	14. If AR tools were made “plug-and-play” via your marketing platforms, how would you envision testing or piloting them in a campaign?
	15. Do you believe AR will become a standard component of omnichannel strategies, or remain niche? What would need to change for it to become mainstream?

3.3.4 Transcribing

Accurate transcription is a crucial component of qualitative research, as it shapes how data is interpreted, coded, and analyzed. According to McLellan, MacQueen and Neidig (2003), transcription should not be viewed as a neutral or purely technical activity, but as an interpretive

phase of the research process that preserves meaning and contextual richness. Clear, high-quality transcripts ensure that the nuances of participant responses are retained for analysis, contributing to the reliability and trustworthiness of the study. In this research, interviews conducted in French were manually transcribed and then translated into English, with care taken to preserve the emotional tone and intended meaning of participant narratives. For English-language interviews, transcription was conducted using AI-based transcription software, and each transcript was subsequently reviewed to confirm accuracy.

Following transcription, all data was anonymized to protect participant confidentiality. This included removing personal identifiers such as names and specific locations, in accordance with ethical research practice. This ensured the data remained analytically useful while meeting standards for privacy and research integrity.

3.4 Data Analysis Method

The analysis in this study was conducted using thematic analysis, a widely used method for identifying, analyzing, and interpreting patterns within qualitative data (Braun and Clarke, 2006). This approach is particularly well suited to studies underpinned by an interpretivist paradigm, where the goal is to explore how individuals make sense of complex, context-specific experiences (Walsham, 1995; Myers, 2013). Thematic analysis enabled the researcher to generate insights grounded in participants' own language while maintaining methodological flexibility.

All interviews were transcribed manually and reviewed multiple times to ensure accuracy. For French-speaking respondents (R1–R4), the transcripts were translated into English during the transcription process to maintain consistency while preserving meaning. Open-text survey responses were exported from Qualtrics for analysis.

Rather than using specialist qualitative analysis software, the coding process was conducted using Google Sheets. Transcripts and survey responses were organized into a shared analysis spreadsheet, with each response segmented by participant and question. Open coding was performed line-by-line in adjacent columns, allowing emerging ideas to be captured alongside the raw data. Throughout this process, memos were maintained in a separate column to record analytical decisions, reflections, and changes, ensuring transparency.

The analysis followed Braun and Clarke's (2006) six-phase framework for thematic analysis, which includes: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. This structured process provided a clear and replicable path from raw data to final themes. An inductive approach was used during the first coding cycle to ensure that themes emerged organically from the data. However, as the analysis progressed, sensitizing concepts from the literature were used to enrich interpretation. These included constructs from the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT2), and the Technology-Organization-Environment (TOE) framework. While these theories did not dictate codes, they informed second-cycle coding by helping to make sense of the data within a broader conceptual context.

For instance, when participants described AR as a way to “*see how things would look before buying*” or “*reduce hesitation*,” these statements were initially coded under decision support. As similar data points emerged, they were grouped into the theme Customer Decision Support and Uncertainty Reduction, linking closely with concepts like perceived usefulness (TAM) and performance expectancy (UTAUT2). Likewise, when both professionals and consumers described AR as “*fun*,” “*novel*,” or a way to “*draw attention*,” these responses contributed to the theme Customer Engagement and Hedonic Motivation, aligned with UTAUT2's hedonic motivation construct.

Survey responses were analyzed using a distinct but thematically aligned coding framework. Because survey data tends to be more concise and structured than interview transcripts, a separate set of five overarching codes was developed to reflect the specific focus of the survey: Shopping Confidence & Trust (SCT), Perceptions of AR Technology (PAT), Adoption & Use of AR (AUA), AR Concerns & Barriers (ACB), and AR in the Broader Tech Landscape (ATL). These codes were derived from the purpose and intent of the survey questions, not from the interview data directly.

Despite the separate coding schemes, final theme development allowed for alignment between interview and survey insights. For instance, comments such as “AR makes it easier to choose” or “it's cool but glitchy sometimes” were grouped under Adoption & Use of AR (AUA) or AR Concerns & Barriers (ACB), providing a consumer-focused parallel to themes like Customer Decision Support or Hedonic Motivation in the interview data.

Thematic analysis was used to interpret the survey data, with themes developed by grouping together responses that expressed similar ideas or concerns. This process was repeated several times, allowing early groupings to be refined or reorganized as patterns became clearer. Responses were also compared across different questions and participant types to check for consistency or contrast. While the interview and survey data were coded separately to reflect their different formats and levels of detail, the final themes were aligned to enable meaningful comparison. This approach ensured that each theme was grounded in multiple types of evidence and reflected both professional and consumer perspectives on augmented reality in retail.

Table 7. Thematic Coding Framework

Theme Code	Theme Description	Sub-Code Examples
ARIM	AR Implementation and Use Cases	Internal integration, Workflow changes, Deployment rationale
CEHM	Customer Engagement and Hedonic Motivation	Enjoyment, Novelty, Personalization, Emotional value
ADRB	Adoption Barriers and Resistance	Technical limitations, Data privacy concerns, Platform constraints, Cost
CDSU	Customer Decision Support and Uncertainty Reduction	Visualization, Purchase confidence, Try-before-you-buy, Reduction of hesitation
ORGSTR	Organizational Strategy and Future Outlook	Leadership buy-in, Cross-functional fit, Forecasting, Long-term planning

Table 8. Survey Question Coding Framework

Theme Code	Theme Description	Full Question
SCT	Shopping Confidence & Trust	What factors typically make you feel uncertain or hesitant when shopping online?
SCT	Shopping Confidence & Trust	Have you ever returned an item you purchased online?
SCT	Shopping Confidence & Trust	What was the reason for the return and how was the experience?
SCT	Shopping Confidence & Trust	Which features or tools make online shopping feel more trustworthy or reliable to you?
SCT	Shopping Confidence & Trust	What are your favorite online stores or apps, and why?
PAT	Perceptions of AR Technology	If a website offered a feature to “preview” or “try on” a product virtually, what would you expect it to involve?
PAT	Perceptions of AR Technology	When you hear the term “Augmented Reality” in online shopping, what comes to mind?
PAT	Perceptions of AR Technology	Which types of products do you think AR would be most helpful for?
PAT	Perceptions of AR Technology	How helpful do you think AR features would be when shopping online?
PAT	Perceptions of AR Technology	Do you think your current device can run AR features smoothly? Why or why not?
PAT	Perceptions of AR Technology	How do you feel about using your phone’s camera for online shopping?

AUA	Adoption & Use of AR	Have you ever used an AR feature while shopping online? If yes, describe the experience. If not, why not?
AUA	Adoption & Use of AR	Do you believe AR could improve your online shopping experience? Why or why not?
AUA	Adoption & Use of AR	What would make an AR shopping feature appealing enough to use, compared to just images or reviews?
AUA	Adoption & Use of AR	How likely are you to use AR “virtual try-on” if available?
AUA	Adoption & Use of AR	Would you be more likely to shop from a brand that offers innovative features like AR?
ACB	AR Concerns & Barriers	How much do you trust online retailers to handle personal data when using AR?
ACB	AR Concerns & Barriers	Do you have concerns about retailers offering AR (privacy, performance, etc.)?
ACB	AR Concerns & Barriers	If you’ve chosen not to use AR features, what influenced that decision?
ATL	AR in Broader Tech Landscape	Have you used other interactive tools (quizzes, live video, AI, etc.)?
ATL	AR in Broader Tech Landscape	Which tools did you use and how helpful were they?

This integrated analysis approach provided a well-rounded understanding of the role of AR in retail from both consumer and professional perspectives. By combining inductive data exploration with theory-informed interpretation, the study ensured analytical depth without sacrificing openness to unexpected insights.

3.5 Ethical Considerations

Ensuring the ethical integrity of this research study is important, particularly given its qualitative nature and the reliance on participant contributions. Within the field of Information Systems (IS), ethical practice is closely linked to maintaining transparency, accountability, and participant trust, especially in studies involving emerging technologies and user data (Walsham, 2006). All participants will be fully informed about the study’s purpose, scope, and procedures before participating. Informed consent will be obtained through consent forms for interviews and implied through the submission of online surveys. This approach is consistent with IS research norms, where informed consent is essential to respecting autonomy and ensuring voluntary participation (Myers & Venable, 2014). Participants will be made aware of their right to withdraw at any stage, without explanation or consequence.

To safeguard participant privacy, all personal data will be anonymized during collection and stored securely. The study will comply with the General Data Protection Regulation (GDPR), which is particularly relevant in IS research due to the handling of digital and often sensitive

information (Stahl et al., 2014). No physical data will be retained, and digital records will be encrypted and accessible only to the research team. Participants will be offered the opportunity to receive a summary of findings, reinforcing transparency and reciprocity in the research relationship. By addressing these ethical considerations in line with established IS research principles, the study aims to maintain the highest standards of integrity, credibility, and respect for participant contributions.

3.6 Scientific Quality

Ensuring the scientific quality of research is critical, particularly in qualitative studies that explore subjective experiences and context-dependent phenomena. In Information Systems (IS) research, quality is assessed through dimensions such as credibility, dependability, confirmability, and transferability, which are adapted to the interpretive and context-sensitive nature of qualitative inquiry (Klein & Myers, 1999; Gregor & Hevner, 2013). To enhance credibility, triangulation will be employed by combining data from semi-structured interviews and qualitative surveys. This methodological integration allows for validation across different participant groups and data types, strengthening the evidence base for emergent themes (Klein & Myers, 1999). Participant validation will also be conducted by sharing findings with selected interviewees to confirm that their perspectives are accurately represented.

Dependability will be supported by maintaining a transparent and traceable research process. This includes the documentation of coding procedures and thematic development. Reflexive practices will be embedded throughout the study to promote consistency and self-awareness, aligning principles of rigor in IS interpretive research (Gregor & Hevner, 2013). Confirmability will be addressed through reflexivity, ensuring that the influence of researcher assumptions and positionality is continuously evaluated. Interpretive IS research acknowledges that meaning is co-constructed; thus, researchers are not neutral observers but active participants in knowledge creation (Klein & Myers, 1999). Transferability will be addressed through thick description and contextual clarity, providing rich detail about the participants, setting, and AR technology context. This enables readers and future researchers to evaluate the relevance of findings in other digital environments or generational groups. Finally, this study balances rigor and relevance by producing findings that contribute both theoretically and practically to the IS field. Through

methodological transparency, participant-centered design, and theory-informed analysis, the research aligns with expectations for high-quality scholarly work in Information Systems (Hevner et al., 2004).

4 Findings

The following section presents the findings from the thematic analysis, structured around two participant groups: Implementation Professionals and Marketing/Brand Professionals. Drawing on the open coding process, key themes were identified within each group, highlighting distinct yet interconnected perspectives on the use of augmented reality (AR) in retail contexts.

4.1 Interview Responses – Interpretation & Analysis

This analysis is based on semi-structured interviews conducted with respondents R1, R2, R3, and R4, who represent a diverse range of roles involved in the application and strategic use of AR across organizational functions such as strategy, innovation, engineering, and business development. In addition, respondents R5, R6, and R7 occupy senior roles in digital marketing and strategy within the e-commerce and retail sectors, offering complementary insights into the branding and consumer-facing dimensions of AR implementation. The analysis followed Braun and Clarke's six-phase thematic analysis model and was conducted inductively. In keeping with our interpretivist stance, we approached these interviews not to validate existing assumptions but as opportunities to understand how professionals make sense of AR within their specific organizational and consumer contexts. Five themes were developed during analysis, which we interpret as reflecting how marketing and implementation professionals currently perceive the strategic role, opportunities, and barriers associated with AR in retail. Throughout, we refer to literature occasionally to sensitize our interpretation, rather than to frame the findings.

The table below outlines the five overarching themes that emerged from our analysis, along with their associated sub-themes and representative codes. These themes serve as a conceptual foundation for the detailed discussion that follows. We present the themes in a way that reflects both the shared and divergent experiences of the two participant groups, while emphasizing the strategic, operational, and consumer-facing dimensions of AR in retail contexts.

Table 9. Thematic Coding of Interviews R1-R4

Code	Theme	R1	R2	R3	R4
ARIM	AR Implementation and Use Cases	Used in factory layout and aircraft design planning to anticipate problems before deployment. Aims for daily on-site and in real time use by operators and onboarding support.	AR used for design validation and equipment inspection; both internal and external applications.	Uses AR mainly for internal processes; implementation depends on scale and proven ROI; emphasizes current use is operational, not customer-facing.	Uses AR to simulate military aircraft configurations for customers, enhancing product presentation at aviation shows.
CEHM	Customer Engagement and Hedonic Motivation	Helps clients visualize cabin interiors to align with brand identity; early-stage visualization appreciated but not core focus.	Focused on improving technical review and team collaboration, but no direct customer engagement mentioned.	Sees limited customer engagement use presently; hedonic value seen more in B2C; current focus is functional, not emotional engagement.	AR drive customer engagement by allowing customers to interact with customized aircraft models in virtual environments.
ADRB	Adoption Barriers and Resistance	Challenges include ergonomic limitations of headsets, frequent platform updates, and strategic decisions about in-house vs market solutions.	High costs and equipment obsolescence are major hurdles; integration complexity noted.	Notes difficulty in integration with legacy systems, high learning curve, and need for better vendor support.	Overcame minimal resistance internally due to leadership support; external challenges include AR's user-friendliness and cost.
CDSU	Customer Decision Support and Uncertainty Reduction	Not explicitly discussed, but implies AR helps clients make informed interior design choices and facilitates operator understanding during onboarding.	AR aids in design accuracy and confidence in equipment installation, but no direct impact on customer decisions.	Highlights AR's strength in validation and inspection use cases, boosting decision confidence internally; less emphasis on consumer-side CDSU.	AR and VR reduce customer uncertainty, particularly in aviation, by allowing detailed exploration of aircraft features and configurations.
ORGSTR	Organizational Strategy and Future Outlook	Central mixed reality team provides training globally. Future goals include AR-integrated work instructions and onboarding. Interested in virtual agent support.	AR is essential for reducing costs in design; needs to evolve to customer-facing aspects for future growth.	Emphasizes AR as part of long-term digital transformation, sees value in internal stakeholder buy-in and structured roadmap for AR integration.	Advocates for strategic deployment of AR, with clear metrics to justify its value; internal ownership involves both marketing and technical teams.

Table 10. Thematic Coding of Interviews R5-R7

Code	Theme	R5	R6	R7
ARIM	AR Implementation and Use Cases	AR as a tool for spatial visualization, practical utility focused	Basic AR integrations via Meta/Snapchat, e-commerce integration lacking	References experimental use cases, sees potential but cautious of over-hype
CEHM	Customer Engagement and Hedonic Motivation	Interactivity as brand differentiator, value in personalization	AR creates, tangible, digital experiences, hedonic value through visual elevation	Warns against overreliance on novelty, experience must align with brand goals
ADRB	Adoption Barriers and Resistance	Cost and resource issues are major constraints, skeptical of ROI	AR implementation too complex for small orgs, high cost and maintenance burden	Integration complexity and UX issues flagged as blockers, questions platform readiness
CDSU	Customer Decision Support and Uncertainty Reduction	Try-ons reduce returns and build confidence, improves decision comfort	Highlights utility across product types, AR seen as value-adding when working seamlessly	Sees AR as a way to clarify options and reduce doubt, especially helpful in high involvement purchases
ORGSTR	Organizational Strategy and Future Outlook	Wants clearer metrics and simplified integration, supports small pilots	AR will scale with plug-and-play platforms, collaboration between teams essential	Strategic deployment needed, champions internal ownership split between marketing and IT

4.1.1 AR Implementation and Use Cases (ARIM)

Interviews with respondents R1 through R7 reveal that augmented reality (AR) is widely perceived as a transformative technology for enhancing visualization and interactivity. Across both implementation and retail contexts, participants emphasized AR’s role in communicating complex ideas, supporting early design decisions, and elevating user engagement. However, its implementation remains more exploratory than mainstream, constrained by issues such as cost, usability, and limited platform integration.

Respondents R1 through R4, all based in aerospace organizations, underscored AR’s value in design, training, and customer engagement. AR was consistently described as a forward-looking tool that enables users to visualize future configurations and validate them in simulated environments. R1 emphasized how AR provides a dual benefit: aiding internal assembly teams and helping clients envision future products:

“The goal is to provide the workers who assemble our products daily with a glimpse of what the future will look like with new designs and other innovations.” (R1 - L5:L6)

“We use augmented reality to help [clients] visualize and anticipate what their future cabins will look like... It gives them a preview, a preliminary visualization of what their final product and brand experience will be.” (R1 – L38:L42)

This immersive capability supports early error detection and cost reduction:

“This helps anticipate and address any potential problems before they occur during actual deployment.” (R1 – L6:L7)

“Ultimately, the time spent validating a solution before finalizing it is always less costly than correcting the problem once it's on the production line.” (R1 – L26:27)

R2 echoed this emphasis on cost-saving and design precision:

“Our design team makes mistakes... it's always much more expensive to modify newly built equipment than to spend more time during the design phase... So, it's really about reducing costs first and foremost, and also, basically, getting it right the first time.” (R2 – L27:33)

R3 extended the discussion to customer experience and quality control, particularly in luxury interiors:

“We do a lot of work focused on the interior... so we need to deliver high-quality renderings of cabin interiors... and apply potential design changes in real time.” (R3 – L40:43)

“It's really about achieving a more realistic experience... getting closer to reality through visualization.” (R3 – L53:55)

R4 also stressed AR's value in client-facing contexts, where physical access to aircraft is often limited:

“The goal is to let the client experience exactly what they want to see, even if the physical aircraft is not available.” (R4 – L63:64)

“It's still a good conversation starter, and at the same time, it keeps people engaged in what they want.” (R4 – L99:100)

Collectively, these accounts demonstrate that in aerospace, AR is leveraged to improve internal processes, enhance design accuracy, and enable immersive client previews, objectives that mirror those found in retail and fashion, albeit with different end-users and environments.

Across interviews R5 to R7, participants referred to AR primarily as a visual enhancement tool. It was consistently positioned to help consumers better imagine products in context, whether on their bodies, in their homes, or as part of a broader narrative experience. R7 described AR as “*a game-changer*” in situations where physical testing is impossible, such as furniture placement or trying on clothing online. Their emphasis was on the practical utility of AR in supporting visual decision-making:

“Placing a couch virtually in your living room before buying it—that’s a game-changer.” (R7 - L49:L50)

This aligns with how prior research has conceptualized AR’s capacity to reduce spatial and sensory uncertainty. However, respondents were also clear that this potential has not yet been fully realized within current platforms. R6 noted that while AR features technically exist within Meta and Snapchat, they are not deeply integrated into e-commerce systems. R5 echoed this, observing that AR is still mostly approached through “workarounds” like QR codes, rather than native functionality embedded into core platforms like Shopify.

“These platforms are starting to integrate AI in some areas, but AR integration is still minimal. There may be workarounds... but native AR functionality is essentially non-existent for now.” (R5 – L28:30)

AR is broadly recognized as a powerful enabler of visualization and interactivity. It aids design validation and client engagement, and it helps bridge the gap between digital and physical experiences. However, its practical limitations reduce its realization. Participants conveyed cautious optimism, positioning AR as a valuable, yet still emerging, component of their digital strategies. This suggests a key tension between aspiration and implementation: AR’s potential is widely acknowledged, but its deployment remains partial. Still, the parallels between aerospace and retail hint at a shared trajectory, toward more immersive, personalized, and visually rich interactions that reshape how products are understood, evaluated, and experienced.

4.1.2 Customer Engagement and Hedonic Motivation (CEHM)

We observed a shared view among respondents that AR adds an experiential or playful quality to digital shopping. R6 referred to this as “*making digital content feel more tangible*,” while R5 described a future in which AR could enable “*outfit mixing*” and avatar-driven styling features that are not necessarily about utility, but about delight.

“If it’s engaging, users will spend more time on site.” (R5 – L61:L62)

R7 also referenced the emotional aspect of interactivity, giving the example of an AR campaign that assigned users a “*green score*” based on their values, which then dynamically altered the visuals:

“They used interactive questions to assign users a green score... Stuff like that makes marketing more engaging and personal.” (R7 – L28-30)

These reflections resonate with literature that explores hedonic motivation as a key driver of AR adoption. However, participants were careful to frame engagement as necessary but insufficient. All three expressed concern that without meaningful integration, AR risks becoming superficial.

“Consumer expectations are high things need to work fast and flawlessly” (R5 – L39:L40)

“The experience has to be good otherwise, it backfires” (R6 – L42:L44)

“It’s not absolutely essential, but it helps” (R7 – L18)

Notably, this concern also emerged in aerospace contexts, though often expressed through a different lens focused on realism, anticipation, and emotional investment. For example, R1 likened the personalization of aircraft interiors to fashion runways, suggesting that these configurations serve as symbolic expressions of brand identity, just as clothing collections do for fashion houses:

“The interior of a plane is like the outfit showcased on the runway when launching a new clothing line or product — it’s a core part of the company’s identity.” (R1 – L33:L35)

Here, AR serves a hedonic function by enabling clients to preview their aircraft configurations in immersive detail, fostering both excitement and brand alignment:

“They’re very satisfied to have that foresight.” (R1 – L42:L43)

Similarly, R3 emphasized the emotional impact of realism and immersion:

“It’s really about achieving a more realistic experience...that’s essentially what augmented reality is.” (R3 – L53:55)

This notion of realism as emotional engagement was echoed by R4, who observed how clients responded to interactive AR demos:

“Yeah, for sure, that’s why we want to develop this even further... It’s still a good conversation starter, and at the same time, it keeps people engaged in what they want.” (R4 – L97:100)

Even though utility and ROI are constant factors especially within aerospace, respondents acknowledged that enjoyment and immersion directly influence stakeholder confidence and buy-in. R3 warned of the “*wow effect*” becoming a trap:

“It’s important to be cautious: is AR really bringing added value, or is it just a gimmick? People enjoy it, yes, but does it truly add utility?” (R3 – L206:L207)

Yet others saw this emotional reaction as precisely the point. For example, R2 likened real-time color and layout switching in aircraft interiors to digital try-on features in retail:

“It’s the same idea I was mentioning earlier about customer requests related to the aircraft interior... Like, for example, you ‘choose your dress,’ meaning you pick your configuration or layout, and then you can instantly change the colors.” (R2 - L114:L117)

In this sense, hedonic value is not an inherent property of AR, but something co-produced through careful design, realism, and responsiveness to user expectations. R4 captured this dynamic well:

“Always keep in mind what the user will experience.” (R4 – L163)

AR’s power, then, lies not just in showing a product or future state, but in making users feel connected, curious, and inspired. If neglected or poorly executed, it risks becoming performative; but when thoughtfully designed, it becomes a powerful tool for trust, excitement, and experiential loyalty. Whether in fashion or flight, the hedonic layer reveals a shared imperative: to move beyond function and create emotionally resonant experiences that drive engagement, trust, and lasting brand connection.

4.1.3 Adoption, Barriers and Resistance (ADRB)

A dominant theme across all interviews was the presence of significant barriers to AR adoption, particularly in terms of cost, complexity, and required capability. R7 noted that while clients are often intrigued by AR, adoption remains *“hard to justify”* without demonstrable ROI. R6 added that integration is not just expensive but represents *“a different level of complexity”*, one that demands deep understanding of an organization’s existing digital architecture. R5 emphasized the fragility of the AR experience itself. In their view, the biggest risk is poor execution:

“If the tech is clunky, loads slowly, or looks bad, the experience fails, and adoption dies.” (R5 – L76:L77)

This concern is echoed by R3, who warned against the misleading promise of AR as a *“miracle solution,”* arguing that the industry often oversells its capabilities:

“The AR industry tends to hype it as a miracle solution, but in reality, we always need to put things into context. When it comes time to actually implement it, it's a very different story — the performance isn't always what was expected.” (R3 – L178:L180)

R1 similarly highlighted how financial and technological constraints affect adoption decisions, noting that while hardware costs are decreasing due to market competition, the real challenge lies in custom development:

“There are many players entering the augmented reality market, and a lot of them are offering solutions that aren't fully adapted to the specific realities of each organization.” (R1 – L81:L83)

“That’s where the real financial question lies for us: do we invest in building our own augmented reality platform that meets our specific needs, or do we wait for the market to consolidate?” (R1 – L83:L85)

This resonates strongly with fashion and retail sectors, where AR must adapt to fast-moving seasonal product cycles, brand-specific aesthetics, and shifting consumer expectations. Just as an aircraft client expects bespoke cabin configurations and instant visualization, retail brands similarly demand real-time customization for virtual try-ons and style previews. But both sectors face the same technical burden: how to make that flexibility scalable, cost-effective, and seamless for end users. R2 explained that beyond capital investment, AR demands robust infrastructure and internal capacity:

“So that’s another challenge—maintaining licenses and maintaining the equipment. Right now, for example, I have a nice pair of Microsoft glasses that are now obsolete.” (R2 – L81:L82)

This sense of obsolescence and ongoing upkeep is particularly relevant in retail, where rapid turnover and consumer trends can render a digital tool outdated within months. Likewise, R3 emphasized the organizational skill gap:

“If we want to avoid relying on external firms, we need to invest internally in the ability to leverage this technology.” (R3 – L146:L148)

Even when the technology works, adoption may be hindered by workforce readiness. R4 commented that it’s not resistance but lack of familiarity that slows uptake:

“It’s more about the fact that people don’t know anything about it. We can take the time, so it’s just a matter of explaining what it is, what it does, and what the added value is.” (R4 – L108:L110)

This mirrors retail contexts, where both employees and consumers often require education or guided experience before embracing AR features such as virtual fitting rooms or interactive catalogues. Several interviewees offered a nuanced view: while AR may introduce initial friction and longer lead times, it ultimately streamlines deployment and reduces downstream costs. R1 elaborated:

“It’s an extra step we impose before any deployment... However, it greatly improves the post-deployment phase.” (R1 – L20:L21)

“While it does make the development phase more complex, in the end, it benefits us... the time spent validating a solution before finalizing it is always less costly than correcting the problem once it’s on the production line.” (R1 – L25:L27)

In the fashion domain, a comparable principle applies. Retailers who invest in virtual sampling and fit validation upfront are often able to reduce costly returns and improve customer satisfaction, mirroring the aerospace sector's use of AR to prevent design errors and anticipate logistical challenges. Ultimately, these constraints are not fixed hurdles but part of a dynamic, evaluative process. As several respondents pointed out, the “*wow factor*” is not enough on its own; organizations must assess whether AR creates true operational or experiential value:

“It’s important to be cautious: is AR really bringing added value, or is it just a gimmick?” (R3 – L206:L207)

These insights align with established frameworks like effort expectancy and facilitating conditions from the UTAUT model, as well as the technological and organizational domains of the TOE framework. Yet rather than viewing these as binary factors (present or absent), our findings suggest a more iterative and context-sensitive approach, one that balances ambition with realism, and experimentation with scalability.

4.1.4 Customer Decision Support and Uncertainty Reduction (CDSU)

While AR was seen as enjoyable, it was also described as a pragmatic support tool for reducing uncertainty and boosting consumer confidence, especially in high-return categories like fashion and furniture. R5 identified virtual try-ons as the clearest high impact use case:

“That directly addresses a big reason for returns—products not looking or fitting as expected.” (R5 – L64:L65)

R6 expanded this to include B2B and industrial sectors, suggesting that any product requiring spatial understanding could benefit from AR.

“Even in technical or wholesale products—machinery, vehicles—AR could play a role.” (R6 – L54:L55)

Similarly, R7 linked AR with informed decision-making, reinforcing the belief that better product understanding translates into better consumer choices.

“It creates a better experience and helps people make more informed decisions.” (R7 – L48:L49)

This view was echoed across multiple interviews. For example, in the aerospace context, AR is not only used to visualize new designs but to validate them in realistic settings before deployment. R1 explained that AR helped assembly workers and clients alike to anticipate future configurations and proactively identify issues:

“This helps anticipate and address any potential problems before they occur during actual deployment.” (R1 – L6:L7)

“It’s similar to the experience of our operators who assemble the planes — they benefit from AR to understand what’s coming. But for the airlines, it gives them a preview, a preliminary visualization of what their final product and brand experience will be.” (R1 – L40:L42)

These applications parallel how consumers use AR in retail to preview purchases before committing, such as trying on clothes virtually or placing furniture in their home space. As R4 pointed out:

“It’s like if you present to them what they want before it even becomes reality... it improves customer engagement.” (R4 – L91:L94)

Whether helping aircraft clients envision cabin layouts or assisting fashion consumers in choosing a style, the core value of AR lies in reducing ambiguity. R2 noted that confidence in design and review processes was a major driver:

“Maybe it’s really the level of confidence... in the design and the review process that makes the difference.” (R2 – L58:L59)

This level of confidence can translate into reduced error rates, improved decision-making, and ultimately, fewer returns or revisions, goals that are equally critical in both aerospace and fashion. R3 emphasized this by contrasting the immersive clarity of AR with the misleading “*wow effect*” sometimes associated with tech demos:

“It’s important to be cautious: is AR really bringing added value, or is it just a gimmick?” (R3 – L206:L207)

Yet, many interviewees were clear that the value was real when applied thoughtfully. R4 highlighted how AR-driven visualizations during client discussions made product offerings tangible, influencing client trust and purchase readiness:

“It allows us to show clients what we can do, our capabilities, what we’re able to deliver... it influences the confidence clients can have and the continuation of the discussion.” (R4 – L140:L142)

Even in fashion contexts, this aligns closely with the emotional and psychological aspects of pre-purchase visualization. As R4 speculated:

“Let’s say, a mirror in front of you and... a piece of clothing that you can put on yourself. Another idea could be to use sensors to detect if the clothing fits properly on your body” (R4 – L168:L170)

Here, the functional value of AR goes beyond novelty, it becomes a conversion-driving tool. R2 noted that even small design errors in aerospace can be costly:

“It’s always much more expensive to modify newly built equipment than to spend more time during the design phase.” (R2 – L29:L31)

In fashion, the stakes may not be as high, but the logic holds: the more a customer feels confident in a product pre-purchase, the fewer adjustments or returns are needed post-sale. We interpret this as evidence that respondents see AR not only as a branding or entertainment tool, but as a functional system with tangible business value, a finding that adds nuance to the existing literature, which often presents hedonic and utilitarian value as distinct. In our view, partic-

ipants saw these values as layered, not mutually exclusive. AR can inspire excitement and emotional engagement and provide concrete support in making more accurate, confident decisions, whether for customizing a jet interior or selecting a new outfit.

4.1.5 Organizational Strategy and Future Outlook (ORGSTR)

Finally, we observed a forward-looking outlook among participants, all of whom believed AR could become standard practice if implementation barriers are reduced. R6 articulated this clearly:

“If platforms offer it as a standard plugin—like a Shopify module or Facebook ad format—it’ll go mainstream fast.” (R6 – L78:L79)

This aligns closely with R4’s vision of AR becoming more integrated, more seamless, and ultimately more democratized across sectors:

“Yeah, that’s definitely true—100%. I’m already seeing it. Augmented Reality (AR) isn’t just about an Apple Vision Pro headset... There are lots of AR glasses coming out now—small ones that display key information right in front of your eyes... I think the biggest opportunity right now might be in manufacturing. But for sure, there’s a lot of potential on the customer experience or sales side as well.” (R4 – L199:L205)

R7 and R5 referred to internal readiness as a critical enabler. R7 proposed a collaborative ownership model, where marketing defines the vision and IT enables delivery. This aligns with broader digital transformation literature, which emphasizes cross-functional integration as a prerequisite for innovation. Interestingly, none of the respondents viewed leadership buy-in as a primary barrier. Instead, they emphasized ease of testing and proof of concept. As R5 put it:

“We’re not sentimental about tools that don’t deliver.” (R5 – L71:L72)

This suggests that within our sample, AR adoption is framed not as a belief system but as a performance test, one that must pass both technical and experiential thresholds. In this context, R1 described AR as a proactive validation layer within complex manufacturing environments:

“It’s an extra step we impose before any deployment... However, it greatly improves the post-deployment phase.” (R1 – L20:L21)

“The time spent validating a solution before finalizing it is always less costly than correcting the problem once it’s on the production line.” (R1 – L26:L27)

This strategic use of AR to de-risk innovation is mirrored in the retail and fashion sector, where AR is increasingly used to simulate store layouts, trial garment designs, and anticipate consumer preferences. As R2 remarked:

“It’s really about reducing costs first and foremost, and also, basically, getting it right the first time.” (R2 – L32:L33)

“Sometimes I have an internal team... other times we outsource... we require the same level of augmented reality validation from them.” (R2 – L8:L10)

This emphasis on standardization and quality assurance recalls the fashion industry’s drive toward scalable customization, an area where digital twins and AR overlays now allow for real-time visualization of fabrics, fittings, and branding in diverse environments. R1 underscored this analogy explicitly:

“In the end, the interior of a plane is like the outfit showcased on the runway when launching a new clothing line or product—it’s a core part of the company’s identity.” (R1 – L33:L35)

The technology’s capacity to simulate and refine these *“runway-ready”* configurations also extends to client-facing use cases, particularly in sales. R4 emphasized that seeing a future product, even in its pre-production phase, builds trust and momentum:

“It makes people much more comfortable... If you present to them what they want before it even becomes reality... it improves customer engagement.” (R4 – L90:L94)

“People are much more enthusiastic when we show them things beyond just paper.” (R4 – L98:L99)

Participants also acknowledged remaining challenges in operationalization, including hardware obsolescence, integration with secure networks, and building internal expertise. As R3 noted:

“The AR industry tends to hype it as a miracle solution, but in reality... the performance isn’t always what was expected.” (R3 – L178:L180)

“The real financial question lies for us: do we invest in building our own AR platform that meets our specific needs, or do we wait for the market to consolidate?” (R1 – L83:L85)

Even so, optimism prevailed. Across both aerospace and adjacent sectors like fashion retail, AR is seen as a maturing technology with rapidly expanding use cases. As R4 concluded:

“You know, we started with an idea... there’s a way to make it work in any sector because it’s the future. It’s what’s happening right now, and it’s only going to get better.” (R4 – L172:L175)

4.2 Interview Responses - Iterative Coding & Analysis

In line with the iterative coding approach outlined in the methodology, the thematic analysis process allowed for the identification of additional themes not pre-defined by the interview guide or theoretical framework. While the five core themes (ARIM, CEHM, ADRB, CDSU, ORGSTR) captured the majority of the data structure, two further themes emerged across both implementation and marketing professionals. These inductive themes, Selective AR Adoption (SARA) and Internal Skills Gaps (ISG) were grounded in repeated patterns in participants’ accounts and reflect the organizational realities that may influence AR strategy and operationalization.

Table 11. Iterative Thematic Coding of Interviews R1-R7

Code	Theme	R1	R2	R3	R5	R6	R7
SARA	Selective AR Adoption	Adopts AR after validating its ability to reduce issues and cost	AR adoption tied to reducing costs and validation	Questions whether AR delivers real value or is just another trend	States they avoid tools that don't deliver measurable performance	Supports AR adoption only if it integrates easily	Difficulty justifying AR without ROI; used selectively for impact
ISG	Internal Skills Gaps	Notes the dilemma between in-house development and market dependency	-	Need for investment in internal ability to manage AR without external support.	-	Lack of alignment between departments and cross-functional gaps	Fragmented ownership between marketing and technical teams

4.2.1 *Selective AR Adoption (SARA)*

Participants from both technical and marketing roles emphasized that AR is not deployed indiscriminately. Instead, it is subject to strict evaluation based on ROI, feasibility, and relevance to specific use cases. One respondent noted:

“Ultimately, the time spent validating a solution before finalizing it is always less costly than correcting the problem once it's on the production line” (R1 – L26:L27)

Highlighting a pragmatic rationale for pre-implementation assessment. Similarly, R3 reflected a cautious stance:

“It's important to be cautious: is AR really bringing added value, or is it just a gimmick?” (R3 – L206:L207)

From the retail side, strategic restraint was also evident:

“We're not sentimental about tools that don't deliver” (R5 – L71:L72)

“Hard to justify without ROI.”

Collectively, these comments suggest that AR adoption decisions are highly contingent and purpose-driven, supporting the notion of selective implementation as a practical response to both internal and market pressures.

4.2.2 *Internal Skills Gaps (ISG)*

A second emergent theme concerned organizational readiness, not in abstract strategic terms, but specifically in relation to in-house capability. One implementation professional described a critical limitation:

“If we want to avoid relying on external firms, we need to invest internally in the ability to leverage this technology.” (R3 – L46:L48)

This sentiment was echoed by R6, who noted:

“Internal knowledge can be a blocker, but not insurmountable.” (R6 – L62:L63)

In retail contexts, R7 described the consequences of this gap more explicitly, noting:

“Possibly a lack of technical knowledge, but that’s solvable.” (R7 – L61)

These reflections point to a recurring challenge: even when strategic interest exists, internal fragmentation and limited expertise can slow or dilute AR initiatives. This finding refines the broader theme of organizational readiness by highlighting operational-level capability gaps as a significant friction point in adoption.

4.3 Survey Responses – Open Coding & Analysis

This section presents the results of the initial thematic analysis of the open-ended survey responses. As with the interview data, a coding framework was developed before analysis, based on the purpose and wording of each survey question. These codes were then organized into five overarching themes: Shopping Confidence & Trust, Perceptions of AR Technology, Adoption & Use of AR, AR Concerns & Barriers, and AR in the Broader Tech Landscape. This stage focused on categorizing responses according to these predefined themes to identify common patterns and viewpoints across the dataset.

Each survey question was mapped to a primary thematic code based on its intent and response patterns. Responses were then grouped under these themes to enable insight into consumer attitudes, expectations, and behaviors surrounding augmented reality in retail. The analysis focused on summarizing patterns across multiple brief responses rather than interpreting extended narratives. Direct quotations are not included and instead, paraphrased summaries of common sentiments are used to capture ideas across respondents.

The table below presents an overview of the five key themes, including the associated survey questions, representative response content, and response count. This thematic structure serves as the foundation for the interpretation that follows. In line with our interpretivist stance, we approached these responses inductively and allowed themes to emerge from the data. Literature is referenced occasionally to sensitize our interpretation, but not to frame or constrain the findings.

Table 12. Thematic Coding of Survey Responses

Code	Theme	Question	Relevant Sample of Quotes	Count
SCT	Shopping Confidence & Trust	What factors typically make you feel uncertain or hesitant when shopping online?	Unsure about how the clothes will fit on me.; shipping costs, fit; Sizes, product not being the same as in the photos; Inability to try clothing on, feel the quality of the material or object purchased; The quality	44
SCT	Shopping Confidence & Trust	Have you ever returned an item you purchased online?	Yes: 38; No: 12	50
SCT	Shopping Confidence & Trust	What was the reason for the return and how was the experience?	It didn't fit well (too big or too small). Or I didn't like the color on me.; Size. Good and easy experience; Clothes did not fit, not a bad experience; Not the right size. Returning something in-store is much quicker and simpler.; It did not fit well	32
SCT	Shopping Confidence & Trust	Which features or tools make online shopping feel more trustworthy or reliable to you?	Customer reviews (with photos) and sizing guides.; reviews, accurate sizing; More products to choose from compared to stores, and usually discounts as well; Sizing guides, reviews, videos and pictures with the objects/clothes; Customer reviews and sizing guides	47
SCT	Shopping Confidence & Trust	What are your favorite online stores or apps, and why?	Shein, H&M, and Zara. It's the stores I shop at the most and I like their clothes and their not too expensive. With Shein, I am able to look at the reviews and the photos of what the clothes look like on real people so I know what to kind expect.; any luxury car brand, they allow you to see all of the changes or features you have added to the vehicle in context without having to imagine based on specifications; Amazon - it is very convenient and the reviews are readily available; I prefer Amazon because of its fast shipping, easy returns, and extensive product selection. The user reviews and recommendations also make it easier to find what I'm looking for.	43
PAT	Perceptions of AR Technology	If a website offered a feature to "preview" or "try on" a product virtually, what would you expect it to involve?	A camera (like pointing the camera on my phone to my body so the virtual clothes can be "on" me); the product to be accurately sized and represented to me or in the environment i choose; Like an avatar with my measurements and outfits I wear?; It would need to take my characteristics into account (shape, weight, height) and give a 360 view of it; I'd expect to see how the product looks on me using my phone or webcam, kind of like AR. It should be realistic and help me feel more confident about my choice.	42
PAT	Perceptions of AR Technology	When you hear the term "Augmented Reality" in online shopping, what comes to mind?	Virtual try ons, virtual showrooms, and virtual mirrors.; virtual products; 3d models with the items; I'm envisioning the experience of a store on a screen; Seeing products in my real environment through my phone—like trying on clothes, glasses, or placing furniture in my room. It makes shopping feel more interactive and helps me visualize before buying	42
PAT	Perceptions of AR Technology	Which types of products do you think AR	Clothing & Fashion: 24; Home & Furniture: 13; Beauty: 4; Technology & Vehicles: 3; Miscellaneous: 3	47

		would be most helpful for?		
PAT	Perceptions of AR Technology	How helpful do you think AR features would be when shopping online?	Extremely helpful: 9; Very helpful: 17; Moderately helpful: 14; Slightly helpful: 3; Not helpful: 4	50
PAT	Perceptions of AR Technology	Do you think your current device can run AR features smoothly? Why or why not?	Confident in device capability: 40; Not confident: 6; Uncertain: 5	50
PAT	Perceptions of AR Technology	How do you feel about using your phone's camera for online shopping?	Comfortable with using phone camera: 30, Conditionally comfortable (depends on privacy/ease): 12, Uncomfortable or negative: 8	50
AUA	Adoption & Use of AR	Have you ever used an AR feature while shopping online? If yes, describe the experience. If not, why not?	Yes, I used it when shopping for jewelry online - I tried on virtually earrings, necklaces, and rings.; yes, the experience was clunky and not an accurate representation of the final product; I don't know that I have had the chance to use one. I think the closest would be trying out furniture for my living room on amazon. It was a great tool to help visualize the furniture piece in my home before committing to it.; No, I haven't used one yet. I guess I haven't come across it while shopping, or I didn't notice it was available	43
AUA	Adoption & Use of AR	Do you believe AR could improve your online shopping experience? Why or why not?	Yes, because it will allow me to get a better idea of what the clothes will look like in real life on me.; yes, it will give me more certainty in my choices; Don't think much of its impact, don't think it can be that beneficial; Yes, the more information I have the better!; Yes, I think AR could make online shopping easier by helping me see if a product fits or looks right before buying. It could save time and reduce returns	49
AUA	Adoption & Use of AR	What would make an AR shopping feature appealing enough to use, compared to just images or reviews?	I can see what it would look like on me (e.g color, fit, length...); the ease of use, not having to download a separate application; Very easy to do and giving you useful information, otherwise it's not worth; I would see it directly as it pertains to me and my specific needs; If it's quick to use, realistic, and shows how the product actually looks on me or in my space, I'd be more likely to try it. It gives a clearer idea than photos or reviews alone	44
AUA	Adoption & Use of AR	How likely are you to use AR "virtual try-on" if available?	Extremely likely: 13; Somewhat likely: 13; Neither likely nor unlikely: 10; Somewhat unlikely: 9; Extremely unlikely: 5	50
AUA	Adoption & Use of AR	Would you be more likely to shop from a brand that offers innovative features like AR?	Definitely yes: 6; Probably yes: 17; Might or might not: 15; Probably not: 9; Definitely not: 3	50
ACB	AR Concerns & Barriers	How much do you trust online retailers to handle personal data when using AR?	Fully trust: 3; Mostly trust: 7; Slightly trust: 12; Neutral: 9; Don't trust at all: 19	50
ACB	AR Concerns & Barriers	Do you have concerns about retailers offering AR (privacy, performance, etc.)?	No concerns.; privacy, performance and misrepresentation; Yes, lots of privacy and data issues; I'd be concerned about privacy, especially if my camera and personal data are being used. Performance issues could also be a problem if the AR feature is	50

			slow or glitches, which could make the experience frustrating.; I don't have any issue with that	
ACB	AR Concerns & Barriers	If you've chosen not to use AR features, what influenced that decision?	slow performance and inaccurate product representation; Usefulness and privacy; sometimes the process feels unnecessary when I can rely on reviews and product images. It also seems like it might be a bit complicated or slow to use.	32
ATL	AR in Broader Tech Landscape	Have you used other interactive tools (quizzes, live video, AI, etc.)?	Yes: 11; Maybe: 13; No: 26	50
ATL	AR in Broader Tech Landscape	Which tools did you use and how helpful were they?	Online quizzes (for shampoo and skincare products).; product show rooms and virtual walk arounds, allowed me to visualize the product in 3d space rather than pictures; I mostly only used AR and AI to help me find products as similar but less expensive on other websites; I used a foundation matcher which was not very helpful. i have used a virtual tour which was helpful.; Augmented Reality, AI prompts, Virtual assistant	10

4.3.1 Shopping Confidence & Trust (SCT)

Responses coded under SCT centered around concerns about online shopping reliability, uncertainty before purchase, and post-purchase behavior. Many participants noted that they hesitate to buy products online due to inconsistent sizing, poor quality, or unclear return policies. Trust in online platforms was frequently described as conditional, often relying on brand reputation, review quantity, or previous experience. Several respondents indicated that they return items because the products do not match the images or descriptions provided. This reflects a broader concern about expectation-reality gaps, and a clear need for greater visual transparency and product assurance before checkout. Consumers also reported trusting platforms more when they offered clear return processes, detailed product visuals, and visible customer feedback. Taken together, these patterns highlight the underlying need for mechanisms that reduce risk and increase confidence in digital transactions.

4.3.2 Perceptions of AR Technology (PAT)

Responses associated with PAT reflect a broad spectrum of attitudes toward AR technology, ranging from curiosity and optimism to confusion or disinterest. Many participants imagined AR as a tool for “virtual try-ons,” “product placement,” or “previewing how something would look in real life.” However, expectations varied significantly. Some saw AR as a natural extension of e-commerce, while others were unsure about its practical value. Participants expressed interest in seeing AR applied to fashion, furniture, and cosmetics, suggesting strong alignment

with products that are appearance- or fit-sensitive. However, there was also some uncertainty around how AR works in practice, with several responses indicating low familiarity or limited prior exposure. This theme also revealed a common assumption that AR should be seamless, realistic, and interactive, with minimal effort required from the user. Where these expectations were not met, interest tended to decline.

4.3.3 Adoption & Use of AR (AUA)

Survey responses under AUA emphasized two recurring conditions for adoption: practical usefulness and technical reliability. Many respondents said they would use AR if it helped them make better choices, reduced returns, or made shopping more efficient. Others pointed to visual accuracy and ease of use as core motivators. Some participants reported prior experience with AR, usually through social media filters or mobile apps, and described these encounters as fun but limited in utility. Others had not used AR at all, citing lack of awareness, access, or motivation. Across responses, there was a recurring theme of conditional adoption. Users were not necessarily opposed to AR but emphasized that they would engage only if it offered clear value without added friction.

4.3.4 AR Concerns & Barriers (ACB)

Concerns around AR were wide-ranging, but three dominant sub-themes emerged: data privacy, technical limitations, and practical skepticism. Many participants expressed hesitation about using features that required camera access, citing fears around data misuse or being tracked. Others were concerned that AR might slow down their devices, fail to work properly, or offer inaccurate representations. Another barrier was trust in execution as participants expressed doubt that AR tools could truly match real-world appearance, fit, or behavior. This skepticism often stemmed from previous experience with underwhelming digital tools. A small but notable subset of responses also reflected general resistance to new technology, often framed as personal preference or generational difference. These respondents indicated that they preferred traditional shopping methods, or did not see the value in trying something unfamiliar.

4.3.5 AR in the Broader Tech Landscape (ATL)

The final theme captured how participants situated AR among other interactive tools. Several respondents mentioned having used features like style quizzes, AI-based recommendations, or

live video shopping. Comparisons to these tools often revealed that AR was still seen as less established, or less immediately useful than other forms of digital engagement. Some participants described AR as “gimmicky” compared to more straightforward utilities like personalized suggestions or high-quality imagery. Others, however, noted that AR could be more engaging if it were better integrated and less demanding on device performance. Overall, responses in this category showed that consumers assess AR not in isolation, but in relation to other available tools—an important consideration for brands seeking to prioritize technology investments.

4.4 Survey Responses – Iterative Coding & Analysis

This section presents the findings from the second round of thematic analysis applied to the open-ended survey responses. At this stage, a refined coding framework was used, drawing on the thematic categories developed during the interview analysis. These interview-derived codes; Customer Decision Support and Uncertainty Reduction, Adoption Barriers and Resistance, and AR Implementation and Use Cases were applied to survey responses to enable direct comparison and triangulation between the two datasets.

Each survey question was mapped to the most appropriate theme based on its intended purpose and the nature of the responses it elicited. While survey data tends to be shorter and less detailed than interview transcripts, common patterns, expectations, and concerns were still clearly observable. Responses were grouped according to these broader themes, providing insight into how consumers perceive and respond to augmented reality (AR) technology across various contexts. As with the open coding section, responses are paraphrased to reflect shared ideas rather than quoted directly.

Table 13. Iterative Thematic Coding of Survey Responses

Code	Theme	Question	Relevant Quotes	Count
ARIM	AR Implementation and Use Cases	Do you believe AR could improve your online shopping experience? Why or why not?	Yes, I think AR could make online shopping easier by helping me see if a product fits or looks right before buying. It could save time and reduce returns; I think that it depends on the website. For clothing I rather have pictures of customers wearing the clothes than having AR; Yes, I can see what it looks like on me; Yes, it would improve the experience in helping with size and fit of merchandise. It would also hold supplier to provide accurate product.; Yes. Sometimes it is difficult to know which size clothing to get or how this might look on me. i think high quality AR could improve this experience.	38

ADRB	Adoption Barriers and Resistance	Do you have concerns about retailers offering AR (privacy, performance, etc.)?	Privacy, performance and misrepresentation; Yes, lots of privacy and data issues; I'd be concerned about privacy, especially if my camera and personal data are being used. Performance issues could also be a problem if the AR feature is slow or glitches, which could make the experience frustrating.; Yes privacy	37
ADRB	Adoption Barriers and Resistance	Do you think your current device can run AR features smoothly? Why or why not?	I do not believe a cellphone would be good for that"; "No, 3D would be best. VR glasses would be better suited"; "No idea, probably not because my phone is shit"; "Probably not, I don't understand how my phone would be able to make jeans look 'normal' on me virtually"; "No, sometimes the Camera will deceive you"; "No, simply because I online shop on an iPhone 11 which is relatively slow now. It struggles to take pictures sometimes so I highly doubt any AR gadgets would run smoothly on it.	6
ARIM	AR Implementation and Use Cases	Have you ever used an AR feature while shopping online? If yes, describe the experience. If not, why not?	Yes, I used it for jewelry try-ons; on Amazon to see if furniture fit; to check item color on me; to preview a TV in my lounge; and via Snapchat filters for shoes and jackets.	17
ADRB	Adoption Barriers and Resistance	How do you feel about using your phone's camera for online shopping?	Not comfortable because of privacy-related concerns; not happy to do that; I don't like using my phone camera; the idea of giving corporations access makes me uncomfortable; privacy is a concern even if AR adds value.	13
CDSU	Customer Decision Support and Uncertainty Reduction	How much do you trust online retailers to handle personal data when using AR?	Fully trust: 3; Mostly trust: 7; Slightly trust: 12; Neutral: 9; Don't trust at all: 19	50
ARIM	AR Implementation and Use Cases	If a website offered a feature to "preview" or "try on" a product virtually, what would you expect it to involve?	Using a phone camera or uploading a body photo to virtually try on clothes; scanning a room to preview furniture in 3D; applying AR filters to see fit and style; entering measurements for accurate visualization; projecting a product onto the body or space using AR.	42
ADRB	Adoption Barriers and Resistance	If you've chosen not to use AR features, what influenced that decision?	Privacy concerns, slow performance, low usefulness, lack of exposure, and resistance to extra effort were key barriers— e.g., 'Too much effort. I'm just lazy', 'Concerns about privacy and data usage', 'Not being satisfied on how realistic it looks', 'Trust issues', 'I don't see the need for an AR feature'.	35
ARIM	AR Implementation and Use Cases	What are your favorite online stores or apps, and why?	Luxury car brands showing customizations in context; Amazon's furniture preview tools; Shein and model-based product imagery; White Fox using videos of models walking; Wayfair showing user-submitted photos to reflect real product appearance.	5

ARIM	AR Implementation and Use Cases	What factors typically make you feel uncertain or hesitant when shopping online?	Unsure about how the clothes will fit on me; sizes or products not matching photos; inability to try clothing on or feel material; product looking different on a model than on a regular body; and difficulty imagining the size of items like furniture or accessories.	16
CDSU	Customer Decision Support and Uncertainty Reduction	What was the reason for the return and how was the experience?	It didn't fit well (too big or too small). Or I didn't like the color on me.; Size. Good and easy experience; Clothes did not fit, not a bad experience; Not the right size. Returning something in-store is much quicker and simpler.; It did not fit well	32
ARIM	AR Implementation and Use Cases	What would make an AR shopping feature appealing enough to use, compared to just images or reviews?	Virtually trying on clothing using my photo or body type; seeing items in 3D or in my personal space; quick, realistic previews for better decision-making; uploading a full-body image to test fit; and modifying product features like color or size live through AR.	38
ARIM	AR Implementation and Use Cases	When you hear the term "Augmented Reality" in online shopping, what comes to mind?	Trying on clothes or glasses virtually using your phone; placing furniture in your room via AR; uploading full-body pictures to preview fit; projecting items into real environments in 3D; and using avatars or camera scans for personalized try-ons.	41
CDSU	Customer Decision Support and Uncertainty Reduction	Which features or tools make online shopping feel more trustworthy or reliable to you?	Customer reviews (with photos) and sizing guides.; reviews, accurate sizing; More products to choose from compared to stores, and usually discounts as well; Sizing guides, reviews, videos and pictures with the objects/clothes; Customer reviews and sizing guides	47
ARIM	AR Implementation and Use Cases	Which tools did you use and how helpful were they?	Online quizzes (for shampoo and skincare products).; product show rooms and virtual walk arounds, allowed me to visualize the product in 3d space rather than pictures; I mostly only used AR and AI to help me find products as similar but less expensive on other websites; I used a foundation matcher which was not very helpful. i have used a virtual tour which was helpful.; Augmented Reality, AI prompts, Virtual assistant	10
ARIM	AR Implementation and Use Cases	Which types of products do you think AR would be most helpful for?	Clothing & Fashion: 24; Home & Furniture: 13; Beauty: 4; Technology & Vehicles: 3; Miscellaneous: 3	47

4.4.1 Customer Decision Support and Uncertainty Reduction (CDSU)

Responses coded under CDSU reflected the importance of AR as a functional tool for improving product understanding and reducing purchase hesitation. Participants emphasized the value of being able to preview products particularly in categories like fashion and furniture where size, fit, and appearance are often difficult to judge online. Several responses suggested that AR

features could help reduce returns, avoid buyer regret, and support more informed decision-making. This theme was especially apparent in responses to questions concerning return experiences and the usefulness of visual tools. Participants repeatedly highlighted that the ability to “see” a product before buying would improve confidence and reduce friction. These insights mirror the perspectives of professionals who framed AR as a validation tool suggesting strong alignment between consumer expectations and implementation priorities.

4.4.2 *Adoption Barriers and Resistance (ADRB)*

Responses under ADRB focused on the challenges and reservations consumers face when interacting with AR features. Common concerns included technical reliability, performance issues, and privacy risks particularly related to camera access and data usage. Several participants expressed doubt about the effectiveness or realism of AR features, suggesting that prior negative experiences had shaped their perceptions. These concerns were most prominent in questions related to device compatibility, data trust, and performance frustrations. Many participants stated that they would only use AR if it was seamless, fast, and clearly beneficial. Some explicitly described AR as “*not worth the hassle*” if it introduced delays or required additional setup. These responses echo barriers discussed by interviewees underscoring the role of both technological readiness and user confidence in AR adoption.

4.4.3 *AR Implementation and Use Cases (ARIM)*

Although survey respondents are not involved in deploying AR technology, their answers provided insight into how they imagine and evaluate potential use cases. Participants frequently cited product categories such as clothing, makeup, eyewear, and furniture as ideal scenarios for AR features. These imagined applications typically involved previewing items in context, assessing scale or fit, and making comparisons. This theme was evident in questions that asked about expectations, prior use, or ideal product types. Respondents described AR as useful “*if it lets me see how it fits*” or “*if I can try it virtually,*” suggesting clear mental models of what good AR should do. While technical terminology was rarely used, responses revealed high consumer awareness of what they expect from immersive shopping tools even if those expectations are not always met. These insights align with professional perspectives on consumer-facing implementation, where realism, ease of use, and contextual value are essential for success.

4.5 Theme Presence Summary Table

Table 14. Summary Thematic Coding of Interviews R1-R7

Code	Theme Name	R1	R2	R3	R4	R5	R6	R7
ARIM	AR Implementation and Use Cases	X	X	X	X	X	X	X
CEHM	Customer Engagement and Hedonic Motivation	X	-	X	X	X	X	X
ADRB	Adoption Barriers and Resistance	X	X	X	X	X	X	X
CDSU	Customer Decision Support and Uncertainty Reduction	X	X	X	X	X	X	X
ORGSTR	Organizational Strategy and Future Outlook	X	X	X	X	X	X	X
SARA	Selective AR Adoption	X	X	X	-	X	X	X
ISG	Internal Skills Gaps	X	-	X	-	-	X	X

Table 15. Summary Thematic Coding of Surveys

Code	Theme Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
SCT	Shopping Confidence & Trust	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
PAT	Perceptions of AR Technology	-	-	-	-	X	X	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-
AUA	Adoption & Use of AR	-	-	-	-	-	-	X	X	X	-	-	X	X	X	-	-	-	-	-	-	-
ACB	AR Concerns & Barriers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	X	-
ATL	AR in Broader Tech Landscape	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-
CDSU	Customer Decision Support & Uncertainty Reduction	X	-	X	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
ADRB	Adoption Barriers and Resistance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	X
ARIM	AR Implementation and Use Cases	X	-	-	-	X	X	X	X	X	-	-	-	-	X	X	-	-	X	-	-	-

5 Discussion

This chapter critically examines the findings derived from both the semi-structured interviews and open-text survey responses, situating them within the context of existing literature and theoretical frameworks outlined in the Literature Review. The discussion aims to deepen understanding of the key themes that emerged and their implications for the central research question.

This study set out to explore how large multinational fashion retailers can implement augmented reality (AR)-driven information systems to enhance customer experience and engagement. Through thematic analysis of qualitative data, two interrelated domains were identified as central to AR adoption: Implementation and Customer Experience/Expectations. These domains, reflected in the perspectives of both implementation professionals and marketing/brand professionals, reveal how AR technologies are understood and operationalized across organizational functions. This aligns with findings by Wafa (2022), whose study of marketing agencies and clients highlighted how adoption decisions are shaped by both organizational capabilities and customer-facing objectives. Similarly, Romano et al. (2021) emphasize that AR must be integrated throughout the customer journey to deliver immersive value, while Berman & Pollack (2021) underscore the importance of strategic, cross-functional planning for successful implementation. Together, these studies support the view that AR adoption is not confined to a single department or goal, but spans both technical integration and user-centered design.

5.1 Revisiting the Research Question: Strategic Implementation and Customer Engagement

The research sought to understand not only how AR is adopted and experienced, but how it can be strategically implemented within global fashion companies to improve customer outcomes. The analysis revealed two interdependent domains:

- **Implementation Domain:** Encompasses technological readiness, scalability, ROI, and integration with existing enterprise systems.
- **Customer Experience/Expectations Domain:** Focuses on AR's ability to enhance interactivity, satisfaction, and confidence in purchase decisions.

These domains are deeply interconnected; effective technical implementation directly shapes the quality of user-facing experiences and, in turn, influences brand perception and customer loyalty. As Romano et al. (2021) argue, the success of AR in retail depends not only on its technological functionality but also on how well it enhances the customer journey. Likewise, Berman & Pollack (2021) highlight that seamless integration across organizational systems is critical to delivering consistent, engaging consumer experiences that foster long-term loyalty.

5.2 Implementation — Balancing Innovation and Scalability

Interview participants consistently emphasized that the successful deployment of AR in fashion retail hinges on robust integration with core enterprise systems such as product databases, CRM platforms, and e-commerce infrastructures. This perspective is echoed in industry literature, which highlights the necessity of seamless integration between AR technologies and existing enterprise systems to enhance the online shopping experience and provide customers with engaging, interactive experiences (Aslam & Davis, 2024; Enyejo et al., 2024; Singh et al., 2023; Yang & Lin, 2024). As one implementation professional observed, while AR can be deployed at a local or pilot scale relatively easily, achieving global consistency and maintaining alignment with brand identity is far more complex. This is supported by a study on augmented reality in fashion e-commerce, which highlights that although AR can significantly enhance the shopping experience, its implementation must be carefully managed to ensure brand consistency and meet customer expectations across different markets (Hilpert & Zumstein, 2023).

Return on investment (ROI) was a recurring concern. Despite the growing accessibility of AR technologies, large-scale adoption demands clear financial justification. Participants warned that without measurable ROI, AR risks being dismissed as a novelty rather than recognized as a strategic asset in the digital customer journey. Hoffmann & Mai (2022) support this view, suggesting that retailers need to set clear goals and metrics before implementing AR applications to understand their impact on key performance indicators. This highlights a persistent

tension in large fashion organizations: how to introduce immersive technologies without disrupting established workflows or fragmenting the omnichannel experience. Respondents stressed the importance of embedding AR into existing digital ecosystems, rather than layering it superficially. For example, personalized recommendations or virtual try-ons require real-time synchronization with inventory data to appear seamless and credible.

5.3 Customer Experience—Engagement, Motivation, and Satisfaction

The Customer Experience/Expectations domain revealed the significant role of AR in enhancing consumer engagement and satisfaction. Survey and interview responses from retail professionals underscored AR's capacity to drive personalization and increase interactivity. One marketing participant noted that AR keeps customers engaged longer, often boosting conversion rates. An effect echoed in the academic literature, where AR has been shown to heighten immersion and positively influence purchase decisions (Hilken et al., 2017; Javornik, 2016c). This was reinforced by survey data, where 51% of respondents indicated that AR would be most useful in the "Clothing & Fashion" industry and 76% of respondents indicated that AR could improve their online shopping experience, hence positively impacting consumer decision-making and satisfaction.

However, the novelty of AR alone is not sufficient. As one participant explained how customers want AR to improve their shopping experience, not just entertain them. A view strongly supported by Poushneh (2018), who argues that users demand tangible value such as reducing uncertainty about product fit or quality. In line with this, 64% of survey respondents emphasized that AR must be user-friendly, while 8% reported they would not find AR helpful in online shopping. Respondents also noted that opting out of AR features is often due to slow performance, inaccurate representations, complexity, or privacy concerns, issues frequently cited in the literature as adoption barriers (Flavián et al., 2019; Poushneh, 2018).

In the aerospace sector, AR enhances the operational performance of engineers and technicians by providing intuitive interfaces and real-time, actionable data, echoed by Nee et al. (2012). Sales Directors also use AR to showcase aircraft configurations and design features, elevating client engagement and supporting informed purchase decisions. Across both sectors, the em-

phasis on usability and functional value emerges as a consistent expectation, aligning with Flavián et al. (2019), who stresses that AR must offer practical utility beyond visual novelty to deliver sustainable impact.

5.4 Cross-Sector Themes: Common Drivers and Challenges

The findings highlight several cross-sector factors critical to the successful adoption of AR, which align with themes found in the scientific literature.

- **Technological Readiness:** Both sectors face infrastructure-related barriers. In aerospace, this involves high levels of customization, which complicates deployment across projects. As Porter and Heppelmann (2017b) explain, the integration of AR into industrial workflows often demands specialized hardware and tailored software, making broad implementation technically complex and resource intensive. In retail, it means ensuring compatibility across diverse consumer devices. As Rauschnabel et al. (2019) note, mobile AR applications must account for variation in hardware capabilities, operating systems, and user environments, factors that significantly hinder seamless AR adoption. These concerns were mirrored in participant responses, where device or system compatibility was frequently cited as a major hurdle.
- **Integration with Existing Systems:** Integration with legacy platforms remains a core challenge. Aerospace professionals noted the need for seamless connection with maintenance and design databases, reflecting concerns raised by Nee et al. (2012). While retail professionals emphasized the importance of aligning AR with inventory and CRM systems to maintain operational coherence, consistent with findings from Hilken et al. (2017).
- **Scalability:** AR scalability was a shared concern. Aerospace professionals struggled to scale bespoke AR solutions, while retail participants noted difficulties in rolling out AR globally without compromising performance or consistency. This issue of scalability is similarly outlined in the work of Chatzopoulos et al. (2017) and Poushneh (2018), who highlight infrastructure and localization as barriers to broad deployment.
- **ROI and Long-Term Value:** Both industries acknowledged the need to justify AR investments. While aerospace professionals focused on operational efficiencies and long-

term savings, retail respondents highlighted short-term engagement and sales as immediate goals. Despite this difference, both groups expressed concerns about how to measure AR's long-term impact. As Javornik (2016c) explains, one of the persistent challenges in AR adoption is the lack of established metrics to assess its impact beyond initial novelty effects. The immersive and experiential nature of AR complicates traditional cost-benefit analysis, especially when evaluating customer experience over time (Javornik, 2016c). Similarly, Flavián et al. (2019) highlight that while AR can enhance customer experience and engagement in the short term, its long-term influence on customer loyalty, brand trust, and purchasing behavior remains difficult to quantify.

5.5 Comparative Insights: Fashion and Aerospace

This section synthesizes key findings from the data, integrating insights across both professional groups while drawing on themes identified through thematic analysis. It also compares these findings with existing scientific literature and reflects on the theoretical and practical implications for AR implementation in the fashion retail context.

The findings of this thematic analysis highlight the similar ways in which augmented reality (AR) is utilized across the aerospace and retail/fashion sectors. Despite the distinct contexts, both industries leverage AR for its transformative potential in immersive visualization, interactivity, decision support, and customer engagement. As Fan et al. (2025) explain, AR significantly enhances retail marketing by improving immersive visualization and fostering consumer engagement through interactive experiences. Similarly, Tadeja et al. (2020) describe how immersive visualization systems such as AeroVR enable aerospace professionals to interact with complex aircraft design data in virtual environments, improving collaboration and supporting design decisions. Additionally, Xu et al. (2022) demonstrate that ARShopping aids in in-store decision-making by overlaying product information and visual simulations, underscoring AR's role in bridging physical and digital experiences. While the specific objectives of AR adoption may vary between sectors, the strategies employed, and the challenges encountered reveal many shared themes.

5.5.1 Implementation and Use Case

Based on the findings gathered in this study, visualization and interactivity emerged as critical elements driving AR adoption across both the aerospace and fashion retail sectors. Participants highlighted how, in aerospace, AR is leveraged during the design and development stages to produce detailed, interactive visualizations of complex systems such as aircraft components, enabling teams to detect issues before physical prototypes are built. This aligns with findings by Fiorentino et al. (2013), who describe how AR supports interactive maintenance and design workflows that reduce downstream errors. Similarly, in fashion retail, respondents noted that AR allows customers to visualize garments on themselves before purchasing, whether through in-store smart mirrors or mobile virtual try-on tools. This function, which helps bridge the gap between expectation and reality, is consistent with studies such as Poushneh & Vasquez-Paraga (2017), who found that AR enhances customer satisfaction and purchase confidence. The role of interactivity in these applications is especially pronounced; as Yim et al. (2017) explain, AR's vividness and user engagement are central to its effectiveness in influencing consumer decision-making. While the industries differ in context and objectives, the underlying mechanism is similar: AR functions as a tool for early-stage testing, enabling users, engineers or consumers, to improve decision-making, and reduce the risk of error. This dual-sector convergence was a key finding in this research and reflects what Nee et al. (2012) describe as AR's potential to improve processes through real-time visual feedback and simulation.

5.5.2 Hedonic Motivation and Engagement

The theme of hedonic motivation and customer engagement is particularly relevant when comparing the emotional appeal of AR in fashion to its role in aerospace. In fashion, AR is largely focused on customer experience, offering immersive shopping experiences where consumers can virtually try on clothes, customize outfits, and engage with products in a more interactive way. This approach is supported by multiple studies highlighting the centrality of virtual try-on technologies and interactive interfaces in driving consumer engagement and purchase intent (Batoool & Mou, 2024; Chen et al., 2024; Enyejo et al., 2024b; Yang & Lin, 2024). This not only increases consumer engagement but also enhances satisfaction by reducing purchase uncertainty. Similarly, in aerospace, AR has a customer-facing component that involves creating engaging visualizations for clients to interact with, such as seeing customized aircraft configurations or viewing design updates in real-time. Both sectors recognize that AR, when executed

effectively, can foster stronger connections with the end user, whether that's a retail customer or an aerospace client, by providing an interactive, personalized experience.

5.5.3 Adoption Barriers

Adoption barriers are another area where aerospace and fashion share similar challenges. Both sectors face high costs, the complexity of integrating AR into existing systems, and the need for ongoing infrastructure investments. In aerospace, AR is used for operational improvements, such as assembly and maintenance, but the integration of AR into workflows and legacy systems remains costly and technically demanding. As highlighted by McCall (2024), businesses face compatibility challenges when embedding immersive technologies into pre-existing IT infrastructures. Similarly, Mesogboriwon & Salami (2024) emphasizes that while AR can improve productivity in manufacturing and service environments, technical complexity and integration with outdated systems remain major obstacles. Further, Marino et al. (2024) underlines the high costs and resource demands of embedding AR into industrial value chains, especially when aligning with legacy workflows. Finally, Blundell & Harris (2023) demonstrates that although AR holds significant promise for operational efficiency, its integration must address strict safety protocols and cross-functional system requirements, which adds to the technical burden. In fashion, the expense of AR technology, particularly when it comes to virtual try-on solutions and digital fashion experiences, can be a barrier for many retailers. As highlighted in recent studies, these solutions often require significant investment in high-quality 3D modeling, real-time rendering capabilities, and back-end system integration to ensure seamless performance and customer satisfaction (Enyejo et al., 2024; Zak, 2020). The study by Zak (2020) notes that the cost and technical demands of AR implementation in fashion e-commerce can outweigh perceived benefits for some firms, especially when ROI is uncertain. Similarly, Enyejo et al. (2024) underscores that while these technologies can enhance customer engagement and influence purchase decisions, their effectiveness depends on retailers' capacity to invest in the infrastructure and expertise necessary for successful deployment. Both industries also struggle with the pace of technological advancements, which makes it difficult to keep AR platforms up-to-date and aligned with rapidly evolving consumer expectations. Despite these challenges, both sectors are gradually recognizing AR's potential to provide long-term ROI and are investing in it strategically.

5.5.4 *Decision Support and Uncertainty Reduction*

From our analysis of these interviews, we interpret that professionals in both sectors see AR as a promising but conditional asset, one that is highly context-sensitive, dependent on available budgets, and still emerging in practical applications. Schuir and Teuteberg (2021) highlight how adoption decisions often involve trade-offs related to cost, technological complexity, and organizational fit. Similarly, Blundell & Harris (2023) emphasize that in aerospace, AR solutions must align closely with operational constraints and user needs to be effective. Rana et al. (2024) further underscore that in e-commerce, budget limitations and evolving maturity levels shape the pace and scope of AR integration. Meanwhile, Jindal (2024) points to AR's emerging status in mechanical design workflows, where successful adoption hinges on contextual factors and organizational readiness. Together, these studies reinforce that while AR holds significant potential, its value is realized only through careful, context-aware implementation sensitive to sector-specific challenges and resources. While the participants valued AR for its potential to increase engagement, confidence, and differentiation, they also revealed a pragmatic orientation: AR must work, integrate easily, and show measurable value to be taken seriously. This pragmatic view reflects the industry's need for AR to be more than a novelty; it must become a functional and valuable tool that can integrate into existing systems and offer tangible benefits (Jessen et al., 2020; Jindal, 2024; Rana et al., 2024; Vaidyanathan, 2020).

Both industries also highlight AR's potential as a decision support tool. In aerospace, AR aids in design and assembly by providing engineers and technicians with real-time visual data, enabling them to make more informed decisions. Similarly, in fashion, AR helps customers make better purchase decisions by visualizing how clothing looks on them before committing to a purchase. In both cases, AR reduces uncertainty and helps mitigate the risk of dissatisfaction, whether it's by ensuring the accuracy of an aerospace component or confirming the fitness and style of an outfit. This shared reliance on AR as a decision-making aid reflects its capacity to boost consumer confidence and improve operational efficiency in both sectors. As Blundell & Harris (2023) note, AR in aviation supports operational efficiency by enabling more intuitive and rapid information processing, which contributes to smoother workflows and potentially enhances passenger trust through improved safety and reliability. Similarly, Rana et al. (2024) explain that in e-commerce, AR strengthens consumer confidence by enabling more informed purchasing decisions while simultaneously streamlining operations through immersive product visualization and reduced return rates.

5.5.5 Organizational Strategy and Future Outlook

The theme of organizational strategy and future outlook also points to a similar trajectory for AR in both industries. Both aerospace and fashion recognize the importance of a well-defined, long-term strategy for AR adoption. In aerospace, the technology must be integrated seamlessly into complex design and production workflows, requiring collaboration between various departments, such as engineering, marketing, and customer relations. As Jindal (2024) observe, successful AR implementation in technical environments depends not only on the technology itself but also on its ability to support multidisciplinary collaboration and align with existing industrial practices. Fashion, too, requires cross-departmental collaboration, particularly between e-commerce teams, digital marketing, and technology departments, to ensure that AR applications are aligned with customer needs and business objectives. As both Ildikó & Keresztes (2024) and Kembau & Lendo (2025) emphasize, effective AR deployment in fashion retail depends on aligning technical capabilities with strategic marketing goals through coordinated efforts across internal teams. The future of AR in both sectors will depend on its ability to integrate into everyday operations and provide measurable, tangible benefits. As both industries look ahead, they see AR as a key driver of innovation and customer satisfaction, although its full potential will require careful consideration of user experience, ROI, and infrastructure investment. As highlighted by Sanodia (2021) and Enyejo et al. (2024), the successful adoption of AR technologies hinges not only on their immersive capabilities, but also on thoughtful implementation strategies that account for system integration, usability, and long-term value generation.

5.5.6 Summary

While the aerospace and fashion sectors differ in their core functions, the use of AR in both industries shares several key similarities. In both contexts, AR serves as a powerful tool for improving design, enhancing customer engagement, supporting decision-making, and overcoming operational challenges. Jessen et al. (2020) highlight how AR fosters creative customer engagement by enhancing the tangibility of digital experiences, while Kumari & Anand (2023) demonstrate its strategic potential in strengthening CRM systems. Similarly, Liu et al. (2024) find that AR positively influences consumer purchasing decisions by increasing interactivity and confidence in the retail environment.

However, these benefits are accompanied by persistent challenges that constrain AR's full integration. All three studies identify shared barriers such as high implementation costs, technological complexity, and the need for infrastructure investment. Jessen et al. (2020) caution that without adequate organizational readiness and technical capacity, AR initiatives may fail to scale. Kumari & Anand (2023) note that successful integration into business processes often demands substantial financial and technical resources. Likewise, Liu et al. (2024) emphasize that despite AR's persuasive power, its effectiveness depends on seamless system performance and user adaptability, both of which may be compromised by infrastructural limitations or poor implementation strategies.

These shared barriers and benefits closely mirror the findings of this study, which revealed that both aerospace and fashion sectors experience similar operational challenges and opportunities when implementing AR. Our findings reinforce that AR's value lies not only in its innovative and immersive features but also in its ability to be embedded effectively into existing workflows and customer interactions. As both sectors continue to explore the possibilities of AR, the parallels in their application demonstrate that AR is not just a tool for a specific industry but a transformative technology with cross-sector applications that can drive innovation, improve experiences, and foster deeper connections with end users.

These findings not only align with but also expand the literature. They confirm key insights around hedonic and utilitarian value, technology adoption barriers, and strategic alignment. Specifically, Vaidyanathan (2020) highlights that users perceive AR technologies as offering both utilitarian benefits, such as increased productivity, enhanced safety, and better task performance, and hedonic benefits, including immersive and engaging experiences. Similarly, Jessen et al. (2020) demonstrate AR's strategic potential to enhance both functional efficiency and customer enjoyment, while Javornik (2016) emphasizes the importance of balancing affective engagement with cognitive usefulness in AR applications. However, the findings also emphasize the need for simpler AR systems that are firmly grounded in organizational realities, highlighting a necessary shift in discourse from viewing AR as a novelty to recognizing it as an essential business tool. Supporting this perspective, Vaidyanathan (2020) illustrates that successful AR adoption depends not only on the immersive and innovative features of the technology but also critically on thoughtful integration strategies. These strategies must address factors such as usability, privacy concerns, and the generation of long-term value within real-world organizational contexts (Vaidyanathan, 2020).

5.6 Strategic AR Implementation Framework

In light of these insights, a clear gap emerges; While interest in AR continues to grow, existing models remain general-purpose, lacking the specificity needed to guide strategic implementation in large-scale retail environments (Fan et al., 2020; Oliveira and Martins, 2011; Venkatesh et al., 2012). Established frameworks such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT2), and the Technology-Organization-Environment (TOE) model provide useful theoretical foundations (Davis, 1989; Oliveira and Martins, 2011; Venkatesh et al., 2012). However, these models have been critiqued for offering only a partial view of AR adoption, particularly due to their limited capacity to capture the experiential, emotional, and contextual factors that shape user engagement in retail environments (Fan et al., 2020; Hilken et al., 2018). As our findings demonstrate, AR sits at the intersection of back-end systems integration and front-end customer experience, and its adoption is shaped by a complex mix of strategic alignment, technological readiness, user resistance, and engagement dynamics.

In response to this gap, we developed a new framework (see Figure 8) that reflects both the empirical insights generated through interviews and surveys, and the theoretical constructs drawn from the IS literature. The framework is not intended as a prescriptive model but rather as an interpretive tool for understanding the interconnected factors that influence AR implementation outcomes in retail. In line with our interpretivist approach, it is designed to reflect the lived realities of practitioners and users, and to support the development of IS strategies that are context-sensitive and grounded in organisational practice.

To build this framework, we followed an iterative process that brought together literature and data. Established models such as TAM, UTAUT2, and TOE provided a theoretical foundation, offering key concepts like perceived usefulness, system readiness, and environmental influence. However, these models were too general to fully explain the unique challenges and dynamics identified in our data. By analysing interview transcripts and survey responses, we identified which factors mattered most in practice, how they related to one another, and what gaps the literature did not fully address.

The result is a framework made up of six interconnected domains, each of which emerged during our coding process and was reinforced by participant narratives. The structure and relationships between these domains reflect both theoretical influence and empirical insight. For example, organisational readiness was frequently described by participants as a prerequisite for successful AR adoption, influencing both internal resistance and external customer outcomes. Similarly, hedonic engagement and decision support were often linked in discussions about user satisfaction and repeat usage. These findings helped us determine not only what to include, but how to position each component in relation to others creating a framework that is both grounded in practice and supported by theory.

The connections between each of the domains are based on themes that emerged during analysis. Solid arrows show direct relationships, while dashed arrows represent more indirect effects. Adoption Resistance is positioned at the centre of the framework as it directly affects both organisational readiness and user hedonic enjoyment, ultimately shaping the overall success of AR implementation.

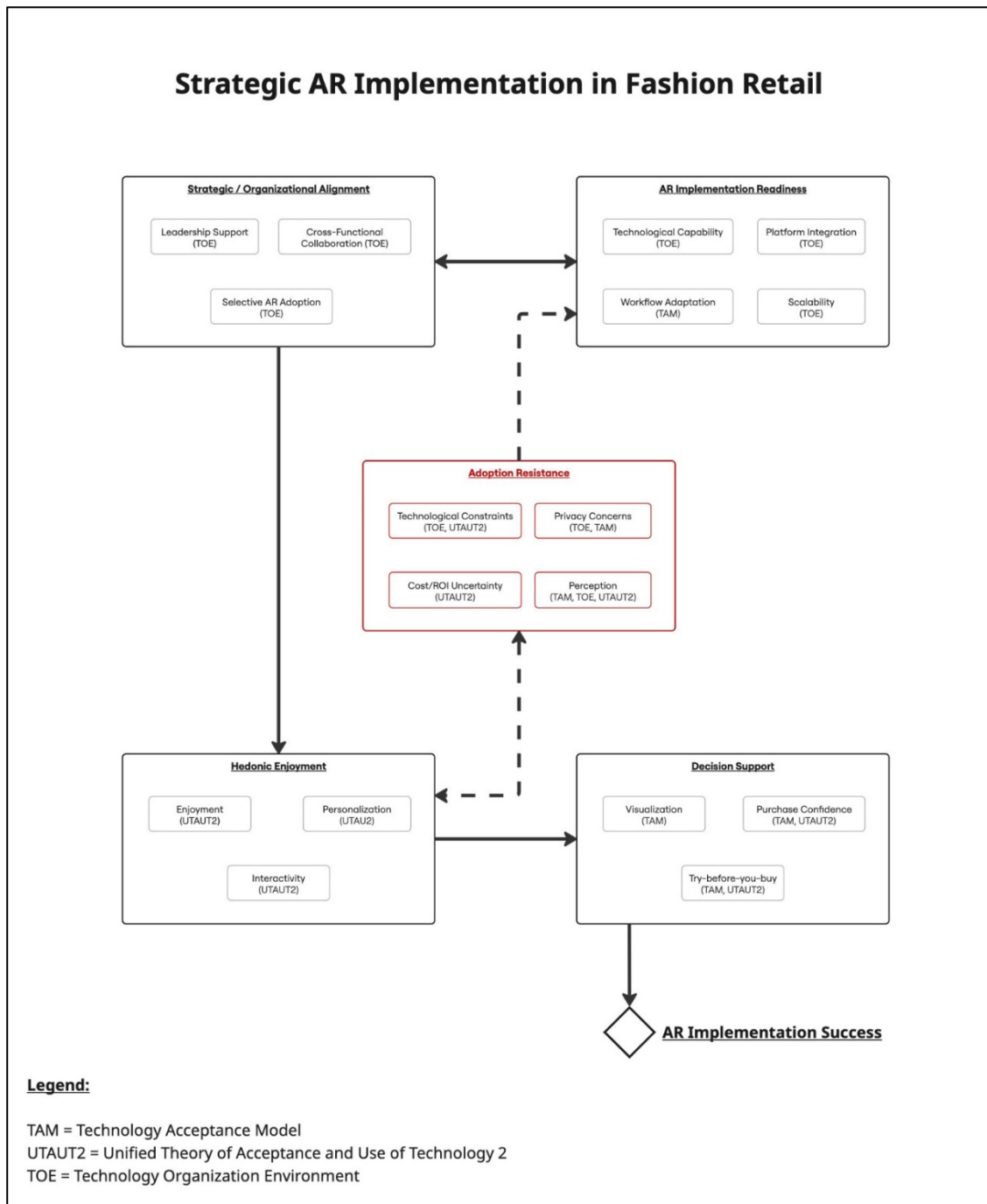


Figure 8. Strategic AR Implementation in Fashion Retail Framework

5.6.1 Strategic and Organisational Alignment

Strategic alignment and internal coordination are consistently highlighted in the IS literature as key enablers of successful technology implementation. The Technology Organization Environment (TOE) framework emphasises the role of leadership commitment, cross-functional collaboration, and organisational readiness in driving adoption outcomes (Baker, 2012; Oliveira

and Martins, 2011). In large retail settings, leadership support is especially critical for transitioning AR from isolated innovation into fully integrated enterprise systems. Our interviews suggest that strategic alignment is often a critical success factor, particularly in ensuring that AR does not remain an isolated innovation project. Participants working in implementation roles consistently highlighted the importance of internal cohesion and senior leadership engagement.

- **Leadership Support** - Identified as essential for securing resources and prioritising AR among other digital initiatives. One participant explained that “without top-down interest, things just sit in innovation and go nowhere.”
- **Cross-functional Collaboration** - Repeatedly emphasised, particularly between marketing and IT. Fragmentation across departments often led to duplication or implementation delays.
- **Selective AR Adoption** - Reflects a pattern identified in both data sets, where organisations favoured focused pilots or campaign-specific activations rather than full-scale deployments. This approach allowed for testing without overcommitting resources, a theme echoed by both marketers and technical leads.

5.6.2 AR Implementation Readiness

Technological readiness is a foundational requirement for the effective deployment of AR within IS frameworks. As Oliveira and Martins (2011) and Carmigniani et al. (2011) explain, compatibility with existing platforms, device requirements, and infrastructure maturity significantly shape an organisation’s ability to implement emerging technologies at scale. In AR contexts, these factors often determine whether a promising use case can progress beyond the pilot stage. Participants frequently referred to AR implementation as contingent on broader systems maturity, and several described efforts to integrate AR being stalled by technical or infrastructural limitations.

- **Technological Capability** - Described as a basic precondition where without sufficient bandwidth, device compatibility, and CMS integration, even the best creative concepts could not be executed.

- **Platform Integration** - A consistent pain point. Several respondents noted that AR features had to be compatible with e-commerce platforms and existing digital ecosystems to avoid data duplication or UX inconsistencies.
- **Workflow Adaptation** - Necessary in many cases. Content pipelines had to be adjusted to include 3D asset creation or to synchronise product data across channels.
- **Scalability** - Cited as a limitation for many organisations. While small pilots were seen as valuable, rolling out AR globally or across multiple product lines introduced operational and resource challenges.

5.6.3 Adoption Resistance

Barriers to AR adoption extend beyond technical limitations, often reflecting perceptual and organizational concerns. According to TAM and UTAUT2, perceived usefulness, risk, and trust play a central role in determining user and internal stakeholder acceptance (Davis, 1989; Venkatesh et al., 2012). In retail, privacy concerns, ROI uncertainty, and cultural perceptions of AR can all reduce momentum for implementation (Fan et al., 2020). This domain brings together the various barriers to adoption identified in the study, many of which were perceptual rather than purely technical. Some participants described internal scepticism, customer hesitancy, or uncertainty around value delivery. This theme was present across professional roles and linked to both organisational and consumer concerns.

- **Technological Constraints** - Such as glitches or slow load times were said to quickly reduce user trust and internal confidence in the tool.
- **Privacy** - Concerns particularly around camera permissions and personal data were common in fashion contexts, where users are often asked to scan or film their body or environment.
- **Cost/ROI Uncertainty** - Frequently raised by participants who questioned whether AR could deliver measurable business value or was primarily a branding tool.
- **Perception** - Was a subtler but important theme. Several stakeholders reported that AR was still seen internally as a “gimmick” or “nice-to-have,” despite increasing maturity and proven use cases. These findings echo TAM and UTAUT2’s focus on the role of perceived usefulness and risk.

5.6.4 Hedonic Enjoyment

Experiential value and hedonic motivation are increasingly seen as central to the success of consumer-facing information systems. UTAUT2 includes hedonic motivation as a key construct for explaining voluntary technology use (Venkatesh et al., 2012), and multiple AR studies show that emotional engagement, interactivity, and novelty directly influence repeat use and satisfaction (Fan et al., 2020; Hilken et al., 2017). Participants in both groups described the emotional or experiential appeal of AR as a central factor in user engagement. AR features that offered novelty, interactivity, or fun were seen as more likely to capture attention and generate repeat use.

- **Enjoyment** - Often described as a driver of engagement, with users reportedly spending more time interacting with AR content when it felt playful or immersive.
- **Personalisation** - Particularly the ability to “try on” products virtually or receive context-specific recommendations was highlighted to increase perceived relevance.
- **Interactivity** - Was discussed as a unique affordance of AR, distinguishing it from static media. The ability to rotate, adjust, or explore products virtually was seen as enhancing both engagement and utility.

5.6.5 Decision Support

One of AR’s most widely documented benefits in IS literature is its ability to reduce uncertainty and improve decision-making. As Hilken et al. (2017) and Lavoyé et al. (2021) note, AR supports product evaluation through immersive visualisation, increasing customer confidence and reducing friction in the purchase journey, particularly in size-sensitive categories like fashion or furniture. This functional role of AR in helping customers evaluate products and make informed decisions emerged as a recurring theme. Both survey respondents and interview participants noted that AR provided them with reassurance during the decision-making process, reducing uncertainty and improving the online shopping experience.

- **Visualisation** - Was described as a key benefit, especially for fashion and homeware categories where size, fit, or placement is difficult to judge without physical inspection.
- **Purchase Confidence** - Appeared to increase when AR tools were used, with one participant suggesting that users “felt more sure” about what they were buying.

- **Try-before-you-buy** - Style features were appreciated by consumers, especially in reducing the friction of returns (a key metric for retailers).

5.6.6 AR Implementation Success

In line with socio technical IS perspectives, implementation success must be defined beyond system uptime. Hevner et al. (2004) argue that digital systems succeed when they generate value across organisational, user, and strategic levels. In AR contexts, success involves not just technical execution, but also customer experience, operational efficiency, and competitive differentiation. The final node in the model captures this overall outcome. Importantly, participants did not define success solely in terms of system uptime or rollout completion, but also in relation to customer engagement, brand differentiation, and internal learning. This aligns with our broader understanding of AR as a socio-technical system, where success must reflect value creation across multiple touchpoints.

- **Enhanced Customer Experience** - Was reported in nearly every case where AR had been deployed effectively, whether through longer session times, improved satisfaction scores, or positive qualitative feedback.
- **Operational Efficiency** - Was mentioned in the aerospace industry where interviewees (R1-R4) explained how AR is being used for internal training, onboarding, and planning.
- **Strategic Differentiation** - Was highlighted by several marketing professionals, who viewed AR as a way to stand out in competitive or saturated digital environments.

This framework brings together themes from the empirical data and established concepts from IS adoption models to offer a context-specific perspective on AR implementation. It is not intended as a universal solution but as a flexible structure that reflects the practical and organisational complexities observed in retail settings. The framework aims to support understanding of the strategic, technical, and experiential factors involved in AR adoption, and to inform future research on its broader organisational implications.

6 Conclusion

The purpose of this study was to explore how augmented reality (AR)-driven information systems can be strategically implemented by large multinational fashion retailers to enhance customer experience and engagement. In order to do this, the research aimed to answer the following question:

How can large multinational fashion companies implement AR-driven information systems to enhance customer experiences and increase engagement in retail environments?

To address this research question, a literature review was first conducted to understand the development, types, and strategic value of AR in the retail sector. Key theoretical frameworks such as TAM, UTAUT2, and TOE were examined to provide a foundation for understanding both consumer adoption and organizational implementation. Following this, qualitative data was collected through semi-structured interviews with industry professionals and an open-text survey, and the findings were analyzed using Braun and Clarke's thematic analysis method.

The analysis identified several key themes, including the current use cases of AR in fashion retail, customer engagement through hedonic motivation, the barriers to AR adoption, and AR's role in reducing customer uncertainty and enhancing decision-making. A final theme focused on the strategic outlook of AR implementation, particularly its alignment with omnichannel strategies and digital transformation agendas.

It was concluded that AR offers strong potential for enhancing the retail experience by improving customer satisfaction, enabling virtual try-ons, and increasing purchase confidence. While AR was found to support both hedonic and utilitarian value, its impact is most significant when integrated into seamless, user-friendly, and personalized experiences. However, several barriers were identified that hinder full-scale adoption, including high implementation costs, infrastructure limitations, and internal skills gaps. Organizational resistance and a lack of strategic clarity also emerged as critical obstacles.

The study also found that while initial consumer interest in AR is often driven by novelty, long-term engagement relies on ease of use, relevance, and tangible benefits. Furthermore, cross-sector comparisons with aerospace suggest that many of the challenges in AR implementation are shared, particularly around systems integration and strategic alignment.

Lastly, an important insight from the study is the identified need for an industry-specific implementation framework. Existing models like UTAUT2 are useful but require adaptation to reflect the dual focus on both back-end integration and front-end experience that AR entails. The proposed Strategic AR Implementation Framework offers one such adaptation, emphasizing readiness, resistance, and return on investment as central considerations.

In summary, this study suggests that for AR to move from a novel feature to a core component of fashion retail strategy, organizations must shift their focus from experimentation to integration. Retailers are encouraged to invest in infrastructure, employee training, and user-centered design, while also addressing resistance and demonstrating clear business value. This will be essential for ensuring that AR technologies can deliver meaningful, scalable impact in the evolving landscape of digital retail.

6.1 Further Research

The implementation of augmented reality (AR)-driven information systems in the fashion retail sector remains a developing area of research, especially when examined through a strategic and organizational lens. While previous studies have explored consumer responses to AR and its potential for enhancing engagement, there is still limited understanding of how large multinational retailers can effectively integrate AR into their broader digital strategies and existing information systems.

This study identified several critical areas that would benefit from further exploration. Notably, the findings revealed organizational resistance, skills gaps, and strategic uncertainty as key challenges to AR adoption. Therefore, future research could focus on developing change management strategies and capability-building models that help organizations overcome internal barriers to implementation. Investigating how leadership commitment, employee training, and interdepartmental collaboration affect AR deployment would also be valuable.

Additionally, this research was limited to the fashion retail and aerospace sectors. While useful comparisons were made, future studies could expand the scope to include other sectors such as home furnishings, beauty, or automotive retail, where AR is increasingly relevant. Including additional interviews with companies from the fashion industry, especially across different market segments (e.g., luxury vs. fast fashion), and extending interviews to organizations in these adjacent sectors would allow for a more comprehensive understanding of cross-sector AR adoption. This, in turn, could inform the development of universally adaptable frameworks for AR integration.

Because this was a qualitative study based on a relatively small sample of industry professionals, the insights generated are rich but not statistically generalizable. Quantitative studies, particularly those involving larger datasets or consumer usage patterns, could validate and extend the proposed Strategic AR Implementation Framework introduced in this thesis. Furthermore, longitudinal studies could assess how AR strategies evolve over time and what factors contribute to sustained engagement and return on investment.

Finally, this study focused primarily on AR as a standalone tool. Future research could examine how AR interacts with other technologies such as artificial intelligence (AI), machine learning, or big data analytics in retail environments. Exploring these integrated systems could provide a more holistic view of digital transformation and offer practical guidance for future technology ecosystems in fashion retail.

7 AI Contribution Statement

ChatGPT:

- Used to correct spelling, grammar, and syntax errors. The prompt “Correct all and any spelling, grammar, or syntax errors” was used and copied the text into ChatGPT and pasted the returned text.
- Used to refine the assignment to ensure reduced redundancy, increase flow, and ensure structure and cohesiveness. The prompts “is it good?” was used by selecting a paragraph and seeing what modifications ChatGPT would suggest as a refined version. However, we made sure that the meaning of the text remained accurate.
- Used to find synonyms.
- The prompt “Are all statements accurate and relevant?” was used to ensure everything was correct. ChatGPT then offered us a refined version which we then used. It’s important to note that the refined version consisted of sharpened arguments, improved sentence flow, and ensured consistency in tone and structure.
- Used to structure interview transcripts.
- Used to get ideas for titles and subtitles.

Apple Intelligence:

Used to create transcripts of conversations that have been recorded with the default iPhone voice recorder application

8 References

- Adamska, I. (2023). Tracing Back the Origins: A History of Augmented Reality, Available Online: <https://nsflow.com/blog/history-of-augmented-reality> [Accessed 11 April 2025]
- Agarwal, C. & Thakur, N. (2014). The Evolution and Future Scope of Augmented Reality, *International Journal of Computer Science Issues*, vol. 11, no. 6
- Akinola, Y., Agbonifo, O. & Sarumi, O. (2020). Virtual Reality as a Tool for Learning: The Past, Present and the Prospect, *Journal of Applied Learning & Teaching*, vol. 3
- Alam, S.S. et al. (2021) 'Factors Affecting Augmented Reality Adoption in the Retail Industry', *Journal of Open Innovation: Technology, Market, and Complexity*, 7(2), p. 142. Available at: <https://doi.org/10.3390/joitmc7020142>.
- Alkhamisi, A. O. & Monowar, M. M. (2013). Rise of Augmented Reality: Current and Future Application Areas, *International Journal of Internet and Distributed Systems*, [e-journal] vol. 01, no. 04, pp.25–34, Available Online: <http://www.scirp.org/journal/doi.aspx?DOI=10.4236/ijids.2013.14005> [Accessed 6 April 2025]
- Alshare, K.A., Grandon, E.E. & Miller, D. (2011). Digital Library Adoption and the Technology Acceptance Model: A Cross-Country Analysis, *Journal of Global Information Technology Management*, vol. 14, no. 4, pp. 31–49, Available Online: <https://doi.org/10.1002/j.1681-4835.2010.tb00288.x>
- Ambrosio, A. P. & Fidalgo, M. I. R. (2020). Past, Present and Future of Virtual Reality: Analysis of Its Technological Variables and Definitions, 1, *Culture & History Digital Journal*, [e-journal] vol. 9, no. 1, pp. e 010–e010, Available Online: <https://cultureandhistory.revis-tas.csic.es/index.php/cultureandhistory/article/view/185> [Accessed 7 April 2025]
- Arasu, D., Anis Basharuddin, S., Zulaila ZulShukor, N. & Zainon, W. M. N. (2018). A Review on Augmented Reality Technology, *International Journal of Emerging Research in Management and Technology*, vol. 7, p.22
- Arth, C., Grasset, R., Gruber, L., Langlotz, T., Mulloni, A. & Wagner, D. (2015). The History of Mobile Augmented Reality
- Aslam, U. & Davis, L. (2024). Analyzing Consumer Expectations and Experiences of Augmented Reality (AR) Apps in the Fashion Retail Sector, *Journal of Retailing and Consumer Services*, [e-journal] vol. 76, p.103577, Available Online: <https://www.sciencedirect.com/science/article/pii/S0969698923003284> [Accessed 16 May 2025]
- Azuma, R.T. (1997). A Survey of Augmented Reality. *Presence: Teleoperators and Virtual Environments*, vol. 6, no. 4, pp.355–385.

- Baek, T. H., Yoo, C. & Yoon, S. (2016). Augment Yourself through Virtual Mirror: The Impact of Self-Viewing and Narcissism on Consumer Responses, *International Journal of Advertising*, vol. 37, pp.1–19
- Batool, R. & Mou, J. (2024). A Systematic Literature Review and Analysis of Try-on Technology: Virtual Fitting Rooms, Data and Information Management, [e-journal] vol. 8, no. 2, p.100060, Available Online: <https://www.sciencedirect.com/science/article/pii/S2543925123000347> [Accessed 16 May 2025]
- Beck, M. & Cri , D. (2018). I Virtually Try It ... I Want It ! Virtual Fitting Room: A Tool to Increase on-Line and off-Line Exploratory Behavior, Patronage and Purchase Intentions, *Journal of Retailing and Consumer Services*, [e-journal] vol. 40, pp.279–286, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0969698916303526> [Accessed 11 April 2025]
- Benbasat, I. & Barki, H. (2007). Quo Vadis TAM?, *Journal of the Association for Information Systems*, vol. 8, no. 4, pp. 211–218, Available Online: <https://aisel.aisnet.org/jais/vol8/iss4/15>
- Berman, B. & Pollack, D. (2021). Strategies for the Successful Implementation of Augmented Reality, *Business Horizons*, [e-journal] vol. 64, no. 5, pp.621–630, Available Online: <https://www.sciencedirect.com/science/article/pii/S000768132100029X> [Accessed 16 May 2025]
- Blundell, J. & Harris, D. (2023). Designing Augmented Reality for Future Commercial Aviation: A User-Requirement Analysis with Commercial Aviation Pilots, *Virtual Reality*, vol. 27, pp.1–15
- Boardman, R., Henninger, C. E. & Zhu, A. (2020). Augmented Reality and Virtual Reality: New Drivers for Fashion Retail?, pp.155–172
- Bonetti, F., Warnaby, G. & Quinn, L. (2018). Augmented reality and virtual reality in physical and online retailing: A review, synthesis and research agenda. In: M. tom Dieck & T. Jung (eds), *Augmented Reality and Virtual Reality: Empowering Human, Place and Business*, Cham: Springer, pp.119–132.
- Braun, V., & Clarke, V. (2006). *Using thematic analysis in psychology*. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Capital One Shopping (2024) eCommerce Fashion Statistics (2024): Online Shopping Trends, Capital One Shopping. Available at: <https://capitaloneshopping.com/research/online-clothing-shopping-statistics/> (Accessed: 27 December 2024).
- Cardoso, T., Coimbra, T. & Mateus, A. (2018). Augmented Reality and 3D Technologies: Mapping Case Studies in Education, in Y. (Aimee) Zhang & D. Cristol (eds), *Handbook of Mobile Teaching and Learning*, [e-book] Berlin, Heidelberg: Springer, pp.1–21, Available Online: https://doi.org/10.1007/978-3-642-41981-2_84-2 [Accessed 7 April 2025]
- Carmigniani, J., Furht, B., Anisetti, M., Ceravolo, P., Damiani, E. & Ivkovic, M. (2011). Augmented Reality Technologies, Systems and Applications. *Multimedia Tools and Applications*, vol. 51, no. 1, pp.341–377.

- Chan, A. (2023) 'The True Cost of Apparel Returns: Alarming Return Rates Require Loss-Minimization Solutions', Coresight Research, 4 April. Available at: <https://coresight.com/research/the-true-cost-of-apparel-returns-alarming-return-rates-require-loss-minimization-solutions/> (Accessed: 27 December 2024).
- Chatzopoulos, D., Bermejo, C., Huang, Z. & Hui, P. (2017). Mobile Augmented Reality Survey: From Where We Are to Where We Go, *IEEE Access*, vol. PP, pp.1–1
- Chen, R. et al. (2022) 'Augmented reality in retail: a systematic review of research foci and future research agenda', *International Journal of Retail & Distribution Management*, 50(4), pp. 498–518. Available at: <https://doi.org/10.1108/IJRDM-11-2020-0472>.
- Chen, C., Ni, J. & Zhang, P. (2024). Virtual Try-On Systems in Fashion Consumption: A Systematic Review, *Applied Sciences*, vol. 14, p.11839
- Clara, C. (2023). Dimensions of Omnichannel Retail Quality on Customer Satisfaction and Loyalty, *Journal of International Conference Proceedings*, vol. 6, pp.44–57
- Cruz, E., Orts-Escolano, S., Gomez-Donoso, F., Rizo, C., Rangel, J. C., Mora, H. & Cazorla, M. (2019). An Augmented Reality Application for Improving Shopping Experience in Large Retail Stores, *Virtual Reality*, [e-journal] vol. 23, no. 3, pp.281–291, Available Online: <https://doi.org/10.1007/s10055-018-0338-3> [Accessed 8 April 2025]
- Dacko, S. G. (2017). Enabling Smart Retail Settings via Mobile Augmented Reality Shopping Apps, *Technological Forecasting and Social Change*, [e-journal] vol. 124, pp.243–256, Available Online: <https://www.sciencedirect.com/science/article/pii/S0040162516304243> [Accessed 8 April 2025]
- Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, vol. 13, no. 3, pp.319–340.
- Edwards-Stewart, A., Hoyt, T. & Reger, G. (2016). Classifying Different Types of Augmented Reality Technology, *Annual Review of CyberTherapy and Telemedicine*, vol. 14, pp.199–202
- Ellis, S. R. (1995). Origins and Elements of Virtual Environments, in W. Barfield & T. A. Furness III (eds), *Virtual Environments and Advanced Interface Design*, [e-book] Oxford University Press, p.0, Available Online: <https://doi.org/10.1093/oso/9780195075557.003.0007> [Accessed 7 April 2025]
- Enyejo, O., Obani, O., Afolabi, O., Igba, E. & Ibokette, A. (2024). Effect of Augmented Reality (AR) and Virtual Reality (VR) Experiences on Customer Engagement and Purchase Behavior in Retail Stores, *Magna Scientia Advanced Research and Reviews*, vol. 11, pp.132–150
- Fan, X., Chai, Z., Deng, N. & Dong, X. (2020). Adoption of Augmented Reality in Online Retailing and Consumers' Product Attitude: A Cognitive Perspective, *Journal of Retailing and Consumer Services*, [e-journal] vol. 53, p.101986, Available Online: <https://linking-hub.elsevier.com/retrieve/pii/S0969698919302127> [Accessed 11 April 2025]

- Fan, X., Xun, J., Dolega, L. & Xiong, L. (2025). (PDF) The Role of Augmented and Virtual Reality in Shaping Retail Marketing: A Meta-Analysis, ResearchGate, Available Online: https://www.researchgate.net/publication/388216421_The_Role_of_Augmented_and_Virtual_Reality_in_Shaping_Retail_Marketing_A_Meta-Analysis [Accessed 18 May 2025]
- Fillmore, H. & Storr, T. (2020). AR and VR in the Workplace, IBM, Available Online: <https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/ar-vr-workplace> [Accessed 9 April 2025]
- Fiorentino, M., Uva, A., Gattullo, M., Debernardis, S. & Monno, G. (2013). Augmented Reality on Large Screen for Interactive Maintenance Instructions, *Computers in Industry*, vol. 65
- Flavián, C., Ibáñez-Sánchez, S. & Orús, C. (2019). The Impact of Virtual, Augmented and Mixed Reality Technologies on the Customer Experience, *Journal of Business Research*, [e-journal] vol. 100, pp.547–560, Available Online: <https://www.sciencedirect.com/science/article/pii/S0148296318305319> [Accessed 17 May 2025]
- Furlan, R. (2016). The Future of Augmented Reality: Hololens - Microsoft's AR Headset Shines despite Rough Edges [Resources_Tools and Toys], *IEEE Spectrum*, vol. 53, pp.21–21
- Garg, A. et al. (2024) 'Augmented Reality in E-Commerce: Unveiling the Future of Online Shopping', in 2024 Sixth International Conference on Computational Intelligence and Communication Technologies (CCICT). 2024 Sixth International Conference on Computational Intelligence and Communication Technologies (CCICT), pp. 356–363. Available at: <https://doi.org/10.1109/CCICT62777.2024.00065>.
- Garg, N., Pareek, A., Lale, A. & Jagannath Charya, S. K. (2021). Evolution in E-Commerce with Augmented Reality, *IOP Conference Series: Materials Science and Engineering*, [e-journal] vol. 1012, no. 1, p.012041, Available Online: <https://iopscience.iop.org/article/10.1088/1757-899X/1012/1/012041> [Accessed 6 April 2025]
- Gregor, S. & Hevner, A.R. (2013). Positioning and presenting design science research for maximum impact. *MIS Quarterly*, vol. 37, no. 2, pp. 337–355, <https://doi.org/10.25300/MISQ/2013/37.2.01>
- Grönroos, C. (2008). Service Logic Revisited: Who Creates Value? And Who Co-creates?, *European Business Review*, [e-journal] vol. 20, no. 4, pp.298–314, Available Online: <https://doi.org/10.1108/09555340810886585> [Accessed 10 April 2025]
- Grönroos, C. (2011). Value Co-Creation in Service Logic: A Critical Analysis, *Marketing Theory*, [e-journal] vol. 11, no. 3, pp.279–301, Available Online: <https://doi.org/10.1177/1470593111408177> [Accessed 10 April 2025]
- Hayes, A. (2025). Augmented Reality (AR): Definition, Examples, and Uses, *Investopedia*, Available Online: <https://www.investopedia.com/terms/a/augmented-reality.asp> [Accessed 6 April 2025]
- Hayes, M. & Downie, A. (2024). What Is Augmented Reality? | IBM, Available Online: <https://www.ibm.com/think/topics/augmented-reality> [Accessed 6 April 2025]

- Hevner, A.R., March, S.T., Park, J. & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, vol. 28, no. 1, pp. 75–105, <https://doi.org/10.2307/25148625>
- Hilken, T., De Ruyter, K., Chylinski, M., Mahr, D. & Keeling, D. I. (2017). Augmenting the Eye of the Beholder: Exploring the Strategic Potential of Augmented Reality to Enhance Online Service Experiences, *Journal of the Academy of Marketing Science*, [e-journal] vol. 45, no. 6, pp.884–905, Available Online: <http://link.springer.com/10.1007/s11747-017-0541-x> [Accessed 11 April 2025]
- Hilken, T., Heller, J., Chylinski, M., Keeling, D.I., Mahr, D. & de Ruyter, K. (2018). Making Omnichannel an Augmented Reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, vol. 12, no. 4, pp.509–523. <https://doi.org/10.1108/JRIM-01-2018-0023>
- Hilpert, L. & Zumstein, D. (2023). Augmented Reality in Fashion E-Commerce, https://www.researchgate.net/publication/369169046_Augmented_Reality_in_Fashion_E-Commerce [Accessed 16 May 2025]
- Hoffmann, S. & Mai, R. (2022). Consumer Behavior in Augmented Shopping Reality. A Review, Synthesis, and Research Agenda, *Frontiers in Virtual Reality*, [e-journal] vol. 3, Available Online: <https://www.frontiersin.org/journals/virtual-reality/articles/10.3389/frvir.2022.961236/full> [Accessed 17 May 2025]
- Huang, T.-L. & Liao, S. (2015). A Model of Acceptance of Augmented-Reality Interactive Technology: The Moderating Role of Cognitive Innovativeness, *Electronic Commerce Research*, [e-journal] vol. 15, no. 2, pp.269–295, Available Online: <http://link.springer.com/10.1007/s10660-014-9163-2> [Accessed 11 April 2025]
- Huang, T.-L. & Liu, F. H. (2014). Formation of Augmented-Reality Interactive Technology's Persuasive Effects from the Perspective of Experiential Value, *Internet Research*, [e-journal] vol. 24, no. 1, pp.82–109, Available Online: <https://www.emerald.com/insight/content/doi/10.1108/intr-07-2012-0133/full/html> [Accessed 8 April 2025]
- Huang, T.-L. (2019). Psychological Mechanisms of Brand Love and Information Technology Identity in Virtual Retail Environments, *Journal of Retailing and Consumer Services*, [e-journal] vol. 47, pp.251–264, Available Online: <https://www.sciencedirect.com/science/article/pii/S0969698918305460> [Accessed 11 April 2025]
- Ildikó, K. and Keresztes, E. (2024) 'Digital Innovations in E-Commerce: Augmented Reality Applications in Online Fashion Retail—A Qualitative Study among Gen Z Consumers', *Informatics*, 11, p. 56. Available at: <https://doi.org/10.3390/informatics11030056>.
- Javornik, A. (2016a). The Mainstreaming of Augmented Reality: A Brief History, *Harvard Business Review*, Available Online: <https://hbr.org/2016/10/the-mainstreaming-of-augmented-reality-a-brief-history> [Accessed 11 April 2025]
- Javornik, A. (2016b). 'It's an Illusion, but It Looks Real!' Consumer Affective, Cognitive and Behavioural Responses to Augmented Reality Applications, *Journal of Marketing Management*, [e-journal] vol. 32, no. 9–10, pp.987–1011, Available Online:

<http://www.tandfonline.com/doi/full/10.1080/0267257X.2016.1174726> [Accessed 11 April 2025]

Javornik, A. (2016c). Augmented Reality: Research Agenda for Studying the Impact of Its Media Characteristics on Consumer Behavior, *Journal of Retailing and Consumer Services*, vol. 30, Available Online: https://www.researchgate.net/publication/293654382_Augmented_reality_research_agenda_for_studying_the_impact_of_its_media_characteristics_on_consumer_behavior [Accessed 16 May 2025]

Jessen, A., Hilken, T., Chylinski, M., Mahr, D., Heller, J., Keeling, D. I. & de Ruyter, K. (2020). The Playground Effect: How Augmented Reality Drives Creative Customer Engagement, *Journal of Business Research*, [e-journal] vol. 116, pp.85–98, Available Online: <https://www.sciencedirect.com/science/article/pii/S0148296320302952> [Accessed 16 May 2025]

Jindal, A. (2024). Augmented Reality Applications in Mechanical System Design and Prototyping, *Darpan International Research Analysis*, vol. 12, pp.1–13

Johnson, P. (2021) ‘Augmented Reality in Fashion’, *Rock Paper Reality*, 31 October. Available at: <https://rockpaperreality.com/insights/ar-use-cases/augmented-reality-in-fashion/> [Accessed: 26 December 2024].

Joy Onma Enyejo et al. (2024) ‘Effect of Augmented Reality (AR) and Virtual Reality (VR) experiences on customer engagement and purchase behavior in retail stores’, *Magna Scientia Advanced Research and Reviews*, 11(2), pp. 132–150. Available at: <https://doi.org/10.30574/msarr.2024.11.2.0116>.

Kang, J.-Y. M., Mun, J. M. & Johnson, K. K. P. (2015). In-Store Mobile Usage: Downloading and Usage Intention toward Mobile Location-Based Retail Apps, *Computers in Human Behavior*, [e-journal] vol. 46, pp.210–217, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0747563215000242> [Accessed 10 April 2025]

Kembau, A. & Lendo, F. (2025). Augmented Reality in Fashion and Beauty Product Marketing: A Preliminary Study of Immersive Marketing In Indonesian E-Commerce, pp.379–395

Klein, H.K. & Myers, M.D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, vol. 23, no. 1, pp. 67–93, <https://doi.org/10.2307/249410>

Koutromanos, G. & Kazakou, G. (2023). Augmented Reality Smart Glasses Use and Acceptance: A Literature Review, *Computers & Education: X Reality*, [e-journal] vol. 2, p.100028, Available Online: <https://www.sciencedirect.com/science/article/pii/S2949678023000223> [Accessed 7 April 2025]

Kumari, S. & Anand, G. (2023). AR-Driven Customer Engagement : An Innovative Approach to CRM, *International Journal of Computer Trends and Technology*, vol. 71, pp.97–101

Lavoye, V., Mero, J. & Tarkiainen, A. (2021). Consumer Behavior with Augmented Reality in Retail: A Review and Research Agenda, *The International Review of Retail, Distribution and Consumer Research*, vol. 31, pp.1–31

- Liu, R., Balakrishnan, B. & Saari, E. (2024). The Impact of Augmented Reality (AR) Technology on Consumers' Purchasing Decision Processes, *Frontiers in Business, Economics and Management*, vol. 13, pp.181–185
- M, N. & Stepheno, A. (2024). The Impact of Augmented Reality in Consumer Behaviour, *Shanlax International Journal of Management*, vol. 11, pp.92–98
- Mann, S. (1997). Wearable Computing: A First Step toward Personal Imaging, *Computer*, vol. 30, pp.25–32
- Marino, E., Barbieri, L., Bruno, F. & Muzzupappa, M. (2024). Assessing User Performance in Augmented Reality Assembly Guidance for Industry 4.0 Operators, *Computers in Industry*, [e-journal] vol. 157–158, p.104085, Available Online: <https://www.sciencedirect.com/science/article/pii/S0166361524000137> [Accessed 16 May 2025]
- Markopoulos, P. (2019). Simulating an Exciting Game Experience within Virtual Reality. THESIS. Masters of Arts (MA) in Virtual Reality
- Mathwick, C., Malhotra, N. & Rigdon, E. (2001). Experiential Value: Conceptualization, Measurement and Application in the Catalog and Internet Shopping Environment.
- Mccall, A. (2024). Augmented Reality (AR) and Virtual Reality (VR) in Business Information Systems
- McLellan, E., MacQueen, K.M. & Neidig, J.L. (2003). Beyond the qualitative interview: data preparation and transcription. *Field Methods*, vol. 15, no. 1, pp. 63–84, <https://doi.org/10.1177/1525822X02239573>
- Mesogboriwon, A. O. & Salami, I. E. (2024). The Impact of Augmented Reality and Virtual Reality on Training and Maintenance in Industry 5.0, *International Journal of Research Publication and Reviews*, [e-journal] vol. 5, no. 11, pp.240–256, Available Online: <https://ijrpr.com/uploads/V5ISSUE11/IJRPR34635.pdf> [Accessed 16 May 2025]
- Miles, M.B., Huberman, A.M. & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook*, 3rd edn, SAGE Publications, Thousand Oaks.
- Milgram, P. & Kishino, F. (1994). A Taxonomy of Mixed Reality Visual Displays, *IEICE Transactions on Information*, [e-journal] vol. E77-D, no. 12, pp.1321–1329, Available Online: https://globals.ieice.org/en_transactions/information/10.1587/e77-d_12_1321/# [Accessed 9 April 2025]
- Muthumanickam, G. and Vs, Dr.P. (2021) 'Impact of Augmented Reality Applications on Fashion Industries', Research Gate, Available at: https://www.researchgate.net/publication/350940654_Impact_of_Augmented_Reality_Applications_on_Fashion_Industries [Accessed: 26 December 2024].
- Myers, M.D. & Venable, J. (2014). A set of ethical principles for design science research in information systems. *Information & Organization*, vol. 24, no. 2, pp. 87–103, <https://doi.org/10.1016/j.infoandorg.2014.03.001>

- Myers, M.D. (2013). *Qualitative research in business & management*, 2nd edn, SAGE Publications, London.
- Nee, A., Ong, S. K., Chryssolouris, G. & Mourtzis, D. (2012). Augmented Reality Applications in Design and Manufacturing, *CIRP Annals - Manufacturing Technology*, vol. 61, pp.657–679
- Nikhashemi, S. R., Knight, H. H., Nusair, K. & Liat, C. B. (2021). Augmented Reality in Smart Retailing: A (n) (A) Symmetric Approach to Continuous Intention to Use Retail p.102464, Available Online: <https://www.sciencedirect.com/science/article/pii/S0969698921000308> [Accessed 8 April 2025]
- Pantano, E. & Timmermans, H. (2014). What Is Smart for Retailing?, *Procedia Environmental Sciences*, [e-journal] vol. 22, pp.101–107, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S1878029614001571> [Accessed 8 April 2025]
- Patton, M.Q. (2015). *Qualitative research & evaluation methods*, 4th edn, SAGE Publications, Thousand Oaks.
- Porter, M. E. & Heppelmann, J. E. (2017). Why Every Organization Needs an Augmented Reality Strategy, *Harvard Business Review*, Available Online: <https://hbr.org/2017/11/why-every-organization-needs-an-augmented-reality-strategy> [Accessed 9 April 2025]
- Porter, M. E. & Heppelmann, J. E. (2017b). A Manager’s Guide to Augmented Reality
- Poushneh, A. (2018). Augmented Reality in Retail: A Trade-off between User’s Control of Access to Personal Information and Augmentation Quality, *Journal of Retailing and Consumer Services*, [e-journal] vol. 41, pp.169–176, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0969698917305969> [Accessed 11 April 2025]
- Poushneh, A. & Vasquez-Parraga, A. Z. (2017). Discernible Impact of Augmented Reality on Retail Customer’s Experience, Satisfaction and Willingness to Buy, *Journal of Retailing and Consumer Services*, [e-journal] vol. 34, pp.229–234, Available Online: <https://www.sciencedirect.com/science/article/pii/S0969698916304477> [Accessed 17 May 2025]
- Rana, M. E., Shanmugam, K. & Chong, K. (2024). An Evaluation of Leveraging AR and VR for Enhanced Customer Engagement and Operational Efficiency in E-Commerce, p.923
- Rauschnabel, P. A., Felix, R. & Hinsch, C. (2019). Augmented Reality Marketing: How Mobile AR-Apps Can Improve Brands through Inspiration, *Journal of Retailing and Consumer Services*, [e-journal] vol. 49, pp.43–53, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0969698918310257> [Accessed 11 April 2025]
- Rauschnabel, P. A., Felix, R., Hinsch, C., Shahab, H. & Alt, F. (2022). What Is XR? Towards a Framework for Augmented and Virtual Reality, *Computers in Human Behavior*, [e-journal] vol. 133, p.107289, Available Online: <https://www.sciencedirect.com/science/article/pii/S074756322200111X> [Accessed 7 April 2025]

Rauschnabel, P.A., He, J. & Ro, Y.K. (2018). Antecedents to the Adoption of Augmented Reality Smart Glasses: A closer look at privacy risks. *Journal of Business Research*, vol. 92, pp.374–384. <https://doi.org/10.1016/j.jbusres.2018.08.008>

Recker, J. (2021). *Scientific research in information systems: A beginner's guide*, Springer, Cham.

Riar, M., Korbel, J. J., Xi, N., Zarnekow, R. & Hamari, J. (2021). The Use of Augmented Reality in Retail: A Review of Literature, Hawaii International Conference on System Sciences, 2021, Available Online: <http://hdl.handle.net/10125/70689> [Accessed 8 April 2025]

Romano, B., Sands, S. & Pallant, J. I. (2021). Augmented Reality and the Customer Journey: An Exploratory Study, *Australasian Marketing Journal*, [e-journal] vol. 29, no. 4, pp.354–363, Available Online: <https://doi.org/10.1016/j.ausmj.2020.06.010> [Accessed 16 May 2025]

Rosenberg, L. (1992). The Use of Virtual Fixtures as Perceptual Overlays to Enhance Operator Performance in Remote Environments, p.52

Sanodia, G. (2021). The Role of Augmented Reality (AR) and Virtual Reality (VR) in Enhancing Customer Experiences within CRM Systems, *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, vol. 12, pp.722–738

Schmalstieg, D. & Hollerer, T. (2016). *Augmented Reality: Principles and Practice*, Addison-Wesley Professional

Schuir, J. & Teuteberg, F. (2021). Understanding Augmented Reality Adoption Trade-Offs in Production Environments from the Perspective of Future Employees: A Choice-Based Conjoint Study, *Information Systems and e-Business Management*, [e-journal] vol. 19, no. 3, pp.1039–1085, Available Online: <https://doi.org/10.1007/s10257-021-00529-0> [Accessed 16 May 2025]

Singh, S. (2023). Impact of Augmented Reality (AR) on Consumer Buying Behavior: Indian Consumer Market

Singh, N. T., Singh, S., Singh, S., Arora, A., Dhaundiyal, A. & Narang, A. (2023). Transforming E-Commerce: Augmented Reality (AR) and Virtual Reality (VR) Integration for Interactive and Immersive Shopping Experiences, p.5

Stahl, B.C., Timmermans, J. & Flick, C. (2014). Ethics of emerging information and communication technologies: On the implementation of responsible research and innovation. *Science and Public Policy*, vol. 44, no. 3, pp. 369–381, <https://doi.org/10.1093/scipol/scu093>

Tadeja, S., Seshadri, P. & Kristensson, P. O. (2020). AeroVR: An Immersive Visualisation System for Aerospace Design and Digital Twinning in Virtual Reality, *The Aeronautical Journal*, vol. 124, pp.1–21, Available Online: https://www.researchgate.net/publication/342450008_AeroVR_An_immersive_visualisation_system_for_aerospace_design_and_digital_twinning_in_virtual_reality [Accessed 18 May 2025]

Tan, Y.-C., Chandukala, S. R. & Reddy, S. K. (2022). Augmented Reality in Retail and Its Impact on Sales, *Journal of Marketing*, [e-journal] vol. 86, no. 1, pp.48–66, Available Online: <https://doi.org/10.1177/0022242921995449> [Accessed 8 April 2025]

Thakkar, K.Y., Joshi, B.B. and Kachhela, P.P. (2023) ‘Consumer engagement with augmented reality (AR) in marketing: Exploring the use of ar technology in marketing campaigns and its impact on consumer engagement, brand experiences, and purchase decisions’, *Journal of Management Research and Analysis*, 10(2), pp. 99–105. Available at: <https://doi.org/10.18231/j.jmra.2023.017>.

Thampan, A., Razak, A., Abhay, K., Akash, R. & Manu, M. (2023). Evolution of Augmented Reality (AR) and Virtual Reality (VR), [e-journal], Available Online: <https://ijrpr.com/uploads/V4ISSUE4/IJRPR12239.pdf>

Vaidyanathan, N. (2020). Augmented Reality in Retail-A Case Study: Technology Implications to Utilitarian, Aesthetic and Enjoyment Values, in Proceedings of the 2020 4th International Conference on Virtual and Augmented Reality Simulations, New York, NY, USA, 18 May 2020, New York, NY, USA: Association for Computing Machinery, pp.27–34, Available Online: <https://doi.org/10.1145/3385378.3385383> [Accessed 16 May 2025]

Van Esch, P., Arli, D., Gheshlaghi, M. H., Andonopoulos, V., Von Der Heidt, T. & Northey, G. (2019). Anthropomorphism and Augmented Reality in the Retail Environment, *Journal of Retailing and Consumer Services*, [e-journal] vol. 49, pp.35–42, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0969698918311421> [Accessed 11 April 2025]

Varshney, R. and Chaudhary, N. (2023) ‘AUGMENTED REALITY: THE MODERN DRIFT IN FASHION INDUSTRY’, *Business, Organizations and Society*, 1, pp. 84–88. Available at: <https://doi.org/10.26480/bosoc.02.2023.84.88>.

Velasquez, V., Gratton, P. & Brock, T. (2025). Multinational Corporation: History, Characteristics, and Types, *Investopedia*, Available Online: <https://www.investopedia.com/terms/m/multinationalcorporation.asp> [Accessed 12 May 2025]

Venkatesh, V. & Davis, F.D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Science*, vol. 46, no. 2, pp. 186–204, Available at: <https://doi.org/10.1287/mnsc.46.2.186.11926>

Venkatesh, V., Thong, J.Y.L. & Xu, X. (2016). Unified Theory of Acceptance and Use of Technology: A synthesis and the road ahead. *Journal of the Association for Information Systems*, vol. 17, no. 5, pp.328–376. <https://doi.org/10.17705/1jais.00428>

Vieira, V. A., Rafael, D. N. & Agnihotri, R. (2022). Augmented Reality Generalizations: A Meta-Analytical Review on Consumer-Related Outcomes and the Mediating Role of Hedonic and Utilitarian Values, *Journal of Business Research*, [e-journal] vol. 151, pp.170–184, Available Online: <https://www.sciencedirect.com/science/article/pii/S0148296322005677> [Accessed 9 April 2025]

Wafa, S. N. W. S. N. (2022). Augmented Reality Adoption in Marketing Communications: Agency Practitioner and Client Perspectives, Available Online: <https://research-reposi->

tory.rmit.edu.au/articles/thesis/Augmented_reality_adoption_in_marketing_communications_agency_practitioner_and_client_perspectives/27598959?file=50794986 [Accessed 16 May 2025]

Walsham, G. (1995). Interpretive case studies in IS research: nature and method, *European Journal of Information Systems*, vol. 4, no. 2, pp.74–81, <https://doi.org/10.1057/ejis.1995.9>

Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, vol. 15, no. 3, pp. 320–330, <https://doi.org/10.1057/palgrave.ejis.3000589>

Wood, N. J. (2023). Ethical Considerations of AR Applications in Smartphones; A Systematic Literature Review of Consumer Perspectives, arXiv:2306.07288, Available Online: <http://arxiv.org/abs/2306.07288> [Accessed 30 April 2025]

Wu, Y. F. & Kim, E. Y. (2022). Users' Perceptions of Technological Features in Augmented Reality (AR) and Virtual Reality (VR) in Fashion Retailing: A Qualitative Content Analysis, *Mobile Information Systems*, [e-journal] vol. 2022, no. 1, p.3080280, Available Online: <https://onlinelibrary.wiley.com/doi/abs/10.1155/2022/3080280> [Accessed 11 April 2025]

Xu, B., Guo, S., Koh, E., Hoffswell, J., Rossi, R. & Du, F. (2022). ARShopping: In-Store Shopping Decision Support Through Augmented Reality and Immersive Visualization, Available Online: https://www.researchgate.net/publication/362066191_ARShopping_In-Store_Shopping_Decision_Support_Through_Augmented_Reality_and_Immersive_Visualization [Accessed 18 May 2025]

Yang, J. & Lin, Z. (2024). From Screen to Reality: How AR Drives Consumer Engagement and Purchase Intention, *Journal of Digital Economy*, [e-journal] vol. 3, pp.37–46, Available Online: <https://www.sciencedirect.com/science/article/pii/S2773067024000219> [Accessed 16 May 2025]

Yim, M. Y.-C., Chu, S.-C. & Sauer, P. (2017). Is Augmented Reality Technology an Effective Tool for E-Commerce? An Interactivity and Vividness Perspective, *Journal of Interactive Marketing*, vol. 39, pp.89–103

Yim, M. Y.-C. & Park, S.-Y. (2019). “I Am Not Satisfied with My Body, so I like Augmented Reality (AR)”, *Journal of Business Research*, [e-journal] vol. 100, pp.581–589, Available Online: <https://linkinghub.elsevier.com/retrieve/pii/S0148296318305228> [Accessed 11 April 2025]

Yu, J., Xie, J. & Lu, H. (2024). Virtual Fitting Room Technology: Unleashing the Transformative Potential for Fashion Brands' Retail Operational Performance, *Asia Pacific Journal of Marketing and Logistics*, [e-journal] vol. ahead-of-print, no. ahead-of-print, Available Online: <https://www.emerald.com/insight/content/doi/10.1108/apjml-06-2024-0844/full/html> [Accessed 30 April 2025]

Zak, M. (2020) ‘Augmented Reality Try-On Adoption in the Online Clothing Industry: Understanding Key Challenges and Critical Success Factors’, TU Berlin & University of Twente, Available at: https://essay.utwente.nl/84375/1/Zak_MA_BMS.pdf (Accessed: 26 December 2024).