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An Interaction–Engagement–Intention Model: How Artificial Intelligence and Augmented Reality Transform the User–Platform Interaction Paradigm

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Abstract: Interaction with mobile platforms changes users' emotional and cognitive engagements through various stimuli cues that respond to behavioural intentions. Emerging technologies such as artificial intelligence (AI) and augmented reality (AR) foster more engagements and transform a new user–platform interaction paradigm in the e-commerce industry. This study signifies the effects of artificial intelligence and augmented reality in assessing user experience for mobile platforms. In this paper, we develop an interaction–engagement–intention model that considers users' continuance intention based on perceived user experience. The proposed model uniquely explains a nuanced understanding of how the user–platform interactions evolve interactivity, product fit, artificial intelligence-driven recommendation, and online reviews in perceiving spatial presence and subjective norm. This paper explores the importance of attitude and trust as emotional states that influence the user's behavioural responses. We validate the consequences of user–platform interactions toward continuance intention by conducting an online questionnaire survey and assessing user experience in augmented reality environments. The results contribute to adopting the co-created values of user–platform interactions through cognitive and emotional engagements that affect users' continuance intention. The platform industry can apply the research outcomes by considering user experience and its implications to enhance the platforms' capability with a broader aspect.

Keywords: interaction–engagement–intention (I-E-I) model; artificial intelligence; augmented reality; user–platform interaction

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Academic Editor: Yue Wu

Received: 31 May 2025
Revised: 16 June 2025
Accepted: 18 June 2025
Published: 19 June 2025

Citation: Kabir, Z.S.; Kang, K. An Interaction–Engagement–Intention Model: How Artificial Intelligence and Augmented Reality Transform the User–Platform Interaction Paradigm. *Electronics* **2025**, *14*, 2499. https://doi.org/10.3390/electronics14122499

1. Introduction

In e-commerce, the physical distance between users and online products is a significant challenge to improving product uncertainty and the need for touch [1]. This study explores the value propositions of integrating emerging technologies such as AI and AR to alleviate uncertainties in using mobile platforms. The pandemic escalated the demands of users to interact with interactive mobile platforms and confirms users' expectations [2,3]. Additionally, a heterogeneous environment through multi-modal interactions involves their cognitive and emotional engagements. These emerging trend in user–platform interactions demand further investigation in assessing users' decision-making processes [4], particularly their behavioural responses to use mobile platforms. This study explores the implications of AI with AR platforms in the new technological horizon that can support predictive data analytics, user preferences, network optimisation, product visualisation, product placement, and interactive recommendations, to deliver at immersive feeling to users at an optimum level. This paper uniquely develops a research framework that explains the paradigm shift to influence users' behavioural responses through interaction capabilities and provide user comfort through sensory information. Integrating AI in AR evolves through a user–platform interaction paradigm that can complement more immersive and interactive experiences to provide users with comfort [5]. Prior studies have shown that new traditions of exploring the effects of multi-modal interactions are required to explain user experience in the user–platform interaction paradigm [6].

Firstly, interaction-based stimuli cues have been considered the sources of engagement in the user–platform interaction paradigm that provide more sensory information to end-users. Although the multi-sensory effects of AR in online retail have been well-discussed [7], there is still limited empirical research on the effects of external sources of information in perceiving UX. We focus on external sources of information that influence users' perceived cognitive states in AR environments [8]. Users engage with mobile platforms through multi-modal interaction to simulate tailored information to meet their needs [9]. Furthermore, AR employs an interaction paradigm that supports users to place virtual products through perceived augmentation, which can develop fit confidence in virtual try-on apps [10,11]. In the context of virtual product fit, AI familiarizes convolutional neural networks (CNN) to classify and the Vio-Jones (VJ) algorithm or the fuzzy neural network (FNN) to track virtual products in the physical spaces [12]. Furthermore, this study incorporates intelligent recommendations through predictive analytics as a potential stimuli factor that can explain how AR mobile platforms can use AI algorithms to analyse all possible selling points and deliver [13]. This interactive recommendation system applies deep neural networks (DNN) to generate personalized recommendations in AR environments [14]. Moreover, the study investigates the effects of online reviews, where users share their views or opinions using social networks, blogs, or platforms' review sites through the internet [15], and these online reviews significantly influence users' decision-making process. However, this study explored an empirical result on how external sources of information influence users' intention to use mobile platforms in the context of AR.

Secondly, this study explains the effects of multi-modal interactions through visual, haptic, intrinsic, and extrinsic sources of information that enhance users' cognitive engagements [16]. AR allows mobile platforms to accommodate virtual product positioning feature [17], where this study includes the effects of embedded virtual products through spatial presence as users' cognitive states in an AR environment [10,18]. However, with virtual try-on using computer-generated objects in the physical space [18], users can perceive a situated experience through spatial presence, creating a cognitive feeling that encourages continued use of the mobile platform. In contrast, influences from peer groups, reviews, and AI-driven recommendations can engage users to perceive subjective norms [19]; this study investigates the effects of those sources of information toward users' subjective norm in the context of AR mobile platforms [20,21].

Thirdly, this study examines the intervening effects of attitude and trust among spatial presence, subjective norm, and continuance intention. In the context of emotional states, users' attitude and trust levels are reached if the perceived performance with confirmation occurs after the fulfilment of users' expectations [22]. Therefore, this study develops a framework that uniquely explains users' cognitive and emotional engagements through user–platform interactions, which subsequently influence user experience. Previous studies have addressed the correlations of attitude and trust towards continuance intention [22,23]. However, the intervening effect of attitude and trust on continuance intention in AR mobile platforms has not been confirmed. Thus, this study includes attitude and trust as mediators in the relationships among spatial presence, subjective norm, and continuance intention. Prior research has shown that new traditions of exploring the effects of interaction-based stimuli cues are required to assess user experience that affects users' behavioural intention [24,25]. Fundamental research interest in this study emphasises how perceived spatial presence and subjective norms respond to user–platform interactions, impacting users' emotions through attitude and trust toward behavioural intention to use AR mobile platforms.

Finally, this study develops an interaction–engagement–intention model, following the stimulus–organism–response (SOR) theory [26,27], and investigates how AR–AI integration influences users' decision-making by reducing cognitive dissonance and assessing their shopping experiences [28]. As such, SOR explores the cognitive states and the consequences of behavioural responses through continuance intention [4], and it is supported that the cognitive process will engage users' responses in AR mobile platforms. However, up to now, there have been limited empirical studies investigating the intervening effect of attitude and trust toward continuance intention in AR environments. Therefore, we propose the following research questions: RQ1: What factors determine users' continuance intention to use AR mobile platforms? RQ2: What are the effects of cognitive and emotional engagement on continuance intention?

This study executes a descriptive quantitative method using a square least square structural equation model (PLS-SEM). An online quantitative survey was designed to collect quantitative data from online users through a convenience snowball sampling technique. The study limits the generalisability of applying IKEA as an AR mobile platform within Australia to investigate the influences of AR on users' perceived cognitive and emotional engagements.

This study contributes to investigating the cognitive and emotional impact of perceiving user experience through the spatial presence and subjective norms. Users' continuance intention is affected by user–platform interactions, influencing the user retention process and facilitating the mobile platform industry to step forward toward immersive e-commerce. This paper is structured with a review section highlighting the current literature on augmented reality, interactions, spatial presence, subjective norms, attitude, trust, user experience, and behavioural responses. It proceeds with methods, where a research design, measurement items, and data analytical procedure are provided. Then, we proceed with the results and discussion section.

2. Related Research

This section describes relevant research on how artificial intelligence and augmented reality have been accommodated as stimuli cues on subjective user experience assessment and their impact on users' behavioural intention in the user–platform interaction paradigm.

2.1. The User–Platform Interaction Paradigm

Augmented reality enables real-time interactions by placing computer-generated products in real-life physical spaces [6]. The virtual product is viewed on the mobile platform and can interact with the users following a user–platform interaction paradigm, which resembles how users sense and perceive the real world. Artificial intelligence plays a crucial role in facilitating engaging interactions on AR mobile platforms. E-commerce users interact with mobile platforms through different retail settings, and AI supports them in enhancing the platforms' capabilities. Nazir et al. also emphasise that artificial intelligence is revitalizing the data analysis process to offer a superior scope of interactions in AR mobile platforms [29], unleashing valuable insights. AI interactions in AR would provide tracking capabilities, past-purchasing experience-based recommendations, seamless network qualities, and interactive reviews to sense virtual products in the user–platform interaction paradigm. This study denotes that interactivity, product fit, AI-driven recommendation, and online review provide an enabling environment to augment virtual products by interacting with AR mobile platforms, moving toward the user–platform interaction paradigm. Similarly, Pereira et al. defined AR as a disruptive technology that enables intuitive interactions to achieve Industry 4.0 and senses virtual objects in an actual position [11]. In the e-commerce revolution, the user–platform interaction paradigm engages interaction-based stimuli cues influencing users' behavioural intention. In Industry 4.0, the e-commerce industry is transforming through user–platform interactions in AR environments, which can engage platforms' capabilities by accommodating emerging technologies to deliver immersive and interactive user experiences.

2.2. User Experience in AI–AR Interactions

User experience (UX) is a holistic and subjective assessment [30] that explains how users interact with products, how they view them, how they perceive their experiential values, how they sense information, and how it confirms or fulfills their expectations compared to other systems. The term 'UX' was presented initially in the service quality management sector; nowadays, it is articulated from different perspectives, especially in ergonomics. According to the International Standard Organization (ISO), UX is defined as users' perceptions and reactions to using or anticipating a product, system, or service [31]. User experience is becoming more immersive and interactive toward sustainable retail 4.0 (fourth generation) using AI interaction in AR mobile platforms. Users can create a virtual identity to interact, communicate, and perform preferred activities with applications, products, devices, or systems and create an environment enabled by user–platform interaction [32]. Furthermore, UX is examined as a user's perceptions experienced through cognitive and emotional engagements [4,27]. In the AR context, users gather sensory information during cognitive engagement through spatial presence and subjective norm that can develop emotional states through attitude and trust. This is a complex way of processing information after interacting with modern technologies like AR and AI. UX through user–platform interaction is considered a "change of paradigm" that transforms from traditional retail settings to user–platform interactions by adopting immersive and more interactive features [33].

This study methodically reviews empirical articles published in the last four years (2021–2024) within the information systems, retailing, technologies, consumers, and decision-making journals, scrutinizing on the latest trend to identify knowledge gaps on the research phenomenon. The review process concludes as outlined in Table 1, explaining a synthesized summary of findings related to UX following the SOR framework in an AR environment. Particularly, the discourse on AI and AR effects in developing user experience through cognitive and emotional engagements to alleviate uncertainty and the need for touch the product [5,27,34], spatial presence through platform interactions [17], effects of AR interactions on behavioural responses [2,4,28], and subjective norms through peer influence [25]. Hsu et al. discuss the product presence in the virtual space and its' impacts on impulse buying intentions [5], while David et al. explore the effects of aesthetics and position relevance on users' recommendation intentions [34]. Several studies emphasise investigating users' purchase intention through their preferences and subjective norms [25,28]. However, the particular domain of continuance intention through cognitive and emotional engagements in AR environments is still unexplored, with Nikhashemi et al. [2] and Qin et al. [4] as notable extensions. While existing framework is promising, the user experience mechanism through cognitive and emotional engagements, where AI and AR involve immersive and innovative sources of information, and its effects on users' continuance intention remains relatively less explored. Addressing these knowledge gaps, this study extends the impacts of AI–AR-oriented sources of information on continuance intention in the context of an AR environment. Particularly, the emerging field of assessing user experience through cognitive and emotional engagements—specifically spatial presence and subjective norms within the virtual realm of continuance intention—represents a novel area of research.

Table 1. Recent literature (2021–2024) on UX following SOR theory in AR environment.

Source Article	Relevant Models/Theories	Independent Variables	Moderators Variables	Method	Outcomes
Hsu et al. [5]	SOR model	Interactivity, vividness, authenticity	Product presence, instant gratification	Quantitative approach	Impulse buying intent
David et al. [34]	SOR model	Aesthetics, position relevance	Service quality, visual quality, satisfaction	Quantitative approach	Recommendation intention
Goel et al. [27]	SOR framework	Visual, acoustic, haptic, arousal, pleasure	Involvement	Quantitative	Urge to buy impulsively
Wang et al. [17]	SOR theory	Interactivity, vividness, augmentation, aesthetics	Spatial presence, flow experience, decision comfort	Quantitative method	Purchase intention
Barta et al. [28]	SOR model, cognitive load theory	No web AR vs. web AR, perceived similarity, confusion by over-choice, repurchase cognitive dissonance.	Product knowledge, preference for consistency	Mixed method	Purchase intention, willingness to pay more
Nikhashemi et al. [2]	SOR model, Uses and Gratification Theory (UGT), Technology Continuance Theory (TCT)	AR interactivity, AR quality, AR vividness, AR novelty	Utilitarian benefit, hedonic benefit, AR engagement, psychological inspiration	Quantitative method	Continuance intention, willingness to pay
Chatterjee et al. [25]	Socialisation theory, Theory of Reasoned Action, congruity theory, expected value theory.	Internal usage, Subjective norms, peer influence, eWOM intention, online customer review	Subjective norms	Quantitative	Purchase intention
Qin et al. [4]	Cognitive–affect–conation (C-A-C) framework, SOR model	Virtual presence, experiential value, shopping benefits, perceived value, attitude, satisfaction	Attitude, satisfaction	Quantitative method	Continuance use intention, purchase intention

2.3. Interaction-Based Stimuli Cues

Retailers are adopting AR technology in mobile platforms to provide immersive experiences for end-users. This study considers the effects of AI interactions in AR mobile platforms in the user–platform interactions paradigm. The inclusion of AI functionalities in AR dramatically changes sources of information [14,24,29], and this study can distinctively embrace those stimuli cues in assessing user experience, explaining virtual engagements through multi-modal interaction capabilities. Furthermore, examining co-created values in AI and AR are vital for platform usage and decision-making process, where interaction capabilities, virtual product placement, AI-driven recommendations, and online review can play critical role in developing user experience [5,12,21,35].

In an AR environment, users interact with the mobile platforms and engage in an immersive experience through stimulus sources of information, where the interactivity with AI in AR can allow users to obtain tailored information about virtual products [5]. Furthermore, interactivity with mobile platforms can provide simulated information regarding specific needs to search for virtual products [9]. However, there is a limited number of studies on the effects of interactivity in user–platform interaction on reducing the cognitive load, consistent with flow experience and convenience [17].

AR mobile platforms provide scale measurement and try-on features to fit the 3D-generated product in a required space [1], where they can be investigated for virtual products through spatial registration and gesture-based interaction by changing the orientation of physical spaces [36]. In the digital era, AI introduces virtual product recognition, detection, and inspection using deep neural networks (DNN) through user–platform interaction [37]. Similarly, AI accommodates product virtualisation through real-time product tracking, scale measuring, and AR positioning [35]. However, the impacts of AI interactions with AR through personalisation, scale measurement, product positioning, and virtual try-on features toward users' continuance intention are unexplored, considering how those immersive effects can alleviate a product's "need for touch" or reduce product uncertainty.

Artificial intelligence (AI) extracts valuable insights from all possible user touchpoints and delivers intelligent recommendations by predicting user requirements. AI enables more interactions between users and platforms that encourage cognitive engagements through predictive data analytics [12], generating recommendations [29] to provide user comfort, where it can be explained the effects of those sources of information toward users' behavioural responses. Furthermore, explainable AI engages a new way of extracting valuable insights through product personalisation and user preferences, which can provide predictive recommendations to make the decision-making process more effective [38]. Moreover, online platforms can use AI for a personalized and adaptive recommendation system that can accommodate predictive data analytics using past purchasing preferences to identify user behaviour through insight experience [13,14,24].

In the virtual world, users' intentions are influenced by online reviews using different online channels. The users are habituated to higher internet usage, gathering information on online goods from different channels, which can be considered effective external sources of information to assess user experience [21]. Nowadays, online reviews are essential in e-commerce to influence users from others' viewpoints that can act as an electronic word-of-mouth (eWOM) to support virtual evaluation techniques through AI-driven predictive analytics [15,38]. Moreover, the data-driven user reviews and ratings in social commerce platforms can influence users' cognitive states through social presence, informational support, and emotional support, which subsequently impact users' decision-making [4].

2.4. Cognitive Engagement

Prior research has examined how users' expectations are met through interactions in AR environments, creating a sense of spatial presence and making virtual products feel more realistic within physical spaces [10]. According to the spatial presence theory, spatial presence is defined as a form of cognitive engagement that creates a user's feeling of being co-located with virtual products in a physical environment [5,16]. However, Wang et al. termed spatial presence as a distinctive psychological state of "being there" [17]. It is expressed as a situated experience with the experiential immersion of a user to perceive self-location in a mediated spatial environment. AR mobile platforms allow users to interact and try-on virtual objects in a physical space and perceive spatial presence through a cognitive state, where this study can investigate the effects of spatial presence toward users' continuance intention in the context of an AR environment [9,18]. In this study, spatial presence can be defined as a cognitive process of perceiving user experience for being positioned virtual products in a desired space.

Perceived value from external innovative sources of information influences users' subjective norms toward platform usage [8]. Subjective norm or social influence is an essential cognitive factor through a perceived experience that explains an individual's feelings about external sources of information. Initially, subjective norm was defined as a cognitive engagement of a user that considers others' views from different aspects, and as something that determines others' fulfillment of expectations from any good or service [39]. However, there are limited studies on how immersive and technological sources of information influence users' subjective norms [21]. Subjective norms can be investigated through three psychological mechanisms: internalisation from expert sources, interpersonal sources from peer influence, and external sources of information from different innovative interactions. This study defines 'subjective norm' as a cognitive state of being influenced through external opinions like AI-driven recommendations and online reviews.

2.5. Emotional Engagement

Researchers have explained that mobile platforms can lead users to perceive situated experience, which can influence their attitudes and intentions to use these platforms [1]. Attitude is a user's internal psychological state that considers their positive or negative feelings, which can help explain their continuance intention to use AR apps [40]. Furthermore, previous studies mention that behavioural intention in AR environments is affected by perceived attitude, and there is an opportunity to extend the research on explaining the effects of different sources of information toward users' attitude [1]. Moreover, attitude plays an essential role in decision-making through experiential values that change behavioural intention, and it can help examine how users' cognitive and emotional engagements can impact in developing attitudes toward using a mobile platform. This study defines attitude as an emotional feeling that can motivate users' determination to engage with virtual platforms.

Trust is defined as a user's mental state that reflects their commitment to perform certain actions after fulfilling specific expectations from the application-based mobile platform [41]. Previous studies have defined the concept of trust as an emotional consequence of cognitive engagements [40]; it can be explained as a system-like belief through perceived cognitive feelings by interacting with technological systems [10,18]. In AR, research findings demonstrated the significant influence of perceived experiences on building users' trust toward using mobile platforms. However, this study can investigate the effects of AI–AR integration in developing users' trust in the context of AR mobile platforms [16,21,24]. Recently, scholars have addressed that interpersonal and innovative sources impact trust and influence users' behavioural intentions [42]. Following the user–platform interaction paradigm, this study can investigate trust as users' emotional engagement by interacting with technological platforms and the consequences of cognitive feelings. In this study, we define "trust" as an emotional engagement that develops users' motivation and confidence to continue using AR mobile platforms.

2.6. Continuance Intention

The term "continuance intention" is adapted from the information system (IS) continuance model, followed by the expectation–confirmation theory (ECT) from the root of the consumer behaviour literature [43]. Recently, researchers have studied continuance intention for immersive virtual environments [22,40]. This shows positive indications for retailers and other related stakeholders to continue using immersive virtual platforms. Qin et al. describe the continuance intention for AR mobile platforms and explain cognitive states through telepresence, perceived mobility, perceived enjoyment, and perceived connectedness [4]. In an e-commerce mobile platform, the physical distance to physically engage with a product creates user uncertainty. Thus, AR and AI features can alleviate the problems by perceiving immersive experiences to end-users. However, these findings help explain how AR characteristics critically influence user attitudes, thereby encouraging continuance intention. Product uncertainty can be reduced by accommodating spatial presence and subjective norm to achieve a positive product attitude toward the users [1]. Furthermore, AR features can encourage users to enhance their intention to continue interacting with the platform by developing positive attitudes and minimizing product uncertainty accordingly [2]. Moreover, AR mobile platforms can enhance a user's sense of spatial presence through narrative transportation and subjective norms within AR environments [1].

2.7. The Interaction–Engagement–Intention Model

This study applies a stimulus–organism–response (SOR) paradigm as a fundamental framework to understand how AR mobile platforms influence continuance intention. Previous studies have followed the framework to examine immersive experience, repurchase intention, and continuance intention [4,27]. This model is embedded in environmental psychology, which utilizes stimuli cues to explain cognitive reactions. The user's cognitive state is influenced by multiple stimuli cues in an environment that consequently affects their behavioural responses [26]. According to Mehrabian and Russell's theory, stimulus components are described as an environment's spatial, temporal, or sensual characteristics. Several studies have applied this framework to identify users' behavioural responses by assessing user experience and their impacts on continuance intention [5,34]. In a recent study on AR mobile platforms, visual, acoustic, and haptic stimuli factors are described as stimuli cues, while arousal and pleasure are described as emotional states and subsequently relate to users' behavioural responses [27]. Furthermore, Barta applied the SOR paradigm to extend research on how AR influences decision-making by reducing cognitive dissonance and assessing users' shopping experiences [28].

In the existing literature, authors explained how different models, such the expectation confirmation theory (ECT), define user confirmation through the fulfilment of their expectation that influences their behavioural intentions [43]. Furthermore, Goel et al. [27] described the consequences of visual, arousal, and haptic stimuli cues through emotional states, following the stimulus–organism–response (SOR) theory, and indicated the positive outcomes toward impulsive buying intentions. Meanwhile, this study explains the development of users' cognitive and emotional engagements through interaction, innovative, and immersive stimuli cues like interactivity, product fit, AI-driven recommendation, and online reviews that positively engage users' attitude and trust development towards continuance intentions [44]. This study uniquely develops an interaction–engagement–intention model, following a SOR framework, to explain user platform interactions and their influences on perceiving user experience through cognitive and emotional involvements, particularly in the context of AR environments that accommodate AI.

From the aforementioned discussions and considering the theoretical underpinning, it is revealed that four previous studies have offered valuable contributions related to the proposed research questions and the development of the interaction–engagement–intention model used in this study. The I–E–I model, and its associated hypotheses are posited from the previous studies on user–platform interaction, the SOR theory, social cognitive theory, spatial presence theory, expectation–confirmation theory, user satisfaction, user trust, and user experience considering AI interactions in AR environments. The proposed conceptual model is outlined in Figure 1.

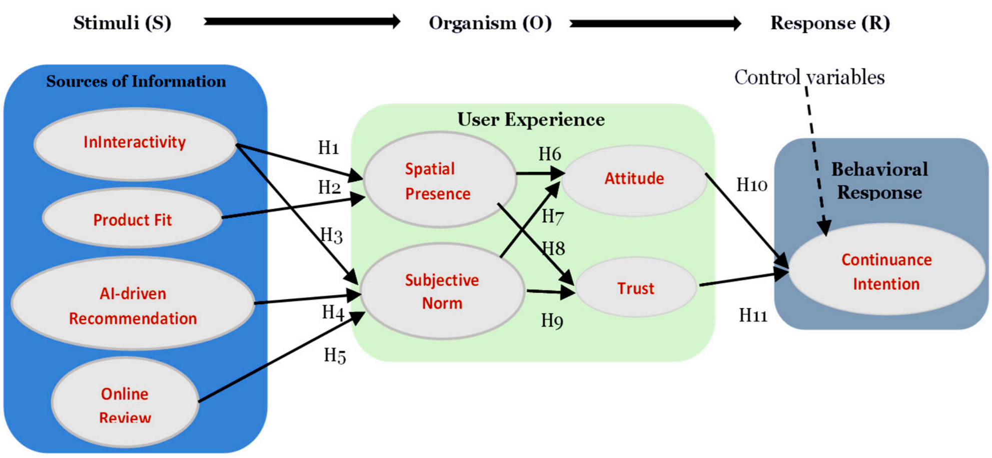

Figure 1. An interaction–engagement–intention model.

3. Hypothesis Development and Research Model

3.1. Hypotheses Development

3.1.1. Interactivity, Product Fit, and Spatial Presence

With the emergence of immersive technologies, AR provides sensory information to users and allows them to perceive immersive experiences to feel virtual products in the physical environment. Spatial presence is a mental feeling with a real-world perception using virtually mediated content. In an AR retail platform, online users interact with a mobile app to see a virtually embedded product in a real-world scenario. Multimodal interactions with AR mobile platforms provide a sensory experience that persuades spatial presence [45]. Similarly, Wang describes the relationship of interactivity through customer engagement and its implications with spatial presence in AR apps [17]. In an AR retail platform, online users interact with a mobile app to see a virtually embedded product in a real-world scenario. Thus, AR enables consumers to try-on and measure a virtual product fit through control and sensory movement, which induces a higher spatial presence [18]. Moreover, AR provides simulated physical control and embedded product fit experience that engages spatial presence as a situated view of a virtual product in a physical environment [10]. AR features provide users with comfort in viewing virtual products in their physical spaces, which alleviates product uncertainties, reduces the need for touch, and increases behavioural responses [9,22]. Sun describes that AR product fit reduces product uncertainty through spatial presence [1]. Therefore, the following hypotheses are proposed:

H1: *Interactivity positively influences spatial presence.*

H2: *Product fit positively influences spatial presence.*

3.1.2. Interactivity, AI-Driven Recommendation, Online Review, and Subjective Norm

Interactions with AR platforms give users a high level of influence when placing virtual products in physical spaces. Such interaction capabilities with immersive experiences likely induce peer groups to use the AR platform. Mclean argues that interactivity positively influences subjective norms in AR environments [44,46]. AI-driven recommendations represent a new way of perceiving subjective norms that influence consumer attitudes and trust-building processes [22]. Artificial intelligence (AI) is an emerging technology that adopts intelligent decision-making processes, and it can predict user requirements by extracting insight. AR mobile platforms use AI through adaptive and personalized recommendation systems for predictive data analytics using past purchasing behaviour [5,13,25]. AI-driven recommendation is considered predictive information regarding user characteristics based on previous activities, and this external source of information influences users' subjective norms. In today's world, online reviews play a crucial role in e-commerce by influencing users through the viewpoints of others. An online review is an electronic word of-mouth (eWOM) that supports virtual evaluation techniques through interactive user feedback [15]. In the virtual world, users' intentions are influenced by online reviews using different online channels. Online reviews are considered a rich external source of information to assess user satisfaction as a positive confirmation after the initial use of a product or service [21]. Several studies have mentioned that online reviews are external innovative sources of information that affect subjective norms to change users' behavioural intentions [8,21]. Users receive feedback regarding apps or products from different channels. Therefore, we propose the following hypothesis:

H3: *Interactivity positively influences subjective norm.*

H4: *AI-driven recommendations positively influence subjective norm.*

H5: *Online reviews positively influence subjective norm.*

3.1.3. Spatial Presence, Subjective Norm, Attitude, and Trust

The prior literature explained the positive relationship between spatial presence and attitudes in AR mobile environments [10,46]. Similarly, David et al. revealed that perceived spatial presence develops consumers' attitudes, which consequently influence their behavioural intention to use AR mobile platforms [34]. A higher sense of spatial presence evokes more realistic feelings through perceived cognitive states, leading to positive attitudes. Higher perceived subjective norms develop consumers' attitudes toward mobile platforms [19]. The prior literature finds that subjective norms positively impact attitudes [47]. In this sense, this study proposes a positive relationship between subjective norms and attitudes. Although the possibility of relating trust with the co-created values from immersive environments has been less studied, Growe defined how spatial presence, as the virtual body associated in the physical space with co-presence, creates user trust [10,16]. Spatial presence creates a realisation of "being there" within the physical space, enhancing trust in products [17]. AR co-creates immersive values to improve trust through the confirmation of initial choices. AR accommodates a sense of presence through personalized embeddedness that increases trustworthiness toward users [22]. On the other hand, previous studies have found that user trust is positively affected by subjective norms [8,21,39]. So, we are proposing the following hypothesis:

H6: *Spatial presence positively influences attitude.*

H7: *Subjective norm positively influences attitude.*

H8: *Spatial presence positively influences trust.*

H9: *Subjective norm positively influences trust.*

3.1.4. Attitude, Trust, and Continuous Intention

The IS continuance model (ISCM) mainly explains three attributes to describe behavioural intentions: satisfaction, confirmation of expectation for prior IS use, and post-adoption expectation. Bhattacharjee emphasises that satisfaction with IS use is a prime concern for users to maintain usage intention [43]. However, empirical research has been conducted on trust related to continuance intention in AR mobile commerce platforms [22,40]. Similarly, it is described that trust in the virtual environment positively impacts behavioural intention [20,21]. Previous studies have shown that users' trust positively influences their willingness to continue using the mobile app [2]. Balakrishnan describes the relationship between user trust and their continuance intention to use technological systems [40]. Therefore, we propose the following hypotheses:

H10: *Attitude has a positive influence on continuance intention.*

H11: *Trust has a positive influence on continuance intention.*

3.2. Research Model Overview

A conceptual UX model (as shown in Figure 1) was developed to determine how external innovative sources of information (interactivity, product fit, AI-driven recommendation, and online review) in AR mobile platforms affect user experience (spatial presence and subjective norm). Subsequently, the study investigates attitude and trust as mediators causing changes in the relationships toward behavioural response. The proposed model is assumed to be valid for the AR mobile platforms and based on the SOR framework. However, the proposed I-E-I model uniquely includes immersive, interactive, and innovative external sources of information in the context of user–platform interaction paradigm and explain how perceived UX through cognitive and emotional engagements influences users' continuance intention to use AR mobile platforms. The research model considers eight constructs: four stimuli cues considering sources of information, two organism factors as cognitive states to perceive UX, two mediating factors, and one behavioural response.

4. Methods and Materials

4.1. Methodological Design Approach

A descriptive quantitative method was applied through an online questionnaire survey (as shown in Table A2 of Appendix A) in this study, followed by a square least square structural equation model (PLS-SEM) as a data analytical technique. Before the data analysis process, the data was collected from respondents using different online platforms like LinkedIn, Facebook, Twitter, IKEA web blogs, and Nextdoor. A few pre-requisite questions were administered to obtain informed consent from the respondents and to verify their eligibility to participate in the survey process. The quantitative survey was involved online users who interacted with AR mobile platforms, and a convenience snowball method was applied as a data sampling technique.

4.2. Measurement Development

An online questionnaire guideline had been developed for this online survey. In the study, IKEA was chosen as an augmented reality (AR) platform that provides an AR mobile app (IKEA app), accommodating AI for online users to virtually place furniture in their location. IKEA, one of the pioneers in the retail industry, has incorporated AR as an immersive technology to allow users to express their preferences through virtual interactions in real-world scenarios. The IKEA mobile app is designed to accommodate a true-to-scale model that permits them to visualize the products' texture, light, and contrast. Furthermore, the IKEA AR platform supports users by offering a one-stop service to place virtual products in their preferred space. This IKEA app was selected as a research instrument to investigate the study with an AR environment. The major motives for using IKEA were as follows: (a) IKEA accommodates users to interact with the mobile app and the responsive website, both of which have AR functionalities; (b) IKEA introduced product fit and scaling features using AR into their mobile platform; (c) IKEA supports AR features in Australia; and (d) IKEA acquired a large number of retail users with versatile age groups in Australia.

This study accommodates the advanced features of IKEA to assess users' cognitive and emotional engagements through sources of information. We have designed questionnaires (as shown in Table A2 of Appendix A) to address the augmented reality- and artificial intelligence-based spatial object orientation, real-time product recognition, and user–platform interaction. IKEA applies AI models using pre-trained data to incorporate try-on measurement and allows users to scale virtual products in their required spaces [11]. Furthermore, IKEA's AR view is designed to process the sensory data and support precise virtual product positioning through spatial reasoning and real-time rendering [7]. Moreover, the AR mobile platform utilizes an AI recommendation engine to assess users' preferences, personalized recommendations, and create user profiling mechanisms by extending predictive analytics [9,33]. The online questionnaire, particularly for the sources of information, adapts the advanced features of IKEA to obtain users' perceived user experience through interactivity, product fit, AI-driven recommendations, and online reviews.

The study incorporated 18 questions for the eight constructs to perform the measurement process. We used the 5-point Likert scale as close-ended answer options to measure the respondents' rank qualities with a response category from 1 (strongly disagree) to 5 (strongly agree). At the beginning of the survey process, we distributed demographic questions to the respondents. Then, the survey moved to deliver UX questions to obtain users' opinions about their experiences using AR mobile platforms. We considered and corrected measurement items for the identified constructs in the proposed I-E-I model (as shown in Table A1 of Appendix A). A few items were adjusted in wording to better fit the AR-based research context. For instance, the items "I could no longer doubt that the product would fit my desired spaces", "With the support of AI marketing technology, the AR mobile platform can arouse my shopping desire", "I felt like the product meshed with the AR mobile platform", "AI marketing recommendations arouse my platform usage", and "I would prioritize the AR mobile platform over other alternative means" were adjusted to reflect the user–platform interactions in an AR mobile platform environment.

This study formed four factors as stimuli cues to explain user expectations and follow measures of product fit from Sun et al. [1], interactivity from Wang et al. [17], AI-driven recommendations from Yin and Qiu [13], and online reviews from Chatterjee et al. [25]. We included three factors to explain the cognitive states that define the UX. We followed this with spatial presence from Tawira and Ivanov [10] and Smink et al. [18] and subjective norm from Belanche et al. [8] and Kumar et al. [21]. The model incorporates two emotional factors: the attitude measures from Sun et al. [1] and trust from Kang et al. [16]. The study includes continuance intention as a behavioural response and measures continuance intention from Yin and Qiu [13].

4.3. Procedures and Sample

The online survey questionnaire was developed using Qualtrics and distributed to the participants in Australia through an email invitation or social network engagements describing the research objectives and privacy concerns to give them confidence [4]. We attached the research objectives, instructions for downloading the AR mobile app, and the URL link or QR code to attend the online survey. The participants were requested to download an AR mobile app to interact with the AR mobile platform for more than 10 min [17]. These actions made them familiar with the AR-oriented e-commerce mobile platform. We maintained all the principles, relevant procedures, ethical regulations, and UTS guidelines to conduct the research, following the Australian National Statement on Ethical Process and the UTS's policy on ethical standards. The ethics approval was received from the University of Technology Sydney (UTS HREC ref no. ETH-22-7706) on 9 August 2023.

An online survey was conducted using a convenience snowball technique, and we collected data from online users within Australia through Facebook, Twitter, LinkedIn, and Nextdoor, with a sample size of 1132. Initially, the data were exported from the Qualtrics platform in .csv format and inserted into IBMSPSS statistics 3.0 for data preparation and cleaning. We checked and imputed the quantitative data using the IBM SPSS Statistics 30.0.0 to clean it through the proper validation process [17]. Then, data imputation and cleaning were performed by checking for missing values, verifying data types, recoding variables, handling outliers, conducting cross-tabulation to identify illogical responses, and applying labelling [5,9]. Finally, a sample size of 880 (N = 880) was confirmed, and the data file was analysed in smart PLS 4.0. The response rate was 78%. The socio-demographic characteristics and the user profiles of the sample are shown in Table 2.

Table 2. Respondents' socio-demographic information.

Characteristics	Values	Frequency	Percentage (%)
Gender	Male	486	55.2%
	Female	394	44.8%
Age Group	Generation Z (18–26 years)	225	25.6%
	Millennial (27–42 years)	387	43.9%
	Generation X (43–58 years)	198	22.5%
	Boomers II (59 years or above)	70	8.0%
Education Level	Primary	37	4.2%
	Secondary	168	19.0%
	Bachelor's degree	367	41.7%
	Vocational or similar	229	26.0%
	Not attended in Australia	79	8.1%

5. Data Analysis and Results

5.1. Analytical Process

The proposed research model was validated using partial least squares structural equation modelling (PLS-SEM), which emphasises extending the explained variance of the constructs [9] and delivers optimum results for complex models [20,27]. SmartPLS 4.0 was used to examine the measurements and develop a structure model to contrast the results. The PLS-SEM was applied as a second-generation, variance-based data analytical technique to analyse the survey-based quantitative data [9]. Due to the exploratory nature of our research, we applied a PLS-SEM to support the data analytical process through predictive outcomes, functional robustness, non-normality, accommodate formative and reflective constructs, and complex model validation, as well as to support more hypotheses. In the PLS-SEM, a two-stage approach was applied, involving measurement assessment (outer model) and structural model evaluation (inner model) to validate the proposed I-E-I model.

This study followed a two-step SEM approach to analyse the data using PLS-SEM. The measurement model acted as an outer model assessment with confirmatory factor analysis (CFA) to determine the reliability of the survey instruments and the validity of constructs [9]. Then, we executed the structural model as an inner model assessment to test the hypotheses [29]. As previous studies recommended the PLS-SEM approach following the SOR framework in augmented reality environments, it was deemed appropriate for this study to extend data analysis [20,29]. We also analysed the effects of the gender and age group, considering the socio-demographic characteristics of the sample profile.

5.2. Measurement Model Assessment

This study used confirmatory factor analysis to check the reliability and validity of the measurement items and constructs in the measurement model. In the model, there is a prerequisite to execute internal consistency reliability, convergent validity, and discriminant validity [20]. The measurement model was analysed through factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) to assess the reliability of the survey instrument. Table 3 describes the psychometric properties of all the constructs deployed in this study. As retrieved from the data, all the outer loadings were above 0.70, and the average variance extracted (AVE) values were above 0.50. Cronbach's alpha value of all constructs was assessed from 0.707 to 0.869, which was higher than the recommended value of 0.7 [9,44]. The CR values of all constructs were higher than the recommended value of 0.70. (i.e., from 0.717 to 0.869). Furthermore, the AVE values were found to be higher than the MSV (maximum shared variance) and the ASV (average shared variance), which shows the strength of AVE and confirms the threshold for discriminant validity [20].

Table 3. Measurement model assessment results.

Constructs	Items	Factor Loading	Cronbach's Alpha	Composite Reliability (rho_a)	Average Variance Extracted (AVE)
Interactivity	IN1	0.938	0.858	0.859	0.876
	IN2	0.933			
Product fit	PF1	0.929	0.853	0.855	0.872
	PF2	0.938			
AI-driven recommendation	AIR1	0.937	0.858	0.858	0.876
	AIR2	0.935			
Online review	OR1	0.921	0.789	0.799	0.825
	OR2	0.895			
Spatial presence	SP1	0.936	0.868	0.869	0.883
	SP2	0.943			
Subjective norm	SN1	0.846	0.773	0.783	0.786
	SN2	0.798			
	SN3	0.840			
Attitude	AT1	0.933	0.849	0.849	0.869
	AT2	0.932			
Trust	TR1	0.897	0.713	0.721	0.776
	TR2	0.864			
Continuance intention	CI1	0.852	0.707	0.717	0.741
	CI2	0.881			
	CI3	0.700			

Then, discriminant validity was checked. The diagonals represent the square root of the AVEs. The square root of all AVE scores was higher than the rest of the correlations. The diagonal value represents the square root of AVE, and the off-diagonal values represent the inter-construct correlation. Based on the above findings, we can say that the measurement model exhibited adequate reliability and validity.

5.3. Structural Model Assessment

For structural model assessment, we first assessed the value of R^2 for all dependent variables, followed by observing the collinearity statistics value for all the relationships. Table 4 shows the value of R^2 and the collinearity statistics for all the constructs and the associated relationships. The explanatory power of the proposed model was examined following the R^2 value measurement, as suggested by Hsu et al. [5]. The R^2 value for all the constructs of user platform interactions in an AR environment were examined, namely interactivity, product fit, AI-driven recommendation, and online review, on users' cognitive and emotional engagements that subsequently impact continuance intention; the values were within the range of 0.11–0.25, which is recommended as acceptable for higher values. Particularly, the R^2 values for all the constructs were greater than 0.19 in the study, as suggested for augmented reality by Hsu et al. [5]. The R^2 values of spatial presence (0.225), subjective norms (0.160, attitude (0.241), trust (0.223), and continuance intention (0.227) showed reasonable variance. Also, the collinearity statistics (VIF) value for all the relationships was less than 4.0. Both the value of R^2 (0.12–0.25) and the collinearity statistics (VIF) (<4.0) confirmed that the structural model is statistically significant (as shown in Table 4).

Table 4. R-square statistics and Collinearity statistics (VIF).

R2 Statistics			Collinearity Statistics (VIF)	
Construct	**R-Square**	**R-Square Adjusted**	**Relationship**	**VIF**
SP	0.225	0.224	IN -> SP	1.003
SN	0.212	0.210	PF -> SP	1.003
AT	0.241	0.240	IN -> SN	1.013
TR	0.223	0.222	AIR -> SN	1.051
CI	0.227	0.225	OR -> SN	1.043
			SP -> AT	1.040
			SN -> AT	1.030
			SP -> TR	1.030
			SN -> TR	1.126
			AT -> CI	1.136
			TR -> CI	1.137

The significance of the hypotheses was tested through path co-efficient (β), t-value, and *p*-value in the structural model assessment. All the hypotheses were supported with a $p < 0.05$ level. The results for the AR environment show that all our hypotheses are supported and that the sources of information positively influence users' behavioural responses. The structural model results (hypothesis testing) are provided in Table 5.

The results showed that the effects of interactivity on spatial presence (t value = 3.667) and AI-driven recommendation toward subjective norm (t value = 4.469) were more significant. It means that interactivity as a stimuli source of information has a significant impact on users' perceived spatial presence. However, there is a significant influence of AI-driven recommendation toward users' perceived subjective norm. At the same time, the relationship of subjective norm toward attitude (t = 5.893) and trust (t = 6.320) are strong and highly significant. The results reveal that the role of perceived subjective norm on developing users' attitude and trust are notable and highly significant, particularly in the context of an AR environment. Also, the relationship of trust with continuance intention (t value = 8.186) is higher than that of attitude with continuance intention (t = 3.245) (as shown in Table 5). Therefore, these critical research outcomes present a strong and highly significant relationship and suggest value propositions in developing attitude and trust toward users' continuance intention to use AR mobile platforms.

Table 5. Hypotheses testing.

Hypothesis	Relationship	Mean (M)	Std. Deviation	T Statistics	*p* Values	Strength	Conclusion
H1	Interactivity -> Spatial Presence	0.124	0.034	3.667	0.000 ***	Moderate	Statistically supported
H2	Product Fit -> Spatial Presence	0.064	0.032	2.000	0.000 ***	Weak	Statistically supported
H3	Interactivity -> Subjective Norm	0.136	0.036	3.792	0.001 ***	Moderate	Statistically supported
H4	AI-driven Recommendation -> Subjective Norm	0.153	0.034	4.469	0.000 ***	Moderate	Statistically supported
H5	Online Reviews -> Subjective Norm	0.139	0.032	4.323	0.003 **	Moderate	Statistically supported
H6	Spatial Presence -> Attitude	0.050	0.035	1.439	0.001 ***	Weak	Statistically supported
H7	Subjective Norm -> Attitude	0.214	0.036	5.893	0.000 ***	Strong	Highly significant and strong
H8	Spatial Presence -> Trust	0.097	0.035	2.787	0.003 **	Weak	Statistically supported
H9	Subjective Norm -> Trust	0.240	0.038	6.320	0.000 ***	Strong	Highly significant and strong
H10	Attitude -> Continuance Intention	0.217	0.033	3.245	0.002 **	Strong	Highly significant and strong
H11	Trust -> Continuance Intention	0.274	0.033	8.186	0.000 ***	Strong	Highly significant and strong

For *p*-values: Significant (*) = $p < 0.05$, Very Significant (**) = $p < 0.01$, Highly Significant (***) = $p < 0.001$. For Mean/β: ≥0.20 = Strong, 0.10–0.19 = Moderate, <0.10 = Weak.

This study also investigated the effects of control variables (age group and gender) on continuance intention. Among the control variables, gender did not have an impact (for males: β = 1.128, $p = 0.172$, and for females: β = 1.199, $p = 0.158$). However, age group (Generation) significantly affected continuance intention. Specifically, Generation Z had more significant effects (β = 0.595, t = 2.863, $p = 0.002$) than Millennials (β = 0.521, t = 2.504, $p = 0.006$) and Generation X (β = 0.505, t = 2.285, $p = 0.011$) on continuance intention (as shown in Table 6).

Table 6. Control variables test analysis result.

Effect of Control Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	*p* Values	Significance
Male -> CI	1.128	1.139	1.192	0.946	0.172 ^{ns}	Not significant
Female -> CI	1.199	1.210	1.194	1.004	0.158 ^{ns}	Not significant
Generation Z -> CI	0.543	0.545	0.221	2.459	0.010 **	Significant
Millennial -> CI	0.508	0.512	0.226	2.244	0.025 *	Significant
Generation X -> CI	0.485	0.487	0.218	2.221	0.026 *	Significant

Not significant (ns) = $p \geq 0.05$, Significant (*) = $p < 0.05$, Very Significant (**) = $p < 0.01$, Highly Significant (***) = $p < 0.001$.

6. Discussion

This study investigated how AI interactions in AR engage users to perceive their user experience, affecting their decision-making process toward continuance intention. Following the SOR framework, the research model theorises that AI-driven stimuli cues change users' cognitive and emotional states, creating behavioural responses. In this article, we explicated interactivity, product fit, AI-driven recommendation, and online review as sources of stimuli in AR environments. The cognitive factors include spatial presence and subjective norm. This study also included attitude and trust as emotional factors. The influence of perceived UX on behavioural response through organism variables was examined to provide evidence of cognitive and emotional assessments that influence users' continuance intention.

The results show that perceived spatial presence and subjective norm as cognitive engagements are positive and significant determining factors of developing users' attitude and trust as emotional states, which positively influence their continuance intention with AR mobile platforms. In line with prior studies, our findings and results provide evidence that there is a significant impact of perceived cognitive [10,17,18] and emotional engagements [16,40] on users' immersive perceptions, which in turn influence their continuance intention to use AR platforms. The study validates that immersive and innovative sources of information engage users to perceive their UX through the spatial presence and subjective norms that subsequently influence continuance intention. The positive effects of UX through perceived cognitive and emotional states indicate its influences on users' intention to use AR mobile platforms. Online shopping benefits through AI and AR are exposed in this study as integral parts of marketing research in the e-commerce industry by alleviating product uncertainty and the need for touch. Support for the relationships in this study confirms the significance of extending benefit analysis in AR mobile platforms [28].

This study confirms that the findings on the relationships of sensory information through multi-modal interactions, spatial presence, subjective norm, attitude, and trust are consistent with prior studies [10,39–41]. The inclusion of AI interactions in AR for assessing UX through spatial presence and subjective norm, and consequently influencing users' attitude and trust, offers a new way of understanding situated and immersive values. The results reflect the same outcome and are consistent with previous research, showing that the emotional states of attitude and trust influence users' continuance intention to use AR mobile platforms [15,22,23]. Attitude and trust were found to mediate the relationships among sense of presence, subjective norm, and continuance intention. The assessment of the attitude–trust–continuance intention correlation in the context of AI interactions for AR mobile platforms shows the importance of adopting AI–AR in mobile platforms. Therefore, this study reveals that immersive and situated experiences can alleviate uncertainty and reduce the need to physically touch products, helping to ensure user retention. UX designers and app developers should focus on technological adoption and complementary features to enhance user comfort.

This study determined two cognitive variables to present evidence of our claim that users respond to AI interaction-based stimuli cues and change their cognitive states. Also, this study examined two variables to complement users' emotional reactions. Users perceive UX through cognitive and emotional feelings, consequently influencing their continuance intention to use AR mobile platforms. The findings demonstrate how AI interactions in AR deliver immersive and situated experiences to users and change their behavioural intention to continue using AR mobile platforms as an extension of sustainable growth of the platform economy. Accordingly, users receive more immersive feelings through AI interactions and prefer to continue using the AR mobile platforms.

The results demonstrate that sources of information, especially interactivity, significantly influence spatial presence. On the other hand, AI-driven recommendations have a positive influence on subjective norms. Also, the influences of subjective norms rather than spatial presence have more influences on attitude. Furthermore, subjective norm, rather than spatial presence, has more impact on users' attitude and trust. Finally, the results affirm that trust toward continuance intention is higher than that of attitude with continuance intention.

This study also examines the effects of gender and age group on the relationships among attitude, trust, and continuance intention to use AR mobile platforms. The results show that gender does not have significant effects on those relationships. However, Generation Z has significantly higher effects on continuance intention than Millennials and Generation X. This study uniquely developed a research model that considers AI interaction-based stimuli cues that influence continuance intention. The findings of this study involve both theoretical and practical implications.

6.1. Theoretical Contribution

This research contributes to the theoretical understanding of perceived UX, considering AI interactions in augmented reality (AR) mobile platforms. It identified immersive, innovative, cognitive, emotional, and behavioural response-related factors and validated the proposed model through internal and external validation processes. We adopted a few variables from different contexts and extended them to provide empirical evidence of their applicability within the context of AI interactions on AR mobile platforms. This expands the existing literature on UX by highlighting the roles of spatial presence, subjective norm, attitude, and trust toward continuance intention. The findings confirm the significant relationships between cognitive and emotional factors, advancing the co-created values in perceiving UX through AI interactions in AR.

The existing literature investigates either purchase intention [28] or continuance intention [2,4]. However, this study contributes to extending knowledge by examining the effects of perceived cognitive and emotional engagements on users' continuance intention, particularly in AR. The study also included AI interaction-based sources of information in the user–platform interaction paradigm and identified more insights on how AR mobile platforms enable more interaction capabilities through a co-created immersive environment to avoid uncertainties in a decision-making process.

The I-E-I model includes multiple perspectives in determining the effects of AI interactions in AR toward a journey mapping of UX through cognitive and emotional factors. Therefore, the proposed model offers a valuable proposition within the AI interaction paradigm for AR mobile platforms, extending a research direction that emphasises immersive, technological, and psychological engagements. Finally, this study validates the importance of incorporating AI interactions in AR into the SOR framework by integrating the user–platform interaction paradigm. This explains that users' decision-making process in AR, especially considering AI interactions, is challenging and complex when assessing UX and its influence on users' behavioural responses. Therefore, designers and app developers can follow the I-E-I model to understand users' perceived user experience that embraces emerging technologies in the product development cycle.

6.2. Practical Implications

From a practical perspective, this study offers valuable insights for developers and designers in designing, developing, and optimising AR mobile platforms to enhance UX and drive continued user engagement. The research outcomes clearly demonstrate that UX designers and marketing professionals can emphasise users' perceived subjective norms, which establish a strong relationship with the development of users' attitude and trust. Furthermore, there is a strong relationship between attitude and trust and users' continuance intention to use AR mobile platforms that accommodate AI-driven user–platform interactions.

Mobile platform designers and developers can create immersive UX through realistic rendering powered by AI and AR, enhance interaction capabilities, integrate AR features with social media, improve recommendation process via predictive analytics, and focus on building user trust and attitude-driven mechanisms. The platform industry can enhance the design and strategic capabilities of the platform throughout the product development cycle, following the research outcomes that can make them more inclusive, human-centric, and sustainable.

The study's findings related to demographical insights can assist in developing targeted marketing strategies that appeal to different demographic segments, including Generation Z and Millennials. Highlighting trust-building initiatives and leveraging satisfaction can help shape users' perceptions and foster continued usage. Companies operating AR mobile platforms can focus on incorporating AI technology to enhance user comfort and feedback mechanisms to address their preferences, build trust, and improve overall attitude. Product presentation, recommendation loops, interactivity, and transparent communication channels can contribute to continuous improvement and users' intention to use AR mobile platforms.

Additionally, insights on generational effects on user behaviours suggest that online retailers can advance and extend their AR platforms to reach a global demographic, while considering generation gaps highlighted in this study. Tailoring UX to different age groups can enhance market penetration and boost consumer retention across diverse segments. Immersive shopping benefits are essential considerations in IS research for advancing virtual marketing strategies by reducing the need for touch and alleviating product uncertainty.

Finally, perceived UX through cognitive and emotional states is endorsed as an essential consideration in our research model. Users who perceive UX with the increased value of spatial presence consequently develop higher attitude levels by building positive trust towards the AR mobile platforms. It subsequently influences users' continuance intention to use the platform. Therefore, retailers and app developers should extend their analytical capacity to understand users' flow of experiences and make more immersive engagement with AI interactions to provide them with optimum levels of comfort and accommodate their preferences.

6.3. Limitations and Future Work

The focus on a specific AR platform, the IKEA app, may limit the generalizability of our findings. Future research could address these limitations by employing more extensive and diverse samples, using objective measures, exploring different AR platforms with different contexts, and considering cross-cultural influences. This study can be extended for other industry contexts, such as digital health monitoring, tourism, intelligent transportation, and gaming, where future research can assess user experience across diversified user–platform interactions. Also, UX designers and developers can develop interactive AR platforms and conduct experimental methods to assess decision-making for design considerations. Moreover, future studies could benefit from longitudinal designs, experimental approaches, qualitative methods, and exploration of emerging technologies like blockchain and the Internet of Things to deepen our understanding of perceived user experiences and their relevance to impulse buying and continuance intention in AR mobile platforms.

7. Conclusions

User experience is an important domain for IS researchers to effectively retain users toward the sustainable progress of AR mobile platforms within the e-commerce industry. AI interactions offer immersive values in AR and enable them to use more data-driven approaches in changing users' cognitive and emotional states. As a result, these perceived values enhance users' attitude and trust, positively influencing continuance intention. This study empirically examined the effects of various AR–AI interactions-based stimuli cues on UX that influence continuance intention to use AR mobile platforms. Also, this study has revealed that trust and attitude on AR mobile platforms mediate the relationship among perceived spatial presence, subjective norm, and continuance intention. For sustainable progress in the retail industry, particularly e-commerce, AI interactions within augmented reality platforms offer immense opportunities by enabling immersive and interactive experiences. The empirical findings of this research aim to advance the emerging potential of AI and AR in online retail environments.

Author Contributions: Conceptualisation, Z.S.K.; methodology, Z.S.K.; software, Z.S.K.; validation, Z.S.K.; formal analysis, Z.S.K.; investigation, Z.S.K.; resources, Z.S.K.; data curation, Z.S.K.; writing—original draft preparation, Z.S.K.; writing—review and editing, Z.S.K. and K.K.; visualisation, Z.S.K.; supervision, K.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data will be made available on request.

Conflicts of Interest: We declare there are no conflicts of interest because we are conducting this study. No external agencies funded the research.

Appendix A

Table A1. Measurement items and scales.

Items	Construct	Measurement Items	Sources
IN	Interactivity	IN1: I was in control of navigating the AR mobile platform	Wang et al. [17]
		IN2: The AR mobile platform was responding to my specific needs quickly and efficiently	
PF	Product Fit	PF1: I could no longer doubt that the product would fit my desired spaces.	Sun et al. [1]
		PF2: I could measure the product size to check for my desired space.	
AIR	AI-driven Recommendation	AIR1: When interacting with the platform, AI marketing technology recommends what I want based on browsing habits.	Yin & Qiu [13]
		AIR2: With the support of AI marketing technology, the AR mobile platform can arouse my shopping desire.	
OR	Online review	OR1: Online user review is a deciding factor in continuing to use the AR mobile platform.	Chatterjee et al. [25]
		OR2: I follow the online review score to choose a product or service using the AR mobile platform.	
SP	Spatial Presence	SP1: I felt like the product meshed with the AR mobile platform.	Tawira and Ivanov [10] Smink et al. [18]
		SP2: It seemed to me that I could do whatever I wanted with the products in the AR mobile platform.	

Table A1. *Cont.*

Items	Construct	Measurement Items	Sources
SN	Subjective norm	SN1: AI marketing recommendations arouse my platform usage.	Belanche et al. [8] Kumar et al. [21]
		SN2: In my culture, online reviews play an important role when using a mobile platform.	
		SN3: Most people I know would like to continue using the platform after observing the online trends.	
AT	Attitude	AT1: I think that an AR mobile platform benefits me	Sun et al. [1]
		AT2: I have gained positive perceptions about using an AR mobile platform.	
TR	Trust	TR1: I feel safer using the AR mobile platform.	Kang et al. [16]
		TR2: I am pretty sure what to expect from the platform.	
CI	Continuance Intention	CI1: I intend to stay on as a member of using this AR mobile platform.	Yin and Qiu [13]
		CI2: I will frequently use the AR mobile platform in the future.	
		CI3: I would prioritize the AR mobile platform over other alternative means.	

Table A2. Survey Questionnaire (from Qualtrics).

Consent Matter		
Please give your consent by agreeing to acknowledge the attached consent form		
O Yes, Agree	O No	
Platform Interaction		
You are invited to click the AR View button on the page to locate the virtual product in your physical space. To scan the QR code using your mobile phone(provided in the Qualtrics). Please click on the go back to continue the survey after interacting with the AR mobile platform. https://www.ikea.com/au/en/p/malm-chest-of-4-drawers-white-20354646/ (created on 19 October 2023)		
Confirmation		
By agreeing to participate, you confirm that you have interacted with an AR mobile platform.		
O Yes	O No	
Verification (Identifiable questions)		
What was the drawer's colour when entered into the AR mobile platform using the above hyperlink?		
O White	O Blue	O Red
What is the required click option to get the AR view page in the AR mobile platform?		
O Upload	O View in AR	O Enter.
How many years have you been using shopping mobile platforms (mobile apps or responsive websites)		
Participant information		
How many years have you been using shopping mobile platforms (mobile apps or responsive websites)		
O Less than 1 Year	O 1–2 Years	O More than 2 Years
Demographic Characteristics		
What is your gender identification?		
O Male	O Female	O Prefer Not to Say

Table A2. *Cont.*

How old are you?					
18–26 Years		27–42 Years	43–58 Years		59 Years and More
What is the level of education you have attended in Australia?					
Primary	Secondary	Bachelor's	Vocational	Graduate	Not Attended in Australia
Survey Questionnaire—Sources of Information					
How did you feel about the control over navigating the IKEA AR mobile platform?					
Not controlled		Somewhat not controlled	Neither controlled nor uncontrolled	Somewhat controlled	Controlled
How did the IKEA mobile platform respond to your requirements?					
Non-responsive		Somewhat non-responsive	Neither non-responsive nor responsive	Somewhat responsive	Responsive
How did you confirm that the product fits in your desired space?					
Extremely unfit		Somewhat unfit	Neither unfit nor fit	Somewhat fit	Extremely fit
How did you measure the product size to check for your desired space?					
Not measurable		Somewhat not measurable	Neither measurable nor not measurable	Somewhat measurable	Measurable
How would you like to get recommendations using AI marketing technology from the platform based on browsing habits?					
Extremely unlikely		Somewhat unlikely	Neither unlikely nor likely	Somewhat likely	Extremely likely
How would AI marketing technology arouse your shopping desire to use the IKEA AR mobile platform?					
Strongly disagree		Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
How would online reviews act as a deciding factor in continuing to use the AR mobile platform?					
Not influenced		Somewhat not influenced	Neither influenced nor not influenced	Somewhat influenced	Influenced
How do you follow the online review score to choose a product or service using the AR mobile platform?					
Not regularly		Somewhat not regularly	Neither regularly nor not regularly	Somewhat regularly	Regularly
Survey Questionnaire—Cognitive Engagement					
How did you feel about the product being meshed with the AR mobile platform?					
Extremely displeased		Somewhat displeased	Neither displeased nor pleased	Somewhat pleased	Extremely pleased
It seemed that you could do whatever you wanted with the products in the AR mobile platform. How would you describe the statement?					
Strongly disagree		Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
AI marketing recommendations arouse your platform usage. What do you think about the statement?					
Strongly disagree		Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
How would online reviews play an essential role in using mobile platforms in your culture?					
Unlikely		Somewhat unlikely	Neither likely nor unlikely	Somewhat likely	Likely
Most people you know would like to continue using the mobile platform after observing the online trends. What do you think?					
Strongly disagree		Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
What do you think about the benefits that the IKEA AR mobile platform gives you?					
Much lower		Slightly lower	About the same	Slightly higher	Much higher
How did you gain the perceptions about using the IKEA AR mobile platform?					
Less perceived		Somewhat less perceived	Neither less perceived nor more perceived	Somewhat more perceived	More perceived
Do you trust using the IKEA mobile platform?					
Highly untrusted		Somewhat untrusted	Neither untrusted nor trusted	Somewhat trusted	Highly trusted
Are you quite sure what to expect from the IKEA AR mobile platform?					
Not clear		Somewhat not clear	Neither clear nor confirmed	Somewhat confirmed	Confirmed
What is your intention to stay on as a member of using this AR mobile platform?					
Definitely not		Probably not	Might or might not	Probably yes	Definitely yes

Table A2. *Cont.*

Are you determined to use the AR mobile platform in the future frequently?				
Definitely not	Probably not	Might or might not	Probably yes	Definitely yes
How would you give the AR mobile platform priority over other alternative means?				
Less priority	Somewhat less priority	Neither less nor more priority	Somewhat more priority	More priority
End of Survey Thank you for your time spent taking this survey Your response has been recorded				

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