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‘The persuasion effects of virtual reality (VR) and augmented reality (AR) video advertisements: A conceptual review’

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ABSTRACT

Using the social psychology theory of elaboration likelihood model (ELM), we present a conceptual model of persuading consumer attitudes through virtual and augmented reality advertisements. We begin this paper with a systematic literature review that assesses a number of theoretical and empirical papers that utilize ELM for virtual reality and augmented reality advertisements. The second section presents research prepositions that facilitate the investigation of consumer attitude persuasion through virtual reality and augmented reality advertisements. The authors identified six research prepositions that facilitate the investigation of consumer attitude persuasion through these advertisements based on the literature. Presented in the third section of this paper is a detailed future research agenda organized by two main research paths: central and peripheral. Moreover, advertisement quality, demographic differences, and the technological context of virtual and augmented reality advertisements helped to facilitate central route persuasion. Variables such as source credibility, social presence, and message content in virtual reality and augmented reality advertisements were found as the persuasion factors under the peripheral route. Therefore, this study provides a method to examine consumer attitudes through virtual reality and augmented reality advertisements using the social psychology theory of elaboration likelihood modelling (ELM).

1. Introduction

Using virtual reality (VR) and augmented reality (AR) for marketing, training, and customer service has a host of benefits (Wedel, Bigné, & Zhang, 2020). Marketing campaigns incorporating virtual reality technology are called VR marketing. The use of social media can help you engage an audience and build a stronger brand (Ferm & Thaichon, 2021; Quach et al., 2021). On the other hand, AR marketing is an evolving trend in marketing and sales strategies (Quach et al., 2022). With this technology, brands can provide their customers with unique experiences using their mobile devices (Meißner et al., 2019; Vahdat et al., 2021). In recent years, both managers and scholars have paid increasing attention to Augmented Reality (AR). Studies in the marketing discipline have focused on fragmented aspects of AR, such as its impact on sales. There is, however, a lack of a holistic approach to AR. “Augmented Reality Marketing” is thus defined by the authors as a novel, disruptive, and

strategic marketing subdiscipline (Rauschnabel et al., 2022; Meißner et al., 2019). Further, Augmented reality marketing is “the strategic integration of AR experiences, alone or in combination with other media or brand-related cues, to achieve overarching marketing goals by creating value for the brand, its stakeholders, and societies at large, while considering ethical implications” (Rauschnabel et al., 2022, p.1141).

Since digital information and communication technologies (ICTs) have made significant advances in many different fields, including marketing research, a concept of digital marketing has developed. This concept may be defined as “an adaptive, technology-enabled process by which firms collaborate with customers and partners to jointly create, communicate, deliver, and sustain value for all stakeholders” (Kannan, 2017; Verhoef et al., 2021). There is a significant difference between the VR and AR which can be further explained based on the xreality framework (Rauschnabel et al., 2022). There are several commonly used

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terms for how technologies generate or modify reality: Augmented Reality (AR), Virtual Reality (VR), Mixed Reality, and Extended Reality (often referred to as XR) (Rauschnabel et al., 2022). Academics and professionals have used these terms inconsistently. As a result, concepts are unclear, and demarcations are unclear (Farshid et al., 2018). With the xreality framework, XR is viewed as an oversight term with two distinct sub streams: AR and VR. In existing classifications (e.g., Farshid et al., 2018; Flavián et al., 2019; Milgram et al., 1995; Milgram & Kishino, 1994), AR and VR are grouped together. Similarly, this framework is the first to include AR, VR, XR, mixed reality, and assisted reality in a coherent framework. Many older (e.g., Milgram & Kishino, 1994) and newer (e.g., Farshid et al., 2018) frameworks remain silent on some aspects of reality (e.g., assisted reality).

Technology that enhances or replaces our view of the world is termed Extended Reality (XR) and often, this involves overlaying or immersing computer text and graphics into real-world or virtual environments (Rauschnabel et al., 2022). The AR/VR distinction is based on the proportion of virtual versus actual content in the context of Looser et al. (2004) and Leclet-Groux et al. (2013), which is difficult to quantify (Meißner et al., 2019). It has been suggested that the AR/VR distinction is based on whether virtual content is augmented to the real world, or if the real world maps to the digital content, but users may not perceive any difference between these approaches. According to this framework, if the physical environment is part of the user experience, it is AR; otherwise, it is VR (Wedel, Bigné, & Zhang, 2020; Meißner et al., 2019).

A growing number of individuals are now able to purchase VR equipment due to the increasing affordability of video format hardware for VR and AR (Kabrovski 2017). Advertisers are particularly interested in VR tools since they can allow potential consumers to experience a realistic preview of a product or a service experience, regardless of where they are located. Due to the interactivity, visualization, and immersion capabilities of virtual reality technology, tourism consumers can gain virtual experiences in simulated tourism environments (Lo and Cheng, 2020). Therefore, consumer attitude persuasion through virtual reality advertisements plays a major role, as utilizing VR technology, consumers are able to gain a virtual experience of a simulated product or service (Claffey and Brady, 2017; Javornik et al., 2021; Kannan, 2017).

Firstly, the relationship between inspiration and source credibility in virtual and augmented reality advertisements were identified as a medium of innovation and an attraction method for a larger audience (Rauschnabel et al., 2019; Zanger et al., 2022). According to most theories of persuasion, limited abilities, and motivations to think about communication should increase the influence of source credibility and argument quality of the message on persuasion (Rauschnabel et al., 2019; Böttger et al., 2017). However, this effect is assumed to occur regardless of the recipients' previous attitudes which restrain changes in cognitive brand attitudes among consumers (Huang et al., 2013; Gountas et al., 2019). Secondly, recent research indicated that source credibility or argument quality-based inspiration emerged only when participants lacked prior attitudes and were unable to form a new attitude based on the message content (Verma et al., 2021). The effects of source credibility decayed rapidly in such settings with prior attitudes among participants when concentrating on the advertisement, which is the main reason for not incorporating inspiration within this model (Verma et al., 2021; Kim et al., 2014).

For example, one of the most significant growth areas of VR marketing will be promotion. The entertainment industry is likely to drive this trend. Rumsey (2016) predicts that 360-degree video trailers will accompany all new film releases by the end of 2016. This trend has been greatly accelerated by Facebook and YouTube's 360-degree video networks. For example, Disney Steam VR app presented a promotional approach for key franchises, including most recently, Star Wars. The first VR games appeared in the early 1990s, and Ford began using VR for designing and producing its vehicles in 1999 (Barnes, 2016). Despite this, VR was never a mainstream consumer product according to several researchers (Barnes, 2016; Flavián et al., 2019; Bogicevic et al., 2019).

When considering the 3D video advertising domain, the study of Wu, Lin, and Bowman (2022) found that 3D agents not only make the ad-viewing experience more enjoyable but also reduce ad-skipping behaviour. Particularly, 3D animated agents elicit anthropomorphism, a sense of presence, vividness, and novelty, which increase the ad-viewing experience enjoyment, leading to positive affective (i.e., brand attitude), cognitive (i.e., brand awareness), and behavioural (i.e., purchase intention) responses. Further in destination marketing studies, VR commercials with high telepresence boost tourist (re)visit intentions, and this effect is mediated by affection (i.e., entertainment, aesthetics) and cognition (i.e., education) (Ying, Tang, Ye, Tan, & Wei, 2022). Moreover, across three studies, Kristofferson, Daniels, and Morales (2022) found that VR ad appeals increase charitable donation behaviour among individuals via a vivid sensory experience (i.e., visual and auditory) in a non-profit marketing setting.

On the other hand, When considering AR mobile app advertising, it enhances consumer escapism through psychological mechanisms of mental imagery (i.e., narrative transportation and spatial immersion) to engage consumers and augment advertising effectiveness (Sung, Han, & Choi, 2022). In the advertising context, comparing the efficiency of AR to that of traditional ads, Uribe, Labra, and Manzur (2022) demonstrate that AR ads are superior in terms of perceived entertainment and informativeness. The motif underlying this is that AR ads not only attract customer's attention and provide a more entertaining experience but also activate more cognitive resources, which lead to enhanced responses to the advertised products. Furthermore, two affordances of an AR e-commerce based platform, namely perceived augmented realism and technology fluidity, positively influence the consumer's flow experience (i.e., control, concentration, interest, and curiosity), significantly impacting cognitive, affective, and behavioural responses toward the brand (Chen & Lin, 2022). AR features (e.g., novelty, awe, inspiration) play a positive role in e-commerce in terms of consumer hedonic motivations and purchase intent (Arghashi, 2022). Nonetheless, the results of this study also stress the negative consequences of AR features (e.g., distraction and information overload) that can reduce consumer hedonic motivations and intentions to purchase.

This paper contributes to the extant literature through introducing a conceptual model to investigate consumer attitude persuasion through virtual reality and augmented reality advertisements using elaboration likelihood model (ELM). This paper begins with a systematic literature review of several theoretical and empirical papers that investigated the use of ELM in virtual reality and augmented reality advertisements. This section outlines the research propositions that facilitate the study of consumer attitude persuasion through virtual reality and augmented reality advertisements. As a result of their literature review, the authors identified six research prepositions that facilitate the investigation of consumer attitude persuasion through these advertisements. In the third section of this paper, we outline detailed future research agendas for the two main routes of central and peripheral research.

2. Theoretical background

An Elaboration Likelihood Model is a dual-process theory of attitudes and attitudes resulting in persuasion (Cacioppo & Petty, 1986). Based on the type of information an individual receives and the level of cognitive energy they choose relevant information in which attitudes are formed and modified (Cyr et al., 2018). Petty and Cacioppo introduced this model to the academic literature in 1981. The ELM is proposed to provide an organizational framework for persuasion that is applicable to a variety of variables including source, message, recipient, and context (Cacioppo & Petty, 1986). According to ELM, there are two paths to persuasion: the central and peripheral.

2.1. Central route persuasion

When an individual is motivated and capable of following a message

carefully (e.g., high personal relevance, low distraction levels), they are more likely to choose the central route to persuasion (Cacioppo & Petty, 1986). This approach is used by people to determine whether the proposal makes sense and will benefit them in some way (Cacioppo & Petty, 1986). The primary path is logic-based and relies on evidence and facts to persuade people of the validity of an argument (Hollebeek & Srivastava, 2022; Shahab, Ghazali, & Mohtar, 2021). A vehicle business, for example, will emphasize the automobile's safety features and fuel efficiency to encourage you to buy their model (Gong, 2016; Mohamad, Abdullah, & Suyurno, 2021). This is a direct approach to persuading that emphasizes the information's quality (Gäthke, 2020; Meng & Choi, 2019). The argument must be powerful for the core channel of persuasion to be effective in altering attitudes, beliefs, and behaviors. If

successful, it will result in long-term attitude change. Small company owners, for example, are likely to be particularly impacted by the emphasis on computer quality and characteristics such as processing speed and memory capacity when purchasing a computer (Allison, Davis, Webb, & Short, 2017; Gong, 2016).

2.2. Peripheral route persuasion

The peripheral route is an indirect method of associating positivity with the message by using peripheral stimuli (Petty & Cacioppo, 1986). The peripheral path, rather than focusing on facts and a product's quality, depends on associations with positive attributes such as happy feelings and celebrity endorsement (Allison et al., 2017). For example,

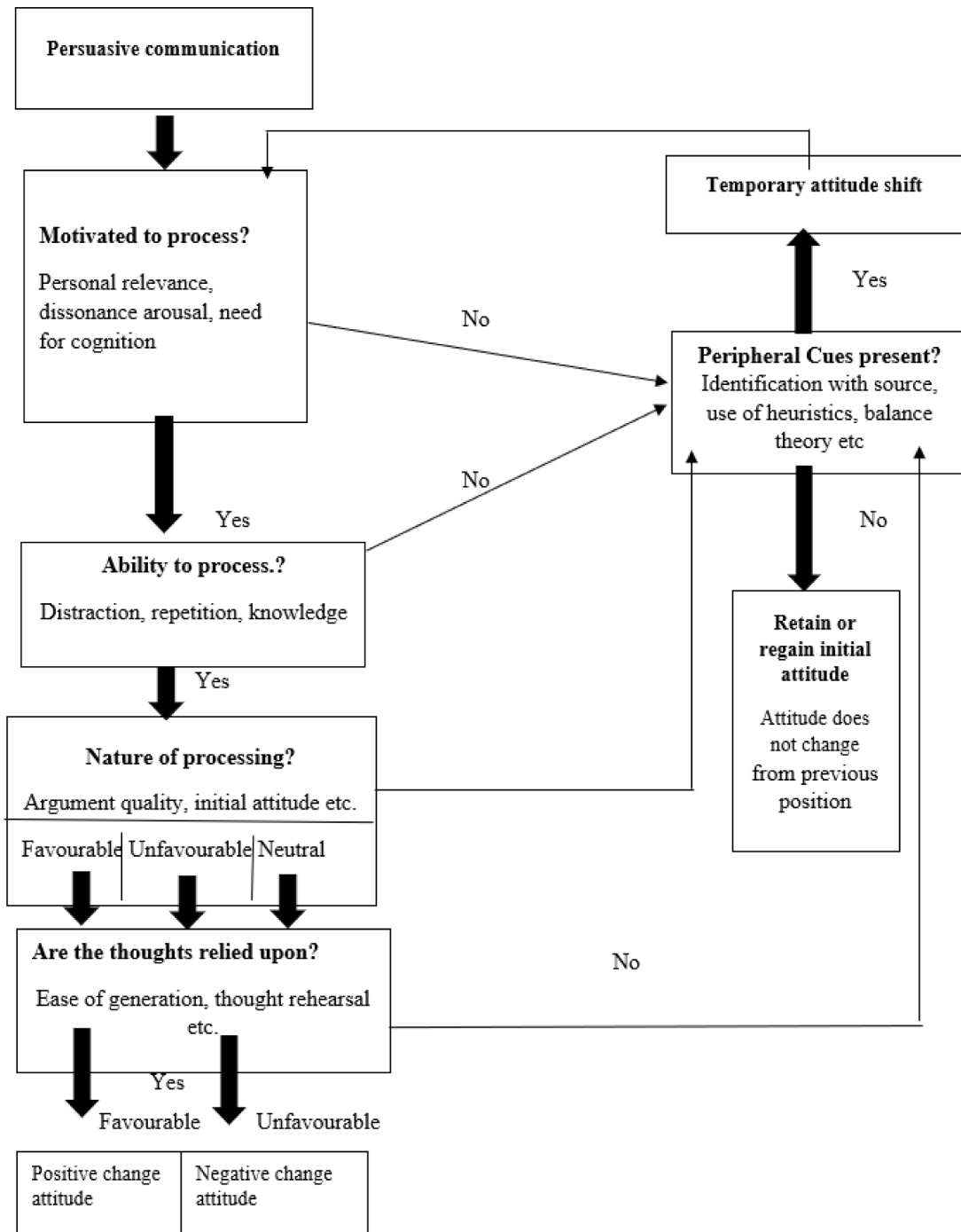


Fig. 1. Elaboration Likelihood model schematic representation Source: Developed by authors based on the source of Petty and Cacioppo (1983).

having a well-known athlete endorse sports shoes is a frequent strategy for getting young adults to buy the shoes (Allison et al., 2017; Liao & Huang, 2021). This method of changing one's mindset does not need much effort or information processing (Wang, Fan, & Bae, 2019). This type of persuasion may increase positive feelings towards the message or product, but it usually results in a more transient change in attitude or behavior (Feng & Xie, 2018; Huang & Liao, 2017). To comprehend the message, the audience does not need to be analytical, or data-driven (Alsheikh, Abd Aziz, & Alsheikh, 2020; Gätke, 2020).

The central path results from a person's deliberate attention to the quality of the material and their reasoning in communication (Shahab et al., 2021). By contrast, the peripheral route is a method of persuading people who are less inclined to examine the message itself and rely instead on the emotive signals embedded at the communication's perimeter (Te'eni-Harari, Lampert, & Lehman-Wilzig, 2007; Zhou, Zhang, Zhao, & Yang, 2021). One such peripheral cue is the credibility of the source, the style of the production, and the amusing elements of the design, such as the use of colourful imagery or even the use of music in the piece of work (Cacioppo & Petty, 1986).

Depending on the arguments presented in a message, a change in attitude or behavior may result from some persuasion processes (Cacioppo & Petty, 1986). These processes fall into the peripheral route to persuasion in the ELM, and they entail systems in which message recipients use basic signals or mental shortcuts to understand the information provided in a message (El Hedhli & Zourrig, 2022; Zhou et al., 2021). A cue may, for instance, be an emotional state (such as "happy") that is positively related to the message's recommended stance (Alsheikh, Abd Aziz, & Alsheikh, 2020). Fig. 1 illustrates the ELM schematically as a set of formal prepositions (Lange et al., 2011).

2.3. Importance of consumer attitude persuasion through virtual reality and augmented reality advertisements

Consumer attitude persuasion in advertising context needs more exploration since it has an impact on customers' selection processes, learning, and, purchasing decisions (Moisander, 2007; Benn, 2004; Rebouças & Soares, 2021). Since customers' attitudes impact their purchasing intentions, understanding various components of consumer attitudes may aid marketers in forecasting product sales. The attitude was originally taken from the Latin terms meaning posture or physical position. The main idea was that a person's physical attitudes predicted the sorts of activities or actions he or she would engage in (Asiegbu, Powei, Iruka, & Management, 2012).

Specifically, one of the major AR-related research themes in the retailing industry concerns decision-making, and encompasses research on AR as an immersive experience, as well as related subthemes of local presence, flow, and mental imagery that facilitate decision-making (and AR-enhanced shared decision-making) (Chen et al., 2021; Chen & Lin, 2022; Lavoye et al., 2021). Huang and Liu (2014) and Huang and Liao (2015) note that presence has changed from feeling present in a far-off (virtual) location to detecting a virtual object close to customers' actual surroundings (Hilken et al. 2017; Vonkeman, Verhagen, and Van Dolen 2017).

In terms of local presence, we refer to the AR form of object presence as local presence due to convenience in inclusion of customer attraction attributes in AR video formats. Using advanced online product presentation technologies, such as virtual mirrors help consumers experience products as if they are actually present with them. AR visualisation promotes experiencing value, prompts telepresence, enhances decision comfort, and encourages purchase intents (Hilken et al. 2017). Further, recent studies indicated that, telepresence is not only about AR but also about the VR as through augmented reality local presence techniques, it offers consumers a product experience that closely resembles physical settings as if the product were locally available. Through virtual reality local presence techniques, consumers can compare the product features using more established product presentation formats such as flying

brand logos, static visuals, and videos (Behl et al., 2022a, 2022b; Chen et al., 2021; Chen & Lin, 2022; Jayawardena et al., 2021). In order for consumers to experience products as realistically as possible in online environments, telepresence is the goal (Mollen & Wilson, 2010). Specifically, one of the major AR-related research themes in the retailing industry concerns decision-making, and encompasses research on AR as an immersive experience, as well as related subthemes of local presence, flow, and mental imagery that facilitate decision-making (and AR-enhanced shared decision-making) (Chen et al., 2021; Chen & Lin, 2022; Jayawardena, 2021; Jayawardena, 2020a; Nigam et al., 2022; Jayawardena et al., 2022; Lavoye et al., 2021; Pereira et al., 2022). Huang and Liu (2014) and Huang and Liao (2015) note that presence has changed from feeling present in a far-off (virtual) location to detecting a virtual object close to customers' actual surroundings (Hilken et al. 2017; Vonkeman, Verhagen, and Van Dolen 2017).

Most scholars have conceptualized presence as telepresence as a result of the rapid development of online social networks, teleconferencing, multi-media product visualizations, and virtual worlds (Steuer, 1992), which defines presence as being present within a mediated environment. In spite of the significant progress made in this field, recent research indicates that conceptualizing presence as telepresence seems somewhat one-sided when telepresence solely emphasizes the sense of (objects) being present in a virtual environment (cf. Steuer, 1992). Therefore, this study considers telepresence as the degree to which a user feels present in the virtual rather than the physical environment (Nowak et al., 2008). With telepresence, people who are not in the same place can collaborate in real-time. On our VR continuum, there are two types of VR: atomistic VR and holistic VR (with high levels of telepresence). The atomistic VR refers to the interactive molecular dynamics within the video formats such as three-dimensional object movement materials and flying object materials (O'Connor et al. 2019; Hilken et al. 2017). Holistic VR refers to the way a VR product is perceived by the users with regard to product aspects. The telepresence further enables participants to feel present and to respond to the VR and AR dimensions within the advertisement (O'Connor et al. 2019; Hilken et al. 2017; Jayawardena, 2022; Jayawardena et al., 2022). In contrast to earlier research streams (Milgram et al., 1995; Milgram & Kishino, 1994), which advocated a fluid AR-VR continuum, our conceptual framework unambiguously distinguishes AR from VR.

AR marketing is widely used across various industries. For example, in the fashion and apparel industry, Essie, a nail polish brand, has introduced an AR app that allows its users to try-on virtual nail polish on their hands (Zanger et al., 2022). Furthermore, Wanna Kicks, a popular shoe brand, has an AR try-on feature, allowing users to virtually wear sneakers from the collection (Chen et al., 2022). Retail giant such as IKEA is also catching up on this trend. IKEA has introduced an AR app called "IKEA place" that lets users virtually place IKEA furniture in actual home space (Chen et al., 2022). Likewise, VR marketing is also gaining attraction among businesses. For instance, Gucci has launched "Gucci Town", a virtual world in the metaverse. Gucci Town's interactive aspects include minigames, browseable art displays, and the Gucci store, where customers can buy outfits for their avatars (Hirsch, 2022). Besides, Nike has created "Nikeland", a VR world (Hirsch, 2022). Within this virtual world, users can not only compete in different minigames but can also purchase Nike's newest digital merchandise. Another e-commerce company, Etsy, launched "Etsy virtual house" where shoppers can walk through a photorealistic 360-degree virtual house filled with Etsy items, giving people an immersive shoppable experience (Arantes, 2019).

Research on attitudes and their implications for behaviour has been conducted since the early 20th century (e.g., Thurstone, 1928; Thurstone & Chave, 1929; Piore, 1934). Psychology and marketing researchers have examined the notion in terms of its predictive value for human behavior (i.e., consumer behavior). Social psychology (Olson & Zanna, 1993) may be its roots. For example, there are a number of reasons why the ongoing ambiguity surrounding AR, AV, mixed reality,

and related concepts may be detrimental to the user experience¹. In the first place, this ambiguity inhibits the exploration of a variety of opportunities these new technologies offer (Farshid et al., 2018, p. 658), which, in turn, hinders both consumer value realization and producer cash flow. The second outcome variable impacted by ambiguity is customer intention to use the product (Deng et al., 2010). When customer perceptions differ from customer expectations, satisfaction issues result. User experience is important for managers since it is linked to equity and other important variables (Poushneh & Vasquez-Parraga, 2017; Szymanski & Henard, 2001). Hence the current research gaps which we are focusing in this paper, is that the boundaries of AR, VR, and mixed reality have not been clearly defined properly, and the extant literature is ripe for reorganizing and reconceptualizing the approaches to AR and VR with an attitude persuasion strategy.

Several studies have examined attitudes and their consequences, especially in areas such as knowledge structures and memory, level of elaboration, behavior prediction, and attitude modification (Fabrigar et al., 2010; Olson & Zanna, 1993). Several recent marketing studies have shown that three-dimensional advertisements (displayed on a two-dimensional screen using VR technology) enhance buying decisions (Oh, Yoon, & Hawley, 2004). For example, in the 1980s, when the R. J. Reynolds Company began showing its Joe Camel cigarette commercials on television, Camel's percentage of cigarette sales to youngsters surged. Persuasion, on the other hand, might have a more favourable result. Several studies have shown that anti-smoking initiatives in the mass media lead to lower smoking rates among both adults and youth (Levy et al., 2021; Watson, Viney, & Schomaker, 2002).

Furthermore, people are also persuaded to donate to charitable causes, volunteer to give blood, and engage in healthy practices using persuasion (Friend & Levy, 2002) emphasizing the importance of consumer attitude persuasion through virtual reality and augmented reality advertisements (Varghese & Kumar, 2022). Despite Facebook's testing of virtual reality and augmented reality advertising, consumer behaviour literature and new technologies have largely ignored consumer reactions. Virtual reality has been used in many past studies to showcase a service or product rather than to promote it (Moisander, 2007; Benn, 2004; Rebouças & Soares, 2021). This study focuses on how to change consumer attitudes in virtual worlds, which is one of the most popular persuasive advertising methods. It is widely accepted that the elaboration likelihood model of persuasion describes the dynamics of persuasion (Petty & Cacioppo, 1986). To determine when attitude change will occur, this model considers the characteristics of the persuasive message's source, message content, and audience characteristics.

3. Part 1: Systematic literature review

In this theoretical study, we aim to present a conceptual model based on the social psychology theory of ELM to facilitate the study of consumer attitude influence in virtual reality and augmented reality advertisements (Rimkute et al., 2016; Paul et al., 2016; Paul et al., 2021). By using the 'Publish or Perish' database, the authors systematically reviewed the current literature by covering journal articles from 1999 to February 2022. The selected timeline of 23 years can be further justified based on several precedent reviews as follows (Gilal, Zhang, Paul, & Gilal, 2019; Pomirleanu, Schibrowsky, Peltier, & Nill, 2013; Willis et al., 2017). The selection of the keywords was based on the two precedent reviews (Gilal, Zhang, Paul, & Gilal, 2019; Pomirleanu, Schibrowsky, Peltier, & Nill, 2013).

We used the following keywords/topics: "virtual reality advertising" AND attitude persuasion through elaboration likelihood model (Topic) or "augmented reality advertising 10" AND attitude persuasion through elaboration likelihood model (Topic) or "virtual reality advertising" AND consumer attitude persuasion through elaboration likelihood concept (Topic) or "augmented reality advertising" AND consumer attitude persuasion through elaboration likelihood concept (Topic) or "3D

advertising" AND social psychology (Topic) or "3D video advertising" AND social psychology (Topic) or "360-degree video online shopping" AND consumer attitude change AND elaboration likelihood model/concept (Topic) or "virtual and augmented reality videos" AND Customer AND elaboration likelihood model/concept (Topic) or "consumer behaviour change" AND "elaboration likelihood concept/ framework / theory (Topic)"

All relevant articles have been included in the business or management categories databases. Thus, we refined our search process through several categories among the web of science database: (business or management) with the following Indexes including Sci-expanded version, SSCI, A&HCI, CPCI-S, CPCI-SSH, and BKCI-S with document type including Interdisciplinary or Business management and marketing (Web of Science Categories). As a result of our search, we found that there are relatively few studies that have applied ELM to consumer attitude persuasion and virtual or augmented reality advertising. Our search was limited to peer-reviewed publications in English only. Further the web of science database was selected as suitable due to the popularity for format-based advertising (Pomirleanu, Schibrowsky, Peltier, & Nill, 2013; Willis et al., 2017).

Specifically, a total of 126 papers have been identified based on the initial search. Following previous studies such as Sung et al. (2022), Yung and Khoo-Lattimore (2019) and Kumar et al. (2022), we screened the abstracts of all articles as well as reviewed their scope and contribution, and excluded those that was out of scope of our study. Since we focus on consumer attitude persuasion in virtual and augmented reality advertising through the lens of elaboration likelihood model, the exclusion criteria were (1) studies in advertising domain without considering augmented reality or virtual reality formats, (2) studies that did not apply the elaboration likelihood model for virtual reality and augmented reality advertisements, and (3) studies that did not focus on the social cognition stage of "persuasion". As a result, 84 papers were excluded, and there are 42 qualified studies. We were able to categorize them into four sections: source, focus, identified variables, and tested components.

Using Table 1 (Please see Appendices), the authors identified six variables (peripheral route and central route persuasion variables), reflecting the ELM theoretical assumptions. Persuasion literature emphasizes that three main factors influence persuasion processes: argument quality, demographic variables, and technology context (Allison, Davis, Webb, & Short, 2017; Wang, Fan, & Bae, 2019). Source credibility, social presence, and message content are the three peripheral route persuasion variables (Gong, 2016; Mohamad et al., 2021).

4. Part 2: Proposed research model and research propositions based on an elaboration likelihood model

According to Allison et al. (2017) there are three main types of central variables that influence persuasion processes. The following three types of peripheral route persuasion variables have been identified: source credibility, social presence, and message content (Gong, 2016; Mohamad et al., 2021).

4.1. Relationship between argument quality and consumer attitude persuasion

In the advertising context, the quality of information is crucial to consumers and has an impact on consumer attitudes, involvement, and behaviour (Shahab et al., 2021). Message quality has been modified in various experiments, although it has usually been done to investigate another variable (for example, source credibility) rather than to identify what defines a high-quality message (Mohamad et al., 2021; Zhou et al., 2021). Though there hasn't been a comprehensive research of the content of high-quality and low-quality communications, this variable has been studied using operationally defined message quality (Zhou et al.,

Table 1

Summary of key studies reviewed in this paper.

References	Key Focus	Mediator / Moderator	Variable identified as central or peripheral	Key Findings
Alsheikh et al. (2020)	- The traveler looks for highly credible sources and information quality to make an informed decision about travel-related products and services	Mediator: information quality	Source credibility	The relationship between E-WOM and tourist intentions was examined using source credibility and argument quality
Bao and Wang (2021)	Analyzed factors that influence consumers' participation in brand microblogs	Moderator: tourist visit intentions Mediator: consumers' participation in brand microblogs	Argument quality	-An argument's quality and credibility are two factors that enhance consumers' commitment to a microblog's community and their trust in it
Bogicevic, Seo, Kandampully, Liu, and Rudd (2019)	This study compares three hotel previews that differ in their level of interactivity (images vs. 360-degree video tour vs VR tour)	Mediator: hotel reviews	Social presence	A VR preview induces a greater elaboration of mental imagery and a stronger feeling of presence than either a 360-degree or an image preview, which translates into improved brand experiences
Balakrishnan, Dwivedi, Malik, and Baabdullah (2021)	-STT features that reflect the core path of elaboration tend to play a stronger role in developing visitors' STT experience and return intention, with STT traits representing the center route of elaboration tending to play a stronger role.	Mediator: STT experience and return intention Moderator: STT traits	Technological context	An investigation was conducted on the role of smart tourism technology (STT) attributes (accessibility, informativeness, interactivity, and personalization) on how visitors' intention to revisit a heritage site is influenced.
Breves (2021)	Improvement of perception of spatial presence and non-mediation	Mediator: spatial presence and non-mediation	Social presence	- Individuals who experienced high levels of spatial presence rated the content more positively due to heuristic
Barhorst, McLean, Shah, and Mack (2021)	- Consumers' perception of an information utility, learning, and enjoyment is positively affected by the state of flow, and these perceptions are significant predictors of satisfaction with an experience.	Mediator: information utility, learning, and enjoyment	Social presence	Analyzed the impact of AR technologies on shopping flows both in an AR context and a more traditional one in order to determine whether investments in AR technologies are justified
Chen, Zhao, and Wang (2020)	Identified the mechanisms by which live streaming influences consumers' trust-building and purchase intent	Mediator: consumers' trust-building	Technological context	- The trust in the streamer is transferred to the trust in the product in live streaming commerce so there is a trust transfer effect
Cho (1999)	To determine how people process Internet advertising, this study developed a model based on the Elaboration Likelihood Model.	Moderator: purchase intent Mediator: Internet advertising	Message content	- Personal and product involvement - Attitude toward Web advertising in general
Ciunova-Shuleska, Palamidovska-Sterjadovska, and Prodanova (2022)	- As the antecedents of perceived m-banking value, our study examined the simultaneous influence of mobile contact and communication (central cues) and entertainment and gamification features of the service as peripheral cues.	Mediator: m-banking contact and communication Moderator: m-banking value cues	Source credibility	- Customers' perception of value and future intentions regarding mobile banking are influenced by cognitive and affective factors.
Chen, Ruangsri, Ha, and Widjaja (2021)	- Study investigated the effects of virtual elements (viz., vividness, spatial accuracy, and local presence) on impulse purchase behavior-related aspects (viz., arousal, diagnostic perception, and drive to buy).	Mediator: Impulsive buying Moderator: virtual elements	Message content	By extending the use of two theoretical models, such as the spatial presence theory and the emotion-based model, to AR mobile shopping applications, this study contributes to the literature on both impulse buying and AR-related studies.
Deng, Huang, and Cheng (2021)	- Low dispositions to trust weakened the influence of argument quality on consumers' attitudes toward products and purchase intentions.	Mediator: Initial trust of consumers	Argument quality	Evaluating the role of initial trust in the persuasion process in Chinese e-commerce advertising
Dotson and Hyatt (2000)	Assessed the effects of religious symbols as peripheral cues in online advertising formats	Mediator: peripheral cues in online advertising formats	Message content	-A less favorable attitude toward the brand, as well as a lower purchase intention, when exposed to the advertisement
De Amorim, Guerreiro, Eloy, and Loureiro (2022)	- A media-rich experience influences brand engagement and willingness to buy via perceived information quality and brand attitudes.	Moderator: of religious symbols Mediator: Information quality and brand attitudes Moderator: Brand engagement and willingness to buy	Argument quality	Consumers' emotional and cognitive responses, as well as how it would affect their purchasing decisions, were studied.
Feng and Xie (2018)	Evaluation of YouTube videos featuring AR advertisements using a measurement tool	Mediator: content characteristics	Technological context	- In order to measure YouTube AR campaigns, there are four main constructs that can be used: informativeness, novelty, entertainment, and complexity
Ferrara (2013)	- Aesthetics comprises sensory aspects such as graphics, sound, haptics, themes, and motifs, as well as contemplative aspects such as narrative, plot arc, and character development. -Rhetoric patterns of the message	Mediator: Rhetoric patterns Moderator: Aesthetics	Message content	Discusses how the inherent procedural nature of video games might make them an ideal medium for persuading people to adopt a particular viewpoint

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Table 1 (continued)

References	Key Focus	Mediator / Moderator	Variable identified as central or peripheral	Key Findings
Gäthke (2020)	Analyzed the impact of AR guidance apps on service evaluation	Mediator: a service evaluation	Technological context	-A virtual reality application results in significantly higher overall service satisfaction than a traditional 2D map due to perceived complexity reduction
Harborth and Pape (2019)	Investigated influencing factors of privacy concerns related to a hypothetical mobile augmented reality app	Mediator: privacy concerns	Message content	- More personally relevant messages, more elaboration on message arguments
Hollebeek et al. (2020)	Analyzed the consumer feedback through VR video commercials	Moderator: consumer feedback	Technological context	- Consumers depend on VR archetypes, formats, and content to provide the sensory feedback they need to engage them, to strengthen consumer-brand relationships, and to drive desired behavior on the part of consumers
Haile and Kang (2020)	- Interactivity and entertainment enhance cognition and affection	Mediator: interactivity and entertainment	Social presence	An investigation was conducted to investigate how features of mobile augmented reality applications affect consumers' attitudes and purchasing intentions, based on the dimensions of persuasion (cognitive, affective, and conative factors).
Jung, Tom Dieck, Lee, and Chung (2020)	Examined the relationship between long- and short-term orientations and the perception of value provided by AR applications	Mediator: consumer perception	Message content	- Narrative structure or message explanation
Karson and Korgaonkar (2001)	Analyses the applicability of the Elaboration Likelihood Model to internet advertising	Moderator: AR applications Mediator: Graphical designs and persuasive graphic designs	Message content	- Designs and persuasive graphics of the message
Kim and Ko (2019)	Sport spectators' flow experience and satisfaction with virtual reality (VR)	Moderator: message Mediator: flow experience and satisfaction	Social presence	- An investigation of how a variety of media (media types), personal factors (sports involvement), and game factors (rivalry between team members) affect spectators' flow experience and satisfaction
Kim and Hyun (2016)	Research was conducted to determine what predicts smartphone-based augmented reality usage	Mediator: brand experience	Message content	- Improving message quality and information quality
Kim, Lee and Jung (2020)	-Attachment to VR influences intention to visit places depicted in VR tourism. Among the cognitive responses, the affective response played a greater role in influencing the intention to travel to a destination in virtual reality	Moderator: cognitive and affective responses, attachment, and visit intention among tourists	Argument quality	It has been proposed that VR tourism integrates authentic experience, cognitive and affective responses, attachment, and visit intention
Liao and Huang (2021)	-Official microblog activities to increase the purchase intention - Social media marketing events - Influence of movie attributes on purchase intent is mediated by marketing intensity	Mediator: new technologies	Social presence	Analyzed how different channels and events in social media marketing contributed to box office success in the movie industry by eliciting different responses from consumers
Lee and Cho (2019)	In advertising contexts, the study examined the conditions under which the use of AR may be particularly effective or rather ineffective.	Moderator: social media marketing Mediator: Consumer conditions	Message content	- By adopting AR for their advertising campaigns, advertisers can improve consumer comprehension of messages related to a product (or service) with less concern for individual innovation.
Leung, Lyu, and Bai (2020a)	The immediate and delayed effects of hotel VR commercials	Mediator: Immediate and delayed effects of hotel VR commercial	Technological context	- VR commercials provided better results than traditional commercials, especially for participants with high elaboration likelihood levels
Llagostera (2012)	The games' rhetorical nature enhanced epistemic affinities and connections	Mediator: rhetorical nature Moderator: gamification and persuasion	Message content	To examine the relationship between gamification and persuasion, the study reviewed debates about gamification and its definitions
Mandliya, Varyani, Hassan, Akhouri, and Pandey (2020)	An examination of the relationship between social and environmental accountability, attitude toward environmental advertising, and intent to purchase environmentally sustainable products.	Mediator: Environmentally Sustainable Products	Social presence	-Purchase attitude is affected by Attitude toward Environmental Advertising and Social and Environmental Accountability
Mauroner, Le, and Best (2016)	- Through AR advertisements, different levels of interactivity can be achieved.	Mediator: interactivity	Social presence	Analyzed the potential of AR applications in combination with traditional print advertising
Oh and Jasper (2006)	Consumers use elements of apparel advertisements to form opinions about a product.	Mediator: Consumer opinions	Message content	- High involvement participants devoted more processing time to specific elements of

(continued on next page)

Table 1 (continued)

References	Key Focus	Mediator / Moderator	Variable identified as central or peripheral	Key Findings
				the advertisement
Pittman, Read, and Chen (2021)	-Messages placed on social media with low-information and high-fear (emotional) appeals are most effective in generating purchase intent and digital engagement	Mediator: (emotional) appeals	Social presence	Explanation of how green advertising can motivate non-green consumers to think more environmentally
Pozharliev, De Angelis, and Rossi (2021)	-By using augmented reality advertisements instead of traditional advertising, consumers can increase physiological responses and willingness to pay	Mediator: customer physiological responses and willingness to pay	Demographic differences	Researched how augmented reality advertising differs from paper-based advertising
		Moderator: customer segmentation and marketing communication		
Rasyid (2022)	- A recent study found that all Halal Toothpaste products took the same direction and used the same advertising strategies.	Mediator: Ingredients and their benefits.	Source credibility	As part of this study, we will examine how advertising is used in Indonesia to help Halal Toothpaste Products differentiate from one another.
Shahab et al. (2021)	-Effectiveness of promotional messages -Content marketing is changing the attitudes and decisions of consumers	Mediator: marketing resource capabilities	Argument quality	Review of the literature based on theoretical principles to assess the use of new technologies in advertising products
		Moderator: employee technical skills		
Sreejesh, Ghosh, and Dwivedi (2021)	It was located in the study that content-driven factors (i.e., characteristics of a game or a brand) influenced the consumer's behavior within an online game	Mediator: content-driven factors	Message content	Platform of access (the online channel to access these games) and device type are contextual cues
		Moderator: consumer behavior		
Te'eni-Harari et al. (2007)	Information Processing of Advertising among Young People for Online Video Advertisements	Mediator: Online Video Advertisements	Message content	- Consumer attitudes and memory of brands are differentially affected by interactions between access platforms and gaming devices - The narrative structure or the message should be considered - Create messages that are more relevant to the individual, give greater detail on their argument
Yen and Chiang (2021)	-Advertisement timeline affects the central brain information retrieval process	Mediator: information retrieval process	Message content	Eye tracking, electroencephalography, and magnetic resonance imaging were used to assess brain processes during participants' attempts to elicit preferences for a product-a neuroscience approach to online advertising
Yuan, Wang, Liu, and Ma (2022)	-Consumers perceive physical attractiveness, social presence, and technological novelty as factors affecting Parasocial relationships, and these factors are positively associated with brand equity	Mediator: physical attractiveness, social presence, and technological novelty	Social presence	Examined the factors driving Parasocial relationships in virtual reality shopping environments, and the effects of such relationships on brand equity
		Moderator: Parasocial relationships		
Wang et al. (2019)	- An experimental team proposed a united persuasion model that considers signals (technical advantage, attitude of game providers, perceived risk, source credibility, and critical mass), as well as personal factors (self-efficacy, personal engagement, and positive cheating attitude).	Mediator: technical advantage, the attitude of game providers, perceived risk, source credibility, and critical mass	Source credibility	Persuading games not to cheat was analysed
		Moderator: self-efficacy, personal engagement, and positive changing attitude		
Yim, Chu, and Sauer (2017)	-Immersion mediates relationship between interactivity and vividness	Mediator: e-commerce tool	Message content	An assessment of the effectiveness of augmented reality (AR) as an e-commerce tool using sunglasses and watches
Zhou et al. (2021)	-Those who exhibit high levels of extroversion, conscientiousness, social centrality, and prior success rate tend to submit quality information. Timeliness, comprehensibility, and sentiment of a piece of creative information are factors negatively impacting the quality of that piece of information	Mediator: High levels of extroversion, conscientiousness, social centrality	Technological context	A study of open innovation platforms examined the joint effects of central route factors (such as timeliness, readability, and sentiment) as well as peripheral route factors (source characteristics such as character traits, past success, and social network location).
		Moderator: information timeliness, readability, and sentiment all negatively affect the quality of creative information		

2021). A subjective appraisal of the issues and information offered to consumers in virtual reality and augmented reality commercials determines the quality of an argument (Haile & Kang, 2020; Lee & Cho, 2019).

To investigate the influence of message content quality within the advertising context, Shahab et al. (2021) conducted a theory-based systematic literature review to assess the ELM literature for advertising the products using new technologies. Based on the ELM central route persuasion, the advertisement content reaches the audience effectively with content marketing in changing the attitudes and decisions of consumers subject to marketing resource capabilities and employee technical skills (Deng et al., 2021). The ELM's Argument Quality route evaluates the quality of the arguments and the involvement of the users with the subject matter.

This was presented in several studies as, in the Tourism sector, argument quality can be further re-instated based on the intention to visit places depicted using VR or AR technology (Kim, Lee, & Jung, 2020). The affective response had a bigger impact on the intention to visit a virtual reality destination than the cognitive response (Kim, Lee, & Jung, 2020). Further, as media-rich augmented reality experiences influence brand engagement and propensity to buy (Pozharliev, De Angelis, and Rossi), AR and VR commercials have been demonstrated to be beneficial in increasing perceived information quality and brand attitudes (Amorim et al., 2022; Bao and Wang, 2021). The user may become less engaged with the advertisement content due to employee technical skills (Shahab et al., 2021), cognitive and affective responses to visit intention among tourists (Kim, Lee, & Jung, 2020), and brand engagement and willingness to buy (Amorim et al., 2022). Based on the precedent arguments, it was identified that advertisement content quality plays a vital role in changing consumer behaviour which leads to the formation of the Tenant 1 of:

Tenet 1 (Argument quality in the advertisement content can affect the cognitive behaviour of the consumers).

P1. Argument quality enhancement through virtual and augmented reality elements focuses on the message content of the advertisement through cognitive and affective responses leading toward buyer decision making.

4.2. Relationship between demographic differences and consumer attitude persuasion

The motivation or ability of a message recipient to purchase products or services can be significantly affected by a variety of factors (Metzler, Weiskotten, & Morgen, 2000). The consumer's behavioral, psychological, and demographic characteristics may also indicate the importance of a message topic (Petty & Cacioppo, 1986). Individual user factors that may have an impact on customer views were not thoroughly considered (Chen et al., 2020; Feng & Xie, 2018; Jung et al., 2020). Based on factors such as age, lifestyle, and prior experiences, different user groups may respond differently to virtual elements in augmented and virtual reality advertisements (Barhorst et al., 2021; Kim & Ko, 2019).

Similarly, Bogicevic et al. (2019) identified that different age groups respond to virtual reality and augmented reality advertisements in different ways. For example, as compared with 360-degree tours and images, VR previews of the advertisements provoke higher levels of mental imagery. The generation gap or differences were identified in young vs. elderly players' roles in virtual reality and augmented reality advertisements. For example, tourists place importance on geographical location, type of experience, and selection of accommodations that influence their tourist experience (Balakrishnan et al., 2021; Bogicevic et al., 2019). Further, it was found that consumer attitude persuasion was mediated strongly by customer physiological responses and willingness to pay for the product or service (Balakrishnan et al., 2021; Bogicevic et al., 2019). When arranging virtual elements in virtual reality and augmented reality advertisements, individual differences such

as age, and generation gaps, needs to be considered in a detailed manner (Balakrishnan et al., 2021; Bogicevic et al., 2019). Based on the precedent arguments, it was identified that demographic differences in general play a vital role in changing consumer attitudes which leads to the formation of the Tenant 2 of:

Tenet 2 (Demographic differences, consumer attitude, and advertisement elements)

P2. In VR and AR advertisements, demographic differences such as age, gender, lifestyles, and prior experiences of consumers can result in different opinions.

4.3. Relationship between technology context and consumer attitude persuasion

The technical context consists of the systems, devices, and services available to users (Chen, Zhao, and Wang, 2020; Rasyid, 2022). As part of the ELM central route to persuasion, technology is integral to augmented and virtual reality advertisements as part of the ELM central route to persuasion. In extant literature, three subcategories of open innovation platforms have been identified: virtual elements to build customer trust and video formats.

In the first instance, researchers examined both central and peripheral factors that influence the quality of creative information in open innovation platforms (such as timeliness and readability) (Zhou et al., 2021). Nevertheless, technology elements in the advertisement were mediated by extroversion, conscientiousness, and social centrality with moderating factors being information timeliness, information readability, and quality of creative information within the advertisement (Rasyid, 2022; Tarim, 2022). Balakrishnan et al. (2021), for example, investigated the role of smart tourism technology (STT) attributes (accessibility, informativeness, interactivity, and personalisation) in generating a positive STT experience that influences tourists' intention to return, thereby improving the image of heritage sites. STT qualities that reflect the core path of elaboration tend to play a bigger part in creating visitors' STT experience and return intent, whereas STT traits that represent the centre path of elaboration tend to play a bigger role in augmented reality and virtual reality marketing (Balakrishnan et al., 2021).

Furthermore, virtual elements were identified as essential to building customer trust. Leung et al. (2020) compared the immediate and delayed effects of hotel VR advertisements to traditional video advertisements. Commercials using VR produced better consumer feedback than traditional commercials, especially for participants under higher elaboration likelihood levels (Behl et al., 2022a, 2022b; Jayawardena et al., 2021; Leung et al., 2020; Nigam et al., 2022). Further, these virtual elements were mediated by marketing communication approaches such as high levels of extroversion, conscientiousness, social centrality (Zhou et al., 2021), and immediate and delayed effects of hotel VR commercial consumer trust-building capabilities (Leung et al., 2020; Hollebeek et al., 2020). Hence Chen, Zhao, and Wang (2020) further identified the ability of virtual reality advertisements on consumers' trust-building and purchase intent abilities. A trust transfer effect may occur in live streaming commerce by transferring trust from belief in the streamer to belief in the product via a variety of virtual elements, including live streamers (e.g., social influencers, celebrities, self-employed sellers, or everyday individuals) demonstrating products, performing demonstrations, and offering consumers special discounts (Chen, Zhao, and Wang, 2020).

Thirdly, video format within augmented and virtual reality advertisements plays a vital role (Feng and Xie, 2018). In their study of consumer feedback on VR video commercials, Hollebeek et al. (2020) found that VR archetypes, video formats, and content features can engage consumers, strengthen consumer-brand relationships, and help drive the behaviors they desire. Furthermore, Feng and Xie (2018) created a measurement instrument for evaluating the content characteristics of

YouTube videos featuring AR advertisements. These findings indicated that the consumer attitude persuasion for YouTube AR campaigns can be carried out using the four main constructs of informativeness, novelty, entertainment, and complexity. These VR and AR elements within the advertisement were found to be moderated through information timeliness and information readability, which negatively impacted the quality of creative information (Leung et al., 2020; Hollebeek et al., 2020). Gätthke (2020), further justified these findings by showing the importance of virtual reality applications on the service satisfaction of the consumers in comparison to traditional 2D maps. Based on the precedent arguments it was identified that technology context, in general, plays a vital role in changing consumer attitudes which leads to the formation of the Tenant 3 of;

Tenet 3 (Enhancing visual elements through technological context)
P3. Technology context mediated through open innovation platforms; virtual elements for building customer trust and video format have the potential to affect consumer attitude persuasion.

4.4. Relationship between source credibility and consumer attitude persuasion

The credibility of a source can be defined as the degree to which the recipient considers it credible, competent, or trustworthy (Bhattacharjee & Sanford, 2006), reflecting the receiver's judgment of the credibility of the source of the communication while bearing no relation to the content of the communication (Sussman & Siegal, 2003). In advertising content, it is the credibility of the product or the service which was demonstrated through the advertisement (Ciunova-Shuleska et al., 2022). Source credibility was identified in extant text literature under two main characteristics as virtual service characteristics and virtual product characteristics.

Studies have used source credibility in marketing settings to advertise various products and services. Firstly, when considering the virtual service characteristics Ciunova-Shuleska et al. (2022) examined the simultaneous influence of m-banking contact and communication (central cues) and the perceived entertainment and gamification features of the service (peripheral cues), as the antecedents of perceived m-banking value and increased intentions to use the service in the future (Ciunova-Shuleska et al., 2022). The cognitive and affective virtual elements within the advertising context include the perceived entertainment and gamification features of the service (Ciunova-Shuleska et al., 2022). Similarly, Wang et al. (2019) analyzed effective methods for persuading gamers not to cheat, and this study proposed a united persuasion model where signals (technical advantage, attitude of game providers, perceived risk, source credibility, and critical mass), as well as personal factors (self-efficacy, personal engagement, and positive cheating attitude), may affect a gamer's intention to refrain from cheating.

Secondly, virtual product characteristics refer to the virtual elements that differentiate the product aspects within the advertisement. Rasyid (2022), for example, illustrates how Halal Toothpaste products in Indonesia utilize advertising to distinguish themselves from one another. There was an observation that Halal Toothpaste products used the same route and approach, while their advertisements emphasized their respective ingredients and benefits. Alsheikh et al. (2020) showed the ability to change the consumer attitudes in tourism through virtual safety symbols as travelers look for highly credible sources and information quality to make an informed decision about travel-related products and services. Based on the extent of literature was identified that source credibility within the VR and AR advertisements are mediated by technical advantages of game providers, perceived risk towards the products or services that can be moderated based on self-efficacy, personal engagement, and positive changing attitude.

Tenet 4 (source credibility and consumer attitude change)

P4. Source credibility is mediated by virtual service characteristics and virtual product characteristics

4.5. Relationship between social presence and consumer attitude persuasion

The term "Social Presence" describes the ability of e-content in virtual reality and augmented reality advertisements to integrate aspects of interactivity using virtual elements, sociability, and sensitivity into the product viewing experience (Lee & Cho, 2019; Leung et al., 2020; Wang et al., 2019). Some of the social presence elements were moderate through technological novelty (Yuan et al., 2022); spatial presence (Breves, 2021); information utility (Barhorst et al., 2021); flow experience (Kim and Ko, 2019); interactivity, and entertainment in the advertisement (Bogicevic et al., 2019; Haile and Kang, 2020; Mauroner et al., 2016; Mandliya et al., 2020).

Pittman et al. (2021) discovered that low-information and high-fear (emotional) appeals in social media messaging were the most effective in increasing purchase intent and digital engagement, while also explaining how green advertising can persuade non-green consumers to change their minds. Similarly, Yuan et al. (2022) examined the factors driving parasocial relationships in virtual reality shopping environments, by identifying technological novelty as a factor affecting parasocial relationships as it is positively associated with brand equity. Bogicevic et al. (2019) supported this claim by contrasting three hotel previews with varying levels of involvement (images vs. 360-degree video tour vs VR tour). According to the findings, a VR preview causes more mental picture elaboration and a stronger sense of presence than a 360-degree or an image preview, resulting in better brand experiences. Besides, when considering the consumer attitude changing factors under social presence elements in AR and VR advertisements, the user experience was identified as a prominent theme.

Individuals who experienced high degrees of spatial presence, for example, assessed the content of virtual reality and augmented reality commercials more favourably owing to the application of heuristics, according to Breves (2021). Furthermore, Barhorst et al. (2021) discovered that the state of flow in the virtual aspects of the advertising effects consumer perceptions of information value, learning, and enjoyment, and that these perceptions are important determinants of overall happiness with the experience. Kim and Ko (2019) investigated the flow experience of virtual elements in the current literature, finding that advertisement elements such as media (media type), portal (sports involvement), and game (rivalry) factor influence spectators' flow experience and investigated how to improve flow experience and consumer satisfaction in sports advertisements (Kim and Ko, 2019).

When creating AR and VR commercial content, Mandliya et al. (2020) looked at the link between social and environmental responsibility, attitude towards environmental advertising, consumerism, and desire to purchase ecologically sustainable items. Furthermore, consumers' cognition and affection will be enhanced when seeing virtual reality commercials due to real-time involvement and enjoyment (Haile & Kang, 2020; Mauroner et al., 2016). Among the virtual elements of social presence, consumers perceive physical attractiveness and technological novelty is identified as factors affecting para-social relationships. These factors have been identified as positively associated with brand equity (Yuan et al., 2022). However, the social media marketing approach and the service values were identified as moderating variables within the AR and VR advertisements. Hence this leads to the formation of the fifth research proposition.

Tenet 5 (social presence and consumer attitude change)

P5. Social Presence mediated by consumers perceive physical attractiveness and technological novelty has the capability to

enhance social presence experience in virtual reality and augmented reality advertisements

4.6. Relationship between message content and consumer attitude persuasion

In-advertising context, 'message context' refers to the communication that speaks to consumer needs and wants at specific times in their lives (Jayawardena, 2020b; Oh & Jasper, 2006). Based on the literature it was identified that, message content can be mediated through several factors including graphical designs of the message, rhetorical nature of the message, aesthetics can change consumer attitude levels.

When considering the graphical designs of the message, in virtual reality-based mobile shopping apps, researchers identified successful virtual elements in demonstrating the message content as vividness, spatial accuracy, and local presence as driving factors to buy impulsively (Chen et al., 2021; Te'eni-Harari et al., 2007). When advertising apparel products, time differences in the video advertisements and verbal messages than pictorial information the product demonstrated a higher level of consumer involvement (Oh & Jasper, 2006). Several factors were identified as important when selling online games such as contextual cues in the advertisement such as the platform of access (the online channel to access these games) and the type of gaming device which affects the consumer memory (Sreejesh et al., 2021).

Throughout the extant literature, rhetorical nature of the message content in virtual and augmented reality advertisements was identified with several moderating and mediating factors. For example, Chen, Ruangsri, Ha, and Widjaja (2021) found that consumer impulsive buying behavior is moderated through pictorial information about the product. Similarly, consumer opinions (Oh & Jasper, 2006); content-driven factors (Sreejesh et al., 2021); consumer perception derived applications (Jung et al., 2020); narrative structure of the story (Jung et al., 2020) plays a vital role in consumer impulsive buying behavior. Furthermore, religious symbols were also found as peripheral cues in online advertising formats (Dotson & Hyatt, 2000). This further indicated that the information retrieval process of the message or advertisement can be moderated through persuasive graphic designs or rhetoric patterns (Te'eni-Harari et al., 2007; Harborth and Pape, 2021; Lee and Cho, 2019; Karson and Korgaonkar, 2001).

Studying further the information retrieval process in VR and AR advertisements for mobile augmented reality applications, it was found that more personally relevant messages and more elaboration of message arguments were influencing privacy concerns (Harborth & Pape, 2021). This factor was further facilitated through aesthetics related to eye-tracking, electroencephalography, and the magnetic resonance neuroscience approach for online advertisements (Yen and Chiang, 2021). Major findings indicated that the advertisement timeline affects the central brain's information retrieval process (Yen & Chiang, 2021; Lee and Cho, 2019). By adopting AR for advertising campaigns, advertisers can improve consumer comprehension of messages related to a product (or service) with less concern for individual innovation (Lee & Cho, 2019). Message content can be further moderated through brand experience (Kim & Hyun, 2016), e-commerce tools (Yim et al., 2017) and gamification tools (Llagostera, 2012).

In summary, graphical designs of the message (Karson & Korgaonkar, 2001; Kim and Hyun, 2016; Yim et al., 2017); rhetorical nature of the message (Llagostera, 2012), aesthetics (Conover et al., 2013) was identified influential in developing the characters with the advertisements.

Tenet 6 (message content through virtual elements)

P6. Message Content mediated through graphical designs of the message, rhetorical nature of the message, aesthetics can influence the consumer attitude levels.

Accordingly, the authors developed the below conceptual model

through these six prepositions as follows.

According to the above conceptual model (Fig. 2), there are six factors to consider: argument quality, demographic differences, technological context, source credibility, social presence, and message content. Argument quality, demographic differences, and technology aspects made possible by elements of virtual and augmented reality may be used to achieve persuasive goals. Through peripheral routes such as source credibility, social presence, and message content, persuasion can be carried out.

5. Future research perspectives

We started by constructing a conceptual model based on ELM's social psychology theory to explore consumer attitude persuasion using virtual reality and augmented reality marketing. This is consistent with previous studies illustrating that attitude persuasion is indispensable in an online video advertising context with special reference to virtual and augmented reality technologies (Mauroner et al., 2016; Oh & Jasper, 2006). This study extends ELM to virtual and augmented reality technologies to investigate the process of consumer attitude change through video advertisements. Future researchers are highly recommended to measure this model using a variety of products and services, such as retail, banking, tourism, and motor vehicles. This may provide a more accurate picture of the validity and applicability of this conceptual model to consumer attitude persuasion. Additionally, future researchers may use this model to investigate the influence of virtual reality and augmented reality advertisements on consumer attitudes. There are six major areas of discussion on our agenda: argument quality, demographic differences, technological context, source credibility, social presence, and message content. Table 2 summarises multiple research questions and avenues for marketing researchers and practitioners in each area.

5.1. Central route persuasion through VR and AR elements in the advertisement

Our proposed framework acknowledges the components which will be useful for advertisement designers when changing consumer attitudes toward VR and AR advertisements. The three variables of argument quality, demographic differences, and technology context was identified through the central route under the elaboration likelihood model. Based on the literature several interesting future research avenues were identified.

Argument quality: Developing new argument quality-based valuation models is necessary for firms to improve cognitive and affective responses that lead to buyer decisions (Shahab et al., 2021). There is potential for future researchers to develop new models to improve the argument quality within advertisements (Allison et al., 2017; Mauroner, Le, & Best, 2016). The relationship between consumer attitudes and video format quality levels is another key question (Moon, 2014). In recent research, researchers have suggested that consumers perceive presence in videos based on the quality of the image (Feng & Xie, 2018; Gong, 2016). Only a few empirical studies have been conducted due to the scarcity of high-definition equipment (Bogicevic, Seo, Kandampully, Liu, & Rudd, 2019; Thun, Drüke, & Hoenig, 2011; Westhues et al., 2008).

To manipulate argument strength and resource requirements consumers perceive presence in videos based on the quality of the image is identified as important based on the below facts. Several social media platforms are used by companies for social media marketing, including Facebook, Snapchat, Twitter, etc. Platform selection depends on target consumers and marketing strategy. The use of Snapchat for social media marketing targeting young consumers was investigated by Chen et al. (2018). Companies employed a variety of strategies, including transformational, where the focal brand's experience and identity have desirable psychological characteristics; informational - presenting

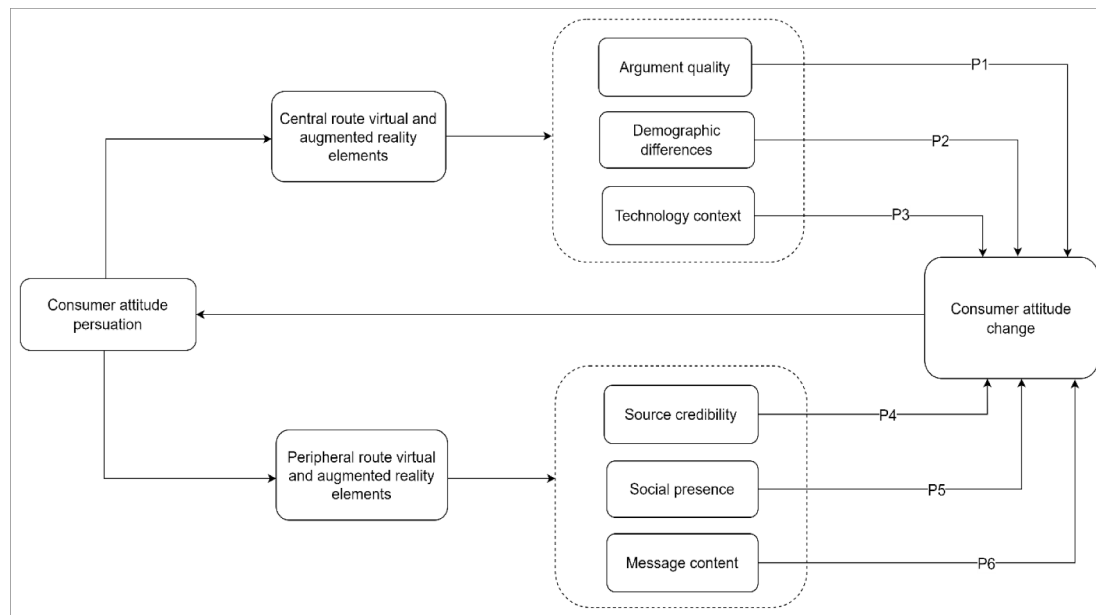


Fig. 2. Modelling using ELM.

factual information about the product; clear information about the service; and interactional - where social media advertising cultivates ongoing interactions with customers and message strategies (Puto and Wells, 1984; Laskey et al., 1989; Tafesse and Wien, 2018).

In a study conducted by Kusumasondjaja (2019), interactive brand posts were more frequently replied to than informative messages. This further shows the ways on improving the argument quality. Several studies have been conducted since HDTV became widely available to test the impact of image quality (Bogicevic et al., 2019; Thun et al., 2011). Bracken (2005) states that high image quality on HDTV contributes to a greater sense of presence in television, for example. Image quality has been found to influence various dimensions of presence, such as immersion and social presence-passive (i.e., observing social cues) (Moon, 2014).

Demographic differences: Demographic differences in central route persuasion refers to consumer behavioral, psychological, and demographic characteristics, which indicate how much importance a message topic holds for the advertisement recipient (Pozharliev et al., 2021). Further, consumer behavioral, psychological, and demographic characteristics, indicate how much importance a message topic holds for the advertisement recipient (Petty & Cacioppo, 1986). The potential individual user characteristics which affect the virtual reality advertisements were not comprehensively addressed (Chen et al., 2020; Feng & Xie, 2018; Jung et al., 2020). Therefore, a potential research consideration might be the empirical or exploratory investigation of potential individual user characteristics which affect the virtual reality and augmented reality advertisements.

Technology context: The technological context refers to the infrastructure (devices, systems, and services) aimed at users. Using the literature, it was identified that joint effects of central route factors (information characteristics) and peripheral route factors (source characteristics) on creative information quality in open innovation platforms are a potential area for future research in order to improve consumer attitudes through virtual elements (Zhou, et al., 2021). The technology context mediated through marketing communication approaches (such as high levels of extroversion, conscientiousness, social centrality) has the potential to affect consumer attitude persuasion (Leung et al., 2020; Hollebeek et al., 2020). However, existing studies do not link the marketing communication approaches and risks of AR and VVR-based consumer attitude persuasion through proper theoretical frameworks (Rasyid, 2022; Tarim, 2022).

5.2. Peripheral route persuasion through VR and AR elements in the advertisement

Under the elaboration likelihood model, the three variables of source credibility, social presence, and message content were identified through the peripheral route. Several future research avenues were identified based on the literature.

Source credibility: Source credibility is defined as the degree to which the recipient believes a source is credible, competent, or trustworthy (Allison et al., 2017; Bogicevic et al., 2019). Studies have used source credibility in marketing settings to advertise various products and services (Rasyid, 2022). Alsheikh et al. (2020) showed the ability to change the consumer attitudes in tourism through virtual safety symbols as travelers look for highly credible sources and information quality to make an informed decision about travel-related products and services. Based on the extant literature it was identified that source credibility within the VR and AR advertisements is mediated by technical advantage, the attitude of consumers, perceived risk towards the products or services that can be moderated based on self-efficacy, personal engagement, and positive changing attitude (Haile & Kang, 2020; Ciunova-Shuleska et al., 2022). However, an individual factor verification is necessary with the key questions: Does source credibility mediated by technical advantage, the attitude of consumers and perceived risk towards the products or services can moderate self-efficacy? AND Does source credibility mediated by technical advantage, the attitude of consumers, and perceived risk towards the products or services can moderate positive changing attitude?

Social presence: Social Presence refers to the ability of e-content in virtual reality and augmented reality advertisements to integrate aspects of human contact, interactivity using virtual elements, sociability, and sensitivity into their product viewing journey (Lee & Cho, 2019; Wang et al., 2019). In considering the influence of AR and VR advertisements on consumer attitudes, the user experience was identified as a prominent theme. As an example, Breves (2021) discussed how individuals who experienced high levels of spatial presence assessed virtual reality and augmented reality advertisements more positively as a result of the use of heuristics. In addition, Barhorst et al. discovered that the flow of virtual components in advertising affected consumer perceptions of

Table 2
Future research agenda.

Theme	Brief Description	Research Questions
Central route persuasion through VR and AR elements in the advertisement		
Argument quality	Argument quality in central route persuasion refers to the persuasive strength of arguments in a message, as it requires a person to think critically about issue-related arguments, and user involvement with the topic of persuasion	What argument quality-based valuation models can be used to improve cognitive and affective buying decisions? Can consumer attitude change be done by enhancing the video format quality levels?
Demographic differences	Demographic differences in central route persuasion refer to consumer behavioral psychological, and demographic characteristics, which indicate how much importance a message topic holds for the advertisement recipient	What are the potential individual user characteristics which affect virtual reality advertisements? What are the potential individual user characteristics which affect augmented reality advertisements?
Technology context	Technological context refers to Infrastructure (systems, devices, and services) toward the users	In open innovation platforms, how do factors such as central route factors (information characteristics such as timeliness, readability, and sentiment) and peripheral route factors (source characteristics such as personality traits, previous successful experiences, and social network location) affect the quality of creative information? Does the technology context mediated through marketing communication approaches (such as high levels of extroversion, conscientiousness, social centrality) have the potential to affect consumer attitude persuasion? What are the risks of AR and VR-based consumer attitude persuasion?
Peripheral route persuasion through VR and AR elements in the advertisement		
Source credibility	The degree to which a recipient feels a source is reputable, competent, or trustworthy is characterised as source credibility.	Does source credibility mediated by technical advantage, the attitude of consumers, and perceived risk towards the products or services can moderate self-efficacy? Does source credibility mediated by technical advantage, the attitude of consumers, and perceived risk towards the products or services can moderate personal engagement? Does source credibility mediated by technical advantage, the attitude of consumers, and perceived risk towards the products or services can moderate positive changing attitudes?
Social presence	Social Presence refers to the ability of e-content in virtual reality and augmented reality advertisements to integrate aspects of human contact, interactivity using virtual elements, sociability, and sensitivity into their product viewing journey	Do technological novelty effects have the capability to enhance the social presence experience in virtual reality and augmented reality advertisements? Do consumers perceive physical attractiveness towards the video format can enhance the social presence experience in

Table 2 (continued)

Theme	Brief Description	Research Questions
Message content	The primary information in the message is considered as message content	virtual reality and augmented reality advertisements? What are the theoretical models which can be developed to identify the mediating factors of message content such as graphical designs of the message, information quality, rhetorical nature of the message, and aesthetics to change consumer attitude levels in AR and VR advertisements?

information value, learning, and enjoyment, and that these views were significant predictors of overall happiness with the experience.

A further source of concern is the way photos appear in hotel previews compared to 360-degree video tours, virtual reality tours, and 360-degree photographs (Bogicevic et al., 2019). A VR preview causes more mental imagery elaboration and a stronger sense of presence than either a 360-degree or image preview, resulting in better marketing experiences (Bogicevic et al., 2019). According to the current review, consumers' perceived physical attractiveness and technological novelty can enhance the social presence experience in virtual reality and augmented reality advertisements. In the future, this concern could be measured empirically by examining the relationship between technological novelty and consumers' perception of physical attractiveness in virtual reality and augmented reality advertisements in order to enhance social presence (Bogicevic et al., 2019; Mauroner et al., 2016; Haile and Kang, 2020; Mandliya et al., 2020).

Message content: The core information in the communication is called message content in ELM, and the message content is used to persuade people via the peripheral route (Gong, 2016; Shahab et al., 2022). According to the extensive literature, several moderating and mediating factors influence the message content in virtual and augmented reality advertisements. Chen, Ruangsri, Ha, and Widjaja (2021) found that consumers' impulsive purchasing behavior could be moderated using virtual elements. Similarly, consumer opinions (Oh & Jasper, 2006); content-driven factors within the advertisement (Sreejesh et al., 2021); and consumers' perceptions (Jung et al., 2020) can be moderated through consumer behavior and AR applications. Research should continue to address the theoretical models which can be developed to identify the mediating factors of message content such as graphical designs of the message, information quality, rhetorical nature of the message, aesthetics to change consumer attitude levels in AR and VR advertisements (Te'eni-Harari et al. 2007; Lee and Cho, 2019; Karson and Korgaonkar, 2001).

6. Theoretical and managerial implications

We make several contributions to the literature with our findings. The goal of this study is to see if the Elaboration Likelihood Model (ELM) can be applied to the new realm of virtual reality and augmented reality advertising, given the parallels and differences between the Internet and other forms of mass media. It may be possible to use this extended model to predict consumer attitudes towards virtual reality and augmented reality advertisements in future studies of online brand communities and to develop and test other constructs related to consumer participation in such technically advanced environments. In an ELM, several attitude antecedents are examined, and the results indicate that the central route is more persuasive than the peripheral route, based on the persuasion factors that affect consumer attitude (Liao & Huang, 2021).

Persuasion can be achieved primarily through the quality of the arguments, demographic differences, and the technological context provided by the virtual elements employed in the advertisement. Content

marketing, for example, is changing consumer attitudes and decisions by illustrating the virtual elements of argument quality. It was also discovered that the roles of young and senior participants in virtual reality and augmented reality marketing differed. Tourists, for example, value geographic location and kind of experience, as well as potential hotel experiences and careful selection of lodgings that may make or break their trip experience (Balakrishnan et al., 2021; Bogicevic et al., 2019) depending on demographic disparities. As a result of technology context, virtual platforms and AR YouTube marketing campaigns were identified as the technical elements to change consumer attitudes.

Variables including source credibility, social presence, and message substance may all be used to persuade. According to the literature, source credibility can be achieved through a variety of virtual and augmented reality elements, such as virtual safety symbols indicating highly credible sources and information quality, which can help consumers make informed decisions about travel-related products and services (Alsheikh et al., 2020). Some of the elements in social presence include consumers perceiving physical attractiveness, and technological novelty as factors affecting Parasocial relationships, and these factors are positively associated with brand equity (Yuan et al., 2022). When considering the message content, time differences in the video advertisements and verbal messages than pictorial information of the product demonstrated a higher level of consumer involvement (Oh & Jasper, 2006). In practical terms, this conceptual model can be used to improve consumers' attitude change and commitment towards different brands, thereby, companies can evaluate the advertising designing strategies based on the informative and persuasive content through the two cues of central and peripheral attitude persuasion.

7. Conclusion and future research directions

This research presents a novel research paradigm based on ELM's social psychology theory. The model contributes significantly to advertising and technological research. As a result, this study presents a mechanism for future researchers to use the social psychology theory of elaboration probability model to empirically analyse consumer attitude persuasion using virtual reality and augmented reality commercials (ELM). One of the major AR-related research themes in the retailing industry concerns decision-making, and encompasses research on AR as an immersive experience, as well as related subthemes of local presence, flow, and mental imagery that facilitate decision-making (and AR-enhanced shared decision-making) (Kumar, 2021; Kumar et al., 2022; Chen et al., 2021). Future scholars can refine this model and apply it to new sorts of commodities, such as search-based vs experience-based, and utilitarian versus hedonistic goods. With the Xreality framework, XR is viewed as an oversight term with two distinct sub streams: AR and VR. In existing classifications (e.g., Farshid et al., 2018; Flavián et al., 2019; Milgram et al., 1995; Milgram & Kishino, 1994), AR and VR are grouped together. Similarly, this framework is the first to include AR, VR, XR, mixed reality, and assisted reality in a coherent framework. Many older (e.g., Milgram & Kishino, 1994) and newer (e.g., Farshid et al., 2018) frameworks remain silent on some aspects of reality (e.g., assisted reality) which could be another future research area worth exploring. The goal of this research was to create an ELM-based conceptual model to evaluate customer attitude change in virtual and augmented reality environments, which is an area that has received little attention.

CRedit authorship contribution statement

Nirma Sadamali Jayawardena: Validation, Supervision, Investigation, Writing – review & editing. **Sara Quach:** Visualization, Supervision, Methodology, Investigation, Writing – review & editing. **Ali Razzaq:** Resources, Visualization, Writing – review & editing. **Abhishek Behl:** Supervision, Project administration, Investigation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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