Presenting a Coherent Model of Augmented Reality Marketing in Advertising Based on the Meta-Synthesis Approach

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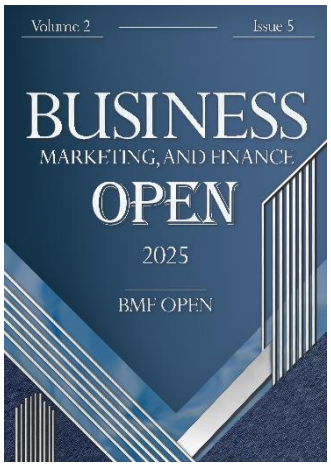

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Citation: Shakeri, M., Rashidi, E., & Vakil Alroaia, Y. (2025). Presenting a Coherent Model of Augmented Reality Marketing in Advertising Based on the Meta-Synthesis Approach. *Business, Marketing, and Finance Open*, 2(5), 1-16.

Received: 21 February 2025
Revised: 27 April 2025
Accepted: 07 May 2025
Published: 01 September 2025

Abstract: Augmented reality marketing refers to the use of augmented reality in marketing to enhance customer experiences. Augmented reality (AR) has increasingly attracted the attention of both managers and researchers in recent years. AR is a potential technology that enriches consumer experiences and transforms marketing. The purpose of this study is to present a coherent model of augmented reality marketing in advertising based on a meta-synthesis approach. To this end, using a mixed-method research approach and the meta-synthesis tool—which includes the seven-step method of Sandelowski and Barroso (2006)—a systematic evaluation and analysis of the results and findings of prior studies was conducted, ultimately reviewing 43 articles. In the quantitative phase, the Shannon entropy method was used to prioritize the components of the identified themes. Augmented reality was classified into three dimensions: AR characteristics, purchase intention, and subjective norms. The characteristics of AR included the AR mirror, perceived usefulness, emerging brands, and digital transformation; purchase intention included informativeness, usefulness, simplification, and persuasion; and subjective norms included AR acceptance, aesthetics, consumer connection experience, and perceived enjoyment. In total, the contribution of AR characteristics (15%), purchase intention (58%), and subjective norms (27%) to augmented reality marketing was determined. The meta-analysis of this study provides insight into the need to utilize augmented reality in marketing, which proves beneficial for developing marketing strategies.

Keywords: Augmented reality marketing, advertising, meta-synthesis, Shannon entropy.

1. Introduction

Augmented reality (AR) has emerged as a novel interactive technology and has rapidly transformed the field of marketing. Academic research on augmented reality has expanded due to its swift adoption in marketing practices [1, 2]. AR technology creates digital opportunities by integrating interactive and shareable digital content into the user's current view of the environment through mobile technologies such as smartphones or smart glasses [3, 4]. This digital content may include images, information, or instructions, highlighting the multiple advantages of AR technology [5-7].

From the user's perspective, AR can be entertaining, while from a marketer's perspective, its novelty can enhance brand awareness. Modern technologies like AR attract and persuade customers [4]. Augmented reality marketing (ARM) refers to the use of AR in marketing to enhance customer experiences. Digital facilitators, such as digital cues in physical environments, support customer behavior. Mobile AR is a promising marketing tool for advertising and e-marketing professionals to reach customers and increase sales rates [8].

Augmented reality marketing refers to the application of augmented reality (AR) in marketing to enhance consumer experiences, increase satisfaction, shape consumer behavior, and ultimately boost company revenues [2, 7-17]. New and engaging media formats enabled by AR play a crucial role in achieving these intended effects. Specifically, AR overlays digital information or objects onto consumers' perception of physical objects and environments, thereby providing rich information about products or services and allowing consumers to interact with them easily. AR not only enhances online experiences and interactions but also creates novel, immersive experiences in physical locations [18]. Major retailers such as Lowe's [6] and Machine A [19] engage customers by incorporating AR-supported features into their mobile apps and delivering innovative customer services. Moreover, both well-established and emerging brands—including Kate Spade, Charlotte Tilbury, Timberland, L'Oréal, Philips, LEGO, and Toys-R-Us—provide interactive experiences that enable consumers to learn more about products, create personalized items, and virtually try products using AR displays in-store or AR features in mobile apps [6]. AR-enhanced stores can generate added brand value, simplify consumer decision-making, and stimulate brand engagement, which in turn strengthens purchase intention [20, 21]. In the restaurant industry, AR services influence customers' perceptions of the dining experience [5] and encourage value-based product selection [22]. Furthermore, AR applications—particularly those developed for wearable devices like smart glasses—affect tourists' intention to visit destinations [23], enhance their enjoyment [24], improve their tourism experiences [25, 26], and increase their willingness to pay [27]. Several theories support this approach, as outlined below.

Researchers have employed a range of theories to explain consumer responses to technology, particularly augmented reality. These include the Technology Acceptance Model (TAM) [28-32], Situated Cognition Theory [3, 4, 33], and the Diffusion of Innovations Theory (Rogers, 2010).

Technology Acceptance Model (TAM) proposes that individuals' perceptions of ease of use and perceived usefulness determine their attitude toward a technological system and their behavioral intention to use it. TAM is a widely recognized model in academic literature to explain technology adoption among potential users. Based on the Theory of Reasoned Action, TAM was developed by Davis et al. (1989), positing that technology acceptance is modeled through perceived usefulness, perceived ease of use, and attitudes toward a given technology [34]. Over time, TAM has evolved to address new contexts, such as the development of e-TAM [35, 36] and the Unified Theory of Acceptance and Use of Technology (UTAUT) [36]. These extended models have been employed to examine consumer reactions to technologies, including in-store smart technologies and mobile app-based technologies, thus offering a valuable conceptual framework for understanding AR in marketing.

Stimulus–Organism–Response (S-O-R) Framework posits that various environmental aspects (stimuli) trigger consumers' cognitive and emotional states (organism), which subsequently influence their approach or avoidance behaviors (response). The S-O-R model is widely used to study consumer behavior in e-commerce environments. It explains how individuals react to environmental stimuli through three stages. In this model, stimuli (S) in the environment affect internal states (O), and these internal emotional and cognitive conditions result in opposing responses (R): either approach or avoidance behaviors. Initially developed for general environmental psychology,

the S-O-R model has proven effective in retail settings, including e-commerce. For retailers aiming to increase customer approach behaviors, this model helps identify how different stimuli impact consumer responses [36].

Self-efficacy theory asserts that individuals' assessments of their own competence significantly affect how they engage with unfamiliar technological environments [37]. Previous empirical literature has introduced a specific form of this concept known as Technological Self-Efficacy (TSE), referring to an individual's belief in their ability to perform a new, technically complex task. Hope and Gano-Overstreet examined how (1) perceived novelty influences attitudes toward AR advertising environments and (2) how TSE affects relationships with the novel AR ad, attitudes toward AR advertising, and brand perceptions [38].

The use of virtual reality (VR) and AR in marketing, education, and customer service offers numerous benefits [16]. Marketing campaigns incorporating virtual reality technology are referred to as virtual reality marketing. The use of social media can help attract audiences and create a stronger brand presence [39]. On the other hand, AR marketing represents an evolving trend in marketing and sales strategies [40]. With this technology, brands can offer unique experiences to their customers using their mobile devices [41].

Although the role of AR in marketing can be easily observed in sales activities, applied marketing studies on this subject remain limited, and the objective of the present article is to help bridge this gap.

2. Methodology

Since the primary goal of this study is to identify the key indicators influencing augmented reality marketing in advertising, it is considered a fundamental research in terms of its objective. Furthermore, as the data in this study were collected without manipulation or intervention, it falls under the category of non-experimental (descriptive) research. The employed method is a mixed-method exploratory design with an emphasis on qualitative data. A mixed-methods approach combines both quantitative and qualitative methods. In a single project, both types of research methods can be effectively utilized. Mixed-methods research refers to a procedure for collecting and analyzing quantitative and qualitative data within a single study or a series of related studies, based on the precedence and sequence of information. In this study, the qualitative phase was conducted first, followed by the quantitative phase.

To address the research problem in the qualitative phase, a meta-synthesis approach was adopted. This method is particularly useful in fields where prior research is primarily qualitative and lacks an extensive theoretical foundation. Since the topic of this article has not been comprehensively studied to date, the meta-synthesis method was chosen as a suitable strategy to identify and synthesize the main components and dimensions. In this research, the seven-step method proposed by Sandelowski and Barroso (2007) was employed, which is illustrated in Figure 1.

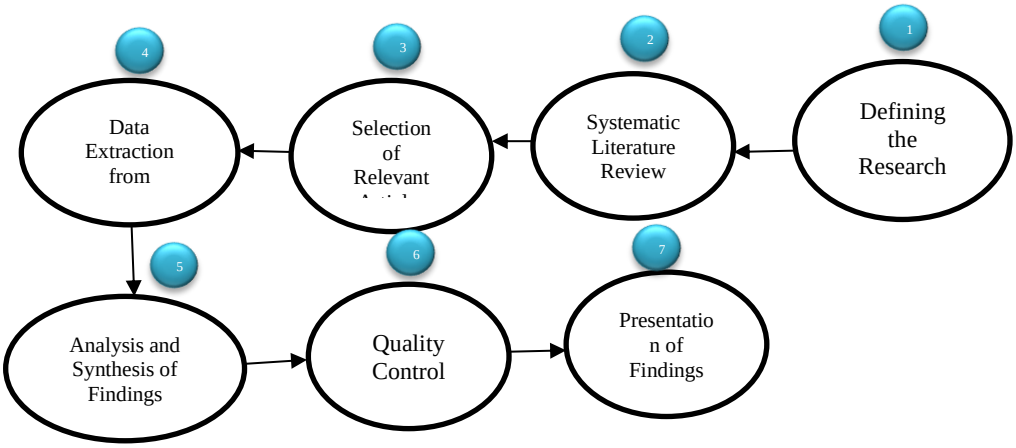

Figure 1. Meta-synthesis steps. Adapted from Sandelowski and Barroso's guide to meta-synthesis (2006).

Meta-synthesis requires the researcher to conduct an in-depth and critical review of the documents under investigation and to integrate previous studies. As mentioned, Sandelowski and Barroso proposed a seven-step model for this purpose. The initial question to launch the meta-synthesis is "What?" Table 1 outlines the categorization and analysis of the research dimensions under key questions.

Table 1. Research Questions

Parameter	Questions
What	What are the indicators that determine augmented reality marketing in advertising?
Who	—
When	What are the dimensions of augmented reality marketing in advertising?
How	How do the dimensions of augmented reality marketing in advertising influence one another?

Step 1 – Deciding What Is Relevant:

The meta-synthesis process involves the inclusion of conceptually relevant studies. A combination of narrow and broad comprehensive search methods is typically applied. There is no fixed limit on the number of studies to be included to ensure saturation and transferability of the findings. Search terms are employed in the first stage of the meta-synthesis (initial search), with further terms added in the second search stage using Boolean operators.

Initially, a comprehensive search was conducted across Scopus and Google Scholar databases for peer-reviewed journal and conference articles. The ProQuest Global Dissertations and Theses database was also used to search for relevant doctoral dissertations. Boolean operators "OR" and "AND" were used with the following keywords: "augmented reality" or "mixed reality" or "AR" and "augmented reality marketing" or "ARM" or "AR advertising" or "consumer behavior" or "customer experience" or "purchase intention" or "engagement" or "hedonic" or "utilitarian" or "perceived value". This search resulted in a total of 4,532 studies.

Step 2 – Study Screening:

All studies that did not examine AR characteristics, ARM, or advertising were excluded. Additionally, all non-English articles were eliminated. This process reduced the number of studies to 2,945.

Step 3 – Thorough Review and Re-reading:

All authors independently reviewed the abstract of each study. Subsequently, any disagreements were discussed collectively until consensus was reached. This step further narrowed the pool to 307 articles.

Step 4 – Full-text Review and Data Extraction:

All authors independently reviewed the full text of each study. The following criteria were used for inclusion: the study must clearly state its research objectives, address at least one target variable quantitatively, and define constructs in alignment with this study's definitions. Again, discussions among authors resolved any discrepancies. Ultimately, this process yielded 43 studies. The selection process is depicted in Figure 2.

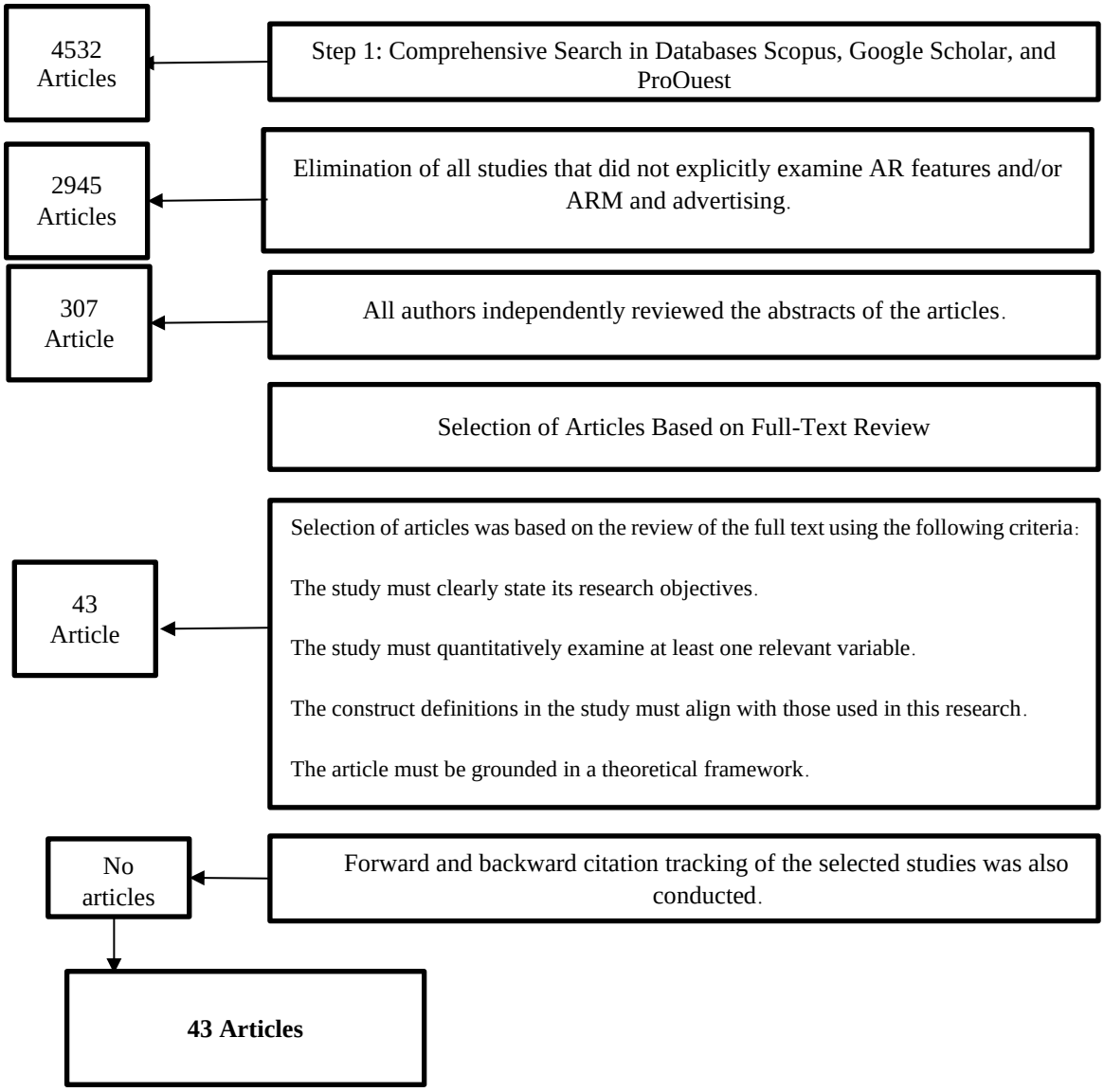

Figure 2. Study selection process steps.

Finally, forward and backward citation searches of these studies did not yield any additional articles, confirming that no relevant studies were omitted. Table 2 presents a summary of the reviewed articles, including sample population, supporting theory, and data analysis method.

Table 2. Summary of Reviewed Articles on Augmented Reality Marketing in Advertising

No.	Reference	Objective	Population	Supporting Theory	Data Analysis Method
1	[42]	Persuasiveness of VR and AR video advertising: A systematic literature review	—	Social Psychology Theory	Meta-analysis
2	[2]	Past, present, and future of marketing research	Scopus database	Technology Acceptance	Bibliometric and thematic analysis
3	[43]	AR-driven purchasing	297 consumers in Turkey	Stimulus–Organism–Response (S-O-R)	Correlation
4	[29]	AR marketing strategy proposal	127 marketing managers	Technology Acceptance Model (TAM)	Structural equation modeling
5	[17]	Emotional responses and brand attitudes in AR marketing	Online customers	Affect-as-Information Theory	Structural equation modeling
6	[10]	Systematic review of AR marketing	Research articles	TAM; S-O-R framework	Clustering
7	[38]	Augmented self: Effects of virtual face enhancement on self-concept	Online consumers	Technology Acceptance Model (TAM)	Laboratory experiment
8	[44]	Acceptance of AR-based self-service technologies (SST)	284 female hairdressers (Nicaragua & USA)	Technology Acceptance Model (TAM)	Structural equation modeling
9	[45]	Acceptance of mobile commerce and AR	541 executive MBA students	Perceived ease of use; perceived usefulness	Path analysis
10	[46]	Behavioral intention to use AR mobile apps in retail	363 university students (Pakistan)	Perceived usefulness	Structural equation modeling
11	[47]	Big Five personality traits and AR acceptance	230 Indian postgraduate students	Perceived usefulness	Path analysis
12	[48]	Norms, attitudes, and intentions in AR tourism experiences	Tourists	Perceived usefulness and ease of use	ANOVA
13	[18]	AR in experiential marketing and consumer responses	248 consumers	Stimulus–Organism–Response	Structural equation modeling
14	[40]	Reuse intention of AR apps	224 participants	S-O-R framework	Structural equation modeling
15	[49]	Presentation modes of AR and consumer response	Online shoppers	Stimulus–Organism–Response	Path analysis
16	[50]	Reasons for not adopting AR	437 cosmetic app users (Taiwan)	S-O-R framework	Structural equation modeling
17	[13]	Mobile AR apps and user behavior	Customers	Hedonic and utilitarian values	Structural equation modeling
18	[51]	AR and purchase intention for beauty products	Mobile customers	Usefulness	Experimental design
19	[4]	Viral marketing through shared social AR experiences	Mobile users	Perceived usefulness	Structural equation modeling
20	[31]	AR in smart retail	Retail users	Perceived usefulness	Conceptual analysis
21	[39]	Consumer responses to AR in e-commerce	IKEA mobile website users	Perceived usefulness	Structural equation modeling
22	[52]	Flow in AR experiences	500 online experiment participants	Flow theory	Structural equation modeling
23	[18]	AR and psychological ownership	527 Zara store customers	Flow	Structural equation modeling
24	[53]	AR app adoption in malls	Mobile shoppers	UTAUT	Empirical study
25	[54]	AR tourism app adoption	360 Chinese film tourists	UTAUT	Structural equation modeling
26	[54]	AR and advertising effectiveness	Consumers	Theory of Planned Behavior	Field and lab experiments
27	[55]	AR interactivity and consumer responses	302 online female consumers (South Korea)	—	Conceptual analysis

28	[16]	Overview of AR and VR applications	—	Future-oriented perspective	Systematic review
29	[21]	Brand experience and AR in fashion retail	Fashion retail (Italy)	Perceived usefulness	Qualitative approach
30	[9]	Garment evaluation using AR in online shopping	Online apparel shoppers	Usefulness and satisfaction	Quasi-experimental
31	[32]	Virtual try-on and appearance in apparel retail	Apparel retail	Technology Acceptance Model	Online qualitative experiment
32	[28]	Enhancing online consumer connection through AR	207 shoppers	Self-determination and self-evaluation theories	Scenario-based survey
33	[56]	Virtual try-on tech in online purchase decision	Online clothing retailers	Integrated utilitarian value	Structural equation modeling
34	[26]	Antecedents of AR experience	Potential tourists (Shangri-La, China)	Technology Acceptance	Conceptual analysis
35	[57]	Online trial of AR before purchase	Online trial	Perceived usefulness	Experimental design
36	[58]	Consumer behavior in digital shopping environments	441 consumers (online survey)	Usefulness and technology acceptance	Correlation
37	[59]	Acceptance of mobile AR in consumer context	335 respondents (Portugal)	UTAUT	Factor analysis
38	[23]	AR in experiential settings	Cultural heritage sites (global)	Theory of Reasoned Action	Path analysis
39	[60]	AR mirror and self-referencing effects	Shoppers	Self-referencing theory	Experimental design
40	[14]	AR holograms and expected satisfaction with smart glasses	Internet users	Tech flow and media acceptance	Experimental design
41	[61]	Trade-off between privacy and quality in AR retail	User experience	Equity theory	ANOVA
42	[62]	Impact of AR on retail satisfaction and willingness to purchase	Retail users	Equity theory	DEMATEL
43	[29]	AR in customer journey: Enhancing hedonic value through playfulness	Marketing experts	Flow theory	Exploratory study

Step 5: Analysis and Synthesis of Qualitative Findings

The goal of meta-synthesis is to generate an integrated and novel interpretation of findings. This methodology is intended to clarify concepts and patterns, refine existing knowledge structures, and contribute to the emergence of operational models and accepted theories (Finfgeld, 2006). During the analysis, it seeks themes or patterns that are recurrent across the included studies. Sandelowski and Barroso (2007) refer to this process as thematic analysis. In this approach, the researcher initially considers all extracted elements from the studies as codes. Then, based on the meaning of each code, they are grouped into similar conceptual categories. Through this process, the researcher forms themes (concepts) and creates a classification, assigning similar and related categories under the theme that best describes them. These themes serve as the foundation for developing explanations, models, theories, or working hypotheses. In the present study, all factors extracted from the reviewed studies were first treated as codes (125 codes in total). These were then grouped into conceptual categories (12 concepts), resulting in the formation of thematic dimensions for the project.

Step 6: Quality Control

To ensure the quality of this study, the selected research articles were evaluated based on criteria such as objectivity, methodological rigor, research design, ethical considerations, clarity of findings, and research value. Only high-scoring articles were selected for further analysis. Additionally, to validate the coding process, intra-thematic agreement between two independent coders was applied. A domain expert re-coded the data, and Cohen's Kappa coefficient was used to calculate inter-rater reliability. Specifically, one of the documents was re-coded by a

second coder, and the agreement rate was calculated. The resulting Cohen's Kappa coefficient was 0.71. Cohen's Kappa can be interpreted as a measure of agreement that accounts for the level of agreement expected by chance. According to Landis and Altman (1991), values between 0.60 and 0.80 indicate good agreement, thus the coefficient calculated in this study is considered acceptable.

Step 7: Presentation of Findings – Content Analysis

At this stage of the meta-synthesis, the findings obtained from the previous steps are presented. The Shannon entropy method is used to statistically demonstrate the extent to which past studies support the findings of this research (see Tables 3 to 5). The Shannon entropy method performs strongly in processing data for content analysis of the selected articles. In information theory, entropy is a measure of uncertainty, represented by a probability distribution. There are various methods for determining the weight of indicators, and one of the most robust is Shannon entropy. In this method, the message is first categorized based on each respondent's input and counted in terms of frequency. Then, using the information load of each category, the importance of each one is determined.

3. Findings and Results

Based on the frequency related to each of the identified components, the priority of the identified themes was determined. Accordingly, the contribution of "Augmented Reality Features" was calculated at 15%, "Purchase Intention" at 58%, and "Subjective Norms" at 27%. The specific contribution of each identified component is presented below.

Using the Shannon Entropy approach, the weight of each identified theme was determined based on the frequency of each component. The following table presents the statistical importance and emphasis of previous research on the dimension of Augmented Reality Marketing Features:

Table 3. Determining the Importance and Emphasis of Previous Studies on the Dimension of Augmented Reality Marketing Features

Code	Theme	Frequency	$\sum(P_i \times \ln P_i)$	Entropy E_j	$d_j = 1 - E_j$	Importance Coefficient W_j
AR mirror impacts the gap between ideal and real attractiveness	AR Mirror	3	-0.09823	-0.27309	0.067111	1.273087
AR mirror impacts ideal self-congruence	AR Mirror	14	-0.26236	-0.72937	0.091163	1.729369
Effect of self-view and narcissism on consumer responses	AR Mirror	5	-0.1405	-0.3906	0.073305	1.390595
Variety-seeking and self-confidence	AR Mirror	4	-0.12052	-0.33503	0.070376	1.335034
Novelty, surprise, inspiration, information overload, and distraction are AR features	Perceived Usefulness	12	-0.2417	-0.67192	0.088135	1.671923
Perceived usefulness positively affects brand interaction	Perceived Usefulness	8	-0.19062	-0.52993	0.080650	1.529926
Humanization of mobile commerce	Perceived Usefulness	2	-0.07286	-0.20255	0.063392	1.202552
Self-efficacy	Perceived Usefulness	2	-0.07286	-0.20255	0.063392	1.202552
AR marketing strategy has branding potential	Emerging Brands	10	-0.21799	-0.60601	0.084661	1.606014
Technical implementation of AR features leads to brand attitude and intention in AR marketing	Emerging Brands	7	-0.17529	-0.48731	0.078403	1.487309
AR branding creates additional content and brand value	Emerging Brands	4	-0.12052	-0.33503	0.070376	1.335034
AR features influence brand engagement	Emerging Brands	5	-0.1405	-0.3906	0.073305	1.390595

Brand communication	Emerging Brands	5	-0.1405	-0.3906	0.073305	1.390595
AR may reduce brand value	Emerging Brands	6	-0.15866	-0.44107	0.075966	1.441068
Personal innovation significantly impacts behavioral intention of film tourists	Digital Transformation	2	-0.07286	-0.20255	0.063392	1.202552
AR advertising innovation is highly visible	Digital Transformation	2	-0.07286	-0.20255	0.063392	1.202552
Digital transformation strategies and AR applications	Digital Transformation	5	-0.1405	-0.3906	0.073305	1.390595
Shopping in the digital world depends on AR novelty, interaction, and clarity, which affect acceptance features like ease of use, usefulness, enjoyment, and subjective norms	Digital Transformation	6	-0.15866	-0.44107	0.075966	1.441068
Features of an experimental AR app are important. Hedonic value positively influences continued use intention, moderated by perceived customer support	Digital Transformation	8	-0.19062	-0.52993	0.080650	1.529926

Table 4. Determining the Importance and Emphasis of Previous Studies on the Dimension of Subjective Norms in Augmented Reality Marketing

Code	Theme	Frequency	$\sum(P_i \times \ln P_i)$	Entropy E_j	$d_j = 1 - E_j$	Importance Coefficient W_j
Subjective norms play a role in AR acceptance	AR Acceptance	4	0.054605	0.748087	0.251913	0.08747
Norms, attitudes, and intentions for using AR technology	AR Acceptance	6	0.048384	0.662866	0.337134	0.117061
Dimensions of controllability and perceived playfulness influence mental imagery	AR Acceptance	4	0.054605	0.748087	0.251913	0.08747
Virtual enhancement of the real world via holograms: Exploring expected satisfaction with smart AR glasses	AR Acceptance	1	0.066701	0.913809	0.086191	0.029927
The role of AR in experiential environments is influenced by perceived aesthetics	Aesthetics	7	0.045602	0.624745	0.375255	0.130297
The effect of AR flow experience is based on perceived aesthetics and novelty	Aesthetics	6	0.048384	0.662866	0.337134	0.117061
The role of AR in experiential environments is defined by perceived advantage and aesthetic experience	Aesthetics	5	0.051372	0.703791	0.296209	0.10285
Notable impact of AR on aesthetic experience and hedonic quality	Consumer Connection Experience	21	0.019017	0.260536	0.739464	0.256758
Peer feedback moderates cognitive control in AR experience	Consumer Connection Experience	2	0.062104	0.850831	0.149169	0.051795
Viral marketing through shared AR social experience	Consumer Connection Experience	4	0.054605	0.748087	0.251913	0.08747
Augmented reality in tourism experiences	Consumer Connection Experience	15	0.02827	0.387302	0.612698	0.212742
Parasocial AR interaction positively affects consumer flow experience	Consumer Connection Experience	5	0.051372	0.703791	0.296209	0.10285
Customer-centric brand experience management through AR	Consumer Connection Experience	16	0.026551	0.363746	0.636254	0.220921

AR increases customer curiosity and attention to advertisements	Consumer Connection Experience	3	0.058147	0.796614	0.203386	0.07062
Method, simultaneous sense of ownership control, and system retrievability in AR testing affect consumer connection	Consumer Connection Experience	4	0.054605	0.748087	0.251913	0.08747
Individuals value both personal data privacy and quality enhancement; control over data access impacts user satisfaction	Consumer Connection Experience	5	0.051372	0.703791	0.296209	0.10285
AR apps directly affect perceived usefulness, perceived ease of use, and perceived enjoyment	Perceived Enjoyment	12	0.033942	0.465006	0.534994	0.185762
AR in experiential marketing affects utilitarian and hedonic perceptions of consumers	Perceived Enjoyment	15	0.02827	0.387302	0.612698	0.212742
VTO tools are more enjoyable, easier, and more useful than traditional mobile commerce interfaces	Perceived Enjoyment	10	0.038222	0.523643	0.476357	0.165402
Perceived enjoyment, privacy concerns, and perceived ease of use influence perceived usefulness	Perceived Enjoyment	14	0.030071	0.411976	0.588024	0.204175
AR performs better through web-based product presentations with higher immersion and enjoyment	Perceived Enjoyment	8	0.042994	0.589024	0.410976	0.1427
AR and the customer journey enhance hedonic value through playfulness	Perceived Enjoyment	5	0.051372	0.703791	0.296209	0.10285

Table 5. Determining the Importance and Emphasis of Previous Studies on the Dimension of Purchase Intention in Augmented Reality Marketing

Code	Theme	Frequency	$\sum(P_i \times \ln P_i)$	Entropy E_j	$d_j = 1 - E_j$	Importance Coefficient W_j
Informing consumers positively affects perception of utilitarian value	Informing	3	0.111532	0.924598	0.075402	−0.1885
Informing is significantly associated with MAR app usage	Informing	4	0.109822	0.910424	0.089576	−0.22394
AR enhances performance through immersion and information delivery	Informing	5	0.108402	0.898656	0.101344	−0.25336
AR purchase decisions are useful when consumers perceive a certain level of presence	Usefulness	3	0.111532	0.924598	0.075402	−0.1885
VTO tools are more useful and easier than traditional interfaces with similar model features	Usefulness	2	0.113632	0.942009	0.057991	−0.14498
AR simplifies decision-making and engages customers, adding brand value	Simplification	1	0.116333	0.964403	0.035597	−0.08899
Facilitated flow and its positive effect on several consumer outcomes	Simplification	4	0.109822	0.910424	0.089576	−0.22394
Enabling conditions have indirect effects on behavioral intention acceptance	Simplification	2	0.113632	0.942009	0.057991	−0.14498
AR persuasion occurs via source credibility, social presence, and message content	Persuasion	8	0.105387	0.873659	0.126341	−0.31585
AR is inspiring and persuasive	Persuasion	10	0.111532	0.924598	0.075402	−0.1885

The final conceptual model derived from this study is illustrated in Figure 3:

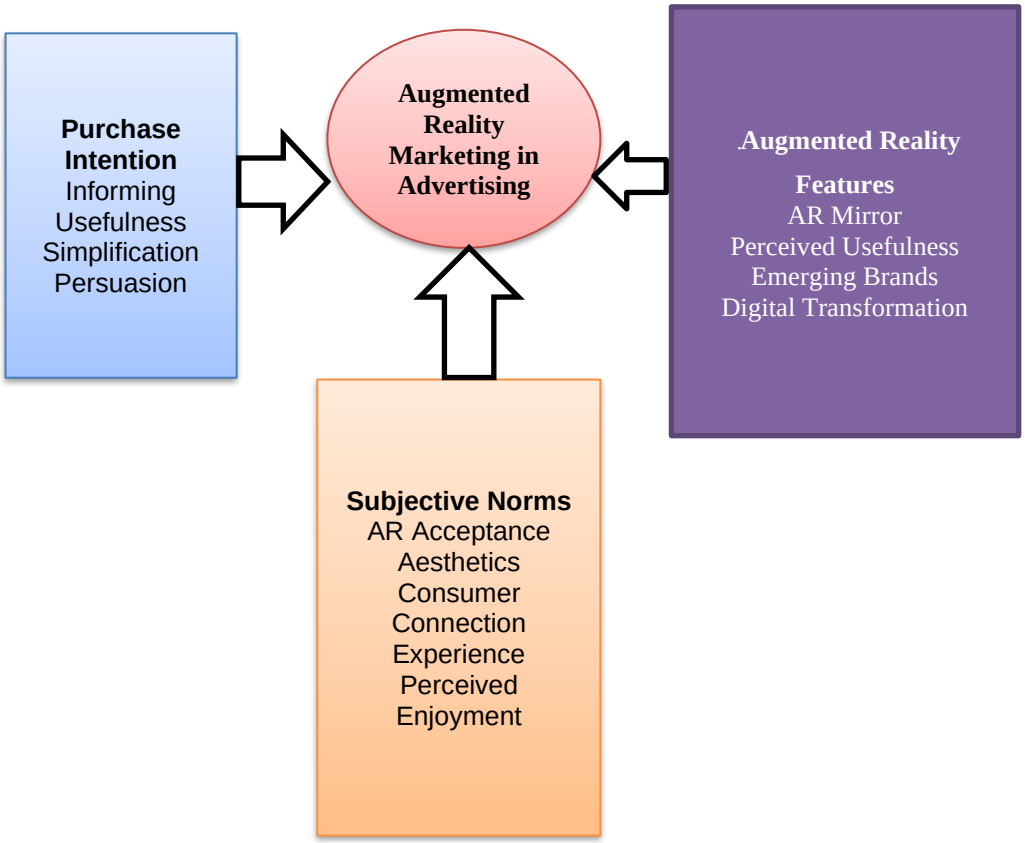

Figure 3. Final Conceptual Model of the Study

4. Discussion and Conclusion

Meta-synthesis studies serve various purposes, and in this research, it was used to identify the dimensions of augmented reality (AR) in advertising. In this context, four themes were identified under the dimension of AR features: AR mirror, perceived usefulness, emerging brands, and digital transformation. Augmented reality, as part of a class of emerging technologies, can be more effectively employed through a better understanding of customer experience. Smart technologies and mobile applications have fundamentally transformed human practices. Access to data anytime and anywhere, the presentation of reality, and three-dimensional virtual environments have reshaped how people organize their lives. Although AR intervenes in reality, it delivers data and visual presentation wherever it is needed in real-world contexts.

Within this framework of change, the widespread use of smartphones has played an increasing role in the application of mobile apps in advertising campaigns. AR enables marketers to virtually showcase products, accessories, and customization options—allowing consumers to visualize how these products would appear before purchasing. AR can be delivered in various ways:

1. Through mobile apps, where consumers use an app to view holographic content integrated into their physical surroundings;
2. Through websites, where consumers use their computer or laptop cameras;
3. Through smart mirrors, where consumers can see themselves and virtually try on clothing items.
4. In the fashion retail industry, AR enables customers to experience events like fashion shows virtually (Stromberg, 2018).

In the dimension of purchase intention, four themes were identified: informing, usefulness, simplification, and persuasion. Previous studies suggest that compared to traditional visualization formats, AR content is perceived as more interactive [63], inspiring [17, 43], useful [11], and enjoyable [33, 60]. Augmented Reality Marketing (ARM) refers to the use of AR in marketing to enhance customer experiences. Digital facilitators, such as digital signage in physical spaces, support customer behavior. Mobile AR is a promising marketing tool for advertising and e-marketing professionals to reach customers and increase sales [8]. Virtual product experiences have become a persuasive alternative to physical trials, enabling consumers to make purchasing decisions without prior evaluation. AR minimizes transaction-related risks.

In the dimension of subjective norms, four themes were also identified: AR acceptance, aesthetics, consumer connection experience, and perceived enjoyment. The role of AR in experiential environments is shaped by perceived advantage and aesthetic experience [23]. The global acceptance of AR technology has grown in recent years. AR's potential to integrate digital information into the physical world presents a challenge to both academia and industry, as they aim to understand and predict its effects on perception, intention to adopt, and usage behavior [53]Customers' attitudes toward AR technology can influence their online purchase intentions, which are affected by perceived usefulness, perceived enjoyment, perceived privacy risks, and perceived ease of use [64].

As both the industrial implementation and academic research on augmented reality marketing are still in their infancy, most current studies focus on the effects of AR usage or its features. Therefore, in-depth investigations are needed on how the complex design features of AR in marketing programs influence outcome variables that describe consumer experiences and responses to AR technology/apps, products/services, brands, tourism destinations, and advertisements. Specifically, enriched information and practical suggestions are required [58]. For faster and more relevant consumer responses, future research should focus on the design elements and features of AR that enhance realism, authenticity, clarity, novelty, interactivity, and efficiency [52, 65, 66].

Current AR marketing studies are based on applications that enhance consumers' visual and auditory perceptions of products and services. With the advancement of AR technology capable of enriching sensory experiences such as touch, taste, and smell, new AR applications can offer multisensory feedback [22]. Researchers are therefore encouraged to investigate the effects of AR applications that combine multisensory enhancement and feedback capabilities [22, 30]. Consequently, academic research can contribute to a better understanding of how the design elements and features of AR influence consumer motivation, experiences, responses, and behavior in relation to products/services, brands, and service providers. In parallel, service/product providers may discover ways to improve AR applications to better meet consumer needs. Ultimately, stakeholders can achieve a win-win situation in which consumers gain high experiential value, and service/product providers benefit from increased revenue and profitability.

This study, by utilizing qualitative meta-synthesis and content analysis based on Shannon entropy, proposed a comprehensive conceptual model that has not been addressed in existing AR marketing literature. Innovations of this research include the use of a novel methodology and the focus on AR marketing, which has received limited attention, especially in Iran. The proposed model, due to its comprehensive and integrative nature, can be applied across various branches of marketing.

Despite the strengths of qualitative studies, they often face limitations such as generalizability and validity. Therefore, to enhance the generalizability of this study, it is necessary for future researchers to test the model across various market segments. Additionally, other quantitative statistical approaches can be employed to evaluate the

validity and improve the generalizability of the model. Researchers are also encouraged to examine the implementation challenges of the proposed framework.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

Acknowledgments

Authors thank all participants who participate in this study.

Conflict of Interest

The authors report no conflict of interest.

Funding/Financial Support

According to the authors, this article has no financial support.

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