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The Application of Virtual Reality Technology: A Meta-Ethnography Systematic Literature Review in Experiential Marketing with Customers in the Retail Business

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Abstract

The purpose of this systematic literature review is to explore the application of virtual reality (VR) technology to enhance customer experiences in retail businesses. The study covers research from 2022 to 2024, gathered from online databases such as EBSCO, Emerald, and ScienceDirect, resulting in a total of 37 relevant articles. The research was conducted using the Seven-Step Model of Meta-Ethnography to present definitions, importance, benefits, research objectives, categorization, concepts, theories, and research methods related to VR, augmented reality (AR), and mixed reality (MR) technologies. Additionally, the study discusses the use of these technologies in retail businesses and marketing communications, as well as research findings and recommendations for retail businesses. This literature review helps to understand the impact of virtual reality technology on consumer behavior and purchasing decisions, as well as future research trends and gaps.

Keywords: Virtual Reality, Augmented Reality, Retail Business, Customer Experience, Experiential Marketing

Introduction

In the constantly evolving competitive business landscape, particularly in retail, the adoption of various technologies to enhance the customer experience and strengthen competitive positioning has become increasingly prevalent. These technologies, known as "consumer-facing" in-store technologies, include virtual reality (VR), augmented reality (AR), and the metaverse, which have seen rapid development and growing application in the business sector. Specifically, AR applications have been developed to blend the real world with the virtual in real-time from the user's perspective. This integration elevates the visualization of products and the perception of the store or service business environment, thereby improving the customer experience as they can interact with a virtual environment. Meanwhile, VR creates experiences in a three-dimensional virtual world. AR enhances the user experience by providing a more realistic and immersive experience within an actual location. AR is defined as the integration of "digitally created information by computers into the user's view of the real world, appearing as if they are part of the same environment." This technology, through the integration and placement of real and virtual objects (via virtual layers that can add computer-generated digital elements such as images, videos, and text), makes augmented reality (the enhanced real world) more effective (Jung, 2019; Arghashi, 2022; Lim et al., 2024; Habil et al., 2024).

According to You Visit, approximately 75% of businesses in The Forbes World's Most Valuable Brands have increasingly adopted virtual reality technologies. The main reasons for this adoption are to display a modern image of the business (Infographic Thailand, 2022) and to develop the consumer

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decision-making journey. This journey began with the traditional AIDA model by E. St. Elmo Lewis, which consists of attention, interest, desire, and action. It then evolved into the 4A's model by Dirk Rector, which developed AIDA into a new model comprising Awareness, Attitude, Act, and Act Again. This model combined interest and desire into attitude and added Act Again to examine customer post-purchase behavior to measure customer loyalty. With technological advancements, there is a connection through the appeal and diversity of products, especially those with long purchase cycles, such as durable goods or high-value items. Repurchase or Act Again can be challenging, leading to customer behavior that expresses "loyalty" by recommending the product to friends, creating a larger network among consumers. Therefore, the consumer decision-making journey in the era of technological progress currently includes awareness, appeal, ask, act, and advocate, known as the 5A's model, which clearly explains contemporary consumer behavior and is flexible according to product types and consumers. Virtual reality technologies are widely used to create new consumer experiences, such as using AR and VR technologies to persuade purchases through online channels, using AR applications to connect the shopping experience by presenting products and promoting product awareness, and using AR and VR to generate satisfaction, stimulate room reservations, and encourage repeat business in the hotel industry (Kotler et al., 2017; Voicu et al., 2023; Daassi and Debbabi, 2021; Lim et al., 2024).

Due to the above phenomenon, virtual reality technology has been widely used in retail businesses. However, research studies on virtual reality technology in relation to retail are still limited compared to studies on virtual reality in education, tourism, military security, public health, urban planning, entertainment, gaming, and engineering (Jung, 2019). With rapidly changing technology and increasingly complex consumer decision-making processes, such studies are essential for building knowledge to respond to current situations and benefit brand owners and product manufacturers who can apply this knowledge for future business endeavors.

Research Objectives

To review and synthesize research on the application of VR, AR, and MR technologies in retail businesses, analyze their impact on customer experience and consumer behavior, identify research gaps, and provide practical recommendations for implementing these technologies in experiential marketing strategies.

Theoretical background

1. Concept of Experiential Marketing Communication

The concept of experiential marketing communication, pioneered by Bernd Schmitt, posits those experiences influence consumers by creating both rational and emotional motives for product selection. Experiences can arise from direct experiences and/or simulated experiences (Strategic Experiential Modules: SEMs) through the senses (Sense), emotions (Feel), thoughts (Think), actions (Act), and connections (Relate). Creating experiences for consumers represents a shift from traditional marketing approaches, where consumers could not perceive products or services prior to purchase, to a new marketing paradigm that focuses on building awareness and satisfaction to elicit future behaviors (Rogers & Schmitt, 2008).

Kwortnik and Ross (2007) state that experiential marketing is a combination of tangible (symbolic) and intangible (emotional) elements and is a co-creation of consumers and marketers in generating impressive experiences, attitudes, and memorable moments for consumers.

Kevin (2012) discusses experiential marketing communication as a marketing strategy that differs from traditional marketing, which focuses on demonstrating the features and benefits of a service at a location. It serves as a strategy to enhance the service experience for tourists, encompassing both physical and emotional experiences. It emphasizes creating new experiential dimensions for tourists and also connects the identity and interests of the tourists.

Schmitt (1999) describes the concept of experiential marketing communication as a modern marketing strategy designed to create experiences across five dimensions: 1) Sense, which involves integrating all five senses; 2) Feel, which uses stimuli to affect emotions; 3) Think, which stimulates consumers to think; 4) Act, which encourages social actions; and 5) Relate, which connects

consumers with feelings and behaviors reflecting their relationship with the brand. Accumulating experiences through sight, taste, smell, sound, and touch is merely a trigger for brand familiarity, which differs from making consumers aware of the brand's essence. This involves creating a distinction from competitors and aligning with consumer needs, where the brand's essence should have distinct characteristics visible through the brand personality. It should align with experiential marketing communication to enable consumers to remember, recognize differences, and become familiar, thus providing a competitive advantage.

2. The Concept of Virtual Reality Technology

Reality technology refers to technology that integrates the real world (real) with the virtual world (virtual) (Onyesolu & Eze, 2011), including augmented reality (AR), which transforms images seen on a display into three-dimensional objects floating above a real surface. This leads to a transformation in modern communication forms into interactive media, which uses symbolic images to decorate various shapes. Subsequently, these images are used to create codes, or what are called markers. When these markers are printed on various objects such as fabric, glass, paper, book pages, or business cards and then viewed through the screen of various electronic devices like a webcam or a smartphone with a Reality Browser Layer, it is possible to see simulated images of large buildings, shop symbols, or various products, as well as avatars, appear through the screen. (Nor'a et al.,2024; Park et al.,2024)

Virtual reality (VR) is the use of computers to simulate or create a virtual world in a three-dimensional format. Accessing or using the system requires specific equipment, such as a helmet or glasses with a display screen and joysticks for controlling sensors installed in the area to read movements. A key feature of VR is that users can experience a 370-degree immersive environment within the 3D world that has been created. It is suitable for design work, entertainment, and training through simulated scenarios. (Carvalho et al., 2016; Onyesolu et al.,2012)

Mixed reality (MR) involves displaying a blend of mixed reality, which is the integration of information from both the real world and the virtual world. This differs from VR, which solely simulates a virtual world. MR represents a new and intriguing form of computer usage with different objectives from AR and VR. However, the devices used in MR are still similar to those in AR and VR, typically designed as displays attached to helmets or glasses. Additionally, the system is flexible and can be easily adapted for use. For example, VR devices that display images or videos from a camera operate in the manner of augmented reality, which is a type of mixed reality. Meanwhile, AR devices that overlay virtual-world images entirely over real-world images operate in a VR-like manner. (Rokhsaritalemi et al.,2020; Tamura, 2000)

3. The Concept of Virtual Reality Technology in Relation to Retail Business

AR, VR, and MR technologies are becoming increasingly popular, especially in the retail business (Jung, 2019). For example, AR combines real-world data with virtual data to create a simulated reality. Thus, product information, sounds, and media technology contribute to enhancing the experience. AR allows consumers to interact with virtual products, and its usage is mainly through devices that can host AR applications, such as computers and mobile phones. The popularity of mobile technology, which is widely accessible, has led to its increased use in businesses such as online stores. Users can shop using AR, which enhances satisfaction and the shopping experience. Early uses of AR in stores include virtual try-ons and interactive displays that provide information about promotions, products, and locations. Therefore, AR has the potential to improve consumer product visibility, increase engagement, and enhance awareness of the shopping experience, which is expected to positively affect the perception of stores and brands and subsequently influence consumer behavior.

The benefits of applying virtual reality technology in marketing communications for retail businesses are numerous (STEPS ACADEMY, 2020; Giant Point, 2020), including:

1. Creates experiences and engagement between the brand and consumers. This is because AR and VR technologies can provide consumers with new experiences that enable them to try or test products or services, making it easier for them to make confident purchasing decisions.

2. It ensures safe purchasing for consumers, as there is no need for them to physically handle or touch products. This is because they do not have to visit the actual location to buy the

products, and it also helps reduce crowding within the stores, giving consumers confidence in their safety.

3. Retail businesses can offer convenience to consumers without the need for sales staff, as customers can easily try or find information using electronic devices such as tablets or applications.

4. It increases the capability of personalized marketing communication. The use of AR technology allows the system to record what individual customers want, opening up opportunities to respond to customer needs on a more personal level.

5. Enhances the image of the business organization, product, or service. The application of technology in marketing communication activities can help create an image of a modern and innovative organization in the perception of consumers.

Methodology

This study is qualitative research using the Seven-Step Model of Meta-Ethnography by Noblit and Hare (1988), as shown in the following table:

Table 1: Seven Steps of Noblit and Hare's meta-ethnography

1. Getting started - Initial step 2. Deciding what is relevant - Selection of studies for synthesis 3. Reading the studies - Detailed review of selected literature 4. Determining relationships - Framework for relationships among studies 5. Translating studies - Synthesis of findings 6. Synthesizing translations - Integration of results 7. Expressing the synthesis - Drawing conclusions

Source: illustrates the Seven-Step Model of Meta-Ethnography (Noblit & Hare, 1988)

The collection of literature relevant to this study involved an initial search framework, including the selection of three online databases: EBSCO, Emerald, and ScienceDirect, which are related to and cover documents from various disciplines. Key terms such as "virtual world", "virtual reality", "virtual environment", "mixed reality", or "augmented reality", along with the primary keyword "retail business", were used to limit the domain of the application. These keywords were applied to titles, abstracts, and the keywords field in order to search for relevant information in each of the aforementioned databases. The data collection period for the documents ranged from 2022 to 2024.

The study framework consists of 10 dimensions that define the framework for synthesizing relationships between research studies:

Dimension 1: Definition of AR, VR, and MR
Dimension 2: Importance, benefits, and advantages
Dimension 3: Research objectives
Dimension 4: Classification and categorization
Dimension 5: Theoretical concepts
Dimension 6: Design/methodology
Dimension 7: Applications in various fields
Dimension 8: Applications in communication
Dimension 9: Key findings
Dimension 10: Recommendations

Results

1. Search results based on the criteria mentioned above found that there are a total of 37 relevant research articles. These articles are distributed as follows: 18 articles from EBSCO, 11 articles from Emerald, and 8 articles from ScienceDirect. The table below displays the details, as shown in the following table:

Table 2: Relevant research articles identified from Emerald, EBSCO, and ScienceDirect databases

(n=37)

No.	Title	Author	Source	Dimensions									
				1	2	3	4	5	6	7	8	9	10
1	The metaverse era: Leveraging augmented reality in the creation of novel customer experience	Habil et al. (2024)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
2	Engaging the customer with augmented reality and employee services to enhance equity and loyalty	Butt et al. (2023)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
3	How mobile augmented reality digitally transforms the retail sector: Examining trust in augmented reality apps and online/offline store patronage intention	Kang et al. (2023)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
4	Designing augmented reality services for enhanced customer experiences in retail	Vaidyanathan & Henningsson (2023)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
5	When historically cultural and creative products meet AR: the effect of augmented reality–based product display on consumers' product evaluation	Xu et al. (2023)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
6	Enhancing brick-and-mortar store shopping experience with an augmented reality shopping assistant application using personalized recommendations and explainable artificial intelligence	Zimmermann et al. (2023)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
7	The rise of 3D E-Commerce: the online shopping gets real with virtual reality and augmented reality during COVID-19	Billewar et al. (2022)	Emerald	AR VR	✓	✓	x	x	x	✓	✓	✓	✓
8	Augmented reality in retail: a systematic review of research foci and future research agenda	Chen et al. (2022)	Emerald	AR	✓	✓	x	✓	✓	✓	✓	✓	✓
9	Augmented reality in online retailing: A systematic review and research agenda	Kumar (2022)	Emerald	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
10	Improving service brand personality with augmented reality marketing	Plotkina et al. (2022)	Emerald	AR	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	Virtual shopping: segmenting consumer attitudes towards augmented reality as a shopping tool	Romano et al. (2022)	Emerald	AR	✓	✓	x	✓	✓	✓	x	✓	✓
12	A Study on Immersion and Intention to Pay in AR Broadcasting: Validating and Expanding the Hedonic Motivation System Adoption Mode	Tu and Jia, (2024).	EBSCO	AR	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Digital commerce in the immersive metaverse environment: cognitive analytics management, real-time purchasing data, and seamless connected shopping experiences	Bratu and Sabău, (2022).	EBSCO	x	✓	✓	x	✓	✓	✓	✓	✓	✓

No.	Title	Author	Source	Dimensions									
				1	2	3	4	5	6	7	8	9	10
14	Empowering digital marketing with interactive virtual reality (IVR) in interior design: Effects on customer satisfaction and behaviour intention.	Tang et al,. (2023)	EBSCO	x IVR	✓	✓	x	✓	✓	✓	✓	✓	✓
15	Exploiting fashion x-commerce through the empowerment of voice in the fashion virtual reality arena: Integrating voice assistant and virtual reality technologies for fashion communication	Morotti et al., (2022)	EBSCO	x XR	✓	✓	x	✓	✓	✓	✓	✓	✓
16	How augmented reality media richness influences consumer behaviour	de Amorim et al., (2022)	EBSCO	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17	Metaverse marketing: How the metaverse will shape the future of consumer research and practice	Dwivedi et al., (2023)	EBSCO	AR	✓	✓	x	x	✓	✓	✓	✓	✓
18	How to strategically choose or combine augmented and virtual reality for improved online experiential retailing	Hilken et al., (2022)	EBSCO	AR VR	✓	✓	x	✓	✓	✓	x	✓	✓
19	Immersive VR-based instruction in vocational schools: effects on domain-specific knowledge and wellbeing of retail trainees	Kablitz et al., (2023)	EBSCO	VR	✓	✓	✓	✓	✓	✓	x	✓	✓
20	Exploring the usage of Mixed Reality Dashboards in Business Intelligence and Analytics	Toreini and Mohazzeb. (2023)	EBSCO	✓	x	✓	x	x	✓	✓	x	✓	✓
21	Consumers' Experience and Satisfaction Using Augmented Reality Apps in E-Shopping: New Empirical Evidence	Voicu et al., (2023)	EBSCO	AR VR	✓	✓	x	✓	✓	✓	x	✓	✓
22	Recognizing shopper demographics from behavioral responses in a virtual reality store	Gil-López et al., (2023)	EBSCO	VR	✓	✓	x	✓	✓	✓	✓	✓	✓
23	The Impact of VR/AR-Based Consumers' Brand Experience on Consumer–Brand Relationships	Zeng et al., (2023)	EBSCO	AR VR	✓	✓	x	✓	✓	✓	x	✓	✓
24	The influence of augmented reality on online user experiences	Radoičić et al., (2022)	EBSCO	AR VR	✓	✓	x	✓	✓	✓	✓	✓	✓
25	The Role of VR Shopping in Digitalization of SCM for Sustainable Management: Application of SOR Model and Experience Economy	Mesjar et al., (2023)	EBSCO	VR	✓	✓	x	✓	✓	✓	x	✓	✓
26	Users' Perceptions of Technological Features in Augmented Reality (AR) and Virtual Reality (VR) in Fashion Retailing: A Qualitative Content Analysis	Wu, Y. F., & Kim, E. Y. (2022)	EBSCO	AR VR	✓	✓	x	✓	✓	✓	x	✓	✓
27	Virtual Commerce in a Decentralized Blockchain-based Metaverse: Immersive Technologies, Computer Vision Algorithms, and Retail Business Analytics	Hopkins, E. (2022)	EBSCO	VR	✓	✓	x	✓	✓	✓	✓	✓	✓

No.	Title	Author	Source	Dimensions									
				1	2	3	4	5	6	7	8	9	10
28	Virtual is so real! Consumers' evaluation of product packaging in virtual reality	Branca et al., (2023)	EBSCO	VR	✓	✓	x	✓	✓	✓	x	✓	✓
29	Virtual Reality in Destination Marketing: The Why, The Who and The When.	PRODAN, S. G., & EGRESI, I. (2023).	EBSCO	VR	✓	✓	x	✓	✓	✓	x	✓	✓
30	Shopping with augmented reality.	Arghashi V,(2020)	ScienceDirect	✓	✓	✓	x	✓	✓	x	x	✓	✓
31	Digitalization driven retail business model innovation: Evaluation of past and avenues for future research trends	Mostaghe et al., (2022)	ScienceDirect	✓	x	x	x	x	x	x	x	✓	✓
32	Emerging digital technologies and consumer decision-making in retail sector: Towards an integrative conceptual framework	Sharma et al., (2023)	ScienceDirect	✓	✓	✓	x	✓	✓	✓	✓	✓	✓
33	Immersive interactive technologies and virtual shopping experiences: Differences in consumer perceptions between augmented reality (AR) and virtual reality (VR)	Kim et al., (2023)	ScienceDirect	AR VR	✓	✓	x	✓	✓	✓	x	✓	✓
34	Does product involvement drive consumer flow state in the AR environment? A study on behavioural responses	Serravalle et al., (2023)	ScienceDirect	x	✓	✓	x	✓	✓	✓	x	✓	✓
35	More than meets the eye: In-store retail experiences with augmented reality smart glasses.	Pfeifer et al., (2023)	ScienceDirect	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
36	The role of time convenience and (anticipated) emotions in AR mobile retailing application adoption	Chekembayeva et al., (2023)	ScienceDirect	AR	✓	✓	x	✓	✓	✓	x	✓	✓
37	Shopping in the digital world: How augmented reality mobile applications trigger customer engagement	Lin and Huang, (2024)	ScienceDirect	AR	✓	✓	x	✓	✓	✓	x	✓	✓

Note: According to the topic, the symbol ✓ indicates that there is information, while the symbol x indicates that there is no information.

Dimension 1: Definition of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR);
Dimension 2: Importance, Benefits, and Advantages of AR, VR, and MR;
Dimension 3: Research Objectives Related to Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR)
Dimension 4: Classification of AR, VR, and MR;
Dimension 5: Concepts and Theories Used in Researching Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR);
Dimension 6: Research Design/Methodology for Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR);
Dimension 7: Applications of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) in various fields;
Dimension 8: Applications of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) in Communication;
Dimension 9: Key Findings from the Research;
Dimension 10: Recommendations from the Research

2. Literature Review Results: The analysis of the data according to the dimensions set out yielded the following results:

2.1 Dimension 1: Definition of AR, VR, and MR. Various research works have defined augmented reality (AR), virtual reality (VR), and mixed reality (MR) as follows, based on the total literature review data from 37 articles.

1) Augmented reality (AR) is a technology that overlays digital information onto the real world that users see in real-time. The medium devices include smartphones, tablets, AR glasses, and wearable devices. For instance, users can virtually try on makeup through a mobile app, view maps with directional information and important locations displayed on a mobile screen, and interact with both the real world and digital information.

2) Virtual reality (VR) is a technology that creates a completely simulated environment. Users feel like they are actually entering the virtual world. The medium devices include VR headsets, smartphones, tablets, and computers. For instance, engaging in video games that replicate a real-world experience or virtually training pilots immerses users in a virtual world, simulating an actual event or location.

3) Mixed reality (MR) is a technology that blends the virtual world with the real world in an immersive way. Users can interact with both worlds. The medium devices include HoloLens glasses, MR headsets, smartphones, tablets, and computers. For example, a furniture store may use MR to show customers how a virtual sofa would look in a living room. Surgeons may use MR to see internal organs in 3D through a virtual camera. Users can interact with virtual objects as if they were real objects in the real world.

The following is a summary table that compares augmented reality (AR), virtual reality (VR), and mixed reality (MR):

Table 3: Comparison of AR, VR, and MR technologies: definitions, examples, and applications

Characteristics	Augmented Reality (AR)	Virtual Reality (VR)	Mixed Reality (MR)
Meaning	Merge the virtual world with the real world.	Create a virtual world.	Blend the virtual world with the real world.
Example	Trying on virtual makeup and viewing maps.	Play virtual reality games and train pilots online.	Virtual furniture store, virtual surgery.
Results	See and interact with digital information in the real world.	Immerse yourself in the virtual world.	Immerse yourself in the virtual world.

In summary, the definitions derived from the literature review indicate that virtual reality (VR) creates a fully simulated environment where users immerse themselves and feel like they are in that world. On the other hand, augmented reality (AR) overlays digital information onto the real world, allowing users to see virtual objects in the real world. Mixed Reality (MR) blends the real world with the virtual world, enabling users to interact with virtual objects as if they were real. Augmented reality (AR), virtual reality (VR), and mixed reality (MR) all have high potential for use in various fields. These technologies allow users to have immersive experiences and interact effectively with the virtual world.

2.2 Dimension 2: Importance, Benefits, and Advantages of AR, VR, and MR

The literature review of 37 articles revealed the following importance, benefits, and advantages of augmented reality (AR), virtual reality (VR), and mixed reality (MR):

Augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies are becoming essential tools in retail businesses, benefiting both business owners and users or customers. These technologies have a positive impact on businesses, as summarized below:

1) Enhancing the shopping experience: Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) help customers see virtual products before making a decision, allowing them to compare goods and make informed decisions.

2) Increasing customer loyalty: Businesses that utilize augmented reality (AR), virtual reality (VR), and mixed reality (MR) can build customer loyalty to their brand or products. Loyal customers tend to recommend the brand or product to friends, family, or acquaintances, expanding the customer base.

3) Adding value to the business: Businesses incorporating augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies create awareness and a good reputation that can persuade customers to purchase products and services.

4) Saving time and costs: Customers can try virtual products before making a purchase or using a service, reducing the chances of returns.

5) Creating a good customer experience: Augmented reality (AR), virtual reality (VR), and mixed reality (MR) help create a good customer experience by allowing customers to interact, experiment, and find product information, leading to purchases, service usage, and repeat business.

6) Gaining a competitive edge: Retailers using augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies can differentiate themselves and stand out above competitors in the same industry.

7) Improving work efficiency: Both augmented reality (AR), virtual reality (VR), and mixed reality (MR) assist in customer verification, room booking systems, customer inquiries, data collection for product and service improvement, and employee training.

In summary, augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies present new opportunities for retail businesses, helping businesses enhance the shopping experience for customers, build customer loyalty, add value to the business, save time and costs, gain a competitive edge, and improve work efficiency.

2.3 Dimension 3: Research Objectives Related to Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). After reviewing all 37 literature sources, we identified four main areas with interesting research objectives:

1) The issue pertains to the impact of augmented reality (AR), virtual reality (VR), and mixed reality (MR) on retail businesses. The literature review is mostly about looking at how Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) technologies affect shopping and tourism. It focuses on the connection between Augmented Reality (AR) and online shopping, Augmented Reality (AR) and in-store shopping, Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) on user experiences, and the effect of Virtual Reality (VR) on tourism.

2) The issue pertains to augmented reality (AR), virtual reality (VR), and mixed reality (MR), and it involves proposing strategies and formats to meet the needs of retail businesses. The literature review focuses on the application of augmented reality (AR), virtual reality (VR), and mixed reality (MR) in the presentation of strategies and formats to enhance retail businesses and elevate customer experiences in retail. Key aspects covered include customer attraction strategies, designing augmented reality (AR) services, integrating virtual reality (VR) and augmented reality (AR) into e-commerce, designing augmented reality (AR) apps, marketing tools in the metaverse, impact on customer decision-making, and factors influencing the use of AR apps. The main goal is to create new knowledge to develop new products and services that meet customer needs, help retail businesses understand customers, develop strategies, and enhance competitiveness.

3) The issue pertains to the relationship between consumer behavior and augmented reality (AR), virtual reality (VR), and mixed reality (MR). The literature review focuses on studying consumer behavior and opinions towards these technologies in the context of shopping. Some important things to think about are dividing people into groups based on how they feel about Augmented Reality (AR), Virtual Reality (VR), or Mixed Reality (MR) and regular stores, what happens when you teach people about AR, how people buy things in Virtual Reality (VR), how Augmented Reality (AR) and Virtual Reality (VR) experiences affect brand relationships, how to test product packaging in Virtual Reality (VR), and This in-depth information helps marketers develop customer-centric experiences, increase sales, and build lasting brand relationships.

4) The issue pertains to the applications of augmented reality (AR), virtual reality (VR), and mixed reality (MR) in retail businesses. The literature review focuses on studying the application of augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies in

retail businesses. Key areas of interest cover employee training, product presentation, employee training, shopping experiences, supply chain management, and data analysis. Some interesting topics to look into are how Augmented Reality (AR) affects customer service, how Augmented Reality (AR) shopping assistant apps affect users, how users feel about Mixed Reality (MR) dashboards, how Augmented Reality (AR) experiences affect buyers, how well Augmented Reality (AR) apps improve online shopping experiences, and the role of Virtual Reality (VR) shopping in sustainable supply chain management. These studies have the potential to help retail businesses understand the benefits and limitations of these technologies and utilize them to enhance shopping experiences for customers.

2.4 Dimension 4: Categorization of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). The literature review of all 37 studies found that it is possible to subdivide the technologies of augmented reality (AR), virtual reality (VR), and mixed reality (MR) into the following categories:

1) Categorized by technology type

(1) The types of AR are as follows:

a) Augmented reality (AR) on mobile devices, using smartphones or tablets to display digital images overlaid onto the real environment. Examples include games like Pokemon Go and apps for measuring furniture sizes.

b) Augmented reality (AR) through wearable devices, which uses glasses or wearable devices to display digital images. Examples include Google Glass and Microsoft HoloLens.

c) Augmented reality (AR) is a technology that uses web browsers to overlay digital images onto the real environment. Examples include IKEA AR apps and virtual museum websites.

(2) The types of VR are as follows:

a) tethered virtual reality (VR), which is connected to a computer desktop to display a virtual world. Examples include the HTC Vive and the Oculus Rift.

b) Mobile virtual reality (VR) involves the use of smartphones or tablets to display a virtual world. Examples include Google Cardboard and Samsung Gear VR.

(3) The types of MR are as follows:

a) Mixed Reality (MR) blended type, merging the virtual world and the real world together. Examples include Microsoft HoloLens and Magic Leap One.

b) Mixed Reality (MR) wearable type, which uses glasses or wearable devices to display the virtual world and interact with virtual objects. Examples include the Epson Moverio BT-300 and the Vuzix Blade.

2) Categorized by roles and usage:

(1) Focus on product testing: This helps customers interact with virtual products before making a purchase decision. Examples include virtual try-on apps.

(2) Focus on presenting brand images: create experiences that attract customers and build brand recognition. Examples include the L'Oreal Makeup app.

(3) Focus on presenting store information: This assists customers in navigating stores and viewing product information. Examples include the Walmart AR app for hotel businesses.

2.5 Dimension 5: Concepts and Theories Used in Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). Research from the literature review of all 37 studies found that the concepts and theories applied in studying augmented reality (AR), virtual reality (VR), and mixed reality (MR) are diverse in terms of topics and research objectives. Researchers need to rely on appropriate theoretical frameworks to support studies in various dimensions, drawing from theories from multiple disciplines such as psychology, information technology, marketing, and consumer behavior. Therefore, it is possible to categorize the concepts and theories used in research on augmented reality (AR), virtual reality (VR), and mixed reality (MR) as follows:

1) The group of acceptance theories includes: (1) Technology Acceptance Model (TAM); (2) The Unified Theory of Technology Acceptance and Use (UTAUT/UTAUT2); (3) Diffusion of Innovations (DOI). This group of theories is used to study factors influencing consumer acceptance and use of technology, helping to understand the motivations and obstacles to applying technology.

2) The group of theories on consumer experience and behavior includes: (1) Flow Theory; (2) Uses and Gratifications Theory; (3) Consumer-Brand Relationships Theory; (4) Brand

Experience Theory; (5) Consumer Satisfaction Theory; (6) Mental Imagery Theory; (7) Cognitive Affective Model of Immersive Learning (CAMIL); and (8) Stimulus-Organism-Response (S-O-R) Model. These theories help explain the experiences of users towards augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies in terms of emotions, feelings, and responsive reactions, which affect perceptions of value and consumer behavior.

3) The group of theories are related to being in a virtual environment: (1) presence theory; (2) telepresence; (3) Embodied Cognition Theory; and (4) Technological Embodiment. These theories investigate the mental state of users while in a virtual environment, which affects perception and the experiences they receive. This leads to changes in behavior and decision-making.

4) Other concepts and theories include: (1) Design Thinking; (2) Service-Dominant Logic; (3) Mental Imagery Theory; (4) Attribute Centrality Theory; and (5) Authenticity Theory. In addition to the core theories, we utilize these concepts and frameworks, in addition to the main theories, to further enhance our knowledge and understanding of the issues studied in various dimensions.

In summary, the theories used in research on augmented reality (AR), virtual reality (VR), and mixed reality (MR) are diverse and cover multiple dimensions, ranging from technology acceptance, creating user experiences, understanding consumer behavior, and design and service provision. This reflects the interdisciplinary nature of the field's research. Therefore, selecting the appropriate theories can yield intriguing results for future applications.

2.6 Dimension 6: Design/Research Methodology for Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR). The review of all 37 literature sources revealed a variety of research methodologies used to study augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies. We can categorize these research works based on their types and research methodologies.

1) Types of Research Methodologies:

(1) Theoretical Research: studying concepts, theories, and frameworks related to augmented reality (AR), virtual reality (VR), and mixed reality (MR) without collecting data from sample groups. For instance, researchers may examine digital marketing concepts and frameworks within the context of augmented reality (AR), virtual reality (VR), and mixed reality (MR).

(2) Quantitative Research: Focuses on collecting numerical data, often using surveys and experiments with sample groups to analyze relationships, causes, and effects of different variables. For instance, researchers examine how consumers use AR for shopping by conducting online surveys.

(3) Qualitative Research: Focuses on understanding the experiences, opinions, and behaviors of individuals, often using targeted group interviews or content analysis. For instance, researchers conduct in-depth interviews to delve into the user's VR tourism experiences.

(4) Mixed Methods Research: Combines quantitative and qualitative research methods to provide a more comprehensive overview. For example, study the impact of augmented reality (AR) on shopping experiences using both surveys and targeted group interviews.

2) Research Methods

(1) Content analysis involves analyzing documents, texts, and media to identify patterns, issues, and meanings.

(2) Surveying involves collecting data from a sample group using questionnaires.

(3) Interviews by gathering data from a sample group through group discussions.

(4) Experimentation with testing hypotheses by controlling various variables and measuring outcomes.

(5) Observation by observing the behavior of a sample group in natural environments.

Summarizing the types and research methods related to augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies reveals a diverse range of research types and methods used in these areas. Researchers employ theoretical and conceptual research methods to delve into pertinent concepts and theories. Quantitative and experimental research are important for testing hypotheses and studying the impact of these technologies on consumers. The most popular research methods include surveys using questionnaires and experiments, which often involve dividing

participants into experimental and control groups to compare the effects of using augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies.

Qualitative research also employs user behavior observation, interviews, and content analysis to gather comprehensive insights into user experiences and opinions.

Researchers use a variety of research formats in their design, including mixed group and within-group research, pilot testing, pre-test-post-test research, and comparisons between virtual and real environments. This reflects efforts to control various variables and increase the credibility of research results. Research employs a diverse range of tools and technologies, such as augmented reality apps, virtual reality devices, virtual reality simulation programs, eye tracking and posture tracking systems, and augmented reality glasses. This reflects the advancement of these technologies and the serious efforts to apply them in research.

Overall, research in augmented reality, virtual reality, and mixed reality technologies is diverse and utilizes a wide range of research methods and tools to study various aspects and implications of these technologies.

2.7 Dimension 7: Application of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) in Various Industries. A review of all 37 literature sources reveals that augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies are significantly changing the retail business landscape. Consequently, we can summarize the application of augmented reality (AR), virtual reality (VR), and mixed reality (MR) in various aspects of retail business as follows:

1) Marketing Applications: Using these techno-logies to create immersive advertisements, attract interest, build brand memorability, efficiently test products, receive customer feedback, and provide a fun and engaging shopping experience to encourage participation.

2) Sales Applications: Assisting customers in visualizing products realistically on their bodies or in real spaces to increase confidence in purchasing decisions, reduce return rates, and enhance customer service with improved data and support.

3) Operational Applications: Displaying detailed product information to help customers efficiently search for products; training employees through realistic simulations; tracking products; improving delivery efficiency; and reducing costs. The retail industry is utilizing augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies in diverse and impactful ways, as these applications demonstrate.

In summary, augmented reality (AR), virtual reality (VR), and mixed reality (MR) play a crucial role in driving innovation and creating new experiences for consumers in various industries, particularly in the retail business. For example, the application of augmented reality (AR) in online and in-store shopping experiences helps customers see product images more clearly, leading to increased purchase intent. On the other hand, virtual reality (VR) can create lifelike shopping experiences, allowing customers to interact with products and immerse themselves in the shopping atmosphere, leading to a positive brand perception.

Furthermore, various industries such as marketing, advertising, branding, product development, customer experience, sales, customer service, and employee training are incorporating these technologies. Interesting examples of applications include trying out virtual products, simulating real stores, and presenting products through augmented reality (AR).

Apart from retail businesses, these technologies are also being applied in other industries such as education and training, tourism and presenting tourist attractions through virtual reality (VR), healthcare and medicine, and digital marketing for various industries like interior design and fashion, etc.

2.8 Dimension 8: Application of Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) in Communication. The analysis of literature data from a total of 37 sources revealed the application of these technologies in communication. The types of communication formats can be categorized as follows:

1) Advertising with the objective of brand or product awareness includes using virtual reality (VR) for in-game advertising, inserting ads in a lifelike format within games, and

marketing on social media using augmented reality (AR). Examples include AR filters on Instagram and AR apps that create virtual try-on experiences for customers.

2) Integrated marketing communication involves creating brand experiences to strategically attract and engage customers, accessing consumers through the metaverse, and increasing brand awareness to enhance brand recognition and participation.

3) Interactive communication with customers includes one-way and two-way communication to provide customer service, AR for communication between anchors and viewers in live streaming environments, and even conversational AI to enhance shopping experiences.

4) Persuasive communication enhances customer perceptions of products and services through the use of augmented reality (AR) to present additional information, interactive content, virtual reality (VR) to simulate situations, and mixed reality (MR) to merge the real world with virtual objects for communication.

In summary, augmented reality (AR), virtual reality (VR), and mixed reality (MR) are transforming the landscape of advertising, marketing, customer communication, and persuasion. People are using these technologies to create lifelike advertising on social media and in games, offer virtual product try-on experiences for customers, access customers through virtual worlds, present interactive product and service information, simulate situations for communication, and merge the real world with virtual objects for communication.

2.9 Dimension 9: Key Findings from the Research After analyzing all 37 literary works, data can be used to analyze the impact of augmented reality (AR), virtual reality (VR), and mixed reality (MR) on retail businesses, affecting consumer purchasing decision-making processes. This can be divided as follows:

1) Augmented reality (AR) and virtual reality (VR) technologies impact consumer purchasing decision-making processes by enabling data analysis to summarize key points in each stage as follows:

(1) Awareness: Increase product and service awareness. a) Augmented reality (AR) helps customers become more aware of products and services. Customers can see products as if they were real before making a purchase decision, such as by trying on virtual clothes or placing virtual furniture in their homes. b) Augmented reality (AR) helps customers understand product and service information better. Customers can compare products and make informed decisions by displaying product information on a virtual screen. c) Augmented reality (AR) helps customers discover new products and services. Customers can discover new products and services through augmented reality experiences, such as AR games or scavenger hunts.

(2) Align: Enhance product and service preferences. a) Augmented reality (AR) helps customers actively engage with products and services. Customers can interact with virtual products, enhancing their experience and making it fun and memorable. b) Augmented reality (AR) helps customers create personalized experiences. Customers can customize their AR experiences to suit their preferences, making them feel involved and connected to the brand. c) Augmented reality (AR) helps build a modern brand image. The use of AR technology showcases the brand's modernity and innovative thinking.

(3) Ask: Present product and service information before making a decision. a) Augmented reality (AR) helps customers compare products. Customers can compare virtual products, helping them make confident purchasing decisions. b) Customers can try products virtually through augmented reality (AR). Customers can try on virtual clothes or test virtual makeup, reducing the risk of purchasing unsuitable products. c) Augmented reality (AR) enables customers to access review information. Customers can read reviews of virtual products, helping them make informed purchasing decisions.

(4) Action: encourage sales of products and services. a) Customers are more likely to purchase products after using augmented reality (AR). b) Augmented reality (AR) helps increase the value of orders: Customers tend to purchase higher-priced products after using AR. c) Augmented reality (AR) helps reduce return costs: Customers are less likely to return products after using AR.

(5) Advocate: Increase satisfaction and word-of-mouth a) Augmented reality (AR) helps customers be more satisfied. Customers who use augmented reality (AR) are more satisfied with

the shopping experience. b) Augmented reality (AR) helps customers be more loyal. Customers who use augmented reality (AR) are more likely to return for repeat purchases and recommend it to friends. c) Augmented reality (AR) helps create customer engagement. Customers who use augmented reality (AR) are more likely to engage with the brand.

2) Augmented reality (AR) and virtual reality (VR) technologies have the potential to transform the retail business, stemming from the acceptance of both business owners and customers. The reasons for this acceptance can be summarized as follows:

(1) Ease of use: Both business owners and customers can easily learn and use augmented reality (AR) and virtual reality (VR) technologies.

(2) Aesthetic appeal: augmented reality (AR) and virtual reality (VR) have the ability to present information beautifully and captivate viewers throughout the presentation.

(3) Engaging experiences: augmented reality (AR) and virtual reality (VR)offer engaging and interactive experiences.

(4) Personalization: The discovery of personalization in augmented reality (AR) and virtual reality (VR) technologies.

(5) Innovation: Customers often seek new and exciting technologies, so businesses must present something new and different in terms of content and differentiate themselves from competitors.

(6) Enjoyable shopping experience: augmented reality (AR) and virtual reality (VR) enhance the shopping experience, making it more enjoyable and fun.

2.10 Dimension 10 Recommendations from Research From the analysis of all 37 literary works, the following recommendations related to Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) can be proposed for retail businesses:

1) Challenges and suggestions for augmented reality (AR), virtual reality (VR), and mixed reality (MR) technology for retail businesses.

(1) The potential of augmented reality (AR) and virtual reality (VR) technology in business.

a) Augmented reality (AR) technology has the potential to enhance the shopping experience, help customers make decisions easier, and increase the competitiveness of businesses.

b) Virtual reality (VR) technology helps travelers experience a realistic experience before traveling, develop product designs, test packaging, evaluate products, and train employees.

(2) Recommendations for businesses

a) Augmented reality (AR) technology should focus on unique strengths compared to competitors, design apps that are easy to use, develop functions that meet customer needs, and consider user privacy. Designing augmented reality (AR) services using design thinking to develop shopping assistant apps that educate consumers about the benefits of augmented reality (AR).

b) Virtual reality (VR) technology should focus on using virtual reality (VR) to create an immersive brand experience, design virtual reality (VR) environments that promote consumer engagement, and develop sustainable marketing strategies focusing on the strengths of augmented reality (AR), such as simplicity, user control, and responsiveness. However, there should also be improvements in enhancing augmented reality (AR) to address the limitations of virtual reality (VR), such as eye strain, by increasing the realism and efficiency of virtual reality (VR).

2) Challenges and suggestions for augmented reality (AR), virtual reality (VR), and mixed reality (MR) technology in the present day.

When using augmented reality (AR) and virtual reality (VR) technologies, there are various technical limitations as well as ethical considerations regarding data privacy and the development of effective marketing strategies. Even issues such as responsible platform governance and accessibility for all users need to be addressed. Symptoms of motion sickness, limitations of voice assistant technology, and security concerns are also challenges that need to be addressed.

Furthermore, a review of the literature reveals that research on augmented reality (AR), virtual reality (VR), and mixed reality (MR) primarily concentrates on presenting information

on augmented reality (AR) and virtual reality (VR), with limited discussion on mixed reality (MR) technology. Future research may need to delve deeper into the realm of mixed reality (MR) technology. Additionally, further studies may be required to enhance understanding of augmented reality (AR) and virtual reality (VR) technologies.

(1) The study focuses on the impact of augmented reality (AR) and virtual reality (VR) on various aspects of user experiences, the completeness of media, attitudes towards AR, the design of effective marketing strategies, and accessibility for all users.

(2) User-influencing factors, including those that influence product involvement, flow experience, and user satisfaction.

(3) Aspects of digital transformation, including its influence on retail business models, the use of digital technology, the significance of deep data, the development of new partnership models, customer engagement, security challenges, and decision-making processes.

Conclusion and Discussion of Results

Based on a systematic literature review of 37 research papers from 2022 to 2024, this study provides comprehensive insights into the application of augmented reality (AR), virtual reality (VR), and mixed reality (MR) technologies in retail businesses.

1. Summary of Key Findings

1.1 Augmented Reality (AR) Technology Impact

The systematic review reveals that AR technology significantly enhances customer experiences across the entire consumer journey. The findings demonstrate that AR applications effectively increase product awareness, enhance customer engagement, and improve purchase decision-making processes. AR technology enables customers to visualize products in realistic contexts, compare products virtually, and access comprehensive product information before making purchasing decisions.

1.2 Virtual Reality (VR) Technology Impact

VR technology shows substantial potential in creating immersive brand experiences and facilitating pre-purchase product evaluation. The research indicates that VR applications are particularly effective in tourism retail, product design development, packaging evaluation, and employee training programs. VR environments allow customers to experience products and services in simulated realistic settings before actual purchase or usage.

1.3 Mixed Reality (MR) Technology Potential

The literature review reveals limited research on MR technology compared to AR and VR. However, existing studies suggest that MR combines advantages of both AR and VR technologies, creating unique customer experiences that blend real and virtual worlds seamlessly.

2. Discussion of Results

2.1 Theoretical Implications

The findings support Schmitt's (1999) experiential marketing framework, demonstrating how AR, VR, and MR technologies create experiences across five dimensions: Sense, Feel, Think, Act, and Relate. This aligns with contemporary consumer behavior models, particularly Kotler et al.'s (2017) 5A's customer journey model (Awareness, Appeal, Ask, Act, Advocate), where immersive technologies influence each stage of the decision-making process.

The research validates Jung's (2019) assertion that reality technologies integrate real and virtual worlds effectively, transforming traditional retail communication into interactive media experiences. This supports the Technology Acceptance Model (TAM) and Unified Theory of Technology Acceptance and Use (UTAUT/UTAUT2) frameworks identified in the literature, where ease of use, aesthetic appeal, and engaging experiences drive technology adoption.

2.2 Practical Implications

The findings corroborate Chen et al.'s (2022) systematic review conclusions that AR technology in retail focuses on research areas including customer experience enhancement, brand loyalty building, and competitive advantage creation. The study supports Dwivedi et al.'s (2023) metaverse marketing perspective, indicating that immersive technologies will significantly shape future consumer research and practice.

Kumar's (2022) findings on AR in online retailing align with this study's results, confirming that AR applications improve customer satisfaction and shopping experiences. Similarly, Arghashi's (2022) research on shopping with augmented reality supports the conclusion that AR creates “wow-effects” that positively influence consumer purchasing equations.

The research validates Billewar et al.'s (2022) observations about the rise of 3D e-commerce during COVID-19, where AR and VR technologies bridge the gap between physical and digital shopping experiences. This supports Habil et al.'s (2024) findings on leveraging AR for novel customer experience creation in the metaverse era.

2.3 Consumer Behavior Insights

The study confirms existing research on consumer acceptance factors for immersive technologies. The identified five key acceptance factors - ease of use, aesthetic appeal, engaging experiences, personalization, and innovation perception - align with established technology acceptance theories and support findings from multiple studies in the reviewed literature.

The research validates that AR and VR technologies positively impact all stages of the consumer decision-making process, from initial awareness through post-purchase advocacy, supporting the evolution from traditional AIDA models to contemporary 5A's frameworks.

2.4 Research Gaps Identification

Consistent with the systematic review methodology, this study identifies significant gaps in MR technology research, ethical considerations, and long-term impact assessments. The limited discussion on data privacy and security concerns echoes broader concerns in the technology adoption literature about responsible innovation and consumer protection.

Suggestions

1. Recommendations from This Study

Based on the systematic analysis of 37 research articles, this study provides the following key recommendations:

1) Strategic Implementation: Implement AR, VR, and MR technologies strategically with focus on competitive advantages, user-friendly design, and customer privacy protection through phased implementation approaches.

2) Address Limitations: Proactively resolve technical limitations such as motion sickness and system efficiency while developing ethical frameworks for privacy and security concerns.

3) Enhance Customer Experience: Utilize immersive technologies to create engaging brand experiences throughout the entire customer journey, emphasizing personalization and innovation perception.

4) Industry Collaboration: Establish partnerships between stakeholders to develop industry standards, best practices, and standardized measurement frameworks for technology effectiveness.

2. Future Research Recommendations

Based on the research gaps identified from this systematic review, future research should focus on:

1) Mixed Reality Technology Research: Conduct comprehensive studies on MR applications, as this review found significantly limited research compared to AR and VR technologies.

2) Long-term Impact Assessment: Examine sustained effects of immersive technology adoption on consumer behavior and business performance, as current research primarily focuses on short-term outcomes.

3) Ethical and Privacy Framework Development: Address ethical considerations and data privacy implications, which were inadequately explored in the reviewed literature.

4) Cross-cultural and Demographic Studies: Investigate technology acceptance variations across different cultural contexts and demographic groups to ensure inclusive implementation strategies.

5) Real-world Implementation Studies: Conduct field studies in actual retail environments rather than controlled laboratory settings to enhance ecological validity of findings.

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