UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Exploring User Experience through User-Platform Interactions in Augmented Reality: An Interaction-Engagement-Intention Model Perspective

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Zian Shah Kabir, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy in the Faculty of Engineering and Information Technology at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Dedication

To my beloved mother, sisters, wife, and children, thank you for your unwavering love and encouragement, which have helped me to accomplish my academic journey.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI – Artificial Intelligence

AIR – Artificial Intelligence-driven Recommendation

AR – Augmented Reality

CI – Continuance Intention

ECT – Expectation Confirmation Theory

5G – Fifth Generation of Mobile Communication

Gen – Generation

HCI – Human-Computer Interaction

HD – High Definition

I-E-I – Interaction Engagement Intention

IS – Information System

ISCM – Information System Continuance Model

MI – Mental Imagery

NQ – Network Quality

OR – Online Review

PF – Product Fit

PLS – Partial Least Square

SCT – Situated Cognition Theory

SEM – Structural Equation Model

SI – Sense of Immersion

SN – Subjective Norm

SOR – Stimulus-Organism-Response

SP – Sense of Presence

3D – Three Dimension

TPB – Theory of Planned Behaviour

TTM – Trust Technology Model

UX – User Experience

Exploring User Experience through User-Platform Interactions in Augmented Reality: An Interaction-Engagement-Intention Model Perspective

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ABSTRACT

This thesis explores a nuanced understanding within user-platform interactions of how augmented reality enhances user experience through cognitive and emotional engagements. This study uniquely addresses the consequences of AR interactions through sources of information toward users' continuance intention with the moderating effects of origin culture, age group, and acculturated culture in a multicultural society. This resulted in a robust and efficient way to explain user experience through immersive values that enhance the user retention process.

An adaptive, inclusive, and integrated interaction-engagement-intention (I-E-I) model was developed, grounded on the stimulus-organism-response (SOR) framework, to advance theoretical knowledge on assessing user experience in the AR interaction paradigm. This study demonstrated an exploratory sequential approach that designed qualitative and quantitative methods to address the emerging field of study. As a result of the mixed-methodological approach, a reflexive thematic analysis and a partial least square–structural equation model (PLS-SEM) were adapted to accommodate theme generation, valuable insights, and statistical analysis. This study also applied a permutation multigroup analysis (MGA) to investigate the moderating effects of origin culture, age group, and acculturated culture.

The results indicated that user-platform interaction through augmented reality positively and significantly impacts user experience on users' attitude, satisfaction, and building trust, which consequently affects users' continuance intention to use augmented reality mobile platforms. Further, the results suggest that users' origin culture, age group, and acculturated culture moderate

the relationships among sources of information, UX, and continuance intention in an AR environment.

The study provides managerial insights that could identify multicultural adaptiveness with AR mobile platforms in a multicultural society. Even more, research outcomes may support UX designers, researchers, developers, solution providers, and marketing professionals to comprehend how AR enhances UX. Specifically, retailers and app developers can extend their analytical capacity to understand users' flow of experiences and make more immersive engagement with user-platform interactions. Toward the end, this study discussed the theoretical implications and managerial contributions of research findings, and presented directions for future research engagements.

Keywords: User experience, augmented reality, user-platform interaction, continuance intention, interaction-engagement-intention model.

LIST OF PUBLICATIONS AND PRESENTATIONS

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Kabir, Zian Shah; Kang, Kyeong, and Sohaib, Osama, "Explaining Artificial Intelligence Interaction Paradigm towards Continuance Intention in Augmented Reality", Electronic Commerce Research and Applications. Manuscript ID: ECRA-D-24-00710. (https://www.sciencedirect.com/journal/electronic-commerce-research-and-applications). (Under review)

Kabir Z, Kang K, "Explaining Sources of Information in Perceiving User Experience on Continuance Intention: An Augmented Reality Mobile Platform Perspective", International Journal of Business and Social Science. Manuscript ID: 19502. (https://www.ijbssnet.com/). (Under review**)**

Kabir, Zian Shah; Sajib, Shahriar, "Using a Conceptualization of Artificial Intelligence Driven Invisible Actors toward Subjective Norm: An Interaction Framework for Augmented Reality Platforms", Journal of Business Research. Manuscript ID: JOBR-5-25-01615. (https://www.sciencedirect.com/journal/journal-of-business-research). (Under review)

Kabir Z, Kang K, "How User-Platform Interactions Influence Continuance Intention in Augmented Reality: An Interaction-Engagement-Intention Model", Machines. Manuscript ID: 3271418. (https://www.mdpi.com/journal/machines/special_issues/5GY3AB7ZM3). **(**Under review**)**

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Zian has been awarded the Vice Chancellor's Conference Fund (VCCF) for round 1 2024 to attend the Americas Conference on Information Systems (AMCIS), 14 - 18 August 2024, Salt Lake City, Utah, USA.

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CHAPTER 1
INTRODUCTION

This chapter presents an overview of this research exploring user experience through user-platform interactions in augmented reality. The chapter begins with the research background, briefly describing the study's summary. Then, the successive sections of this chapter outline the research problem, motivation, and knowledge gaps for undertaking this study. A section describes research questions and objectives, followed by an overview of the method and the significance of the study. This chapter concludes with a thesis statement, outline of the thesis structure, and summary of the chapter.

1.1 Research Background

Nowadays, digital technologies have changed a paradigm shift in perceiving user experience (UX), and the converged nature of service deliberations varies across different aspects. In an interactive mobile platform, augmented reality (AR) transforms the way of assessing user experience through user-platform interactions involving engagements through sensory information. AR allows users to perceive UX through cognitive and emotional engagements (Kabir & Kang, 2024; Torres et al., 2020; Ameen et al., 2021) while reducing product uncertainty and the need for touch (Sun et al., 2022). However, these engagements through user-platform interactions influence users' behavioural responses to prioritise their decision-making, which might affect the user retention process (Chandler et al., 2022). Conversely, mobile platforms are expanding their business servicescape to transnational boundaries, and socio-cultural values play an essential role in a multicultural society. On the other hand, generation in user groups is essential in addressing choices and requirements through immersive technologies.

In an AR mobile platform, user-platform interactions through product virtualisation explore the enormous potential to revolutionise UX that supports users in perceiving immersive values. This study explained those virtual engagements through an integrative assessment process that

explains how to understand UX by exploring users' requirements with the immersive features of AR (Wu & Kim, 2022). These requirements have extended due to rapid changes in user demands in heterogeneous networks through human-computer interaction (HCI) and the availability of different sources of information. Notably, COVID-19 escalated the nature of interactions in online platforms and transformed the evolving characteristics of assessing UX in an AR environment (Billewar et al., 2022). It changes users' habits in adopting AR mobile platforms to engage in virtual interactions by alleviating uncertainties. From a theoretical perspective, this study developed a comprehensive understanding of UX by integrating user-platform interactions in AR that involve cognitive and emotional engagements, thus influencing users' decision-making towards the user retention process (Chandler et al., 2022; Keegan et al., 2022). This thesis explores how user-platform interactions with AR while integrating with mobile platforms can support users in enhancing continuance intention by shaping the UX through cognitive and emotional engagements.

In this study, interaction-based sources of information for AR have been identified as stimulus cues in the user-platform interaction paradigm that provide sensory information to end-users. The user-platform interactions co-create immersive value proposition that engage vividness and interactivity as sensory information in an AR environment (Wu & Kim, 2022; Liu & Wang, 2021). Furthermore, this study investigated the perceived UX through product virtualisation, where AR allows users to try on or track virtual products in their desired spaces (Pereira et al., 2023), thus involving a product fit capability for the AR mobile platform (Sun et al., 2022). Moreover, this study identified network quality as an essential characteristic in maintaining seamless communication through an advanced wireless network (Huang et al., 2023) to deliver immersive services to end-users. Further, standard network and peripheral qualities through advanced wireless systems were addressed to explain immersive services that allow users to interact with uninterrupted services (Hazarika & Rahmati, 2023; Kowalczuk et al., 2021). Considering the innovative social influences, interactive recommendations using artificial intelligence (AI) algorithms (Goti et al., 2023) and users' opinions or feedback using social

networks, blogs, or platform sites to engage in online reviews (Al Amin, 2022) were addressed as external innovative sources of information. This investigation identified critical factors with the AR mobile platform that positively engage innovative and interactive sources of information.

This thesis presents a theory for describing how to process sources of information and guide users' cognitive and emotional engagements to perceive UX. The effects of user-platform interactions were investigated to explain how they motivate users' intrinsic values in an AR environment, which leads to explaining cognitive engagements (Acharya et al., 2023; Jumaan et al., 2020). Firstly, mental imagery was derived as a cognitive engagement (Park, 2020) in an AR mobile platform that explained how virtual interactions with an AR mobile platform create schema through the information processing of a 3D product. Secondly, this study included immersion to replicate product virtualisation and movement through a cognitive engagement (Chandler et al., 2022) that involves a sense of immersion (Daassi & Debbabi, 2021). Thirdly, sense of presence was derived as another cognitive engagement (Kim et al., 2023) in an AR mobile platform that allows users to perceive cognitive feelings by placing and tracking virtual products through haptic interactions in the real world. In the fourth context of social influences, this study investigated the influences of online social actors on their opinions and recommendations in interactive virtual spaces to correlate with subjective norms as a cognitive engagement (Faqih, 2022). This study explained cognitive engagements, particularly with the user-platform interactions in AR mobile platforms, which explored mental imagery, sense of immersion, sense of presence, and subjective norm toward users' continuance intention.

This study examined the consequences of perceived cognitive engagements toward emotional feelings that influence users' intentions to continue using AR mobile platforms. In the context of emotional engagement (Jessen et al., 2020), this study explained users' attitude, satisfaction, and trust as resultants of perceived cognitive engagements with the confirmation of fulfilling the users' expectations from AR mobile platforms (Kabir et al., 2024a; García et al., 2020; Nguyen & Ha, 2021). Users' cognitive and emotional engagements were explained through user-platform interactions in an AR environment that influences UX. This thesis investigated the process of

perceiving UX through these engagements, facilitating users' decision-making to use AR mobile platforms (Acharya et al., 2023; Zhang et al., 2023). This study explained the development continuance intention as a behavioural response to continue using AR mobile platforms, considering the effects of perceived UX through cognitive and emotional engagements that extended the research to understand the user retention mechanism in the platform economy (Chandler et al., 2022). The relationships among sources of information, perceived UX, and continuance intention were analysed, considering user-platform interactions in an AR environment that explains the user retention process by minimising uncertainties and the requirements for physical touch.

In socio-cultural aspects, this study described origin culture, age group, and acculturated culture as critical socio-cultural factors influencing users' preferences, values, and behavioural intentions to interact with AR mobile platforms. The effects of users' origin culture on continuance intention were investigated through cultural values, beliefs, and individual group members' perceptions that insist on their intention to use AR mobile platforms in a multicultural society (Chatterjee et al., 2022). In this study, individualism/collectivism and uncertainty avoidance as cultural dimensions were considered to identify the origin cultural groups in a multicultural society like Australia for investigating users' continuance intention in an AR environment (Martínez et al., 2023). Furthermore, Cabanillas and Santos (2017) studied that generation or age group may identify users' classifications with distinct sociocultural norms and their effects on continuance intention. The study investigated the moderating effects of age groups on relationships developed in the I-E-I model. Moreover, this study explained the effects of acculturated culture on the behavioural change of users who migrated from the native to host culture in a multicultural society. This thesis explored the nuanced understanding of the moderating effects of origin culture, age group, and acculturate culture on the relationships among sources of information, UX, and users' continuance intention, considering a multicultural society like Australia (Kim, 2001).

1.2 The Problem – Experiences with Augmented Reality

The central problem to be investigated in this thesis is the assessment of UX through cognitive and emotional engagements considering user-platform interactions in an AR environment with the moderating effects of origin culture, age group, and acculturated culture. Although AR involves more interaction capabilities in mobile platforms, there is a significant knowledge gap in investigating UX through sensory engagements, and how AR alleviates uncertainties considering the physical distance between users and virtual products in a mobile platform (Sun et al., 2022). This study identified the problem as threefold and demanded further investigation.

The first issue identified a lack of identification of sources of information as stimuli cues in an AR environment, considering immersive, product placement, network qualities, and social influences through innovative sources. For this study, user-platform interactions in AR mobile platforms were considered to determine different sources of information. It is evident that AR engages virtual interactions that engage interactive and innovative sources of information.

The second issue identified a gap in explaining UX through cognitive and emotional engagements in AR that were unrealised for users' continuance intention. Assessing UX through user-platform interactions in AR is an emerging research phenomenon that requires an extension of understanding cognitive and emotional engagements and explaining user retention mechanisms through continuance intention.

The third issue identified is the socio-cultural factors influencing users' intention to use AR mobile platforms. Usually, "socio-cultural traits" refer to an engagement assessed through different origin cultures, age groups, and acculturated cultures, especially in a multicultural society, that may influence their intentions to continue using AR mobile platforms. A thorough review of assessing user experience, in particular, found a lack of knowledge on the moderating effects of cultural traits and age groups, describing cognitive and emotional engagements in the context of AR.

1.3 Research Motivation

Mobile platforms accommodate AR and allow users to engage with sensory information, achieving a sustainable e-commerce industry with a higher penetration rate of mobile adoption and technological advancements. It demands extending research studies in different domains, including retail (Acharya et al., 2023), tourism (Martinez et al., 2023), education (Hsieh et al., 2019), digital health (Sany et al., 2023), gaming (Faqih, 2022), and hospitality management (Jung et al., 2018). Each domain is attended by its characteristics and service requirements, contextual usage, and industry demands. The Global Systems for Mobile Communications Association (GSMA) announced that 400 million new mobile subscriptions with a total of 5.7 billion users will be reached at a penetration rate of 100% by 2025 in the world, and the percentage of smartphone connections is projected to reach 85% (The mobile economy report 2023, GSMA). In another context, Statista reported that 77 billion mobile apps were downloaded in the first half of 2023, and 49% of users open at least one app 11 times daily (Global mobile app usage 2023, Statista). This may be notably important in understanding user perceptions, such as UX for user-platform interactions in AR, where individuals perceive uniquely and versatile usage of AR with a higher penetration rate of mobile subscriptions and smartphone adoption, and UX assessment for this research phenomenon has been unexplored.

UX is pivotal in analysing the user journey in the growing e-commerce industry. Due to the COVID-19 effect, e-commerce transactions have increased by 26.4%, resulting in US$ 4.248 trillion immediately after the pandemic outbreak in 2020 (Cramer-Flood, 2022). Even so, the annual Retail Trade Survey (ARTS) of the United States Census Bureau released that e-commerce sales increased by US$ 244.2 billion, resulting in 43% penetration in 2020, increasing from US$ 571.2 billion in 2019 (ARTS, US Census 2022). Conversely, customer engagement hub, customer journey analytics, and graph analytics for customer experience (CX) are depicted as the peak of inflated expectations in the hype cycle for customer experience analytics, and influence engineering, multi-experience analytics, and customer psychographics will trigger the next 5-10 years in the hype cycle for customer engagement (Gartner, 2023). Considering market analytics,

seamless experiences through user engagement using mobile platforms demand extensive research to assess users' cognitive and emotional engagements towards behavioural intentions.

In addition, immersive technologies encourage users to perceive UX through sensory information, which supports user retention. Ericson introduced the term “Internet of Senses” to enhance online experiences in the 5G-enabled environment using immersive technologies. The consumer research report of Ericsson shows that early adopters will use the Internet of Senses through mobile applications by 2030, and 33 percent are expected to see immersive online shopping through the Internet of Senses (Ericsson, 2022). Therefore, user retention through immersive technologies is a crucial research area in the information systems (IS) field. Furthermore, Forbes reported that it costs five times more to attract new users than to retain existing ones (Jia Wertz, 2018). Similarly, previous studies suggest that increasing user retention rates by 5% increases profits by 25% to 95% in loyalty rules (Reichheld, 2001). Although user retention is essential for business continuity, research may be explored to analyse UX toward continuance intention in the context of AR, which can be extended in the mobile platform industry.

In Australia, the e-commerce market is expanding through the advancement of wireless networks throughout the country. According to a GSMA report, Australia launched 5G in early 2019. The mobile internet landscape has matured with an adoption level of more than 80%, and 32.71 million mobile connections were achieved in 2023. As of 2023, 5G networks reached Australia’s mass areas by around 42% (GSMA Mobile Economy Report, 2023). On the other hand, Australia has experienced a high penetration in the e-commerce market and is expected to achieve 21.31 million users with a penetration rate of 77.6% by 2027 (Statista report, 2023). Prior research has focused on assessing UX from a cross-cultural or national perspective. However, little knowledge has been expanded on framing research design to assess UX in a multicultural society like Australia.

1.4 Knowledge Gap

The literature about UX has emphasised the development of cognitive (David et al., 2021) and emotional (Jessen et al., 2020) engagements in perceiving UX through different sources of information. Although AR is accommodated in developing mobile platforms, there is limited knowledge about the trends, particularly the effects of user-platform interactions with AR in perceiving UX. This study identified the gaps that existing studies have paid less attention to exploring users' continuance intention (Martinez et al., 2023), considering interactive, immersive, and socio-technological factors in an AR environment. Further, existing literature has studied less to assess UX in AR environments; the moderating effects of origin culture, age group, and acculturated culture toward continuance intention in a multicultural society (Elsharnouby & Maher, 2023), like Australia, are unexplored. Thus, this study investigates ways of assessing UX towards continuance intention with the effect of cultural traits and age groups in an AR environment.

UX research in AR is an emerging field, owing to its virtual capabilities that engage multiple immersive and innovative factors in an AR interaction paradigm. For example, online retailers accommodate AR technology to enhance capabilities through user-platform interactions, and platforms allow users to engage with immersive experiences through intrinsic value (Nhan et al., 2022). Even so, research has not been extended to assess UX considering sensory information in AR mobile platforms, particularly user-platform interactions through product virtualisation. There is a lack of knowledge on how immersive and innovative characteristics of AR co-create values in an intelligent servicescape by incorporating stimulus information that improves user experience through real-time interactions in an AR servicescape (Roy et al., 2019). Having said that, existing studies considered a few factors related to product virtualisation and platform features for an AR environment in the UX assessment process (Vaidyanathan et al., 2022; Hong Qin et al., 2021), not investigate the rapid development of an interactive e-commerce mobile platform using AR that engages new immersive features and transforms the way of assessing UX through multi-modal interactions.

In addition, UX research focused on processing information through psychological processes (David et al., 2021) and ignored the complex human organism mechanism through cognitive and emotional engagements in user-platform interactions. For example, Acharya et al. (2023) explained cognitive engagements as a consequence of perceiving user experience in an augmented reality environment. Notably, mental imagery, sense of presence, aesthetic view, situated experience, and embedded experience are critical cognitive states that explain perceived values through user-platform interactions (Nhan et al., 2022; Hilken et al., 2017). Further, users' emotional states can be described while attitude, satisfaction, and trust are reached after confirming the perceived performance by fulfilling the user's expectations from a technological system (Vo et al., 2022; Kumar et al., 2023). Moreover, an emerging concept of assessing the effects of emotional feelings towards users' decision-making relates to the user retention process (Hsu et al., 2021; Hong Qin et al., 2021).

Consequently, this study follows the stimulus-organism-response (SOR) framework to describe the UX mechanism through user-platform interactions in an AR mobile platform. Although previous studies apply the SOR paradigm to develop research models (Goel et al., 2023; Barta et al., 2023; Al-Adwan et al., 2022), it demands extending theoretical knowledge in assessing UX considering cognitive and emotional engagements through user-platform interactions in AR. Therefore, an integrated UX model can support understanding the development of cognitive and emotional engagements (Jessen et al., 2020; David et al., 2021) through user-platform interactions towards continuance intention in an AR environment and better explain users' continuance intention.

In addition, an integrated model to understand and assess UX from the user's socio-cultural perspective is unexplored. In response to socio-cultural effects, Mortimer et al. (2022) suggested that an individual's ethnic or origin culture with shared values, common cultural beliefs, and attitudes may influence users' behavioural responses. Furthermore, individualism/collectivism and uncertainty avoidance are the most relevant cultural dimensions to address national culture identity for assessing continuance intention to use technological systems (Martínez et al., 2023).

Further, the age group may also significantly affect users' behavioural responses to technology adoption or continuance intention (Cabanillas & Snatos, 2017). Moreover, cultural acculturation occurs through changing characteristics of users' psychological states when migrants stay in a host culture and transform their cultural practices from origin cultures to host cultures (Ma & Xia, 2021), where the effects of users' acculturated culture can be investigated in perceiving UX (McCormick & Quinn, 2020) for an AR environment. However, the nuanced understanding of the acculturation effect can be measured appropriately through living periods and attending educational institutions in a multicultural society (Kim & Gorman, 2022). Therefore, there is a research gap in investigating the moderating effects of acculturated culture toward continuance intention, particularly how acculturated users respond to AR mobile platforms in a multicultural society

1.5 Scope of the Study

This thesis highlights the scope of research by reviewing the literature, methodological approach, and analytical methods in assessing UX in the context of AR. In the context of e-commerce (B2C) mobile platforms, we investigated to explain the UX for an AR environment. The study examined the perceived UX through cognitive and emotional engagements toward continuance intention, identifying immersive, interactive, and socio-cultural factors (Chapter 2). This study developed a conceptual model by developing hypotheses considering user-platform interaction in an AR environment (Chapter 3). An AR mobile platform, IKEA, was chosen, allowing users to interact with virtual products through AR view capabilities. This study mainly designed a mixed-method approach with a qualitative method and extracted valuable insights from users' perceived user experience with the AR mobile platform. Then, a quantitative method was applied to collect data from respondents to validate and test the proposed model (Chapter 4).

Firstly, two focus group interviews were conducted to identify critical factors for assessing UX, considering the nature of the research field. Then, an online survey was conducted to assess UX through questionnaire responses. However, owing to the limited group of respondents who

interact with AR-based mobile platforms, we do not claim that our findings can apply to every spectrum of virtual platforms. The findings essentially revealed the perceived user experience of respondents on continuance intention through understanding the user retention process by explaining users' cognitive and emotional engagements with AR (Chapter 5). The research outcomes may support guidance for UX designers, researchers, marketing professionals, and technology solution providers dealing with AR mobile platforms to provide seamless experiences for end-users.

In an AR mobile platform, this thesis explores valuable implications of how AR co-creates values through user-platform interactions, impacting UX through cognitive and emotional engagements. The study defines different sources of information as stimuli cues, considering product virtualisation, virtual interactions, interactive recommendations, and in-platform reviews, as well as how these stimuli cues impact UX. Furthermore, this study explains the consequences of cognitive engagements through attitude, satisfaction, and trust toward the user's continuance intention. Also, we construct cognitive and emotional factors to develop an Interaction-Engagement-Intention (I-E-I) model, following the schema theory, the flow theory, the situated cognition theory, the theory of planned behaviour, the expectation-confirmation theory, and the trust-technology model into the stimulus-organism-response (SOR) framework. This study developed hypotheses by considering UX in the context of an AR mobile environment. The study applied the SOR framework to explain the effects of sources of information in perceiving UX through cognitive and emotional engagements in the AR context. Moreover, we critically investigated the assessment of users' continuance intention with the moderating effects of origin culture, age group, and acculturated culture in AR mobile platforms.

1.6 Research Aim and Objectives

Considering the research gaps in the context of AR, the study aims to explore the UX mechanism through perceived cognitive and emotional engagements, influencing continuance intention to use AR mobile platforms with the moderating effects of cultural traits and age groups. This thesis attempts to achieve the research aim through three objectives.

OBJECTIVE 1: To identify critical factors influencing continuance intention to use AR mobile platforms by explaining the perceived UX through user-platform interactions.

Although the multi-sensory effects of AR in a mobile platform were well-discussed (Heller et al., 2019), there is still limited empirical research on the effects of addressing immersive and innovative sources of information (Tawira & Ivanov, 2023). External sources of information in AR mobile platforms play a vital role in interacting with AR mobile platforms and engaging users to perceive a better UX. Furthermore, influences from peer groups, reviews, and external innovative sources engage users to perceive subjective norms in the AR mobile platform, engaging in personal fulfilment and exchanging their perceived experiences (Cabanillas & Santos, 2017). This study focuses on sources of information using user-platform interaction, which engages sensory effects toward users in AR environments (Belanche et al., 2019).

In AR, user-platform interactions engage sensory information that involves immersive feelings through product virtualisation. Previous literature shows that critical characteristics of AR develop immersive shopping experiences in apps (Hsu et al., 2021), which alleviates uncertainty and reduces the need to touch products. Furthermore, body esteem and photo satisfaction involve situated experience through perceived augmentation that develops product fit confidence in virtual try-on apps (Tawira & Ivanov, 2023). Conversely, influences from peer groups, reviews, and external innovative sources engage users to perceive subjective norms in the AR mobile platform, engaging in personal fulfilment and exchanging their perceived experiences (Cabanillas & Santos, 2017). Thus, this study investigates identifying sources of information through user-platform interactions in an AR mobile platform context.

OBJECTIVE 2: To understand the relationships among sources of information, user experience and continuance intention for user-platform interaction in AR mobile platforms.

This study includes four cognitive engagements, namely mental imagery, sense of immersion, sense of presence, and subjective norm and three emotional engagements, namely attitude, satisfaction, and trust. Sun et al. (2022) explained the positive impact of sources of information

on users' behavioural responses through cognitive engagements. In AR, interactions with a virtual product allow users to create mental sketches through cognitive engagements, which form mental imagery (Heller et al., 2019). In another context, sensory information through user-platform interactions in AR fulfils users' expectations through perceived cognitive values that develop a sense of immersion (Daassi & Debbabi, 2021) to feel more realistic about virtual products in physical spaces. Furthermore, AR allows users to avail virtual try-on features with computer-generated objects in physical space (Smink et al., 2020), while users perceive UX through a sense of presence. Similarly, Wang describes that AR mobile platforms engage users to perceive a unique psychological state of "being there" that defines a sense of presence, following the situated cognition theory (Wang et al., 2021). In the context of social influences, prior studies confirm the positive effect of subjective norms on online shopping behaviour (Chatterjee et al., 2022; Kumar et al., 2023). Moreover, Chandler et al. (2022) addressed that AR changes users' perceptions and its consequences on the decision-making process in e-commerce mobile platforms.

In an interactive AR mobile platform, perceived cognitive engagements influence users' attitudes that mediate the relationships toward behavioural intention to use mobile apps (Cabanillas & Santos, 2017; Alimamy & Gnoth, 2022). Therefore, interactions with AR mobile platforms develop attitudes that change users' emotional feelings. Furthermore, McLean and Wilson (2019) suggested that AR interactions with a mobile platform motivate users to perceive satisfaction after fulfilling their confirmation of expectations from the platform. Conversely, trust is essential in perceiving emotional engagement toward platform usage to explain user comfort. Previous studies explained that user-platform interaction in AR allows users to interact with a mobile platform and engage emotional feelings through network functionalities, reliabilities, and product virtualisation, enhancing the user's trust-building process toward the platform (Alimamy & Gnoth, 2022). Moreover, numerous studies have explained the effects of attitude, satisfaction, and trust towards continuing to use AR mobile platforms (Nguyen, 2021; Ameen et al., 2021). However, the effect of sources of information in perceiving UX considering cognitive and

emotional states and the effects of attitude, satisfaction, and trust toward continuance intention to use AR mobile platforms have been unexplored.

OBJECTIVE 3: To examine the moderating effects of origin culture, age group, and acculturated culture on users' continuance intention to use AR mobile platforms.

This study examines three main moderating effects of origin culture, acculturated culture, and age group in perceiving UX on continuance intention. These three factors may influence users from different backgrounds in a multicultural society like Australia. This study extended the research to determine the moderating effects of those factors on users' behavioural intention in an AR mobile platform.

Users in a multicultural society adopt the ability to interact with mobile platforms, and user perceptions may be assessed for different origin cultures, which develops a harmonious life in a culturally diverse community (Elsharnouby & Maher, 2023). From another viewpoint, this study examined the influences of the users' age group on how AR impacts different generations toward relationships among sources of information, perceived UX, and continuance intention. Few studies investigated the moderating effects of different age groups on technological adoption in AR environments (Cabanillas & Santos, 2017). In another context, previous studies explored that acculturated culture changes the characteristics of migrants staying in a host culture and transforms their cultural practices from origin to host cultures, affecting users' psychological states (Ma & Xia, 2021). In a multicultural society, the nuances of users' acculturated culture can be measured appropriately by examining language, living in a host culture, attending educational institutions, co-ethnic social ties, and social engagements (Kim & Gorman, 2022). Migration and long-term staying in a host culture transform a new acculturation behaviour of users that engages cultural adoption from the host society. Thus, this study includes origin culture, age group, and acculturated culture as attribute-independent variables in assessing user experience in AR environments.

1.7 Research Questions

Considering the UX assessment in the context of AR mobile platforms, this study addressed the following research questions.

This study seeks to determine how user-platform interactions involve sources of information in an AR environment and how these sources of information as stimulus cues influence UX. Thus, we attempt to answer the following research question:

RQ1: How do we identify critical factors that explain user experience with AR in user-platform interactions?

To develop an interactive mobile application, AR is among the most emerging technologies for mitigating the limitations of mobile e-commerce platforms – the capability to alleviate product uncertainty and the need for touch (Sun et al., 2022). AR involves more user interactions in an interactive mobile platform to improve UX and explore users' requirements (Wu & Kim, 2022). Those interactions engage information sources that enhance UX. More importantly, AR accommodates virtual interactions, situated product presence and intrinsic values that persuade users to develop their behavioural responses through perceived cognitive and emotional engagements (Jiang et al., 2022; Kim et al., 2023), influencing decision-making (Belanche et al., 2019; Chandler et al., 2022). Thus, we attempt to answer the following research question:

RQ2: What are the relationships among sources of information, user experience, and continuance intention for user-platform interactions in an AR mobile platform?

External factors like origin culture, acculturated culture, and age group may impact the relationship between perceived UX and continuance intention. It would be incredibly challenging to assess the effects of those factors in an augmented reality environment. In this regard, Santoso emphasised the subjective importance of perceiving UX considering cultural aspects (Santoso & Schrepp, 2019).

Previous studies explained that UX may be assessed from users' ethnic backgrounds. Users' origin culture may influence their behaviour and preferences in adopting technological systems (Elsharnouby & Maher, 2023). However, users from different age groups can be categorised to explain the effects of generation on users' behavioural responses to adopt e-commerce platforms (about the influence of users' age groups (Cabanillas & Santos, 2017). Furthermore, Mannheim (1970) defined generations as a joint group of users belonging to their birth years, which considers life experiences, shared beliefs, attitudes, and behavioural responses. In another context, users' host culture may be transformed into their cultural values from their origin to host cultures and form an acculturated culture, affecting users' behavioural responses (Ma & Xia, 2021). Therefore, cultural traits and age groups may significantly influence perceiving UX. However, this study emphasised identifying the moderating effects of origin culture, age group, and acculturated culture on users' continuance in a multicultural society like Australia (Elsharnouby & Maher, 2023). Thus, we attempt to answer the following research question:

RQ3: What are the moderating effects of origin culture, age group, and acculturated culture towards the relationships among sources of information, UX, and continuance intention?

1.8 Research Significance

This thesis contributes to explaining new knowledge in the information system (IS) field on how user-platform interactions in AR engage users to perceive UX through cognitive and emotional engagements, influencing their continuance intention as a behavioural response. The proposed I-E-I model in this research is unique and extends the theoretical implications to explain the impacts of different sources of information on users' cognitive and emotional engagements towards users' intentions to continue using AR mobile platforms. It theorises a more robust and effective way to investigate user experience through situated and immersive values and their consequences toward the user's continuance intention to address the user retention process.

This research is particularly significant as it offers a scalable, process-oriented, and value-driven UX assessment model that benefits online platforms that can accommodate immersive

value propositions to achieve sustainable business growth. Unlike traditional online retail channels that rely on only product selection mechanisms through static settings, this study provides predictive insights that support users in interacting with virtual products and product fit options in an AR environment. The study will contribute to information systems, behavioural science, cognitive psychology, marketing, and engineering by explaining how the UX domain can intersect to address real-virtual environmental challenges.

This study co-created knowledge by establishing relationships among constructs in the I-E-I model. It affirms that mental imagery has more influence on users' attitudes, and the subjective norm has more influence on users' satisfaction. Meanwhile, sense of presence has a more significant impact on users' trust. Also, the study suggests that satisfaction has a significant influence on users' continuance intention to use AR mobile platforms.

This study accommodates origin culture as a socio-cultural factor to explain the moderating effects toward relationships, considering individualism/collectivism, which is crucial in assessing UX for a multicultural society. Therefore, the study confirms the moderating effects of age group/generation on relationships. Notably, the platform industry may address the moderating effects of Generation Z, Generation X, Millennials, and Boomers, considering significant invariance to penetrate the global markets. Additionally, this study indicates that acculturated culture through living periods in Australia and attaining educational degrees in Australian educational institutions could be integral to assessing UX. This study also explores the effects of socio-demographic factors like gender, employment status, and annual income level on users' intentions to continue using AR mobile platforms.

This research contributes to UX assessment and advances immersive technologies' applicability by explaining cognitive and emotional engagements through an integrated I-E-I model. It bridges knowledge gaps in current UX assessment practices and Technological advancements in an AR environment. By integrating user-platform interactions-oriented UX assessment, the proposed model enhances the reliability and trustworthiness of AR mobile platforms, ensuring uninterrupted virtual settings in the retail industry. This focus on AR

in mobile platforms sets a new standard for the UX assessment process, highlighting the importance of perceived cognitive and emotional engagements for post-interactive decision-making.

Based on the research objectives and aims, the research significance is as follows:

i) Key Sources of Information for user-platform interaction in AR mobile platforms:

The study identified critical immersive, innovative, and interactive sources of information, considering user-platform interactions as stimulus cues and their impacts on continuance intention to use AR e-commerce mobile platforms. This study included immersive, technological, interpersonal, and innovative social factors as sources of information through user-platform interactions in an AR environment.

ii) Key motivations for gaining users' cognitive and emotional engagement:

This study explained how stimulus cues in AR platforms involve users' cognitive engagements with mental imagery, sense of immersion, sense of presence, and subjective norms that influence behavioural intention. Significantly, the consequences of gaining immersive experiences are explained through users' emotional feelings like attitude, satisfaction, and trust. This study identified the key motivations, impacts, and relationships of how user-platform interaction in AR influences users to perceive user experience through cognitive and emotional engagements. The study uniquely explained the correlations among different sources of information, perceived UX through cognitive and emotional engagements, and continuance intention in an AR environment.

iii) Explaining the moderating effects of origin culture, age group, and acculturated culture in UX:

This study determined the effects of origin culture, age group, and acculturated culture on users' intention to use AR mobile platforms in a multicultural society. We considered individualism and uncertainty avoidance as cultural dimensions to identify the origin culture with

their backgrounds within Australia. We identified users' generations by examining the age groups collected from the survey responses. Furthermore, this study explored the process of identifying acculturated culture by examining users' living periods in Australia and attained degrees from Australian educational institutes. This is a unique consideration in this study to investigate the impacts of origin culture, age group, and acculturated culture in perceiving UX for a multicultural society.

iv) Appropriateness of theoretical lenses in model development:

The study contributes to extending the body of knowledge in the information systems research domain by developing a novel theoretical model, leading to advances in theoretical grounds and informed guidance for the decision-making process in the mobile platform industry. Mainly, the proposed interaction-engagement-intention (I-E-I) model was uniquely developed by investigating the stimulus-organism-response (SOR) framework with the schema theory, the flow theory, the situated cognition theory, the theory of planned behaviour, the expectation-confirmation theory, and the trust technology model that presents the dynamic capability of UX assessment considering socio-cultural traits. It theorises the UX assessment with the information process of developing cognitive and emotional engagements that other theories or models may not fully satisfy for user-platform interaction in AR environments. The inclusiveness of sociocultural effects through value propositions was explained in the research model, considering the augmented reality perspective.

v) Industry-oriented research significance:

This thesis contributes to explaining a comprehensive understanding of how users perceive UX and guiding practical implications for mobile platforms in this research phenomenon. Online shopping benefits through interactive AR engage user-platform interaction in mobile platforms, and those interactive effects were explored in this study to explain how perceived immersive experiences alleviate product uncertainty and the need for touch. Practically, this study guides solution providers and UX designers in optimising AR mobile platforms and enhancing the user

retention process. Furthermore, mobile platform owners can focus on incorporating AR technology to engage interactive stimuli cues and feedback mechanisms to improve UX. Additionally, this study suggests that the platform industry can plan to expand its business in a multicultural society by addressing the effects of origin culture, age group, and acculturated culture. Moreover, research findings and insights could guide UX designers, researchers, business promoters, platform developers, solution providers, and marketing professionals to understand how socio-cultural factors impact users' continuance intention through technological adoption.

Finally, value propositions from users of different origin cultures, age groups, and acculturated cultures with the moderation effects on different relationships and influences on users' continuance intention are essential considerations in designing UX, product development, preparing business models, and promoting marketing strategies. Nowadays, all mobile platform owners are accommodating augmented reality into their applications to provide immersive UX. This study's research outcomes contribute to theoretical knowledge on understanding how cultural traits and age group affect user experience through cognitive and emotional states in a multicultural society

1.9 Research Method Overview

The study followed a mixed methodological approach combining qualitative (focus group interviews) and quantitative methods (online questionnaire survey). Initially, a focus group guideline and a focus group script were developed to conduct the interviews. In order to follow the qualitative process, focus group interviews were conducted for two distinct focus groups to understand critical factors using a non-probabilistic purposive sampling technique and get valuable insights into relationships among constructs (Barta et al., 2023). Later, we analysed the collected transcript data using the NVivo platform and prepared the focus group report. Furthermore, a descriptive quantitative research method was applied to conduct a cross-sectional study. This study developed an online questionnaire using the Qualtrics platform to collect user quantitative data. A convenience snowball sampling technique was followed to reach online users interacting with AR views on mobile platforms by distributing questionnaire surveys through

social networks, such as Facebook, LinkedIn, online blogs, and Nextdoor. These social network platforms were appropriate and helpful for this study (Trivedi et al., 2022). Later, a structural equation modelling (SEM) was executed using smartPLS 4.0 software.

A mixed-method approach with a sequential-qualitative first timing was applied in this research study for several reasons (Poushneh, 2018). Firstly, combined validity is confirmed using qualitative and quantitative methods through a sequential process that can mutually identify factors and validate the model. Secondly, in terms of completeness, a mixed method allows researchers to comprehend the findings of research outcomes in an emerging field like augmented reality. Finally, after getting valuable insights and opinions from users, the qualitative study generates more feedback to revisit hypotheses and the research model, and the quantitative study supports the validation and testing of the proposed model.

1.10 Thesis Statement

This thesis examines the UX with AR in three challenging scenarios: sources of information for user-platform interactions, cognitive and emotional engagements in perceiving UX, and the moderating effects of origin culture, age group, and acculturated culture on continuance intention. We argue that (1) AR enhances immersive and interactive capabilities for mobile platforms, (2) user-platform interactions in AR influence UX through cognitive and emotional engagement that affect continuance intention, and (ii) origin culture, age group, and acculturated culture significantly moderates on relationships among sources of information, UX, and continuance intention to use AR mobile platforms. Since AR engages user-platform interactions, immersive experience is phenomenologically "a new way of assessing UX in an augmented reality environment." This thesis identifies the consequences of cognitive and emotional engagements in perceiving UX and influencing intention to use AE mobile platforms.

1.11 Thesis Outline

The thesis is organised as follows: In Chapter 2, we present a review of recent literature about user experience, sources of information, cognitive engagement, emotional engagement, sustainability, augmented reality, and mobile platforms in the e-commerce domain and study the moderating effects of origin culture, age group, and acculturated culture on users' behavioural intention in a multicultural society. Chapter 3 discusses the theoretical background, research model description, and hypotheses development. After that, in Chapter 4, we design a research method to identify critical factors and validate the research model with hypotheses. In Chapter 5, we analyse the collected data using different analytical tools. Following that, Chapter 6 discusses the theoretical implications and managerial contributions of the research. Finally, in Chapter 7, we conclude the thesis with limitations and future research.

CHAPTER 2

LITERATURE REVIEW

This chapter summarises and synthesises the background literature on sources of information, continuance intention, user experience, augmented reality, multiculturalism, and mobile platforms. The closely related literature was reviewed to find existing theories and accommodate our reviewed knowledge to make arguments and explore research gaps in Chapter 2. This chapter also focuses on socio-cultural values like origin culture, age groups, and cultural acculturation related to UX in AR mobile platforms. Then, several theories and models were studied to develop a conceptual model for AR mobile platforms. In the reviewed works, methodological processes were studied, which guided the framing of a research design to assess UX in AR. Finally, this thesis presents the key motivations and reasoning to extend the research on assessing user experience toward users' continuance intention.

2.1 Overview of the Research Phenomenon

The study emphasised user experience, sources of information, augmented reality, multiculturalism, age group, and mobile platforms to investigate users' technological adoption, interactions with platforms, product virtualisation, cultural dimensions, etc. The UX evaluation process primarily focused on determining the impacts of different sources of information, considering user-platform interactions on perceiving UX that influences users' continuance intention to use the AR environment (mobile app and responsive mobile website using AR), engaging interdisciplinary studies with technological, environmental, social, cultural, and psychophysiological aspects. It included a multidisciplinary field of studies such as information systems (IS) engineering, IT, marketing, management, psychology, UX design, and behavioural science. Thus, the study extended the research on investigating UX with the effects of socio-cultural identities like origin culture, age groups, and acculturated culture. The study considers the emerging nature of research by combining all the literature from different research fields.

2.2 Literature Search Strategies

The concept-centric analysis was applied to select relevant literature by searching keywords such as user experience, sources of information, augmented reality, cognitive engagement, emotional engagement, socio-cultural factors, multiculturism, cultural dimensions, origin culture, age group, acculturated culture, continuance intention, and e-commerce mobile platforms using Web of Science, Scopus, Google Scholar, ScienceDirect, ACM digital library, IEEE Xplore, and UTS library. The study focused on recently published journals, conference papers, and book chapters to review the latest peer-reviewed research works and critically investigate the literature to identify a research phenomenon. The literature search strategy considered a few inclusion and exclusion criteria for searching current literature (as shown in Figure 1).

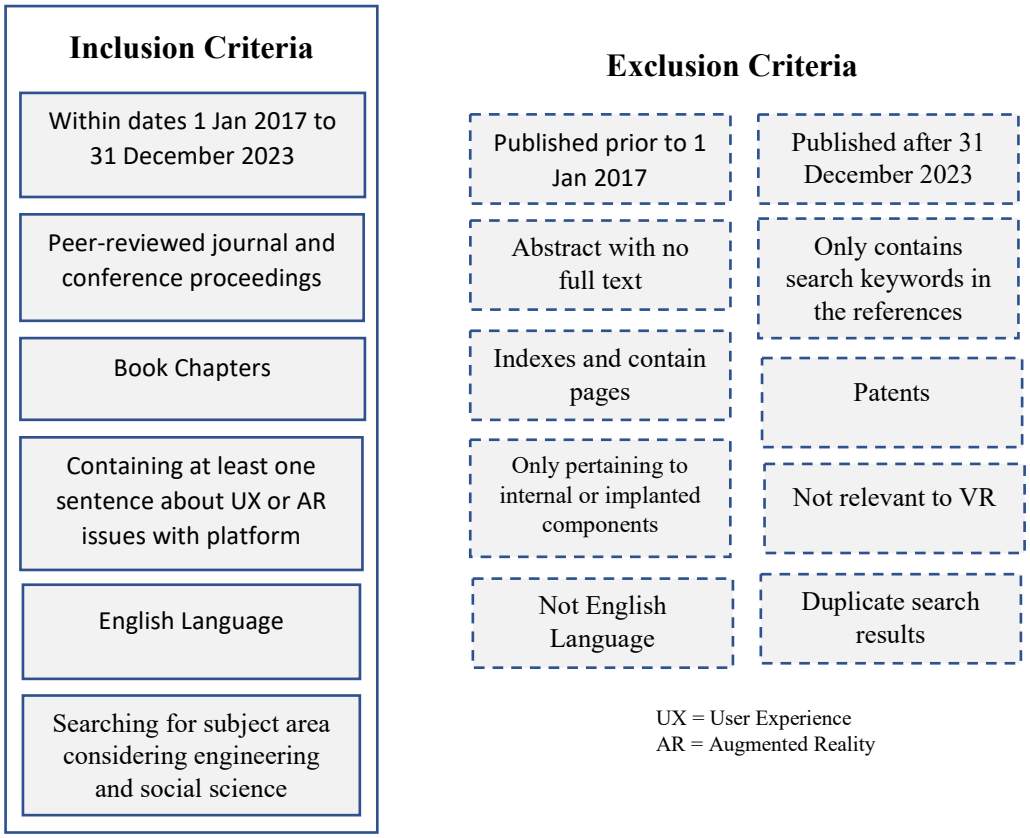

Figure 1. Inclusion and Exclusion Criteria for Literature Search

A PRISMA review framework was followed to identify high-quality literature for extending the research (Moher et al., 2009). This study initially examined relevant literature to find knowledge gaps and extended the research. The PRISMA flowchart for the literature review is as follows (as shown in Figure 2).

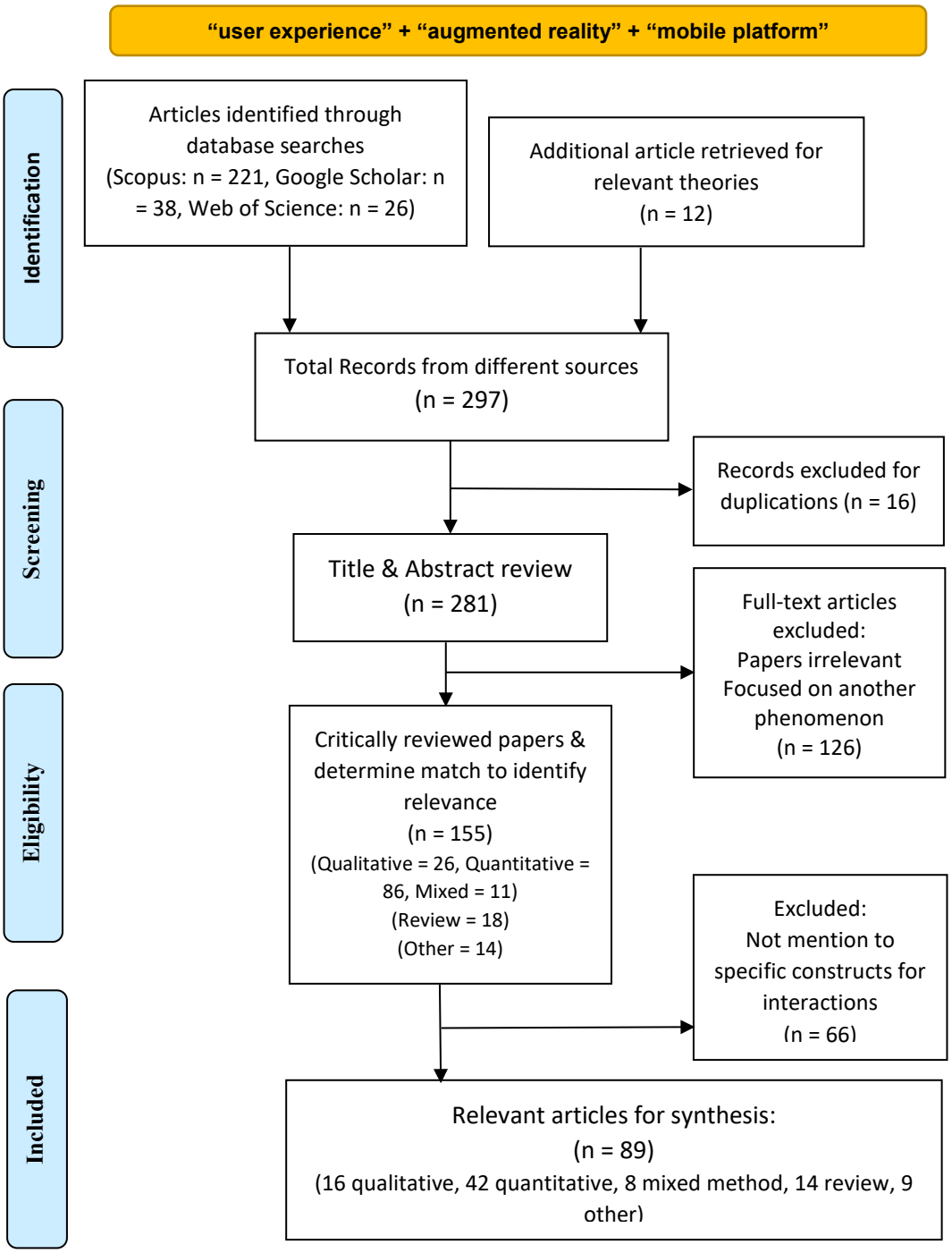

Figure 2. PRISMA flow chart for literature search

2.3 User Experience

2.3.1 User Experience in AR

The study of user experience has advanced from service quality to interaction engagements in the AR mobile platforms to the usage of virtual spaces and digital applications. Initially, the term "UX" was articulated from an ergonomics perspective. Then, the International Standard Organization (ISO) defines UX as the users' perceptions and reactions to using or anticipating a product, system, or service (ISO, 2019). From a different perspective, UX is derived through interactions with a product or service by gaining pragmatic value as physical appearance and hedonic value as aesthetic views of a product/service (Hassenzahl et al., 2018). In other words, the Dagstuhl UX framework was presented in the Dagstuhl seminar, explaining a conceptual structure for understanding how user interactions with any technological system affect UX (Roto et al., 2011) that includes a narrow scope, where an episodic UX assessment can be extended for an AR environment to alleviate product uncertainty considering users' reflections on perceived experiences (Sun et al., 2022). The progression of UX considering different stages of interactions with a system over time can be shown in Figure 3.

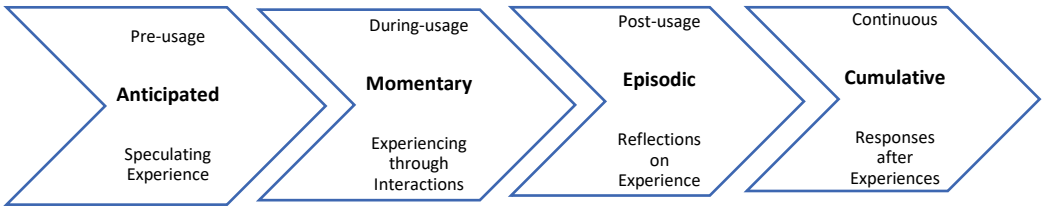

Figure 3. Stages of User Experience in terms of interactions with different time span
(Source: Dagstuhl UX framework, Roto et al., 2011)

UX has revolutionised with immersive technologies in mobile platforms, and it varies from different perspectives, such as gaming, tourism, education, office communication, and retail. Existing approaches to assessing UX through pragmatic (Hassenzahl et al., 2018) and hedonic (Hsu et al., 2021) values might not consider engagements through user-platform interactions with AR (Goel et al., 2023). However, recent studies emphasise how user-platform interactions engage digital nudging to influence users' decision-making (Purohit et al., 2023), where it may consider

interactive engagements to investigate UX towards users' behavioural intentions. For instance, UX assessment not only includes the cognitive states through co-creating values (Kumar et al., 2023), but also harnesses emotional feelings (Jessen et al., 2020) in the context of AR in perceiving UX. There is a scope to extend a new way of assessing UX, where users can create a virtual identity in a smart system to communicate, interact, and engage with applications, products, and devices (Chen et al., 2021; Yuntao et al., 2022) to achieve retail 4.0 (fourth generation) in the sustainable e-commerce industry.

Digital technologies have transformed into an ecosystem, demanding an extension of assessing UX, where multi-modal interactions occur among users, products, devices, socio-cultural aspects, and platforms. Dirin and Laine (2018) explained UX as the emotional consequences of those multi-modal interactions. These emotional engagements influence users' decision-making, which may involve a user retention process to achieve sustainable growth. Since the pragmatic value for assessing UX considers only the online product visualisation in a mobile platform, it can also explain the hedonic approach through user-platform interactions of how AR gives pleasure to interacting with mobile platforms that intrinsically motivate users with lower cognitive loads (Barta et al., 2023). Moreover, it may include the effects of cognitive and emotional engagements that influence users' adaptive usage intention (Kang et al., 2022). From the above observations, UX can be assessed through user-platform interactions that co-create virtual engagements with AR and gain immersive values in an AR environment.

The reviewed literature through service innovation with AR characteristics, UX assessment, methodological approach, psychological mechanism for processing sensory information, and value co-creation of AR in mobile platforms are summarised in the context of an AR environment considering theoretical aspects (as shown in Table 1).

Table 1. Summaries of Literature on UX in an AR Environment

Source	Relevant Models/ Theories	Independent variables	Dependant/ Moderators variables	Method	Outcomes
Acharya et al., 2023	Flow Theory, Technology Acceptance Model	Curiosity, temporal dissociation, focused immersion	Cognitive absorption, perceived usefulness	Quantitative	Behavioural intention
Goel et al., 2023	S-O-R framework	Visual, Acoustic, Haptic, Arousal, Pleasure	Involvement	Quantitative	Urge to buy impulsively
Tawira & Ivanov, 2023	Theory of the self, Theory of interactive media effects	Body Esteem, Photo Satisfaction	Perceived Augmentation. Fit Confidence, Consumer Inspiration	Quantitative method	Adoption Intention
Barta et al., 2023	S-O-R model, Cognitive load theory	No web AR vs web AR, perceived similarity, confusion by over-choice, and repurchase cognitive dissonance.	Product knowledge, preference for consistency	Mixed method	Purchase intention, Willingness to pay more
Martinez et al., 2023	Unified Theory of Acceptance and Use of Technology (UTAUT)	Individual beliefs and technological attributes	Satisfaction	Quantitative	Continuance intention
Pathak & Prakash, 2023	Flow Theory	Flow dimensions (simulated physical control, environmental embedding, product likeability, mental tangibility, specificity)	Immersion, Psychological ownership, decision comfort	Quantitative	WOW-effect feeling/Awe experience, Purchase intention
Sun et al., 2022	Uncertainty Reduction Theory	Product presentation	Perceived informativeness, sense of presence, mental imagery, trust	Quantitative	Product attitude
Keegan et al., 2022	S-O-R framework	Marketing, environment, website navigation	Self-esteem, hedonic, fashion involvement, emotions	Quantitative	Impulsive purchase of fashion online
Al-Adwan et al., 2022	SOR-IPT Model, Stimulus-Organism-Response (SOR) paradigm, Information Processing Theory (IPT)	Cash on Delivery, Product Availability, Return Policy Leniency, Shipment Condition, Timely Product Delivery, Product Availability,	Customer Satisfaction, Customer Trust	Quantitative Method	Word of Mouth (WOM) Intention, Repurchase Intention
David et al., 2021	SOR model	Aesthetics, position relevance	Service quality, visual quality, satisfaction	Quantitative	Recommendation Intention

Wang et al., 2021	SOR model	Interactivity, vividness, augmentation, aesthetics	Spatial presence, flow experience, decision comfort	Quantitative	Purchase intention
Hsu et al., 2021	SOR model	Informative features, Personalised features, Interactivity features, Utilitarian value, Hedonic value	Utilitarian value, hedonic value, perceived customer support	Quantitative approach	Continued usage intention
Nikhashemi et al., 2021	S-O-R model, Uses and Gratification Theory (UGT), Technology Continuance Theory (TCT)	AR interactivity, AR quality, AR vividness, AR novelty	AR engagement, Utilitarian benefit, hedonic benefit, psychological inspiration	Quantitative method	Continuance intention, willingness to pay
Chatterjee et al., 2022	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
Hong Qin et al., 2021	Cognitive-affect-conation (C-A-C) framework, S-O-R model	Experiential value, Virtual presence, Perceived value, Shopping benefits, Attitude, Satisfaction	Attitude, satisfaction	Quantitative method	Continuance use intention, Purchase intention
Jumaan et al., 2020	Expectation-Confirmation Theory	Confirmation Perceived Usefulness Cognitive Absorption	Satisfaction	Quantitative Method	Continuance Intention

2.3.2 Factors Impacting User Experience

Overall, UX assessment for an interactive platform is complex (Hassenzahl et al., 2018). The subjective assessment of UX becomes more complex in an interactive mobile platform, where it may engage critical factors in explaining UX that involve contextual aspects, user's state, and information system characteristics through user-platform interactions (Roto et al., 2011). For the virtual effects on users, not only product-related information but also user-platform interactions-oriented factors influence UX in AR. In an AR environment, mobile platforms engage user-platform interactions through network, social, device, cultural, and innovative sources of information (Huang et al., 2023; Zhang et al., 2022) that may involve users' cognitive (Hing Qin

et al., 2021) and emotional (Jessen et al., 2020) engagements. Therefore, this study may review the behavioural responses through perceived UX that users could respond to AR while interacting with mobile platforms.

However, there are different aspects of how to assess UX. Previous studies argue that user-platform interaction with AR may involve immersive and interactive sources of information as stimuli that engage sensory information (Goel et al., 2023), and it demands assessing UX in a complex scenario (Barta et al., 2023) that depicts significant challenges to critical UX factors in different contexts. As pointed out earlier, UX assessment is a complex phenomenon that may comprehend users' cognitive reactions considering perceived immersion, sense of presence, mental imagery, and subjective norms to address existing limitations on assessing UX (Pathak & Prakash, 2023; Wang et al., 2021; Chatterjee et al., 2022) through user-platform interactions in AR. In addition, factors influencing emotional feelings through users' attitude, satisfaction, and trust can be addressed through the confirmation of user expectations from an interactive online platform (Hong Qin et al., 2021; Jumaan et al., 2020; Sun et al., 2022) in an AR environment.

Specifically, UX assessment can be extended to the user retention process with AR, which involves virtual interactions through AR characteristics such as novelty, interactivity, hedonic value, and satisfaction. Jumaan et al. (2020) explain the confirmation of users' expectations from the e-commerce mobile platform as perceived cognitive and emotional engagements that impact behavioural responses. Further, users' trust and satisfaction may be considered as emotional feelings that influence users' behavioural responses through continuance intention, purchase intention, and word-of-mouth (WOM) (Martinez et al., 2023). AR enhances UX when interacting with virtual platforms in an immersive environment, and this product virtualisation affects users' behavioural responses to continue using the platform, where this study may investigate how AR influences users' continuance intention (Lucas et al., 2023) by alleviating the need for touch the product and associated uncertainties (Sun et al., 2022). Thus, this study adopts emotional factors and investigates the effects of emotional engagement towards continuance intention as user retention in an AR environment (Kabir & Kang, 2024; Acharya et al., 2023; Zhang et al., 2023).

Overall, integrating AR into mobile platforms involves different sources of information as stimulus cues that impact users' cognitive and emotional engagements, influencing behavioural responses. With the advent of emerging technologies, mobile platforms accommodate immersive, interactive, socio-cultural, network qualities, cognitive, emotional, and behavioural factors that impact user experience in an AR environment. Factors affecting UX can be summarised as shown in Figure 4.

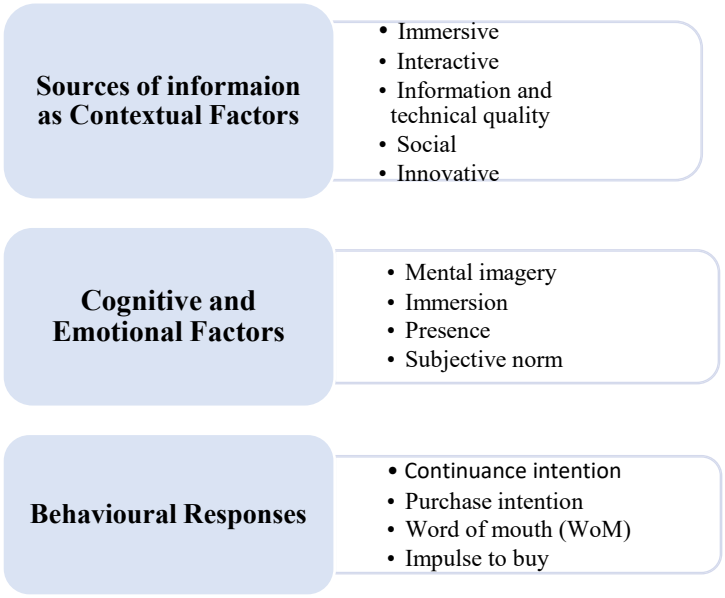

Figure 4. Factors Impacting User Experience

2.3.3 User-Platform Interaction in UX

Digital technologies have transformed new communication channels between users and platforms that engage more interaction capabilities to provide seamless experiences. Mobile platforms, especially, co-create values through multi-modal interactions among users, products, devices, and platforms in the platform economy (Zheng & Yang, 2022), where advanced technologies create an ecosystem through smartphone penetration, technological advancements, low-latency wireless communication, gesture recognition, and motion capture. The ecosystem moves toward an interaction paradigm shift, engaging user-platform interaction that involves sensory information to end-users (Goel et al., 2023). User-platform interactions in AR, therefore,

may be considered for assessing UX that engrosses sensory information, considering users' technological, sociocultural, and psychological states in an information system (Roto et al., 2011).

Caboni (2019) identified critical dimensions through interactivity, product movement, user engagement, product orientation, visualisation, and preferences by explaining the user-platform interactions from a mobile platform perspective. In the retail industry, an interactive platform may engage technological, interactive, and sociocultural stimuli factors through user-platform interactions (Santoso & Schrepp, 2019). Recent studies have shown that those interactions through AR may provide real-time interactions with virtual products on a mobile platform (Dargan et al., 2023), while the effects of how user-platform interactions with AR engage stimulus factors are unexplored.

Mobile platforms have accommodated AR to enhance user-platform interactions, transforming a new way of interaction in the platform industry. Wu and Kim (2022) explained that AR features involve more interactive engagements through user-platform interactions in different dimensions. AR supports users to be involved with sensory information through a user-platform interaction paradigm, which explains how users are sensing real-time feelings in the physical world. Recently, artificial intelligence (AI) has played a crucial role in engaging more interactions on AR mobile platforms, applying predictive analytics using users' preferences and touchpoints (Huang et al., 2021). Therefore, AI opens a new avenue for AR mobile platforms that involve sensory information through user-platform interactions.

With technological advancement, AR allows users to interact with virtual products in an immersive environment that enhances UX. The AR mobile platform accommodates a video semantic segmentation process that uses an encoded bitrate to reduce latency and maintain the network experience (Hazarika & Rahmati, 2023). To deliver uninterrupted immersive services, a stable wireless network can process massive, high-quality data with low latency to maintain uninterrupted user-platform interactions. Further, Qin et al. (2021) describe the effect of AR on a user's cognitive and affective reactions that change the user's decision-making process by applying the cognition-affect framework. Moreover, the user-platform interactions enhance UX

through co-created immersive values while interacting with an AR environment, where the influences of socio-technological, immersive, and interactive values may be considered to assess UX towards behavioural responses (Izogo, 2018) in the user-platform interaction paradigm.

UX is becoming sustainable through retail 4.0 (fourth generation) using AR technologies, where mobile platforms accommodate user-platform interactions to improve UX. In addition, as a socio-technical system, the AR mobile platform co-creates values through user-platform interactions that harness cognitive (Acharya et al., 2023) and emotional (Jessen et al., 2020) phenomena to perceive immersive experiences (Pathak & Prakash, 2023). Furthermore, user engagement with interactions changes situated experience to motivate users' intrinsic values and to facilitate their decision-making mechanism toward continuance intention (Zhang et al., 2023), where UX assessment can be extended considering those effects of user-platform interactions in an AR mobile platform.

2.4 Augmented Reality

2.4.1 Concept of AR

Augmented reality (AR) is an emerging technology that can overlay computer-generated content in the physical space. Milgram and Kishino (1994) initially defined product virtualisation through the "Reality-Virtuality Continuum", which introduces AR to create an immersive environment. AR allows users to select, rotate, or interact with virtual products in the current technological landscape through an integrated, immersive environment. Further, Azuma et al. (2001) explained the coexistence of 3D-generated objects with the real world in an interactive environment. AR uses cameras to sense digital objects and process them through computer vision, object recognition, positioning, and rendering to visualise a desired space (Hung et al., 2021), where there is a research interest in assessing immersive experiences for an interactive AR environment (Dargan et al., 2023).

Mobile platforms have become a more prevalent and efficient channel for technical robustness, innovative services, versatility, virtual interactions, and product movement by

accommodating immersive features. AR engages immersive characteristics that may alleviate product uncertainty by interacting with embedded virtual products and placing them in the physical environment (Fan et al., 2020). The AR mobile platform accommodates the virtual try-on feature of presenting 3D-generated content with the required colour, design, model, and scale measurement options in the desired spaces (Sun et al., 2022). AR involves more capabilities in mobile platforms, and it demands further research on assessing UX that revolutionises service innovation through spatial presence, product virtualisation, and a sense of embodiment to deliver an immersive experience (Hong Qin et al., 2021).

In mobile platforms, AR accommodates superimposing digital objects into a desired location (Figure 5). Users can experience this by interacting with virtual products and checking in the physical world. Importantly, an AR system includes major components, such as sensors, processors, and displays, to engage product virtualisation in the real world (Bimber & Raskar, 2005). In order to visualise the product using AR, the integrated system integrates virtual information into the physical space, enhancing UX through virtual interactions.

In an interactive mobile platform, AR integrates embedded sensors through cameras: visual input, accelerometer, stabilising virtual products, and a magnetometer that accommodates the smartphone's orientation to provide a fusion technique (Pereira et al., 2018). In that case, smartphones enhance the capabilities of AR mobile platforms to place virtual products onto the desired physical location through tracking (Li et al., 2020), virtual product placement, and rendering techniques (Liu & Wang, 2021) for shaping light and shadows to enhance virtual realism. Indeed, the IKEA AR platform allows online users to interact with innovative features like virtual product fit, where the research can extend to assess immersive experiences (Vaidyanathan et al., 2022).

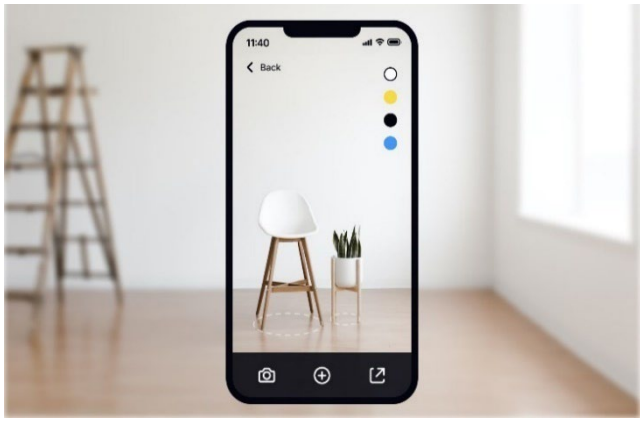

Figure 5: Experience with virtual objects in an AR mobile platform

Previous research on AR has addressed technological characteristics and emphasised UX, ignoring the effects of interaction-based stimuli cues (Kowalczuk et al., 2021) and socio-cultural values (Santoso & Schrepp, 2019). From the conceptual viewpoint, multiple industries like tourism, health, retail, and education use AR capabilities to develop interactive mobile platforms that can engage sensory information (Heller et al., 2019). Previous research suggests that AR delivers a flow experience with situated actions through cognitive, emotional, and virtual engagements to cooperate, collaborate, and communicate virtual products in physical spaces (Torres et al., 2020; Ameen et al., 2021). Moreover, AI algorithms may be applied to detect and recognise digital objects through neural network structure analysis and evolved AR mobile platforms' interaction capabilities (Zhang et al., 2022).

The socio-technological dimensions of AR involve sensory engagements that result in immersive experiences. Previous studies explained that vividness and interactivity as technological factors in an AR environment enhance UX in the retail industry (Wu & Kim, 2022). In another context, AR allows users to engage with social dimensions to differentiate their social identity, which defines cognitive and emotional engagements over 3D-generated products during user-platform interaction in an AR environment (Jessen et al., 2020). Additionally, AR mobile platforms may create an interactive environment for users to act as social actors and give opportunities to exchange thoughts and opinions about products, which could reduce the cognitive

load to interact with virtual products. Although there are few studies on AR, there is a lack of investigations on assessing UX through the effects of socio-technological values.

2.4.2 AR in E-commerce Platforms

Research supports that mobile platforms are designed to deliver specific functions to share sources of information using AR capabilities in the e-commerce industry to accommodate multiple touchpoints (Lucas et al., 2023; Wang et al., 2019; McLean et al., 2019). Currently, mobile platforms in e-commerce transactions are categorised mainly through two different channels: (i) mobile application (app) or (ii) responsive website, where users can use their mobile devices using wireless networks anywhere, anytime. Regarding technological adoption, e-commerce in mobile platforms is considered the fastest-growing field because of the advancement of new technologies and the higher penetration rate of mobile phone subscriptions. Furthermore, previous studies define an AR-based mobile application structure where sensory information is captured through mobile devices and processed through multiple tasks like detection, extraction, recognition, and positioning (Cao et al., 2023). Then, associated annotations are delivered to mobile devices and rendered through virtual products after data analysis, and the virtual products are visible in users' views in the physical space. Moreover, an interactive, responsive website has been developed to deliver easy access to a host remote server without downloading it on a mobile phone, accommodating a user-friendly interface to give users comfort in viewing content on the screen (Lucas et al., 2023).

As with concerns of accommodating AR in e-commerce mobile platforms, there are a few challenges regarding distant usage and how 3D virtual product presentation engages immersive values (Billewar et al., 2022), alleviating product uncertainty and the need for touch. In another context, AR-based e-commerce mobile platforms provide sources of information that change users' positive intentions through perceived immersive experiences in the smart shopping industry (Bonetti et al., 2019; Mclean et al., 2019). From the above points, it is evident that perceived immersive values through user-platform interactions with AR may impact users' psychological states to change behavioural intentions to continue using the platform.

Further research on AR adoption in e-commerce showed that higher penetration of mobile subscriptions, smartphone usage, and digital banking has encouraged retailers to adopt business-to-consumer (B2C) e-commerce, empowering users to use interactive online platforms (Feng & Mueller, 2019). The B2C in e-commerce has evolved through online platform capabilities in the retail industry, where digital transactions between businesses and users are an integral part of the digital economy through online channels. Furthermore, AR transforms B2C e-commerce by enhancing immersive experiences, allowing users to interact with virtual products. It integrates immersive features into B2C e-commerce, where there is a scope to extend research considering the interactive engagements through AR that lead to users' decision-making (Heller et al., 2019).

According to a GSMA report, Australia is considered an emerging e-commerce landscape with 5G coverage of around 42% and an adoption level of more than 80%, achieving 32.71 million mobile connections in 2023 (GSMA Mobile Economy Report, 2023). On the other hand, Australia has experienced a high penetration in the e-commerce market and is expected to achieve 21.31 million users with a penetration rate of 77.6% by 2027 (Statista report, 2023). Furthermore, the Statista report indicates that most of the e-commerce sales are based on domestically based e-commerce sites, which comprise a significant contribution to the overall e-commerce market of Australia. Moreover, popular e-commerce sites in Australia include eBay (AU), Amazon (AU), IKEA, Woolworths, JB HiFi, Kmart, Coles, Kogan, Officeworks, Chemist Warehouse, Dan Murphy's, Nike, and Catch (ITA, 2023). Considering the market penetration and business growth, over 40% of all B2C transactions occur on e-commerce platforms like eBay, Amazon, and Gumtree, which are reported as the major e-commerce platforms in the Australian e-commerce market. In the case of immersive adoption, AR technology was incorporated by a few e-commerce mobile platforms in Australia to present virtual products towards end-users. Concerning AR mobile platforms, Kmart Australia, IKEA, Sephora, The Iconic, and David Jones are prominent e-commerce platforms in Australia that integrate AR into their platforms to enhance immersive experiences following the global trend (Adams, 2019).

2.4.3 User-Platform Interaction with AR

In e-commerce, users interact with mobile platforms through different retail settings, and AI supports them in enhancing the platforms' capabilities. Additionally, AI is revolutionising the analytical process to provide more interactions that unleash valuable insights through tracking capabilities, past-purchasing experience-based recommendations, seamless network qualities, and interactive reviews to sense virtual products in the user-platform interaction paradigm (Kabir & Kang, 2024; Nazir et al., 2023). With regard to accommodating AI in AR mobile platforms, this study may address innovative sources of information like product fit, network quality, AI-driven recommendation, and online reviews, providing an immersive environment to augment virtual products by interacting with AR mobile platforms in the user-platform interaction paradigm. Similarly, Pereira defined AR as a disruptive technology that engages an intuitive interaction to sense virtual objects in an actual position and revolutionise the e-commerce industry through the user-platform interaction paradigm that engages interaction-based stimuli cues to achieve Industry 4.0 (Pereira et al., 2023). In the e-commerce revolution, AR enhances platforms' capabilities through the user-platform interaction paradigm, which may deliver optimum UX.

The following sections review the previous works on stimulus cues of AR by exploring cognitive and emotional engagements in UX research. Then, this thesis presents the influences of AR in forming sense of embodiment, immersion, social influence, and mental sketches of virtual products, where AR is observed as not just an immersive technology but a paradigm shift for the study of user-platform interactions.

2.5 Sources of Information as Stimuli

Retailers have adopted AR technology into mobile platforms and engaged sources of information to provide immersive experiences towards end-users. AR mobile platforms create an interactive environment where users can try on a virtual product in the physical space. Nowadays, users can use computer-generated images of furniture to fit in the available space, while IKEA introduces AR views in their mobile application to provide user comfort. This study considered internal and external sources of information as stimulus cues: vividness, interactivity, product fit,

network quality, AI-driven recommendation, and online reviews in the context of AR mobile platforms.

2.5.1 Vividness

In promoting virtual products in the e-commerce industry, vividness is considered a critical internal factor as an AR characteristic that can explain the quality representation of a virtual product (Yim et al., 2017) towards users; that is, higher image quality can produce a higher level of vividness in a sensory-mediated environment. Concerning vivid representation, AR engages sensory information through product virtualisation, which involves immersive experiences of a virtual product through the user's cognitive and emotional states. Furthermore, Wu and Kim (2022) suggested that higher vividness in AR mobile platforms represents higher image quality. Moreover, vividness may be explained as a clear and detailed representation of a 3D virtual product (Mclean et al., 2019) that represents sensory-mediated information of a virtual product in an augmented reality mobile platform. This research considers the influences of vividness on how users react to the vivid presentation of virtual products through user-platform interactions in an AR environment.

2.5.2 Interactivity

In an AR environment, users interact with an AR mobile platform, which allows them to get tailored information about virtual products (Hsu et al., 2021). It engages sensory information to enhance immersive experiences through virtual interactions with a product. Further, AR retailing research confirms that interactivity with mobile platforms provides simulated information regarding specific needs to search for virtual products (Kowalczuk et al., 2021). Additionally, Wang et al. (2021) suggested interactivity as an interactive factor that supports users to control the movement of virtual products in an AR mobile platform. Interactivity is an AR characteristic that enhances user-platform interactions by which users can gather simulated product information as a choice of requirements in an AR mobile platform. This study considers the impact of interactivity on user experience and how users respond to interactive features of AR.

2.5.3 Product fit

Seeking to describe the AR potentials in product movement, product fit can be considered a critical factor that provides scale measurement, experiential information, and virtual try-on features to fit the 3D-generated product in a required physical space using an AR mobile platform (Sun et al., 2022). Additionally, Grubert (2021) explained that tangible augmented reality (TAR) allows users to interact with virtual products through spatial registration by changing the orientation of physical spaces, gesture-based interaction, and positioning front and back-facing mobile cameras to place the products through in-air gestures. With technological advancements, AI can accommodate virtual product recognition, detection, and inspection using deep neural networks (DNN) through human-computer interaction, integration with 5G, and other intelligent technologies (Goti et al., 2023; Nadir et al., 2021), engaging a new way of interaction capabilities through predictive analytics in AR mobile platforms.

A recent study explained that real-time product tracking, scale measuring, and virtual positioning have been commercialised using deep neural network (DNN) of AI, visual-inertial odometry (VIO), and geospatial recognition that integrated AI capabilities with AR mobile platforms (Tang et al., 2023). In an interactive AR mobile platform, AI integrates advanced features with AR to move towards an interaction paradigm, accommodating product personalisation, scale measurement, positioning, and virtual try-on features that alleviate a product's “need for touch” and reduce product uncertainty. Therefore, product fit may be defined as an AR characteristic used to extract virtual product information with accurate measurements in the physical space. Product fit may provide an effective way of assessing UX by identifying the platform’s capabilities to make users confident about using the AR mobile platform with experiential product information. This study considers the effects of product fit capability on how users react to product fit in an AR environment.

2.5.4 Network Quality

In AR mobile platforms, a robust and intelligent wireless network is required to maintain network qualities, ensuring uninterrupted immersive services through ultra-low latency, high

throughput, and sufficient bandwidth (Nadir et al., 2021). Concerning the requirements for enhancing immersive experiences, AI-based solutions may be integrated into 5G to optimise network qualities through resource scheduling, automatic fault detection, and intelligent network traffic management (Huang et al., 2023) that may allow the network to transmit full-view high-resolution video for AR mobile platforms. Likewise, an AI-collaborated 5G growth vertical-oriented monitoring system (Hazarika & Rahmati, 2023) may ensure an automated resource management process that may maintain optimum and service-oriented network qualities by adopting dynamic spectrum allocation, next-generation radio access, and cloud-edge computing.

Network quality is vital in delivering immersive services with good performance and reliability for maintaining uninterrupted user-platform interactions (Kim, 2021), which includes platform robustness, product information, network capacity, and device qualities to maintain the platform's ability in an AR mobile platform. For example, Odarchenko proposed network quality with KPI categories such as (i) availability, (ii) reservation, (iii) mobility, (iv) completeness, (v) utilisation, and (vii) traffic to maintain the platform's capabilities to provide services with good performance and reliably at the optimum level (Odarchenko et al., 2020). In other words, immersive services are referred to as new digital services using AR while maintaining a higher data transmission rate with near-zero latency with a 5G wireless network, excessive processor speed of the mobile devices, and sufficient data transfer rate in the cloud are essential factors in providing uninterrupted immersive service to end-users (Zhang et al., 2023). In an interactive AR environment, immersive experiences include a holistic approach to improving network qualities with low response time, higher reliability, fluency, and low latency (Kowalczuk et al., 2021). The network quality may be defined as an integrated quality to maintain uninterrupted user-platform interactions in an AR mobile platform that supports higher image resolution, low latency, higher bandwidth capacity, and network robustness. This study considers the impacts of network quality on maintaining user-platform interactions and how users respond to network quality when perceiving UX in the context of AR.

2.5.5 AI-driven Recommendation

Studies have shown that artificial intelligence (AI) can predict user requirements by extracting insights from all possible users' touchpoints and delivering intelligent recommendation processes (Huang et al., 2021). Similarly, Schmiedel explains predictive data analytics by analysing human-machine interactions using machine learning and cloud computing that generates AI-driven recommendations (Schmiedel et al., 2018), persuading cognitive states to provide user comfort. Furthermore, previous studies described explainable AI as a new way to encourage users by extracting valuable insights through personalisation and analysing user preferences, providing recommendations to make the decision-making process effective (Cabrera et al., 2020).

This thesis includes studies regarding interactive recommendations in AR mobile platforms – although AI analytics have been studied less to investigate the effects of AI-driven recommendation by predicting user behaviour through all possible touch points to expedite a decision-making process (Yin & Qiu, 2021), including prospective analytics in an AR mobile platform that can comprehend users' adoption behaviour, product preferences, pre-interaction, and post-interaction tendencies for generating recommendations to end-users (Goti et al., 2023). Moreover, previous studies have shown that interactive mobile applications use feeling AI through personalised and adaptive recommendation systems to accommodate predictive data analytics to identify user preferences, and it may be extended to assess the effects of AI-driven recommendations towards users' cognitive states (Yin & Qiu, 2021; Huang et al., 2021). This AI-driven recommendation may be an interactive technique adopting AI in an AR mobile platform to deliver predictive information regarding user characteristics based on previous activities that support marketers in understanding existing users' preferences through predictive analytics. This research considers the effects of AI-driven recommendations on how users react to this online social and interactive recommendation process.

2.5.6 Online Review

In the virtual world, online reviews from social actors are available online, considered an essential and effective source of information to assess users' intentions through perceived

satisfaction with using a product or platform (Kumar et al., 2023). Chatterjee et al. (2022) described that users are habituated to higher internet usage, gathering information on online goods from other channels and, consequently, making users dependent on online reviews that influence behavioural intention to purchase goods or services. In today's world, online reviews play a crucial role in pursuing electronic word of mouth (eWOM) as a virtual evaluation technique through interactive user feedback (Al Amin et al., 2022) in e-commerce that influences users from others' viewpoints towards products or platforms. Moreover, user reviews and ratings in an interactive online mobile platform engage cognitive states through social presence, informational support, and product evaluation, developing users' emotional feelings to expedite decision-making (Li et al., 2020). The online review may be defined as users' feedback and opinions regarding mobile platforms, virtual products, and contextual information gathered from online channels like app review sites, social network sites (SNSs), search engines, etc. This study considers the effects of online reviews in perceiving UX.

2.6 Cognitive Engagement

Previous studies suggested that cognitive engagements from a user-platform interaction perspective may enhance mobile platforms' capability, where it can be explored for assessing UX through sources of information in an AR environment (Qin et al., 2021), including mental imagery, sense of immersion, sense of presence, and subjective norm to explain UX. Concerning user-platform interactions with AR, mobile platforms may involve cognitive engagement that may explain users' perceptions of products or services (Yim et al., 2017). In the context of AR, this study conceptualises cognitive engagements through perceived values that explain mental imagery, immersion, situated presence, and social influences. Therefore, cognitive engagement may be defined as the cognitive consequences of virtual interactions on how AR mobile platforms impact users' mental imagery, sense of immersion, sense of presence, and subjective norms through product visualisation, AI-based recommendation, and integrating robust network qualities. This study may investigate how sources of information impact users' cognitive engagements in perceiving UX.

2.6.1 Mental imagery

Based on the cognitive assessment, Park et al. (2020) defined mental imagery as a cognitive factor that explains an information processing activity to create mental images of a virtual product. In AR, users can sketch virtual products where they cannot interact with the physical product in traditional retail channels. Furthermore, AR allows platforms to transform digital content or 3D models of virtual products in physical spaces, which may create complex visual information through mental imagery to enhance decision-making processes (Heller et al., 2019). For example, IKEA's AR mobile app or responsive website encourages users to try on virtual furniture in their physical location, which involves mental imagery of 3D models of furniture. In another context, AR features support users in visualising virtual products and provide virtual try-on to place the products in their required location, alleviating uncertainty and the need for touch and using less cognitive load to generate and transform virtual product information. Recently, Giannopulu et al. (2022) explained how users' neural activity engages in a dynamic association of creating a scene by defining virtual mental imagery (VMI) and virtual execution (VE) through user-platform interactions in an AR environment, where it can be explained the internal cognitive process through mental imagery that reflects a virtual product using AR. This study considers the formation of users' mental imagery as a cognitive engagement in perceiving UX.

2.6.2 Sense of Immersion

The term 'sense of immersion' is considered a unique feature of AR that provides the capability of overlaying virtual products in the physical space in an AR environment. Sense of immersion deals with the user's psychological response when interacting with an AR environment that delivers immersive experiences (Daassi & Debbabi, 2021). Therefore, a sense of immersion can develop a comprehensive understanding of the effects of user-platform interactions in an AR mobile platform. Interactivity extends the inclusive constructs for the SOR framework, in that an AR app stimulates users' sense of immersion. Furthermore, users need to get interactivity through a virtual engagement to feel more realistic through a virtually generated object (Pathak & Prakash, 2023). It reflects how users are deeply engaged physically, cognitively, and emotionally in the

virtual world. However, understanding the perceived sense of immersion through user-platform interactions in an AR environment is still unexplored. In this study, this sense of immersion may be defined as a degree of perceiving cognitive feeling to perceive UX through virtually embedded computer-generated things by placing the virtual products in the physical world. This study may consider the formation of perceiving a sense of immersion towards users' behavioural responses through user-platform interactions in an AR environment.

2.6.3 Sense of Presence

In the spatial presence theory, a sense of presence is described as a cognitive feeling that enhances UX by interacting with virtual products in the physical spaces using a cognitive process (Schubert, 2009). However, Wang et al. (2021) stated that a sense of presence is an essential immersive and cognitive factor and a unique psychological state of "being there in the virtual world that influences user experience in AR. Furthermore, AR engages sensory information through product movement and placement that can enhance a sense of presence (Smink et al., 2020) through user-platform interactions. Moreover, a sense of presence is also termed a spatial cognitive system and expressed as a binary experience with the experiential immersion of a user through a mediated spatial environment (Wirth et al., 2007), where research can be extended to assess the formation of a perceiving sense of presence considering product virtualisation in the required physical location. The sense of presence may be defined as a user's subjective experience through a cognitive process of 'being the virtual product in a physical space'. This study can investigate how users react to virtual product placement through a perceived sense of presence in an AR environment.

2.6.4 Subjective Norm

Subjective norm or social influence has been defined as an individual's feelings about normative influences from other sources of information (influence of peer groups and external innovative sources) in social psychology (Belanche et al., 2019). In other words, subjective norms are defined as cognitive states of a user that may consider others' views from different aspects and determine others' fulfilment of expectations towards any good or service (Fishbein & Ajzen,

1975). Further, Belanche described subjective norms as a cognitive state that is externally influenced by innovative sources of information (Kabir et al., 2024a; Belanche et al., 2019), while it may engage psychological mechanisms: internalisation from expert sources, interpersonal sources from peer influence, and external innovative sources of information. Furthermore, a recent study explores social influence (subjective norm) as an essential determinant in adopting AR systems (Faqih, 2022). According to previous literature, users gather online reviews or recommendations from peer groups or external innovative sources that may impact users' behavioural intentions (García et al., 2020). In interactive mobile platforms, this view agrees with the previous literature on technological innovations, where other users' opinions are reflected through online reviews and platforms' recommendations from predictive analytics. This study may explore the effects of online reviews and recommendations toward subjective norms as a form of perceived cognitive engagement through external sources of information in AR mobile platforms.

Nowadays, online users interact with mobile platforms and harness product reviews and recommendations from interactive online platforms that may create a social world where online users can act as social actors in the cyber world. In the experience economy, users act as online social actors to create an interactive online society, accepting others' values and opinions. In the online community theory, online users in an interactive mobile platform create a virtual community where they exchange thoughts and perceived experiences about products, services, and systems (Rheingold, 1993). Concerning social influences, these innovative social actors with online or cyber platforms may act as peer groups to influence users' subjective norms. This study may investigate the effect of these social and interactive influences on subjective norms in an AR mobile platform.

2.7 Emotional Engagement

A user's emotional engagement is highly impacted by stimulus cues, which subsequently influence behavioural intentions (Goel et al., 2023). Previous literature explains the effects of perceived emotions on users' decision-making processes in AR environments. Previous studies

suggest that when users interact with AR mobile platforms, perceived cognitive engagements through sources of information may engross their emotional engagements, changing attitude, satisfaction, and trust. Emotional engagements triggered by perceived values mediate the effects of cognitive factors on continuance intention (Jessen et al., 2020), where this study investigates users' emotional engagement through attitude, satisfaction, and trust in mobile shopping platforms.

2.7.1 Attitude

Attitude is defined as a user's responses through evaluating the confirmation of expectations from a mobile platform, which can be impacted by beliefs, feelings, and behavioural responses towards technologies (Fishbein & Ajzen, 1975). Vo et al. (2022) defined attitude as a user's internal psychological state that considers the user's positive or negative feelings about using AR apps. Attitudes play an essential role in developing users' attitudes through perceived cognitive and emotional states (Kim et al., 2023; Jessen et al., 2020) that may influence decision-making. Furthermore, previous studies explained attitude as a determinant of psychological motivation that may have a positive relationship with users' behaviour responses (García et al., 2020). In AR, users interact with mobile platforms and engage in cognitive engagements that may influence users' emotional feelings through user-platform interaction in an AR environment. The attitude may be defined as a cognitive feeling influencing users to continue using mobile platforms. This study considers the effects of cognitive states on developing users' attitudes in AR.

2.7.2 Satisfaction

Use satisfaction refers to a user's happiness with perceived UX towards mobile platforms. It was initially defined as the degree to which mobile platforms fulfil users' expectations and requirements and relate to pleasure and joy (Oliver, 1980). Researchers have explained satisfaction as a cognitive process in fulfilling users' expectations or requirements from a technological system (David et al., 2021; Park, 2020), while the consequences of perceived cognitive states in an AR environment are unrealised. Therefore, this study can investigate the development of satisfaction as a confirmation of a pleasant mode for users when they perceive

the quality or performance of a product or service they desire to use. Furthermore, previous studies have indicated that perceived service satisfaction significantly motivates continued use of a product or service (Chylinski et al., 2020). However, user satisfaction is not realised adequately as an extension of confirmation of user expectations from AR mobile platforms, considering user-platform interactions. Satisfaction may be defined as a consequence of a perceived sense of presence and subjective norms using the user-platform interaction, which consequently influences behavioural intention in AR environments. This study may consider satisfaction as a consequence of perceived cognitive states through user-platform interactions in an AR environment.

2.7.3 Trust

Concerning the fulfilment of user expectations from a technological system, trust plays a critical role in an AR mobile platform that creates users' confidence by assuring the platform's serviceability, reliability, and integrity. In AR, a mobile platform may accommodate virtual interaction capabilities through scale measurement, experiential information, and try-on features to fit the 3D-generated product in a required space that influences trust-building towards platform usage (Sun et al., 2022). Furthermore, AI engages a new way of interaction capabilities in AR through predictive analytics and complements this AR characteristic, which can build user trust with service continuation. Therefore, this study may consider the influences of how immersive features in AR mobile platforms engage sensory information that builds users' trust towards the platform's usage.

In the AR context, tangible augmented reality (TAR) allows users to interact with virtual products through spatial registration by changing the orientation of physical spaces and gesture-based interaction through front and back-facing mobile cameras to place the products using in-air gestures (Grubert, 2021). It may encourage users to gain confidence and build trust in adopting technological systems. In the digital era, AR mobile platforms can accommodate virtual product recognition, detection, and inspection using deep neural networks (DNN) through human-computer interaction, integration with 5G, and other intelligent technologies, where the effects of those engagements can be investigated towards users' trust-building process (Goti et al., 2023).

A recent study has shown that real-time product tracking, scale measurement, and AR positioning features may create user trust through forming virtual realism by using DNN of AI, visual-inertial odometry (VIO), and geospatial recognition regarding products that can be extended to explain users' trust with AR (Tang et al., 2023).

In the online retail industry, AI interactions with AR move towards an interaction paradigm through product personalisation, scale measurement, positioning, and virtual try-on features (Huang et al., 2021) that may also develop users' trust by alleviating a product's "need for touch" or reducing product uncertainty (Sun et al., 2022). This research may consider the building process of users' trust after interacting with AR on mobile platforms.

2.8 Continuance Intention as a Behavioral Response

The term "continuance intention" was adapted from the information system (IS) continuance model, followed by expectation-confirmation theory (ECT) from the root of consumer behaviour literature (Bhattacherjee, 2001). Recently, researchers have studied continuance intention for the immersive virtual environment. This shows positive indications for retailers and other related stakeholders to continue using immersive virtual platforms. Furthermore, Hung (2021) describes the continuance intention for AR mobile platforms, which may extend to explain the effects of perceived UX through cognitive and emotional (Kabir & Kang, 2024b; Kumar et al., 2023; Jessen et al., 2022) engagements in an AR mobile platform. In an AR mobile platform perspective, this study may investigate the effects of perceived cognitive and emotional engagements towards continuation intention, which is an essential behavioural response to explain the user retention process in the e-commerce industry.

Concerning to reduce product uncertainty, AR can alleviate the problems by perceiving immersive experiences (Sun et al., 2022) to end-users by accommodating a sense of presence, mental imagery, and perceived informativeness. Thus, AR characteristics can engage users to perceive cognitive and emotional engagements through critical sources of information, influencing continuance intention to use AR mobile platforms. With regard to the complex

formation of behavioural intentions, AR features may encourage users to enhance their intention to continue using the platform by developing positive attitudes and minimising product uncertainty. Sung et al. (2022) also explain that the escapism experience with AR affects users' relationships to gather information from different sources to identify alternative selling points that may influence continuance intention. This study may investigate users' continuance intention as a user retention process to explain the consequence of perceived emotional feelings by minimising product uncertainty and avoiding the need to touch the product.

User retention is considered an effective way of continuing business growth in the platform business, and retailers are struggling to retain users for sustainability. Dirin and Laine (2018) described UX as the emotions encountered through user-platform interactions, which can be assessed for users' cognitive and emotional engagements to enable a sustainable system through decision-making. It supports the mobile platform industry in engaging user retention, resulting in sustainable growth using AR. This study may consider how user-platform interactions with AR influence users' continuance intention as a behavioural response.

2.9 Multiculturalism

Multiculturism is a global phenomenon that engages different stakeholders to extend the study of assessing user behaviour in a multicultural society. Assessing cultural effects is essential for UX designers and researchers on mobile platforms, where multiculturalism accommodates different cultural groups through continuous interaction with cultural forces. A multicultural society adopts the ability to interact with different cultural backgrounds, where behavioural intentions of those cultural groups can be assessed considering the perceived UX in an AR environment for a culturally diverse community (Kabir & Kang, 2024; Elsharnouby & Maher, 2023; Dey et al., 2019). Further, Santoso and Schrepp (2019) described the triangular relations among users' expectations, origin cultural aspects, and perceived UX. However, the effects of cultural traits towards UX in a multicultural society can be investigated in AR.

Cultural diversity influences users through individual beliefs, hierarchy, geography, generation, characters, and habits, which may affect their behavioural responses. Previous studies explain major cultural traits through different aspects: (i) the cognitive dimension as an aspect to define the user's ability, (ii) the cognitive level, the epistemic dimension as an aspect to acknowledge between facts and conformities, (iii) the social dimension is an aspect of the user's commitment and feedback, and (iv) personal dimension as an aspect to link as user's intentions with clarity (Permatasari et al., 2019). Furthermore, Zhou et al. (2015) explained the effects of cultural values and age groups by defining two factors, indulgence and individualism, influencing users' perceived benefits for continuance intention to use the social virtual platform. This study may investigate how multiculturalism influences users to perceive immersive experiences in a multicultural society (Jung et al., 2018).

2.9.1 Multiculturism in Australia

Cultural and linguistic differentiation in Australia has been increasing, forming one of the most multicultural societies in the world. According to the 2021 census, more than 7 million people (28%) were born in other countries, and 5 million people (22%) communicated in a language other than English at home (ABS census report, 2022a). The census report indicates that older immigrants are most likely born in European countries, while younger immigrants are likely born in Asian countries. Jaiswal and Zane (2022) stated that users' origin culture influences their attitudes towards emerging technology-based platforms that may develop users' behavioural intentions. Considering Australia's statistics, the report (as shown in Table 2) identifies major origin cultural groups in Australia. It addresses the low median age to identify young users on online retail platforms (ABS Census, 2022a).

Table 2. Summaries of Cultural Diversity in Australia

Origin Culture	Percentage of the total population	Median age	Native language
United Kingdom (UK)	25.9%	58	English
Australia	25.4%	34	English
German	3.2%	66	German
Italy	3.3%	72	Italian
China	3.1%	39	Chinese

New Zealand	2.2%	45	English
India	1.4%	35	Hindi
Philippines	1.6%	41	Filipino
Vietnam	1.3%	48	Vietnamese

The median age of users from different origin cultures is essential for identifying cultural differentiation in a multicultural society. Australia is a multicultural society where immigrants enter for different purposes and processes. In the earlier stage, immigrants from Europe were in large numbers, but recently, immigrants from Asian countries have surpassed them. We can describe the median age for different cultural groups in Australia as shown in Table 3.

Table 3. Median age by country of birth in Australia, Census 2022

Country	*Males*	*Females*	*Persons*
Australia	33	35	34
China	39	40	39
India	35	35	35
Nepal	29	28	28
South Korea	39	40	39
Malaysia	41	43	42
South Africa	45	45	45
Vietnam	49	46	48
England	57	58	58
Germany	67	65	66
Lebanon	54	55	54
New Zealand	45	45	45
Scotland	60	62	61

Source: ABS Census, 2022

In a multicultural society, this study may identify users from different cultural groups through different cultural dimensions that form an ecosystem. However, existing studies on AR e-commerce mobile platforms have concentrated on cross-cultural analysis (Al Adwan et al., 2022). Only a few studies focused on multicultural analysis within a single country (Zhang et al., 2012). This study can be extended to consider how different cultural groups of origin react to AR mobile platforms in a multicultural society like Australia. It can give valuable insights for e-commerce mobile platforms to enhance business growth. This research can identify cultural diversity and cultural differences for distinct user groups among users from different origin cultures in an AR environment.

2.9.2 Origin Culture

In a multicultural society, it is crucial to understand the origin culture of the users, which inherits the cultural values, customs, and beliefs of the users' ethnic backgrounds. Ålund (1999)

explained origin culture as an identical essence representing users' race and ethnic background with eternal originality. In other words, the term "origin culture" was defined as a cultural identity rooted in the ethnic inheritance and geographical existence of an individual who belongs to a group (Hall & Ghazoul, 2012). However, in a multicultural society, users with ethnic communities maintain their original cultural identity from family members, countries, and ethnicities (Dey et al., 2019). It is a collective distinctiveness through shared language, norms, values, native ethnicity, costumes, social beliefs, and communal engagements.

Previous studies suggest that the origin culture acts as a socio-cultural factor that indicates users' ethnic background, native roots, or cultural values of an inherent background (Pilar & García, 2015). Origin culture is critical in identifying user characteristics and cultural groups, particularly in assessing UX.

Geert Hofstede's framework defines origin culture as a user characteristic that differentiates individual group members considering the cultural dimensions theory (Hofstede, G., 1980). Hofstede's model effectively identifies users' origin culture, where six cultural dimensions-individualism, power distance, uncertainty avoidance, masculinity, long-term orientation, and indulgence describe users' cultural identity.

Concerning individualism/collectivism as a cultural dimension, an individualistic society emphasises user goals, self-support, and autonomy, while a collectivistic society honours social harmony, community rules, norms, and mutual engagements (Hofstede, G., 1980; Hofstede & Bond, 1988). This dimension identifies users' origin culture through users' characteristics when assessing UX. In another context, previous studies explain uncertainty avoidance as the cultural diversity of the cognitive and emotional process in e-commerce platforms (Feng & Mueller, 2019). Users in high uncertainty avoidance societies prefer to show solid social norms and recognised rules, whereas low uncertainty avoidance societies accept unpredictable situations and are less dependent on rules (Hofstede et al., 2010). It is evident that the origin culture may impact users' decision-making process in a multicultural society (Kim, 2001). Further, users from a low uncertainty avoidance culture are more likely to adopt new technology. In contrast, users from a

high uncertainty avoidance culture may show reactions and seek defined guidelines with uncertain usage (Hofstede, G., 1980). In AR, uncertainty avoidance would be a catalyst for influencing behavioural intention and describes the characteristics of the user who will adopt AR mobile platforms. Therefore, the origin culture, identified by individualism/collectivism and uncertainty avoidance, may influence users' continuance intention. Even though Hofstede's cultural dimensions apply to a holistic approach to identifying the origin culture, it can be extended to identify different cultural groups in a multicultural society.

In another context, users from the universalistic culture follow straight rules to perform activities, whereas users from the particularistic culture follow relationships and associated obligations (Trompenaars et al., 2021). In a particularistic culture, users follow pre-set rules and customs consistently. However, a universalistic culture allows flexibility in adopting new procedures in particular situations. In this context, origin culture is defined as the habitual interactions of people, which are differentiated from each other by explaining exchanged values, perceived experiences, and contextual engagements that influence their actions. It is associated with temporal, activity, relational, and environmental orientations to develop cultural beliefs, values, norms, virtue, and ethical considerations to perform as a social actor. Trompenaars also explained individualism as a self-oriented and communitarianism as a common-goals-oriented cultural group.

Previous studies demonstrated that an individual's cultural values, common cultural beliefs, and attitudes influence users' behavioural responses (Zhang et al., 2008; Mortimer et al., 2022). East-Asian (Chinese), Western (Australian), European (German), and Southeast Asian (Indian) users have different cultural values. In Australia's highly individualistic origin culture, users emphasise themselves more than their groups with innovative and retail-forward (Taylor, 2005; Mortimer et al., 2022). In contrast, the Chinese are considered a highly collectivistic culture, explicit in retail consumption with interdependence and communal relationships (Lee & Huang, 2021; Mortimer et al., 2021). Moreover, users from India are more of a collectivistic culture, integrate themselves into their groups, and are less emotionally expressive (Dang & Raska, 2022;

Jaiswal & Zane, 2022). Origin cultures from central European countries like Germany have individualistic cultures to seek innovative technologies and platform adoption (Hofstede et al., 2010; Zhu et al., 2022). Hofstede's cultural dimensions for distinct origin cultures (as shown in Figure 6) are as follows:

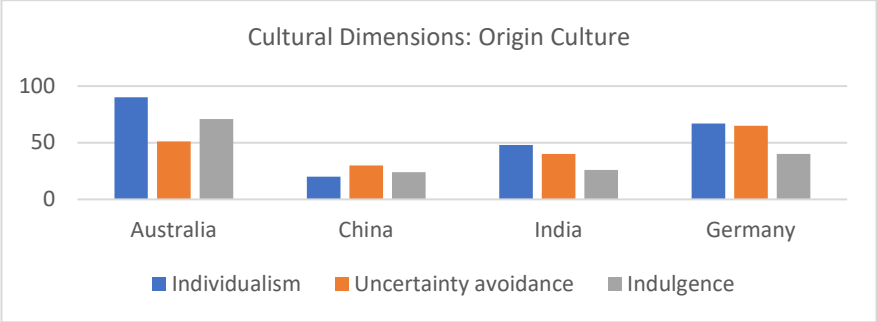

Figure 6. Comparison chart for distinct origin cultures

Source: Hofstede's cultural difference: https://www.hofstede-insights.com/country-comparison/ (Hofstede et al., 2010)

Individualism and uncertainty avoidance are critical cultural dimensions that help to identify the origin culture of users in a multicultural society. Previous studies considered individualism as correlating with adopting innovative technology, whereas uncertainty avoidance is associated with product uncertainty and associated risks. Individualistic origin cultures with low uncertainty avoidance may adopt more online shopping channels with innovative technology (Xu & Cheng, 2021). Online retailers are accommodating AR in their mobile platforms, promoting specific products to individualistic groups in a multicultural society. In other contexts, users in individual cultures are habituated to build trust in their perspectives. In a collectivist origin culture, trust is built based on the user's previous experiences in the prediction process, considering social influences. Without experience, in-group transference can also establish trust in a collectivist culture. During the process, trust is transferred from a trustworthy source to the next target. Without prior experience with a target such as an online vendor, users rely on recommendations or peer group opinions from their friends and family members. Therefore, comprehensive research can be extended by considering the effects of users' origin culture on behavioural responses in an AR environment.

Individualism is one of Hofstede's cultural dimensions, defined as the degree of independence in an individual culture that influences users to perform an activity, and collectivism is described as the degree of integration with a society (Hofstede et al., 2010). In an individualistic society, users' cognitive feelings are developed only to care for themselves and their close family members. Users in a collectivist society perform 'in groups' that maintain unconditional loyalty to others' opinions. Chauhan describes that users in an individualistic culture intend to engage in online shopping activities (Chauhan et al., 2022). García demonstrates the significant effects of individualism as a cultural dimension in e-commerce platforms (García et al., 2020). The e-commerce industry is extending its businesses in a multicultural environment. It is essential to consider individualism and collectivism as cultural dimensions to assess user experience toward e-commerce platforms. Conversely, uncertainty avoidance is an important dimension defined as the degree to which a culture member feels uncomfortable or ambiguous about an unknown situation and avoids acting on future activity (Hofstede, 2011). This is a practical dimension to assess user experience for the e-commerce apps in the interaction paradigm for augmented environments because product uncertainty and the need for touch occur in online interactions. Uncertainty avoidance can describe the risk behaviour of a user as a tolerance level to interact with a virtual platform to accept uncertainty (Serravalle et al., 2022).

Previous studies have confirmed that individualism/collectivism and uncertainty avoidance are the most related dimensions for investigating users' continuance intention to use technological systems, including mobile platforms (Martínez et al., 2023). Therefore, individualism and uncertainty avoidance are appropriate for identifying the origin culture in a multicultural society like Australia. Individualism/collectivism is the cultural dimension of individuals or a cultural group within a multicultural society that identifies users' national culture as a unique set of characteristics. On the other hand, uncertainty avoidance is defined as the degree to which a user would adopt to use of services without uncertainty (Hofstede et al., 2010). Still, there is a research scope to assess the effects of users' origin culture, considering major dimensions like individualism/collectivism and uncertainty avoidance, on continuance intention to use the AR

mobile platform. The impact of individualism and uncertainty avoidance is closely related to defining cultural groups in a multicultural society. Table 4 shows the consequences of different origin cultures that influence users' continuance intention to use platforms.

Table 4. Origin Culture and continuance intention

Origin Culture (Hofstede et al., 2010)	**User characteristics of origin culture that influence continuance intention**	**Cultural impact on continuance intention**	**Sources**
Individualism	Individual interest, self-reliant, self-centred, more demanding, self-orientation, low-context communication, emotional independence, privacy and autonomy, looking for high-quality services, flexible, independent, own interest, freedom, not bothering by a long-term relationship	Positive influence	Martínez et al., 2023; Kumar et al., 2023; Verma et al., 2023; Wang et al., 2022
Collectivism	Collective interest, harmony, interdependence, more tolerant of mistakes, lower expectations, joint decision-making, attention to emotional connection, loyalty, security, adherence to customs, reliance on long-term relationships, a greater need to assure the quality of service, less demanding, traditions, more tolerant, not a frequent complainer.	Negative influence	
Low uncertainty avoidance	Risk-taking, tolerant, trustworthy, low level of social influence, openness to change or innovation,	Positive influence	
High uncertainty avoidance	Conservatism, unpredictable, resistant to change, highly influenced by peers, more cautious, seeking to follow rules, like expert advice	Negative influence	

Understanding the origin culture in a multicultural society like Australia is critical, primarily through defining individualism/collectivism and uncertainty avoidance. These origin cultures influence users' behavioural responses to adopt technological systems. Hofstede introduces dimensions of culture to address how and why users from distinct cultures behave differently in a multicultural environment (Hofstede, 1980). Previous studies explain that the origin culture through individualism/collectivism and uncertainty avoidance may impact user-platform interaction, decision-making process, and technological adoption in a multicultural society (Kim, 2001). Therefore, the comparison between the origin culture in correlation with cultural dimensions may be articulated as follows (Table 5).

Table 5. Comparison between the origin culture and cultural dimensions

Origin Culture	**Individualism**	**Uncertainty avoidance (UA)**	**Remarks**

United Kingdom (UK)	89	35	Highly individualistic origin culture with low UA
Australia	90	51	Highly individualistic origin culture with moderated UA
Germany	67	65	Highly individualistic origin culture with high UA
Italy	76	75	Highly individualistic origin culture with high UA
China	20	30	Highly collectivistic origin culture with low UA
New Zealand	79	49	Highly individualistic origin culture with moderated UA
India	48	40	Collectivistic origin culture with low UA
Philippines	32	44	Highly collectivistic origin culture with low UA
Vietnam	20	30	Highly collectivistic origin culture with low UA

Source: Hofstede's cultural difference: https://www.hofstede-insights.com/country-comparison/

2.9.3 Generation/Age Group

The age group of users has a significant moderating effect on behavioural intention to use AR mobile platforms. Cabanillas and Santos (2017) categorise users into different age groups or user generations to explain users' behavioural intentions to adopt mobile platforms, where the impacts of age group on users' continuance intention in an AR environment are still unrealised. Mannheim (1970) defined the term age group as a joint group of age users with life experiences, shared beliefs, attitudes, and behavioural responses. Further, generations are categorised as Boomers II (born between 1955 and 1964), those who were familiar with radio and television as broadcasting channels; Generation X (born between 1965 and 1980), who followed a change in the leading media; Millennials, (born between 1981 and 1996), those who were introduced with the internet technology, and Generation Z (born after 1997) (Koscielniak et al., 2022). However, Generation X grew up in an age of economic uncertainty (Howe & Strauss, 2009). Generation X is considered to be pessimistic, severely self-deterministic, and entrepreneurial (Lyons et al., 2007; Wey et al., 2002), favouring relying on their own decision rather than taking support from others (Howe & Strauss, 2009; Lyons et al., 2007). On the other hand, Millennials are developed as self-regulating, innovative, and flexible; however, Millennials are considered more expectant and self-centred than Generation X (Tapscott, 2009). Moreover, Generation Z is considered 'digital natives', the first generation to have grown up with digital communication (Adeola et al., 2020; Djafarova et

al., 2021). Therefore, the effects of different age groups and generations may influence users' behavioural responses to continue using AR mobile platforms.

Generational cohorts are vital in determining users' behaviours, especially when adopting technological systems. The age group (e.g., Generation Z, Millennials, Generation X, Boomers) shows diverse behavioural intentions, societal engagements, influence mechanisms, and adoption tendencies in the technological adoption process (Nwobodo & Weissmann, 2024; Wilson, 2019). In the immersive era, generational gaps may be investigated to assess user experience and the effects of generation on users' continuance intention to use AR mobile platforms. Understanding the influences of age groups on users' behavioural intention to use AR mobile platforms is a unique context. For example, Generation Z prefers to communicate with virtual and interactive images for innovative content, whereas the older generation, like boomers, likes to communicate with text (Prakashyadav & Rai, 2017; Priporas et al., 2017). This research may consider investigating the effects of age group as a sociocultural factor towards users' continuance intention in an AR environment.

2.9.4 Cultural Acculturation

John W. Berry's acculturation theory describes how users from distinct cultures adapt to a host culture by defining strategic viewpoints (Berry, 1997). Cultural acculturation is a construct that defines the changing characteristics of users' psychological states among migrants staying in a new cultural environment and transforming the cultural practices from origin cultures to host cultures (Ma & Xia, 2021). Acculturation is essential in multicultural studies, especially when investigating users' behavioural intentions for different origin cultures. Initially, the term cultural acculturation was proposed to define the typology for cultural orientations of native society toward the host society and explain how cultural viewpoints are blended (Berry, 1997). Some strategies can define cultural acculturation, mainly describing the four stages of integration, assimilation, separation, and marginalisation. Further, migration and long-term staying in a host culture transform a new acculturation behaviour that engages cultural adoption from the host

society. Moreover, Ålund (1999) explains a cultural transformation through cultural, social, and ethnic identities in a multicultural society, where it can be extended to an AR environment.

With the multifaceted approach, the nuances of acculturation can be measured appropriately through language, staying period in a host culture, attending educational institutions, co-ethnic social ties, and social structures (Kim & Gorman, 2022), where the effects of acculturated culture through living period and attained educational degrees towards users' continuance intention may be explored in an AR environment.

Acculturation is about transforming cultural traits and adopting local traditions from the host cultures. Marketing researchers could better understand the behavioural traits of users by analysing usage patterns from different cultures of origin in a multicultural society. Usually, users are mentally attached to their home cultures, but they compare them with the host cultures, influencing their decision-making process (Miocevic & Zdravkovic, 2020). However, it remains unexplored to investigate the effects of acculturated culture in perceiving UX in AR environments. Also, there is limited knowledge about the acculturated effect on users' continuance intention through perceived UX in a multicultural society like Australia. Previous studies have described the influences of cultural acculturation on users' behavioural responses to health or retail consumption issues (Foroudi et al., 2020), where it can be investigated for users' continuance intention to use AR mobile platforms (Williams & Liu, 2023; Kim & Gorman, 2022).

2.10 Summary

This chapter describes an integrative literature review that investigates the fundamental concepts and evolutions of AR, sources of information, user experience, behavioural response, cultural traits, and age group. The emergence of augmented reality in engaging user-platform interactions for e-commerce mobile platforms was reviewed by identifying different factors that allow users to perceive user experience. The literature review explores the requirement of assessing users' cognitive and emotional engagements toward developing attitude, satisfaction, and trust in an augmented reality environment. Also, the user retention process through

continuance intention was revealed as a potential research topic to include in this study. In a multicultural society, there are some external influences on users' continuance intentions, and this study reviewed relevant literature to identify critical socio-cultural factors like origin culture, age group, and acculturated culture to frame a comprehensive research design. Until now, no research has examined users' perceived user experience in Australia through cognitive and emotional engagements that influence continuance intention, considering the moderating effects of cultural values and age groups in an augmented reality environment.

Online users prefer interacting with virtual products in AR mobile platforms, perceiving user experience and overcoming uncertainty through user-platform interactions. However, it is not clear as a rich explanation whether users' cognitive and emotional engagements are perceived positively towards the decision-making process by alleviating product uncertainty and the need for touch. The next chapter explains the methodology developed in this study to reveal how users perceive user experience and influence their behavioural intention in AR mobile platforms with the effects of origin culture, age group, and acculturated culture.

CHAPTER 3

THEORETICAL DEVELOPMENT AND RESEARCH MODEL

Based on the theoretical groundwork outlined in Chapter 2, this chapter extends the formation of the theoretical framework that constitutes the foundation of the conceptual model to address the knowledge gaps. The proposed model accommodates the key concepts and theoretical understandings from this study's relevant theories and evidence.

3.1 Key Concepts in the Proposed Conceptual Model

As discussed in Chapter 2, previous studies have shown that a new way of exploring the sources of information in augmented reality is required to explain user experience (Chatterjee et al., 2022), considering users' cognitive and emotional engagements with AR mobile platforms (Kang et al., 2022). The effect of those engagements motivates users' intrinsic values and supports users to enhance their continuance intention as a decision-making process (Acharya et al., 2023). Concerning the forming of cognitive engagements with AR, this study identified mental imagery (Park, 2020), sense of immersion (Daassi & Debbabi, 2021), sense of presence (Wang et al., 2021), and subjective norm (Belanche et al., 2019) as critical factors that allow users to alleviate product uncertainty (Sun et al., 2022). Further, attitude (Vo et al., 2022), satisfaction (David et al., 2021), and trust (Kang et al., 2022) were included as emotional engagements, explaining the consequences of perceived cognitive values. Moreover, this study investigated the moderating effects of origin culture (Martínez et al., 2023), age group (Cabanillas & Santos, 2017), and acculturated culture (Ma & Xia, 2021) on users' continuance intention in an AR environment.

This study investigated the abovementioned psychological states through sources of information and the effects of cultural traits and age groups to conceptualise a model as a theoretical extension following the stimulus-organism-response (SOR) framework. The SOR was applied to explain UX through perceived cognitive and emotional engagements, influencing decision-making (Barta et al., 2023) by reducing cognitive dissonance with the effects of cultural

traits and age groups. The definition of critical factors with relevant sources (as shown in Table 6) is as follows:

Table 6. Key Factors, Definitions, and Sources

Factor	Definition	Source(s)
Vividness	"Vividness" is a quality representation of sensory-mediated information of a virtual product in an immersive environment.	Wu & Kim, 2022; Yim et al., 2017
Interactivity	Interactivity is an AR characteristic by which users can gather simulated product information as a choice of requirements in a mobile platform.	Kowalczuk et al., 2021; Hsu et al., 2021
Product fit	Product fit is an AR characteristic that gets virtual product information with accurate measurements in the physical space.	Sun et al., 2022
Network quality	"Network quality" is an integrated quality for user-platform interactions in an AR mobile platform that supports higher image resolution, low latency, higher bandwidth capacity, and robustness.	Odarchenko et al., 2020; Kowalczuk et al., 2021
AI-driven recommendation	"AI-driven recommendation" is a technique adopted in the AR mobile platform that considers predictive information regarding user characteristics based on previous activities.	Yin & Qiu, 2021; Huang et al., 2021
Online review	"Online review" is defined as users' feedback and opinions regarding mobile apps and virtual product information using different online channels like app review sites, SNSs, search engines, etc.	Kumar et al., 2023; Chatterjee et al., 2022
Mental imagery	"Mental imagery" is an internal cognitive process that generates mental images reflecting a virtual AR mobile platform product.	Park, 2020; Heller et al., 2019
Sense of immersion	"Sense of immersion" is a degree of perceiving cognitive feeling to experience virtually embedded computer-generated objects from the virtual to the physical world.	Daassi & Debbabi, 2021; Pathak & Prakash, 2023
Sense of presence	We define "Sense of presence" as a user's subjective experience through a cognitive engagement of 'being a virtual product in a physical space.	Wirth et al., 2007; Smink et al., 2020; Schubert, 2009
Subjective norm	"Subjective norm" is a cognitive engagement of a user that perceives feelings towards AR mobile platforms by considering different external sources of information.	Belanche et al., 2019; Zhang & Yang, 2022
Attitude	Attitude is an emotional engagement that influences users to continue using AR mobile platforms.	Vo et al., 2022
Satisfaction	Satisfaction is a pleasant emotional feeling after interacting with AR mobile platforms.	Chylinski et al., 2020; David et al., 2021
Trust	"Trust" is the degree to which a user relies on the AR mobile platform to interact with a virtual product in a situated environment by alleviating product uncertainty and the need for touch.	Li et al., 2022; Kang et al., 2022
Continuance intention	Continuance intention is a behavioural response to continuing to use AR mobile platforms, considering user-platform interactions.	Yin & Qiu, 2021; Park, 2020

3.2 Theoretical Development

Following the theoretical foundation discussed in Chapter 2, this chapter describes the theoretical framework to develop the conceptual model considering the knowledge gaps. The proposed model is developed by defining relevant constructs. Drawing the theoretical background on the SOR framework, this study identified other relevant theories like cognitive load theory, schema theory, flow theory, situated cognition theory, theory of planned behaviour, expectation-confirmation theory, and trust-technology model to construct the conceptual model to develop conceptual model.

3.2.1 The S-O-R paradigm

The stimulus-organism-response (S-O-R) paradigm was introduced in the psychological theory under environmental science, where environmental factors were considered stimuli that impact cognitive reactions, consequently influencing users' behaviour (Mehrabian & Russell, 1974). Using the SOR framework in the UX study towards users' behavioural intentions can support mobile platform developers in identifying critical immersive and interactive sources of information as stimuli that may persuade and explain users' cognitive and emotional states towards behavioural intentions.

Currently, users interact with AR mobile platforms and engage with different sources of information. Recently, the SOR framework has been applied to determine the effects of AR characteristics and how users react to those stimulus cues. For example, few empirical studies investigated AR attributes like aesthetics, position relevance, interactivity, vividness, product movement (David et al., 2021; Wang et al., 2021; Nikhashemi et al., 2021), which impact users' cognitive states, resulting users' behavioural responses (purchase intention, word of mouth, continuance intention, impulsive buying intention, etc.) (Goel et al., 2023; Barta et al., 2023; Al-Adwan et al., 2022). This study identified the gaps that existing studies have emphasised less to explore users' continuance intention considering interactive, immersive, and socio-technological sources of information (Goel et al., 2023) through user-platform interactions (Santoso & Schrepp,

2019) in an AR mobile platform because perceived UX through cognitive and emotional engagements is wholly involved with social and technological dimensions of AR.

Therefore, this study applied the S-O-R paradigm as a base framework to understand how AR mobile platforms influence users' continuance intention through perceived UX. Although the SOR model was originated in the environmental psychology field, which described stimulus cues to explain users' cognitive reactions, recent studies followed the framework to investigate user experience, repurchase intention, and continuance intention (Goel et al., 2023; Qin et al., 2021; Hung et al., 2021). Initially, it was derived that multiple stimulus cues in an environment influence an organism, which consequently impacts on user's behavioural responses (Mehrabian & Russell, 1974). According to Mehrabian and Russell's theory, stimulus components are described as an environment's spatial, temporal, or sensual characteristics.

These stimulus factors act as catalysts to influence the user's cognitive engagements that change users' behavioural responses. Subsequently, these cognitive values involve emotional feelings with a degree of pleasure, joy, arousal, and dominance experienced by a user. This framework extends to user behaviour in different contexts like retail, tourism (Martinez et al., 2023; Jung et al., 2018), e-learning, and the gaming industry. Several studies have applied this framework to identify users' behavioural responses by assessing user experience and its influence on continuance intention to use the AR e-commerce platforms (David et al., 2021; Qin, 2021; Hsu et al., 2021).

Recently, the S-O-R paradigm has been used to examine various impacts of AR characteristics on users' behavioural responses. Researchers have started to use the S-O-R framework in AR mobile platforms to explain behavioural responses. In a recent study, visual, acoustic, and haptic stimuli factors were examined as stimulus cues to explain arousal and pleasure as emotional states that influence users' behavioural responses (Goel et al., 2023). Furthermore, Barta applied the S-O-R paradigm to extend research on how AR influences decision-making by reducing cognitive dissonance and assessing users' shopping experiences. Moreover, AR features create experiential values, enhancing continuance intention to mobile

platforms (Hsu et al., 2021). Considering the above relevance, we applied the SOR framework to understand how different sources of information (S) engage cognitive and emotional engagements to perceive user experience (O) that influences continuance intention (R) in an AR environment.

However, in order to explain the SOR framework in the user-platform interactions of AR, this study considered other relevant theories to develop constructs as an extension of theoretical development in the context of an augmented reality environment.

3.2.2 Other Relevant Theories

Online users struggle to visualise how products fit into their physical spaces and the realities of the products displayed on the platforms, which increases users' cognitive load. The cognitive load theory explains that processed information engages cognitive resources, and excessive cognitive loads affect perceiving negative emotions (Sweller et al., 2011). AR can support users in visualising product information through 3D presentations on how they could interact with virtual products in the physical world, and their perceived imaginative capabilities reduce cognitive loads (Barta et al., 2023; Fan et al., 2020). In other words, user-platform interactions with AR assist users in interacting with virtual products in their required positions, and it can alleviate product uncertainty by accommodating product interaction processes through cognitive and emotional engagements. Therefore, the AR product visualisations provided by user-platform interaction can decrease users' cognitive load and reduce excessive information by increasing mental imaging, immersion, and situated engagement capacities.

Jean Piaget introduced the schema theory with a cognitive schema framework that explains how users receive and interpret information after assimilating it from the world (Piaget, 1952). Previous studies stated that schema influences how mental images are shaped and remembered, leading to perceived mental imagery of a product (Greenberg & Verbrugge, 1983), which describes a user's ability to understand and interpret mental images through sensory information by comparing them to existing experiences that generate cognitive schemas. In the context of AR, users can form virtual product schemas to integrate with real scenarios and make sense of the

augmented objects. An AR environment can engage mental imagery by interacting with digital content in physical spaces. This embedded and situated experience of placing virtual objects in the desired location can influence the development of schemas.

In cognitive psychology, Kosslyn and Shepard (1994) studied mental imagery and derived it as a user's cognitive process where perceived experiences are simulated with sensory information. Mental imagery was derived as a cognitive process that creates a schema of virtual products through vivid presentations and detailed sensory information in virtual environments. It engages the development of processing sensory information and sketches images without external interventions. In the context of AR mobile platforms, user-platform interaction enables users to mentally visualise virtual products when interacting with digital spaces in their physical locations. Furthermore, Previous studies have shown that AR accommodates interaction with 3D objects in physical spaces to sketch mental imagery through user-platform interactions, and users' perceptions through mental representation enhance user experience (Perry et al., 2021). Therefore, AR augments users' cognitive engagements by perceiving mental imagery through product virtualisation to enhance user experience. So, we can adopt mental imagery to explain the schema generation process, following the schema theory, which other researchers have subsequently studied in different contexts. This study explores how mental imagery as a cognitive engagement is perceived through sources of information in user-platform interactions.

The flow theory explains a foundational concept in understanding the sense of immersion to extend user experience research in AR. Csikszentmihályi (1997) initially introduced the flow theory to define a cognitive state with complete engagement that fully immerses users in activities when a user loses self-consciousness. Immersion is a crucial concept in explaining the effects of augmented reality that supports understanding how a deep concentration in a virtual environment engages a sense of cognitive engagement through a sense of cognitive engagement. This cognitive engagement, a flow of experience, is explained through a sense of immersion, where users perceive UX through interactions and deep engagements with an environment. In the context of AR, recent literature has examined how flow theory can explain the dynamics of perceiving a

sense of immersion through user-platform interactions in AR applications (Liu & Wang, 2021). Furthermore, those interactions with mobile platforms engage sensory information in AR, and it can develop a sense of immersion through the seamless integration of virtual products with physical things (Yao & Zhang, 2021). So, a sense of immersion would be an essential cognitive factor in assessing UX in AR mobile platforms. This study investigates how different sources of information in user-platform interactions influence user experience through flow and immersion, with the previous evidence on enhancing the sense of immersion followed by flow theory principles.

The situated cognition theory (SCT) suggests that cognitive engagements are involved through deeply embedded physical existence in virtual spaces (Lave & Wenger, 1991). Initially, situated cognition was introduced by exploring learning experiences through embedded processes in the social context. Lave and Wenger (1991) explained that situated cognition is related to users' internal cognitive states and involves situated experiences through product interactions. In an AR context, it engages a sense of embodiment for virtual products through user-platform interactions using interactive mobile platforms. Further, it creates an enabling environment for users to perceive user experience that connects the virtual world to desired physical spaces. The SCT introduces the term "sense of presence," which represents the user's feeling of being physically engaged in a virtual environment.

In an AR mobile platform, users perceive a sense of presence through the embodiment of virtual products with physical things, creating an immersive experience. Following the situated cognition theory, previous studies explain how stimulus factors in AR environments significantly impact the sense of presence (Liu et al., 2017; Smith et al., 2020). According to previous studies, three stages are addressed to explain sense of presence: physical presence as a user's feeling of being situated in the AR space; social presence: engagement through interacting with virtual products; and environmental presence: the feeling of being in a realistic and known virtual environment. Furthermore, the organism addresses how a user's biological process reacts to an environment in the S-O-R framework. However, interactions with AR engage situated feelings,

and this cognitive factor, considering user-platform interactions, is crucial to explaining user experience in AR mobile platforms. This study includes the sense of presence as a cognitive engagement to understand how users perceive user experience in AR, mainly focusing on how different sources of information as stimulus cues influence the sense of presence.

Subjective norm is a determining factor in the theory of planned behaviour (TPB), which states the perceived expectations from other sources of information that influence users' behaviour (Ajzen, 1991). In the context of AR, user-platform interactions engage innovative sources of information through technological advancements, emerging features, and ways of delivering opinions that change users' perceptions of societal and technological expectations that play a vital role in assessing subjective norms. Schmiedel et al. (2018) explained that opinions or recommendations from different sources influence user experience through perceived subjective norms. Further, engagement through user-platform interactions in AR involves innovative sources of information that impact users' subjective norms. Consequently, users are more likely to be interested in interacting with AR mobile platforms, influenced by social actors through interactive online platforms.

The emerging trend in adopting AR applications engages a new way of user-platform interaction, and it develops platforms' capabilities to generate recommendations through artificial intelligence-based data analytics platforms. Although innovative sources of information through experiences and reviews through online platforms engross subjective norms, a new way of assessing subjective norms is required by explaining valuable insights through a perceived user experience that engages multi-modal interactions in AR (Zheng & Yang, 2022). Therefore, subjective norms may play a pivotal role in users' perceptions and interactive engagement through adopting new technology in AR environments, influencing behavioural intentions. This study included the subjective norm as a cognitive engagement to assess user experience through interpersonal and innovative sources of information, considering user-platform interactions.

The expectation-confirmation theory (ECT) was initially introduced by Richard Oliver in 1980, explaining user satisfaction as fulfilling users' expectations that influence behavioural

intentions (Oliver, 1980). Bhattacharjee also describes satisfaction as a confirmation of expectation and correlates with users' continuance intention to use products (Bhattacherjee et al., 2001). Further, satisfaction can be defined as a constructive emotional state resulting from users' confirmed expectations of mobile platforms. The ECT explained that users have expectations before interacting with interactive mobile platforms, and their satisfaction is assessed by how they perceive user experience through cognitive and emotional engagements that fulfil expectations. Also, the overall satisfaction engages users' future actions to continue using AR mobile platforms. Moreover, the perceived user experience in user-platform interactions impacts users' satisfaction with AR mobile platforms. After interacting with AR mobile platforms, confirmation of user expectations often impacts users' satisfaction, which influences users' continuance intention to use AR mobile platforms (McCormick & Quinn, 2020).

Trust is a crucial construct influencing the continuance intention as a user retention process to use augmented reality mobile platforms. Trust was explained in the Trust Technology Model (TTM), which considers user confidence by assessing technological features that develop users' trust towards a system (McKnight et al., 2002). AR mobile platforms require a robust system to accommodate virtual product visualisation, interactive capabilities, product placement, accurate spatial measurement, an artificial intelligence-based recommendation process considering all possible touchpoints, and an interactive review process on a mobile platform as stimulus cues. In another aspect, Gefen theorises the trust-based model for system usage, which defines trust as a consequence of repetitive interactions with a technological system (Gefen, 2000). In AR, prior studies suggested that high-quality sensory information through user-platform interactions positively impacts users' trust-building in an AR environment (Growe, 2019). Furthermore, trust was defined as a multi-layered emotional factor impacted by different stimulus cues through cognitive engagements such as flow experience, spatial presence, utilitarian value, hedonic value, and psychological inspiration (Park, 2020; Pathak & Prakash, 2023). Therefore, users perceive a positive user experience if user-platform interactions through AR capabilities engage them to gain

immersive values by alleviating product uncertainty and the need to touch the product, and, in turn, building trust that influences users' continuance intention.

Previous studies investigated continuance intention for e-commerce mobile platforms following the expectation-confirmation model (ECM) (Chauhan et al., 2022). In the S-0-R framework, AR characteristics are addressed to explain as stimulus factors. However, users have some prior expectations from AR mobile platforms regarding interaction capabilities, network qualities, platform recommendations, and peer reviews. Empirical studies confirmed the relationship between users' perceived user experience and continuance intention following the ECM (Jumaan et al., 2020) through cognitive and emotional engagements in the context of the AR mobile platform to explain the user retention process. Furthermore, the ECM addresses the users' cognitive and emotional engagements toward continuance intention to address the adoption of post-usage behaviour after interacting with mobile platforms (Nguyen et al., 2021; Bhattacherjee, 2001). In this study, we include continuance intention as a behavioural response by investigating users' confirmation of expectations from AR mobile platforms and how different sources of information as stimuli fulfil users' expectations to perceive UX.

3.2.3 Justification for Applying the SOR Framework

AR accommodates immersive features in e-commerce mobile platforms, providing user comfort through different retail settings. This study extended theoretical lenses to develop a conceptual model, followed by the SOR framework, to explain the perceived UX through user-platform interaction in AR mobile platforms, considering the identified research gaps. The SOR framework is related to identifying stimulus cues, which transform users' organisms through biological effects to perceive UX. When users interact with an AR mobile platform, user-platform interactions through an immersive environment involve different sources of information as stimulus cues that influence users' behavioural responses. These stimulus factors change users' cognitive and emotional engagements in perceiving UX. The cognitive states influence users' emotional feelings through attitudes, satisfaction, and trust.

The proposed model explains users' experience journey by accommodating sources of information as stimulus cues, perceived UX through cognitive and emotional engagements, and continuance intention as a behavioural response. This study has chosen the S-O-R framework to develop the research model because all the constructs are relevant to address research requirements, primarily identifying stimulus factors in an AR environment and correlating the relationships among sources of information, perceived user experience, and behavioural responses. The study followed other relevant theories and models to identify cognitive and emotional engagements considering the research context. The model includes relevant constructs like different sources of information, cognitive and emotional engagements to determine UX, continuance intention as a behavioural response, and socio-cultural factors to investigate the study while considering research gaps.

This study investigated different sources of information, considering user-platform interaction and its impacts on the user experience through cognitive and emotional engagements that influence users' continuance intention to use augmented reality mobile platforms. Previous studies have paid less attention to explaining the impact of different sources of information, considering user-platform interactions in perceiving user experience. Also, the model included the effects of origin culture, age group, and acculturated culture in a multicultural society. Therefore, this study applied the SOR paradigm, which is the most appropriate theoretical foundation to explain the perceived UX in the context of an AR environment and adopted cognitive and emotional constructs from the Schema theory, the Flow theory, the Situated Cognition theory, the Theory of Planned Behaviour, the Expectation-Confirmation theory, and the Trust-Technology model-based to theorise the proposed model.

3.2.4 Development of Conceptual Model

This thesis contributes to the existing knowledge by framing a conceptual model explaining how user-platform interactions with AR (stimulus) can influence users' cognitive (mental imagery, sense of immersion, sense of presence, subjective norm) and emotional (attitude,

satisfaction, and trust) engagements. Consequently, the framework explains the influences of these engagements on users' behavioural intention to continue using AR platforms.

This framework theoretically conceptualises how user-platform interactions in AR involve users interacting with more sources of information as stimulus cues that change users' cognitive engagements. The proposed model extends to explain the consequences of those cognitive states towards forming emotional engagements, influencing continuance intention to use AR mobile platforms. These cognitive and emotional engagements can be derived to explain the development of perceived UX in an AR environment.

This study theoretically addresses the lack of knowledge about the effect of user-platform interactions in AR toward continuance intention, where users perceive UX by reducing uncertainties and the need for touch. Thus, the study explained how user-platform interactions in AR impact users' cognitive and emotional engagements through different sources of information, explaining a mechanism by which AR changes user abilities to sketch mental images, immersion, situated presence, and subjective norm that influence users' emotional engagements through attitude, satisfaction, and trust by reducing cognitive loads. The perceived UX through cognitive and emotional engagements influences users' intentions to use AR mobile platforms. This study also identified the impacts of origin culture, age group/generation, and acculturated culture towards users' continuance intention. The theoretical and conceptual framework for assessing UX through user-platform interactions with AR is shown in Figure 7.

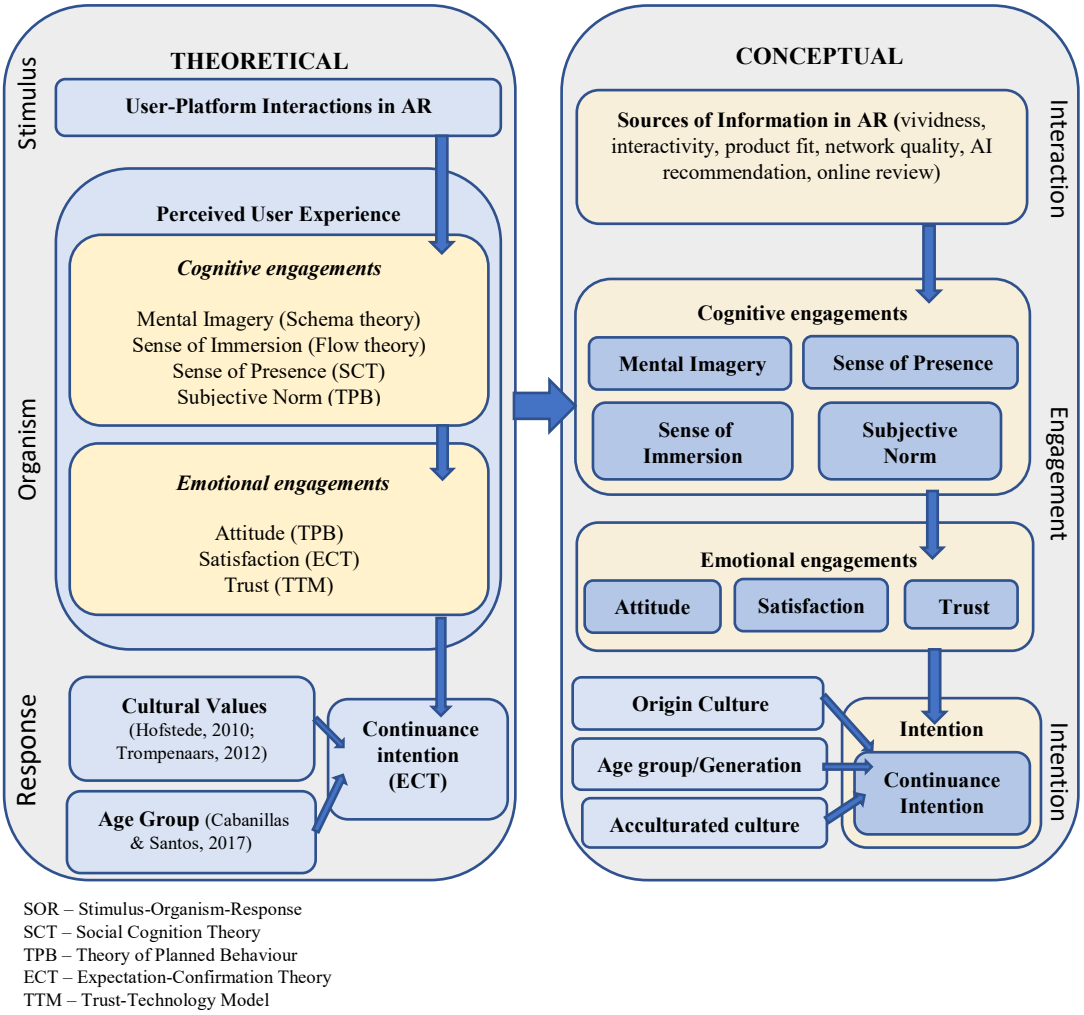

Fig 7. Development of a conceptual model for UX through user-platform interactions in AR

3.3 Hypothesis Development

The study relates the AR mobile platforms to users' cognitive and emotional engagements regarding how they perceive UX. We consider hypotheses using constructs and dimensions to develop a research model that considers individual cultural dimensions.

3.3.1 Vividness, Product Fit, and Mental Imagery

An AR mobile app can engage users to create mental imagery by visualising the vividness of a product. Several studies explain vividness as integrated sensory information to gain mediated mental imagery (Nikhashemi, 2021; Yim et al., 2017). So, AR e-commerce apps engage users to create mental imagery by visualising the vividness of a product. Product fit refers to the degree to which a virtual product satisfies users' demands with different functionalities, including scale

measurement, visual appeal, and product placement capabilities. On the contrary, mental imagery engages users to perceive sensory experiences through virtual product evaluations. Cavanaugh explains that product fit capabilities make it more reliable and desirable towards users by perceiving mental imagery (Cavanaugh & Sanguinetti, 2002). This study proposes the following hypotheses (as shown in Figure 8):

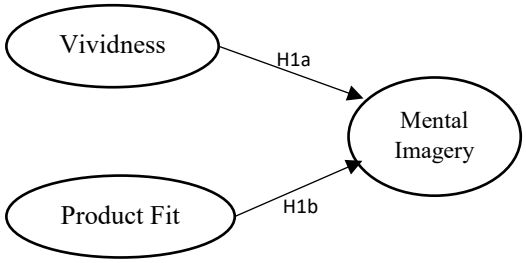

Figure 8. Hypotheses H1a and H1b

H1a. Vividness positively influences mental imagery in the user-platform interaction.

H1b. Product fit positively influences mental imagery in the user-platform interaction.

3.3.2 Vividness, Interactivity, Network Quality, and Sense of Immersion

Many studies empirically emphasised that the effect of vividness impacts immersive experiences, which is termed a sense of immersion. Users must engage virtually with vividness to feel more realistic through a computer-generated object (Yim, 2017; McLean et al., 2019). According to Olson, interactivity involves engagement and anticipates the mentally envisioned experiences during interactions with the product for the following consequences of usage (Olson, 1995). The user's mode of interactivity delivers a subjective decision through a sense of immersion to participate in an interactive system (Yim, 2017). In an AR environment, rich interactions through multiple input and output modalities enhance the users' immersion (Grubert, 2021). With the emergence of immersive technologies, AR provides sensory information to consumers and allows them to perceive immersive experiences to feel virtual products in the physical environment. In contrast, network quality is essential to ensure response time, availability, reliability, and prompt deliberations. In the context of AR applications, network

quality is essential to ensure response time, availability, reliability, and prompt deliberations. Furthermore, Kowalczuk et al. (2021) described that network qualities in an AR environment engage users' sense of immersion and develop their feelings. AR allows users with a high level of sensory engagement when placing virtual products in physical spaces. Such interaction capabilities with immersive experiences likely induce consumers to use AR platforms. Users are habituated to higher internet usage, gathering information on online goods from online channels. In the other context, Artificial Intelligence (AI) interactions change a new way of decision-making processes through multi-modal interactions, and it can predict consumer requirements by extracting insight from all possible touchpoints. Online mobile platforms use feeling AI through adaptive and personalised recommendation systems to extend predictive data analytics and analyse past purchasing behaviour to identify user behaviour through AI-driven recommendations (Yin & Qiu, 2021; Huang et al., 2021). In the virtual world, recommendations from different online channels influence consumers' intentions. Therefore, the following hypotheses are proposed (as shown in Figure 9):

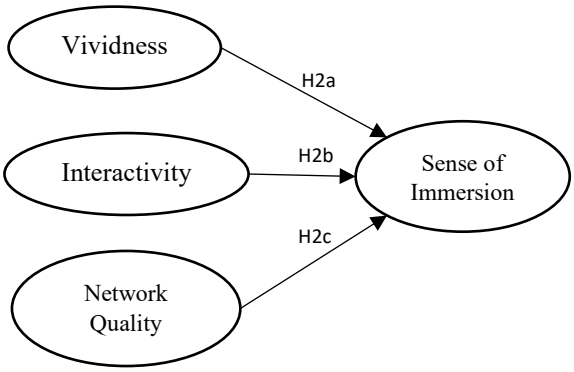

Figure 9. Hypotheses H2a, H2b, and H2c

H2a: Vividness positively influences sense of immersion in the user-platform interaction.

H2b: Interactivity positively influences sense of immersion in the user-platform interaction.

H2c: Network quality positively influences the sense of immersion in the user-platform interaction.

3.3.3 Product Fit, Network Quality, and Sense of Presence

In the era of emerging technologies, AI interactions provide consumers with more sensory information in AR environments, allowing them to perceive immersive experiences and feel that virtual products exist in the physical environment. AI interactions with AR support consumers in placing virtual products through tactile interactions in the required position through tracking, and the embodiment of 3D-generated products enhances the sense of presence (Kim et al., 2023). Sense of presence is a mental feeling with a real-world perception using virtually mediated content such as 3D image/video, visual/auditory animated content, haptic/tactile information, and impulse/feedback.

In e-commerce, online users interact with a mobile app to see a virtually embedded product in a real-world scenario. Hilken explains situated experience as a sense of presence in an AR environment (Hilken et al., 2017). Furthermore, mobile platforms accommodate AR features that provide users comfort in viewing virtual products in their physical environment and confirm virtual product information like sizes, colour, etc., by measuring the scale, which alleviates product uncertainties, reduces the need for touch and increases behavioural responses (Schlosser, 2003). Similarly, Sun describes that AR product fit reduces product uncertainty through spatial presence (Sun et al., 2022). On the other hand, edge AI-assisted applications in AR environments require ultra-high reliability, higher bandwidth capacity, and ultra-low latency through seamless integration with resource optimisation. This ensures critical performance indicators to maintain network qualities (Zhu et al., 2021). However, AI transforms wireless networks through quality optimisation with key parameter indicators, enhancing the UX by adopting seamless convergence of virtual realism in the physical spaces that engage the sense of presence (Growe, 2019). Therefore, we propose the following hypothesis (as shown in Figure 10):

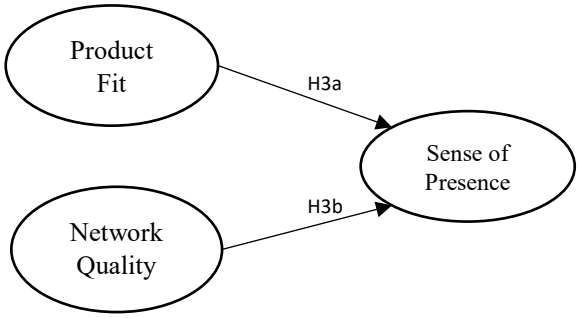

Figure 10. Hypotheses H3a, and H3b

H3a. Product fit positively influences sense of presence in the user-platform interaction.

H3b. Network quality positively influences sense of presence in the user-platform interaction.

3.3.4 AI-driven Recommendation, Online Review, and Subjective Norm

AR engages users with 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. AR engages users with a high level of influence when placing virtual products in physical spaces. Such interaction capabilities with immersive experiences likely induce users to use the AR platform. External innovative sources of information engage users more in the post-usage experience. Artificial Intelligence (AI) is an emerging technology that adopts intelligent decision-making processes, and it can predict user requirements by extracting insight from all possible users' touchpoints. Online Apps use feeling AI through adaptive, personalised recommendation systems for predictive data analytics using past purchasing behaviour to identify user behaviour through insight experience (Yin & Qiu, 2021; Huang et al., 2021). The 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 are essential in e-commerce to influence users from others' viewpoints. Furthermore, online reviews are considered a rich external source of information to assess user satisfaction as a positive confirmation after the initial usage of a product or service (Kumar et al., 2023). In other words, online review is an electronic word of mouth (eWOM) to support virtual evaluation techniques through interactive user feedback (Al Amin et al., 2022;

Wei et al., 2013). In the virtual world, users' intentions are influenced by online reviews using different online channels. Users are habituated to higher internet usage, gathering information on online goods from other channels. Chatterjee et al. (2022) also described the cultural effects of online reviews on user intention to purchase goods or services. Several studies have mentioned that online reviews are an external innovative source of information that affects subjective norms to change users' behavioural intentions (Son et al., 2023; Moradi & Zilhagh, 2022). Users are getting feedback regarding apps or products from different channels. Therefore, this study proposes the following hypotheses (as shown in Figure 11):

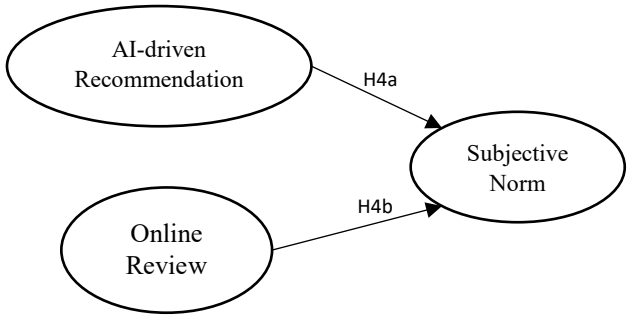

Figure 11. Hypotheses H4a, and H4b

H4a. AI-driven recommendation positively influences subjective norms in the user-platform interaction.

H4b. Online reviews positively influence subjective norms in the user-platform interaction.

3.3.5 Mental Imagery, Sense of Immersion, and Attitude

In the virtual world, platform experiences through mental imagery influence users' attitudes**.** The virtual interaction enhances the user's imagery process to create user attitudes (Schlosser, 2003). Sense of immersion relates to perceiving the sensory information of a product's presence by inspecting it as a real object. Then, the sensation of the product's existence in an AR platform transforms to influence attitudes toward the app (Dassi & Debbabi, 2021). The recent literature shows that perceived cognitive values positively impact attitudes (Adel et al., 2022; Pangaribuan et al., 2020). Therefore, this study proposes the following hypotheses (as shown in Figure 12):

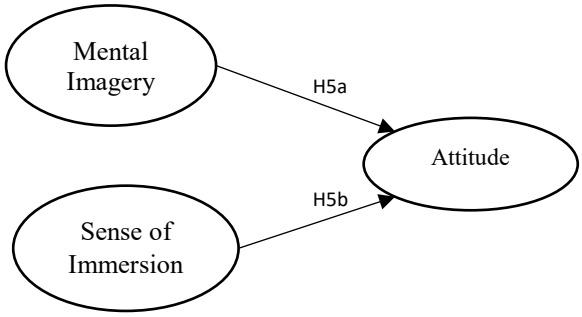

Figure 12. Hypotheses H5a, and H5b

H5a. Mental imagery positively influences attitude in the user-platform interaction.
H5b. Sense of immersion positively influences attitude in the user-platform interaction.

3.3.6 Sense of Presence, Subjective Norm, and Satisfaction

AR engages more virtual interactions with product virtualisation in an AR environment. Grubert (2021) explained how a virtual product is associated with the physical space through the sense of presence with value co-creation, which develops consumers' trust. The sense of presence creates a realisation of "being there" in the physical space, enhancing trust in products (Wang et al., 2021). AR co-creates immersive values to improve trust by confirming consumers' initial expectations or preferences. AR accommodates a sense of presence through personalised embeddedness that increases trustworthiness toward users (Alimamy & Gnoth, 2022). In contrast, the AR environment enhances the sense of presence through the embodiment of a product through cognitive ownership and persuades the user's impression through satisfaction (Chylinski et al., 2020; Heller et al., 2019). Furthermore, users' cognitive states through the embodied products create psycho-pleasure through the user's satisfaction as an emotional reaction (Poushneh, 2018). Due to AI interaction and external influences, previous studies have adopted the effects of a perceived sense of presence toward user satisfaction (Lee et al., 2023). In the case of social media interaction and external influences, previous studies have adopted the effects of subjective norms toward user satisfaction (Sany et al., 2023). Therefore, this study proposes the following hypotheses (as shown in Figure 13):

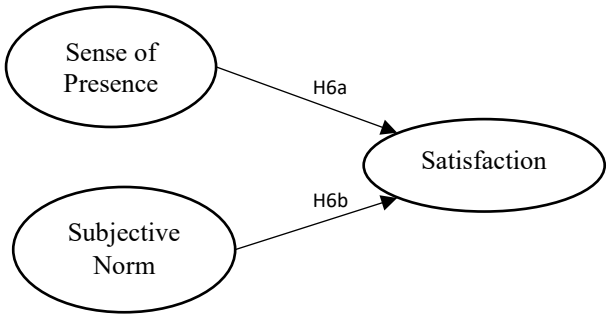

Figure 13. Hypotheses H6a, and H6b

H6a. Sense of Presence positively influences satisfaction in user-platform interaction.

H6b. Subjective norm positively influences satisfaction in user-platform interaction.

3.3.7 Sense of Presence, Subjective Norm, and Trust

In an extension of the immersive environment, trust is described as a mediating variable that considers the impacts of network functionalities, reliability, user experience, risk, usefulness in environmental values, and situated experience through interactions (Wang et al., 2021). Due to the characteristics of distance shopping, e-commerce platforms face challenges in avoiding product uncertainty and the need to touch the products. AR can address those issues by accommodating immersive capabilities; users can perceive subjective feelings towards building trust to interact with the mobile platforms (Nguyen, 2021). In summary, the abovementioned references indicate that a sense of immersion has a positive impact on building users' trust. Although the possibility of relating trust with the co-created values from immersive environments has been studied less, Growe (2019) defined how a sense of presence, as the virtual embodiment associated with the physical space, co-creates values that build user trust. The sense of presence develops a realisation of "being there" in the real world, enhancing trust about virtual products (Wang et al., 2021). AR co-creates immersive values to improve trust through the confirmation of initial choices. AR accommodates a sense of presence through personalised embeddedness that increases trustworthiness toward users (Alimamy & Gnoth, 2022). AR environment enhances the sense of presence through the embodiment of a product through cognitive ownership and persuades the user's impression through satisfaction (Chylinski et al., 2020; Heller et al., 2019).

The cognitive states through the embodied object create the psycho-pleasure through the user's satisfaction as an emotional reaction (Poushneh, 2018). On the other hand, previous studies have found that subjective norms positively affect user trust (Faqih et al., 2022). Therefore, this study proposes the following hypotheses (as shown in Figure 14):

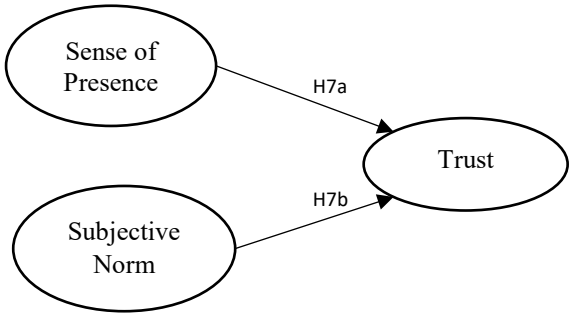

Figure 14. Hypotheses H7a, and H7b

H7a: Sense of presence positively influences trust in user-platform interaction.
H7b. Subjective norm positively influences trust in user-platform interaction.

3.3.8 Attitude, Satisfaction, Trust, and Continuance Intention

The theory of reasoned action (TRA) explains that attitudes influence behavioural intentions that predict the user's behaviour (Fishbein & Ajzen, 1975). The cognitive consistency theory explains the consistency of attitudes and behaviour of a user. Ajzen also describes the relationship between attitudes and behavioural intentions (Ajzen, 1980; Heider, 1946). Few authors have examined the relationship between users' favourable attitudes toward behavioural purposes and the retail context. It is empirically tested that users' attitudes influence users' behavioural intentions (Park, 2020; Chen et al., 2021). 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 regarding continuance usage intention (Bhattacharjee, 2001). So, an AR e-commerce mobile app is deemed an IS, and satisfaction is associated with getting users' continuance intention. Furthermore, Chauhan explains the effect of perceived satisfaction on

continuance intention to use mobile platforms (Chauhan et al., 2022). However, empirical research has been conducted on trust related to continuance intention in AR mobile commerce platforms (Nguyen, 2021; Balakrishnan et al., 2021). Similarly, Ameen et al. (2021) described that trust in the virtual environment positively impacts behavioural intention. Previous studies have shown that users' trust positively influences their willingness to continue using the mobile app (Beldad & Hegner, 2018). Balakrishnan and Dwivedi (2022) described the relationship between user trust and continuance intention to use technological systems. Therefore, this study proposes the following hypotheses (as shown in Figure 15):

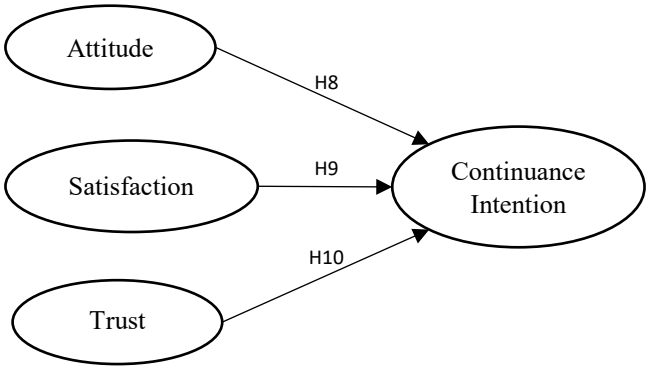

Figure 15. Hypotheses H8, H9, and H10

H8. Attitude positively influences continuance intention in the user-platform interaction.
H9. Satisfaction positively influences continuance intention in the user-platform interaction.
H10. Trust positively influences continuance intention in the user-platform interaction.

3.4 Moderation Effects of Origin Culture, Age Group, and Acculturated Culture

3.4.1 Origin Culture

According to previous research, origin culture or ethnic background acts as a socio-cultural factor in influencing user behaviour over many dimensions concerning products or services, and it changes depending on the origin culture, staying in a host country, or cultural values of a native background (Pilar & García, 2015). Origin culture is critical in identifying user characteristics and cultural groups when assessing UX. Several studies have applied Hofstede's dimensions to identify user motivations to adopt AR and investigate the influences of origin culture on

continuance intention in e-commerce mobile platforms (Serravalle et al., 2022). These studies include how cultural differences impact user expectations to adopt AR in a multicultural society. Previous studies have considered Hofstede's theory for identifying the origin culture with user characteristics (Chatterjee et al., 2022; Jung et al., 2018; Feng & Mueller, 2019).

AR engages users to perceive experiences, and individualistic culture provides information on how to feel product virtualisation through an immersive environment that ultimately enhances personal gain rather than in a collectivist society (Feng & Mueller, 2019). On the contrary, users in a collectivistic community agree to pay more for products or applications considering beneficial aspects than users in an individualistic society (Serravalle et al., 2022). Further, previous studies explained that user attitude and satisfaction towards behavioural intention are closely related to users' origin culture (Zhang et al., 2012; Chauhan et al., 2022). Moreover, few studies show that the effect of subjective norms on behavioural intentions is more significant within Eastern culture than in Western culture (Jung et al., 2018; Tarhini et al., 2017). Consequently, this study assumes that users' origin culture considering individualism/ collectivism may have significant effects on users' continuance intention to use AR e-commerce platforms. Similarly, previous studies described that origin culture significantly influences subjective norms toward continuance intention to use mobile platforms (Ho et al., 2020; Neves et al., 2022).

It is evident from previous studies that cultural values with higher uncertainty avoidance have higher risk perception to perform activities (Sohaib et al., 2019; Xu & Cheng, 2021; Zhu et al., 2021). Users in a high uncertainty avoidance society might be more likely to resist purchasing online than those with low uncertainty avoidance. Further, previous studies showed that users' cultural values on uncertainty avoidance influence user attitudes toward further usage of digital applications (Al-Adwan et al., 2022; Zhu et al., 2021; Sun et al., 2022). User satisfaction represents the user's cognitive states derived from the continuance of users' previous experiences with apps. Moreover, prior studies indicate that users in high uncertainty avoidance societies are more resistant to using e-commerce platforms than those in low uncertainty avoidance societies. Particularly, innovative technologies influence users from a low uncertainty avoidance culture,

and users would be satisfied to re-use Apps (Al-Adwan et al., 2022; Martínez et al., 2023). Therefore, uncertainty avoidance is a critical cultural dimension in addressing AR in e-commerce platforms to relate to UX towards behavioural intention. Recent studies revealed that uncertainty avoidance influences subjective norms towards behavioural intention in an AR environment (Jung et al., 2018; Pena et al., 2020; Tarhini et al., 2017). Therefore, the effects of users' origin culture, considering individualism/collectivism and uncertainty avoidance, may be investigated concerning users' intentions to continue using AR mobile platforms.

Previous studies have shown that users' behavioural responses depend on their origin culture, common cultural beliefs, and rituals inherited from their social community (Mortimer et al., 2022). Individualism and uncertainty avoidance may act as critical cultural dimensions that support researchers in identifying origin cultures in a multicultural society. In the context of behavioural responses like continuance intention, it is evident that individualism and uncertainty avoidance are considered the most influential cultural dimensions for assessing UX on users' continuance intention to use mobile platforms (Martínez et al., 2023; Wang et al., 2022). Previous studies explain that individualism as a cultural dimension affects users' behavioural intentions to use e-commerce mobile platforms (Xu & Cheng et al., 2021; Pilar & García, 2020). Furthermore, recent literature has explained that users with an individualist origin culture positively influence users' continuance intention (Kumar et al., 2023; Verma et al., 2023). In contrast, uncertainty avoidance can be used to describe the users' risk behaviour as a tolerance level to interact with an AR mobile platform (Serravalle et al., 2022). Moreover, Dang and Raska (2022) confirmed that users from cultures with higher uncertainty avoidance are more likely to adopt a resistant approach to online platforms than those from cultures with low uncertainty avoidance.

Users from individualistic cultures generally like to interact with platforms that offer customised features to support users' needs and demands. Previous studies explained that higher levels of interactive features engage users to perceive experiential values, influencing continuance intention to use mobile platforms (Xu & Cheng, 2021). On the other hand, users from collectivistic cultures follow social influence by group norms and interactive recommendations

that influence continuance intention to use mobile platforms (Chauhan et al., 2022). Furthermore, previous studies explained that user-platform interaction with group-oriented service features engages the users' sense of belonging (Zhang et al., 2012). We therefore propose the following hypothesis, taking into account the moderating effect of origin cultures on relationships, as illustrated in Figure 16.

H11. We hypothesise that origin culture significantly moderates the relationships among sources of information, UX, and continuance intention.

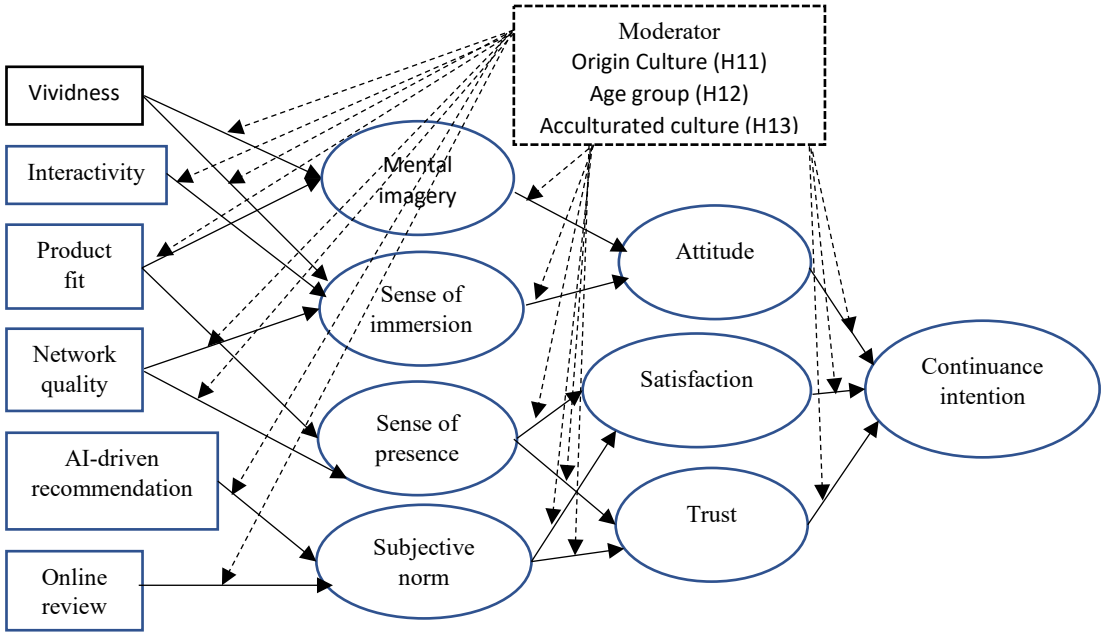

Figure 16. Hypothesis H11, H12, and H13 as Moderating Effects

3.4.2 Age group/generation

In a multicultural society, different age groups form a generation of users that can influence their behavioural responses to using mobile platforms, considering the context of age variations. Previous studies categorise users from different age groups and generations to explain the relationship between behavioural responses and continuance intention to use e-commerce platforms (Cabanillas & Santos, 2017). Generations are categorised as Boomers II (born between 1955 and 1964), those who were familiar with digital broadcasting channels; Generation X (born between 1965 and 1980), who followed a shift in the leading media; Generation Y, or Millennials

(born between 1981 and 1996), those who were introduced with the internet technology, and Generation Z (born after 1997) (Koscielniak et al., 2022). Generation X grew up in an age of economic uncertainty (Howe & Strauss, 2009). Generation X is considered highly pessimistic, self-determining, and risk-taking (Lyons et al., 2007; Wey et al., 2002), desiring to rely on their own choice rather than taking recommendations from others (Howe & Strauss, 2009; Lyons et al., 2007). On the other hand, Millennials are developed as self-determining, innovative, and flexible; however, Millennials are considered more expectant and self-absorbed than Generation X (Tapscott, 2009). Generation Z are considered 'digital natives', the first generation to have grown up with digital communication (Adeola et al., 2020; Djafarova et al., 2021). Generation Z prefers to share innovative content with images, as the grown-up generation prefers to share through text communication channels (Prakashyadav & Rai, 2017; Priporas et al., 2017). So, the different generations with classifications of age groups affect behavioural intentions to adopt advanced technologies. Therefore, we propose the following hypothesis considering the moderating effect of age group on continuance intention (as shown in Figure 16):

H12. We hypothesise that age group significantly moderates the relationships among sources of information, UX, and continuance intention.

3.4.3 Acculturated Culture

Previous studies described that acculturated culture through language, living in the host culture, and attending educational institutions significantly influence users' behavioural intentions (Kim et al., 2022). In a multicultural society, users from different origin cultures staying in a host culture undergo a new acculturation process to transform their behavioural responses that engage cultural adoption from the host and other cultures. Acculturation is about transforming cultural traits and adopting local traditions from the host cultures. Information system researchers could address the effect of acculturated culture to understand the behavioural traits of users by analysing usage patterns from different origin cultures in a multicultural society. Even so, immigrants have inadequate contact with their origin culture; they appear to be adapted to a host culture through pluralism (Dey et al., 2019). Usually, users are mentally attached to their home

cultures, but they compare with the host cultures, influencing their behavioural responses (Miocevic & Zdravkovic, 2020). Previous studies explore the effects of cultural acculturation on users' continuance intention in the context of the health or retail industry (Kim & Gorman, 2022; Williams & Liu, 2023; Kim et al., 2022). Cultural change from native culture and adaptation from a host culture develop cultural acculturation for migrant users. Previous studies describe that acculturated experiences through interactive engagements impact users' perceived experiential values, influencing their intention to use mobile platforms (Park & Kim, 2020). Considering the above discussions, we address the moderating effects of acculturated culture towards the following relationships:

H13. We hypothesise that acculturated culture significantly moderates the relationships among sources of information, UX, and continuance intention.

3.5 Overview of the Conceptual Model

An integrated UX model (Figure 2) is developed to determine how internal and external sources of information as stimuli cues (vividness, interactivity, product fit, network quality, AI-driven recommendation, and online review) in AR mobile platforms influence users' cognitive engagements (mental imagery, sense of immersion, sense of presence, and subjective norm) in perceiving user experience (UX). Subsequently, the model includes attitude, satisfaction, and trust as emotional engagements causing changes in the behavioural response (continuance intention). The proposed model is presumed to be valid for AR mobile platforms. In addition, it can explain how AR mobile platforms' sources of information as stimuli cues enhance the user experience by visualising virtual products, immersive motivations, multi-modal interactions, and situated positions in an AR environment. We developed the conceptual model by incorporating both the hedonic and eudaimonic values through cognitive and emotional engagements. The model considered user-platform interactions to explain user experience that influences behavioural responses to support the user retention process. We accommodated attitude, satisfaction, and trust as post-interactive emotional engagements towards AR mobile platforms. The model also

incorporated the confounding effects of origin culture, age group, and acculturated culture in a multicultural society.

3.6 The Interaction-Engagement-Intention Model

The proposed Interaction-Engagement-Intention (I-E-I) model (Figure 13) is based on the S-O-R framework to explain how sources of information as stimuli cues through user-platform interactions in an AR mobile platform lead to users' organisms (cognitive and emotional engagements), and behavioural responses (continuance intention). The organism is initially addressed as a biological reaction to environmental cues in the SOR framework. The SOR has been applied to AR environments in previous literature. In extension with existing theoretical backgrounds, cognitive and emotional factors were included to explain the perceived immersive experiences through mental imagery, sense of immersion, sense of presence, subjective norm attitude, satisfaction, and trust. These cognitive and emotional engagements could explain virtual realism through actualisation by considering immersive, virtual product movement, network parameters, innovative recommendation processes, and reviews.

In the context of user-platform interactions in an AR mobile platform, the model identified cognitive states that involved the processing of sensory information through user-platform interactions. As a theoretical inclusion, the schema theory was followed to explain how AR views of virtual products co-create values to sketch schemas and engage a user to perceive user experience through mental imagery as a cognitive engagement. In addition, it identified a sense of immersion as a cognitive engagement, followed by the flow theory, which supported the model in explaining user experience through a sense of cognitive engagement and deep concentration in an immersive environment. In the context of situated experience through virtual product embodiment in the physical spaces, the Situated Cognition theory explains how spatial orientations of products engage a user's cognitive engagement in perceiving user experience. Considering the importance of AR capabilities through product movement and scale measurement, we extended the theoretical model by adding a sense of presence as a cognitive engagement to explain the embedded and situated experiences. To address the innovative in-

platform recommendations and sources of versatile review processes considering user-platform interactions in an AR environment, the subjective norm was identified as a cognitive factor that engages perceived social influences with external innovative sources of information, followed by the Theory of Planned Behaviour.

This study identified emotional engagements that supported the assessment of the confirmation of users' expectations through perceived feelings. In the context of AR interactions, the Theory of Planned Behaviour explains that perceived cognitive values can influence user emotional engagement by forming personal attitudes toward AR mobile platforms (Ajzen, 1991). Also, previous literature explained that a user's perceived cognitive states significantly impact the adoption of AR technologies, which vary across users from different origin cultures, where attitudes act as emotional consequences of value propositions (Chauhan et al., 2022). Furthermore, Davis suggests that perceived values positively affect users' attitudes toward the intention to use technological systems (Davis, 1989). The model included attitude as an emotional engagement to explain virtual realism with the fulfilment of cognitive actualisation. In the model, satisfaction was defined as an emotional engagement that enhanced the capability of the model in assessing the confirmation of users' expectations from an AR mobile platform, followed by the expectation-confirmation theory (ECT).

The proposed model incorporated trust as an emotional factor to support the proposed model by explaining the consequences of user-platform interaction with AR capabilities that involve emotional engagement to build trust in platform usage, followed by the Trust Technology Model (TTM). AR mobile platforms allow users to perceive immersive experiences through product virtualisation, user-platform interaction capabilities, product movement, scale measurement, interactive recommendations, and reviews that engage users' trust-building mechanisms toward AR adoption. Furthermore, the trust-based model of system use explains that repetitive interactions with a technological system develop trust. We included trust as an emotional engagement in the context of an AR mobile platform that supported the model in assessing the consequences of perceived cognitive states by alleviating product uncertainty and the need to

touch the product, influencing users' continuance intention. Finally, we addressed continuance intention as a behavioural response, followed by the Expectation-Confirmation Theory to support the proposed model to investigate users' intention to continue using AR mobile platforms that comprehend the user retention process in the mobile platform industry.

This model incorporated mental imagery, sense of immersion, sense of presence, subjective norm, attitude, satisfaction, and trust to develop our conceptual model that enhanced the theoretical framework to explain UX. The proposed model theorises cognitive and emotional engagements to explain the UX that complements the organism process in an augmented reality environment.

Subsequently, the study investigated the mediating effects of emotional engagement in the causal relationships toward continuance intention to use AR mobile platforms. The proposed model considers eight constructs: six sources of information as stimulus cues considering user-platform interactions, two organism factors as cognitive engagements, two as emotional engagements, and continuance intention as a behavioural response. The Interaction-Engagement-Intention (I-E-I) model was assumed to be valid for an AR environment. Furthermore, origin culture, age group, and acculturated culture were incorporated as attribute-independent variables to test the effects on users' intentions to continue using mobile platforms. The model investigated the retention process by extending users' behavioural responses as a form of continuance intention.

The interaction-engagement-intention model (as illustrated in Figure 17) was established to explain how interactions-based stimuli cues (vividness, interactivity, product fit, network quality, AI-driven recommendation, and online reviews) influence users' cognitive engagements (mental imagery, sense of immersion, sense of presence and subjective norm) considering user-platform interactions in an AR mobile platform. Subsequently, the model included attitudes, satisfaction, and trust as emotional engagements and their influences on the behavioural response (continuance intention). The proposed I-E-I model considers the user-platform interactions with the effects of origin culture, age group, and acculturated culture in the context of AR mobile platforms.

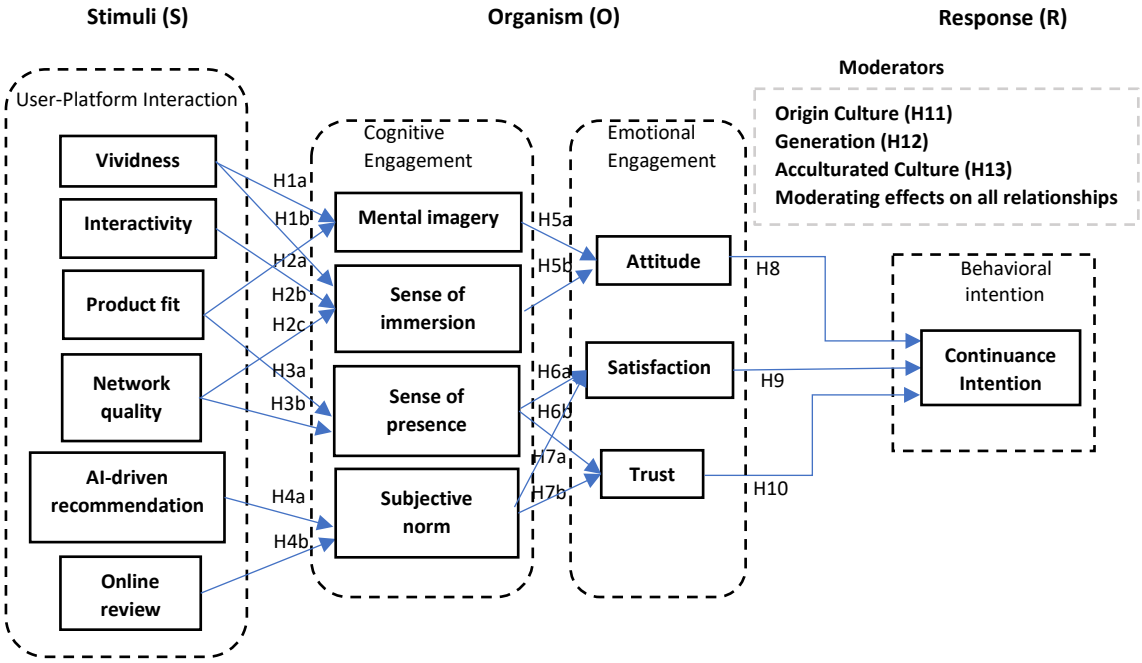

Figure 17. Interaction-Engagement-Intention Model

3.7 Statement of Research Questions

This study developed hypotheses to explain research questions through a model incorporating multiple constructs. We can describe the correlations as follows:

Table 7. Relational table among constructs, research questions, hypotheses, and sources

Research Question	Factors/Constructs	Interpretation/Hypotheses	Sources (supporting theory/literature)
RQ1: How do we identify the critical factors that explain user experience with AR in user-platform interaction?	Vividness, interactivity, product fit, network quality, AI-driven recommendation, online review.	Identify critical factors and define them in the context of AR mobile platforms.	Wu & Kim, 2022; Barta et al., 2023
RQ2: What are the relationships among sources of information, user experience, and continuance intention in AR mobile platforms?	Vividness, product fit, and mental Imagery	H1a. Vividness positively influences mental imagery in the user-platform interaction.	Nikhashemi et al., 2021; Yim et al., 2017
		H1b: Product fit positively influences mental imagery in the user-platform interaction.	
	Vividness, Interactivity, network quality, and sense of immersion	H2a: Interactivity positively influences sense of immersion in the user-platform interaction.	Yim et al., 2017; Jiang et al., 2022
		H2b: Interactivity positively influences the sense of immersion in the user-platform interaction.	Olson, (1995). Yim et al., 2017
		H2c: Network quality positively influences the sense of immersion in the user-platform interaction.	Kim et al., 2016; Kowalczuk et al., 2021

	Product fit, network quality, and Sense of presence	H3a: Product fit positively influences sense of presence in the user-platform interaction. H3b: Network quality positively influences sense of presence in the user-platform interaction.	Wang et al., 2021; Hilken et al., 2017
	AI-driven recommendation, online review, and subjective norm	H4a. AI-driven recommendation positively influences subjective norms in the user-platform interaction. H4b. Online review positively influences subjective norms in the user-platform interaction.	Yin & Qiu, 2021; Huang et al., 2021; Son et al., 2023; Moradi et al., 2022
	Mental imagery, sense of immersion, and Attitude	H5a. Mental imagery positively influences attitude in the user-platform interaction. H5b: Sense of immersion positively influences attitude in the user-platform interaction.	Schlosser, 2003 Dassi & Debbabi, 2021
	Sense of presence, subjective norms, and Satisfaction	H6a. Sense of presence positively influences satisfaction with the user-platform interaction. H6b. Subjective norm positively influences satisfaction in the user-platform interaction.	Chylinski et al., 2020; Heller et al., 2019; Growe, 2019; Cheng et al., 2019
	Sense of presence, subjective norm, and trust	H7a: Sense of presence positively influences trust in the user-platform interaction. H7b: Subjective norm positively influences trust in the user-platform interaction.	Chylinski et al., 2020; Heller et al., 2019, Wang et al. 2021
	Attitude, Satisfaction, Trust, and Continuance intention	H8. Attitude positively influences continuance intention in the user-platform interaction. H9. Satisfaction positively influences continuance intention in the user-platform interaction. H10. Trust positively influences continuance intention in the user-platform interaction.	Park, 2020; Chen et al., 202; Bhattacharjee, 2001 Nguyen, 2021; Balakrishnan & Dwivedi, 2021
RQ3: What are the moderating effects of origin culture, age group, and acculturated culture towards the relationships among sources of information, UX, and continuance intention?	Effect of origin culture, age group, and acculturated culture as moderators in a multicultural society	H11. We hypothesise that origin culture significantly moderates the relationships among sources of information, UX, and continuance intention. H12. We hypothesise that the age group significantly moderates the relationships among sources of information, UX, and continuance intention. H13. We hypothesise that acculturated culture significantly moderates the relationships among sources of information, UX, and continuance intention.	Serravalle et al., 2022; Zhu et al., 2021; Martínez et al., 2023 Cabanillas & Santos, 2017; Kim., 2022; Foroudi et al., 2020; Williams & Liu, 2023

3.8 Summary

This chapter explains key constructs, relevant theories, and hypotheses to develop an interaction-engagement-intention (I-E-I) model to describe the perceived user experience in an augmented reality environment. The proposed model (Figure 16) explains users' cognitive and emotional engagements toward continuance intention in an AR environment, with the effects of origin culture, age group, and acculturated culture. This chapter developed hypotheses to address research questions considering the research objectives. The relationships were investigated to develop hypotheses considering sources of information (vividness, interactivity, product fit, network quality, AI-driven recommendation, and online review), cognitive engagements (mental imagery, sense of immersion, sense of presence, and subjective norm), emotional engagements (attitude, satisfaction, and trust), and continuance intention as a behavioural response. The study also includes origin culture, age group, and acculturated culture as moderating factors to determine the effects of socio-cultural factors on the relationships among sources of information, UX, and continuance intention in an AR environment.

CHAPTER 4

METHODOLOGY

This chapter investigates how users perceive UX on continuance intention in an augmented reality environment. The investigation includes the research method, materials, and data collection methods used in this study. The chapter begins with a description of the research design approach applied to the study. This chapter describes the experimental platform and procedures for collecting data with theoretical evidence. Then, the population and sample for qualitative and quantitative methods were explained. Following this, the data analytical processes were discussed in detail. Then, this chapter included an ethical process to extend the research following all the procedures, relevant laws, regulations, and the University of Technology Sydney (UTS) policies to extend research activities. The ethics application was approved as per UTS HREC REF NO. ETH22-7706 on 9 August 2023 by the ethical committee of UTS, considering the Australian National Statement on ethical conduct in human research.

4.1 Research Design Approach

Concerning the UX assessment in AR, a mixed methodological approach (as shown in Table 8) was designed in this study, combining qualitative and quantitative methods with the timing of sequential-qualitative first. This study followed a sequential exploratory strategy to execute focus group interviews as the first phase to collect and analyse qualitative data, followed by an online survey as the second phase to collect and analyse quantitative data (Creswell et al., 2023). A thematic approach was chosen to identify immersive and innovative factors by generating themes in the emerging field of augmented reality and then using those themes and sub-themes to create survey instruments and develop a conceptual model. Finally, a large sample was collected to validate the measurement items and test the developed hypotheses.

Table 8. A mixed-method approach

Timing	Weighting	Mixing	Data Format	Theorising
Sequential – Qualitative first approach	Equal Qualitative – Inductive (generating themes)	Connecting	Qualitative – Textual Quantitative - Number	Explicit

(Sequential exploratory)	Quantitative – Deductive (testing a model)			

In the qualitative phase, focus group guidelines and scripts were developed to conduct focus group interviews. Then, focus group interviews were conducted for two distinct focus groups to understand critical factors using a non-probabilistic purposive sampling technique and extracted valuable insights into relationships among constructs by analysing textual data (Barta et al., 2023). Later, the NVivo platform was used to analyse the transcript data to generate themes that considered the research phenomenon.

In the quantitative phase, a descriptive quantitative research method was included to conduct a cross-sectional study. An online questionnaire was developed using the Qualtrics platform to collect user quantitative data for the quantitative phase. The study considered online users, those who interact with AR on their smartphones, as focused users of immersive technology like AR. A convenience snowball sampling technique was applied to collect numerical data from online users as participants through social networks: Facebook, LinkedIn, online blogs, and Nextdoor. Considering previous literature, it was revealed that these social network platforms are appropriate for this study (Trivedi et al., 2022). Later, the PLS-SEM technique was used to analyse the collected data using smartPLS 4.0 software.

A mixed methodological approach considered participants, measuring techniques, scales, materials, and procedures to collect data from different sources. This study included qualitative and quantitative methods considering UX research methods for data collection applied to asking, observing, and inspecting a process. The data collection processes were followed to conduct focus group interviews (discussion with users and experts to get insights from their experience) and an online survey (questionnaires to users to collect their demand/behaviour/attitude, post-usage experience). Before approaching the focus group interviews and questionnaire survey, a focus group and survey guidelines were distributed to participants that included the research topic, a short description, research objectives, data privacy, procedure to download the AR mobile app or use the responsive IKEA mobile website on their smartphones, focus group script (for focus group

interview), and web link or QR code to attend the survey (for a survey). A comprehensive research design is shown in Figure 18.

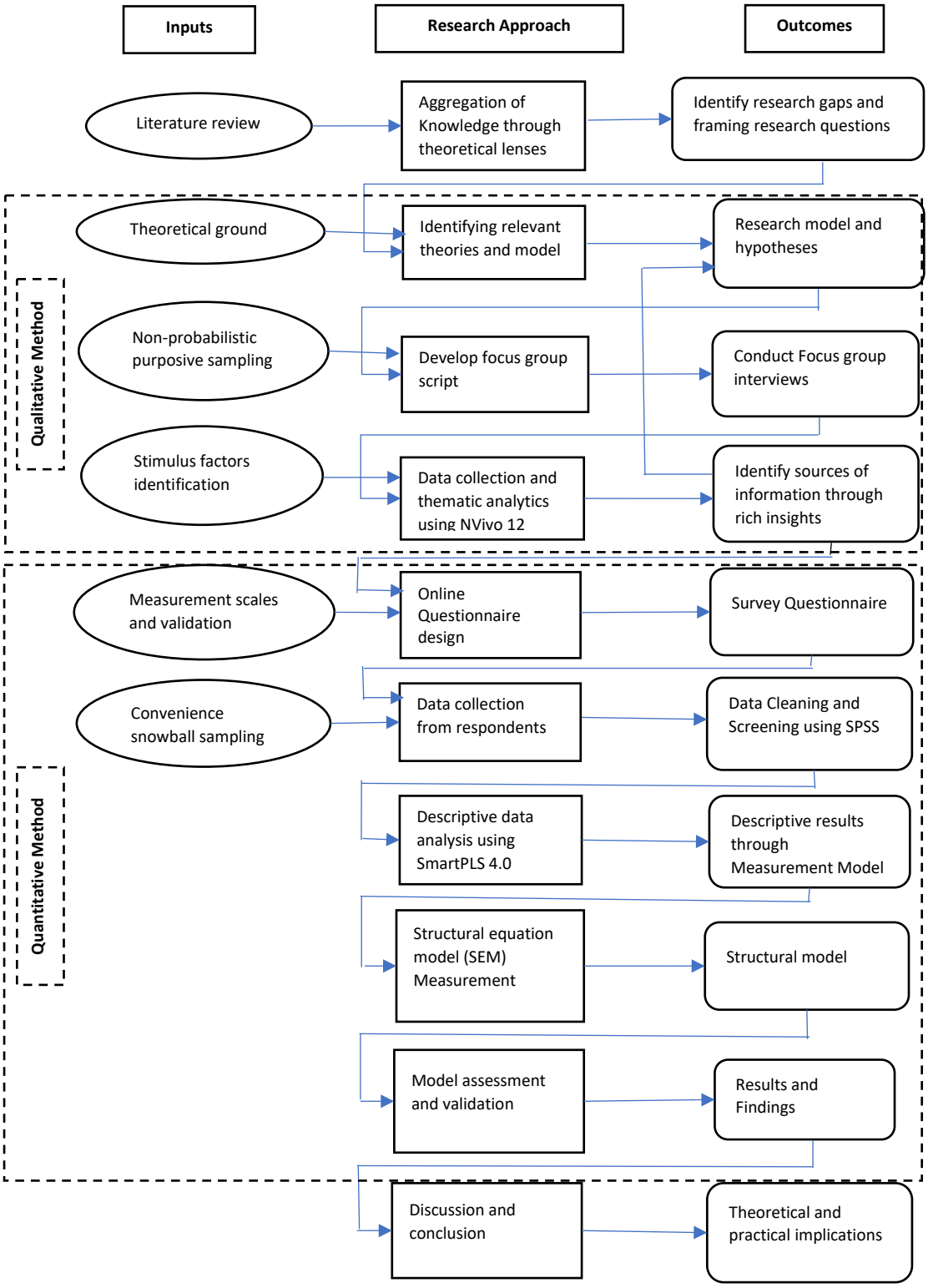

Figure 18: Research design approach

4.2 Research Instrument

This study chose IKEA as an augmented reality (AR) mobile platform that accommodated AR capabilities into their mobile app (IKEA app) and a responsive IKEA mobile website for online users to place furniture virtually in their location. As a pioneer in retail brands, IKEA introduced AR technology to enhance user choice through virtual replicas in real-life settings and make deep engagement with virtual products to achieve a sustainable retail experience for everyone, everywhere (Rodrigues & Brandão, 2020). The IKEA AR mobile platform incorporated a true-to-scale 3D model that allows users to view the fabric's texture and the virtual product's light and shadows. Further, the IKEA AR platform allows online users to accommodate a one-stop service by placing virtual furniture and checking that the product fits in a desired location (Vaidyanathan et al., 2022).

This study has selected the IKEA AR view as an experimental mobile platform to investigate user experience in an AR environment for a multicultural society. The reasons why we chose IKEA are that (i) IKEA develops both the mobile app and responsive mobile website to avail AR features for their virtual products, (ii) IKEA is the pioneer in the furniture retail market who introduces AR into their mobile platform and achieved extensive subscriber base, (iii) IKEA supports users to use existing IKEA app and the responsive mobile website to interact with virtual products through AR features in Australia, (iv) IKEA has a more significant number of retail consumers with versatile group of users and their diversified cultural backgrounds in Australia, and (v) The IKEA AR view incorporates a true-to-scale 3D model, which is essential for assessing situated experience.

Other retail platforms like Shopify and Sephora have introduced AR features in Australia. Shopify offers an AR mobile platform that incorporates 3D images and videos of products into a physical environment using mobile or desktop computers (Shopify Australia). In another example, Sephora developed a virtual artist app in the fashion industry to introduce AR for in-store users trying on a virtual product that gives them immersive feelings. Further, Sephora's virtual artist app scans the user's face to detect features that provide the user with comfort in

online beauty product shopping (Sephora Australia). However, the Shopify and Sephora apps deal with a particular user segment in society, and the result could not give the generalisability of the research. Further, there are some limitations for other platforms, such as limited product selection, user interaction capabilities, and the fact that products are sold in one category with unique user groups compared to IKEA's features. Moreover, this study requires different user groups to identify cultural traits and age groups in their intentions to use AR mobile platforms.

Although some AR mobile applications like Adidas, Amazon, Nike, and Target are available in the global market, their AR features are not supported in Australia. Therefore, this study has selected IKEA as a research instrument that introduced AR features in Australia, and the system quality and versatility of IKEA AR mobile platforms are more robust. Moreover, IKEA has been permitted to collect user data to extend this research. From another viewpoint, this study investigated the effects of cultural traits and age groups in Australia, and IKEA would be an appropriate choice for investigating the research. Therefore, this research included IKEA as a research instrument for its different user groups and extended our research to include a heterogeneous sample from different user groups.

The IKEA AR mobile platform introduced augmented reality to try on virtual products in a physical location to give users comfort (Heller et al., 2019). IKEA is the most famous furniture retail platform of Swedish origin, expanding its sustainable business growth in Australia. The IKEA AR mobile platform applies ARKit for iOS and ARCore for Android. The platform allows users to interact with virtual products and place them at the physical location. In qualitative and quantitative studies, participants were requested to interact with an AR mobile platform before participating in the focus group session and questionnaire survey to be involved with that situated experience. Once participants or respondents downloaded the app, they could scan their physical location through the camera and place computer-generated images of furniture products to augment the product (Figure 19). This is a great way to alleviate product uncertainty and provide scale measurement with approximately 98% accuracy to utilise the spaces you have designed (Ozturkcan, 2021). Participants were instructed to download the IKEA mobile platform

(https://www.ikea.com) to interact with the virtual product. However, not all the products are available for 3D and augmented views. So, this study was designed to allow participants to choose a Malm drawer using the IKEA link: https://www.ikea.com/au/en/p/malm-chest-of-4-drawers-white-20354646/.

A B C

Figure 19. AR view of virtual malm drawer using IKEA AR mobile platform: (A) First prompt page after entering into the IKEA app with search option to view product category, (B) Virtual product view prompt with different options like colour preferences, view in 3D, and AR view in a room (in a desired physical space), and (C) Placing the virtual product through mobile interaction capabilities and embedded a 3D generated thing with the physical world.

4.3 Phase 1: Focus Group Interview (Qualitative Study)

4.3.1 Focus Group Interview Guideline

As mentioned in the Table (attached in Appendix A), an interview guideline was developed to conduct interviews with users to identify immersive and innovative features of AR mobile platforms (Barta et al., 2023). The interviews were conducted to get feedback and recorded opinions for two focus groups to assess user experience by getting insights. The interview session was designed to start with an introductory note and then move to the UX-related interview questionnaires for the participants. However, UX research in AR mobile platforms is an emerging field of study, and it was challenging part to identify AR stimulus factors and their applicability when designing a questionnaire from user aspects. Therefore, this study included a qualitative method to get valuable insights from users so that this study could revisit the survey questionnaire and hypotheses (Poushneh, 2018). Interview questions were used to gain valuable insights from

participants' perceived experiences. Then, insights regarding design aspects and identified critical factors were extracted from data analytics and identified critical factors from the user perspective.

Concerning the qualitative method, this study developed a focus group interview (FGI) guideline for conducting interviews with two distinct groups. The interviews determined stimulus factors in AR mobile platforms and how users' cognitive and emotional engagements influence continuance intention to use AR mobile platforms. This method allowed participants to express their valuable thoughts and opinions to explore ideas in the AR mobile platform as an information system (Wu & Kim, 2022). Qualitative studies support researchers in getting valuable insights and a deep understanding of users' cognitive feelings in immersive environments. The focus group was formed with a certain degree of homogeneity, like age, and also included distinct user groups considering their occupation for a practical discussion (Barta et al., 2023).

Two focus group interviews were conducted separately for each group with 5 participants because we accommodated users of different ages and professional backgrounds. At the initial stage, the moderator explained the study's objectives and goals: to reveal the stimuli and cognitive and emotional factors influencing the intention to use AR mobile platforms. In the focus group session, the focus group script (as shown in Appendix E) and focus group rules were shared with the participants to deliver their opinions independently and discuss among themselves to explore the research objectives.

4.3.2 Data Collection Procedure

The focus group interview method was applied to assess user experience for both the AR mobile application and responsive website, and it identified quality attributes in perceiving UX for AR mobile platforms. This study applied a non-probabilistic purposive approach as a sample recruitment process to ensure homogeneity with maximum representations from distinct groups (Barta et al., 2023). Also, the focus group guidelines included mandatory conditions, information sheets, necessary instructions to download the IKEA app or use the IKEA responsive mobile

website on their smart devices, and procedures to interact with the AR mobile platforms. After interacting with the AR mobile platform, participants were asked to follow the focus group script before starting the discussions.

Initially, the purpose of the research was explained to accommodate participants and make them comfortable, to make the discussion more inclusive and vibrant. The initial information allowed participants to define their roles and guaranteed their data privacy. At the beginning of the focus group interview, the procedure and focus group rules were explained for participating in the session. Then, a short description of the research objectives and goals was delivered to participants. The interview session was moderated, following the focus group guidelines and the associated focus group script with a unique set of questions to gather the group's opinions and feelings about the study topic. Then, participants were asked to express their experiences with AR mobile platforms. The focus group interviews were recorded with participants' consent, and the focus group reports were prepared accordingly to identify critical factors of the augmented reality environment that engage cognitive and emotional states on users' continuance intention.

4.3.3 Population and Sample

A focus group interview was applied to identify the concepts and immersive, external, cognitive, and emotional factors related to user experience in an AR environment. This study selected ten participants by applying a non-probabilistic purposive sampling technique to conduct two focus group interviews. Two distinct focus groups were chosen, consisting of participants from backgrounds with homogenous characteristics. Firstly, students, young professionals, experts, app developers, technology solution providers, UX designers/researchers, and academics were communicated to conduct focus group interviews. Ten participants were selected to form two participatory groups to get valuable insights from their discussions. After getting their acceptance to join the focus group interview session, invitations were given through emails to participants, and the Google form, consent form, information sheet, etc., were attached. Finally, participants who consented to participate in the study were confirmed using the Zoom platform.

Their age ranges from 18 to 50 years to ensure the heterogeneous representations from different user groups.

4.3.4 Analytical Technique – Reflexive Thematic Analysis

This study conducted two focus group interviews, applying an inductive approach to identify emerging patterns and themes (Azungah, 2018). This study follows an inductive approach for extending qualitative data analysis without predetermined categories. The inductive approach is suitable for the emerging field of study, like assessing UX in AR, and it allows researchers to identify patterns, new themes, and valuable insights. Initially, video scripts were collected from the Zoom platform, converted into a transcript file (.vtt), and a classification sheet was prepared for further data analysis. The collected data from the focus group interviews was computed and transformed into a textual format. Then, the NVivo 12 Pro platform was used to categorise the qualitative data into codes by exploring coding passages using a descriptive-focused coding method to support the research question (Barta et al., 2023; Newton et al., 2021). The platform was a robust analytical tool to organise data, generate code with nodes, develop themes, extract insights, and develop a codebook to explain results. Finally, a reflexive thematic analysis was executed to develop a story about patterns of themes for identifying immersive, cognitive, and emotional factors in AR environments (Braun & Clarke, 2019). The reflexive thematic analysis supports the use of an accessible data analytical method to explore and interpret qualitative data and develop a story to describe the meaning of patterns.

4.4 Phase 2: Questionnaire Survey (Quantitative Study)

4.4.1 Survey Guideline

This study considered a quantitative research method through an online questionnaire survey as a quantitative data collection method that included respondents' profiles, data collection techniques, survey instrument, measuring technique, measurement items, and data analytical processes to check the reliability of constructs, validate the proposed model, and test the hypotheses. A survey questionnaire guideline (as shown in Appendix B) was developed to

conduct an online survey for this study. An online questionnaire survey was conducted following a convenience snowball sampling technique in Australia. The study recognized this technique because of the nature of the research study, which could identify online users as potential respondents who had previous experience interacting with the IKEA app (AR mobile platform). Further, quantitative data were collected from homogenous samples, considering the age group of online respondents. Also, this study designed a few pre-requisite conditions as a verification technique to scrutinise respondents' eligibility to enter into the main survey questionnaire.

The study incorporates 29 questions for the four constructs with 14 factors to perform the measurement process (as shown in Appendix F). The quantitative data were collected from respondents of different origin cultures within Australia. The Likert scale was used as a closed-ended answer option to measure respondents' rank qualities with a 5-point response category from 1 (strongly disagree) to 5 (strongly agree) (Allen, 2007).

Fourteen attributes were used in the study such as stimuli sources of information: vividness, interactivity, product fit, network quality, AI-driven recommendation, and online review; cognitive engagement as organism: mental imagery, sense of immersion, sense of presence, and subjective norm; emotional engagement as organisms: attitude, satisfaction, and trust; and behavioural response: continuance intention. Participants were selected randomly and asked to download an AR mobile app (IKEA Place app) or use a responsive mobile website (IKEA mobile website) to interact with virtual furniture products in Australia. One thousand fifty-two participants joined the survey to share their perceived experiences. After data screening and checking, 886 valid responses were confirmed.

A convenience snowball sampling technique was used to collect participants from different geographical areas of Australia and conduct the questionnaire survey towards online users with a sample size of 1052 (who interact with AR-based e-commerce apps or responsive websites). An online questionnaire was developed to assess user experience based on the constructs of the proposed interaction-engagement-intention model and distributed to online users to get responses for the quantitative survey within Australia to identify the cultural effects of perceiving UX.

4.4.2 Measurement Development

The online questionnaire started with demographic questions at the beginning of the survey process. Then, the survey was moved to present UX questions to get users' insights about their experiences using AR mobile platforms. Constructs and measurement items for the research model are shown in the Table (As attached in Appendix C). This study included vividness, interactivity, product fit, network quality, AI-driven recommendation, and online review as active independent variables (IV) that were applied to participants through interventions. Further, mental imagery, sense of immersion, sense of presence, subjective norm, attitude, satisfaction, trust, and continuance intention were considered dependent variables (DV). Moreover, origin culture, age group, and acculturated culture were included as moderating variables that may change the relationships among sources of information, UX, and continuance intention. Out of the moderating variables, acculturated culture was designed as a composite variable that combined two variables: living period in Australia and attaining educational degrees from Australian Institutions. Then, gender, origin culture, age group, acculturated culture, annual income level, and employment status were considered attribute-independent variables (IV) that were intrinsic characteristics of the participants.

Considering previous studies, survey instruments have been formed with six factors as stimuli sources of information (combining both internal and external sources of information) to explain user expectations and follow measures of vividness from Yim (2017) and Mclean (2019), interactivity from Yim (2017) and Roy (2019), and Hilken (2017), product fit from Sun (2022), network quality from Kowalczuk (2021) and Park (2015), AI-driven recommendation from Yin & Qiu (2021), and online review from Chatterjee (2022). Also, four factors were included to explain cognitive engagements that define the user experience, followed by mental imagery from Sun (2022) and M. Park (2022), sense of immersion from Daassi (2021), sense of presence from Smink (2020), and subjective norm from Faqih (2022) and Yin & Qiu (2021). The research model incorporates three emotional factors and follows the measures of attitude from Vo (2022), satisfaction from Park (2015) and David (2021), and trust from M. Kang (2022). The study relates

to continuance intention as a behavioural response and measures continuance intention from Yin & Qiu (2021) and Park (2020). The study identified the moderating effects of origin culture, considering individualism and uncertainty avoidance, by identifying users from different origin cultures in Australia, acculturated culture through living in Australia, language, and participation in Australian educational institutions, and age groups/generation by identifying question selection in the survey questionnaire.

4.4.3 Data Collection Procedure

The quantitative data was collected through an online survey to confirm the validity and reliability of the research models and test the hypotheses. We emailed participants with an invitation letter, including the research objectives, instructions for downloading the AR mobile app or using the responsive mobile website, and the URL link or QR code to attend the online survey. We asked participants to download an AR mobile app (IKEA app) or use a responsive mobile website (IKEA responsive mobile website) and interact with the AR mobile platform for more than 5 minutes (Wang et al., 2022). Those interactions have familiarised them with the AR-oriented e-commerce mobile platform. UX research questionnaires (subjective) were presented to participants to get post-experiences after using an e-commerce mobile platform (mobile application or responsive website). The survey was conducted considering initial conditions related to ethics, participants, sample size, etc. We used a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) for close-ended questionnaires. This study examined how stimulus sources of information in augmented reality environments engage cognitive and emotional engagements towards continuance intention to use mobile platforms.

4.4.4 Respondents and Profile

The questionnaire was distributed to online users within Australia who have experienced AR mobile platforms as shopping channels. A few mandatory questions were designed to visit a link (IKEA responsive website) to interact with the IKEA AR view for more than 5 minutes and provided three questions to confirm their interactions (Wang et al., 2022). These familiarisations

made them familiar with the AR-oriented e-commerce mobile platform. IKEA was chosen as an experimental platform because of its larger subscriber base, AR features in Australia, accessible through a responsive website, and user-friendly UX design (Ozturkcan, 2021).

4.4.5 Analytical Technique – PLS-SEM

This study applied a partial least square–structural equation modeling (PLS-SEM) as a second-generation variance-based data analytical technique to analyse the quantitative data (Kowalczuk et al., 2021). The study follows a PLS-SEM technique to support the research because of its robustness, like exploratory research through predictive responses, non-normality, formative and reflective constructs, complex models, and many hypotheses. A two-stage approach was followed: measurement model assessment tests the fitness of the proposed model as an outer model in the first stage, and structural model assessment evaluates the significance of path coefficients for the inner model to test the developed hypotheses in the second stage.

The outer model assessment examines the reliability of survey instruments or measurement items and the validity of each construct (Nan et al., 2020). The study extends for outer model fit evaluation with confirmatory factor analysis (CFA) through executing internal consistency reliability (the value of the Cronbach's alpha is more significant than 0.70), composite reliability (the recommended value for more than 0.6 – indicates sufficient reliability), factor loadings (the threshold value is more than 0.7), convergent validity (the average variance extracted value should be more than 0.5), and discriminant validity (the square root of AVE should be greater than other correlations) (Kowalczuk et al., 2021).

The inner model (structural model) assessment examines the research model's fitness and predictive power and tests the developed hypotheses (Acharya et al., 2023). The study executes for structural model assessment through confirming co-efficient of determination (R^2) (the value should be greater than 0.100, ideally 0.11 – 0.25 for reasonable variance explained), predictive relevance (Q^2) (The value for minor predictive relevance – 0.02, medium predictive relevance – 0.15, and for sizeable predictive relevance – 0.035), standardised root mean square residual

(SRMR) (a good fit when the value is less than 0.100), collinearity statistics value (VIF) (less than 0.3), path co-efficient, t-value, and p-value (less than 0.05) (Ringle et al., 2014).

This study applies a multigroup analysis (MGA) to test the moderating effects of origin culture, age group, and acculturated culture on the proposed relationships for multiple groups. By executing MGA, we can test identical models for multiple groups. MGA through PLS-SEM is an effective analytical process to determine moderation effects over various relationships for different groups, as limited to the standard moderation process (Hair et al., 2014). This technique can present more comprehensive results of the influences of moderators, focusing on examining their effects on all relationships being developed in the proposed model. To execute the PLS-MGA assessment, this study follows a three-step procedure (as shown in Figure 20) as proposed to assess the moderation effects with the measurement invariance of composite models (MICOM) (Mathews, 2017; Henseler et al., 2016).

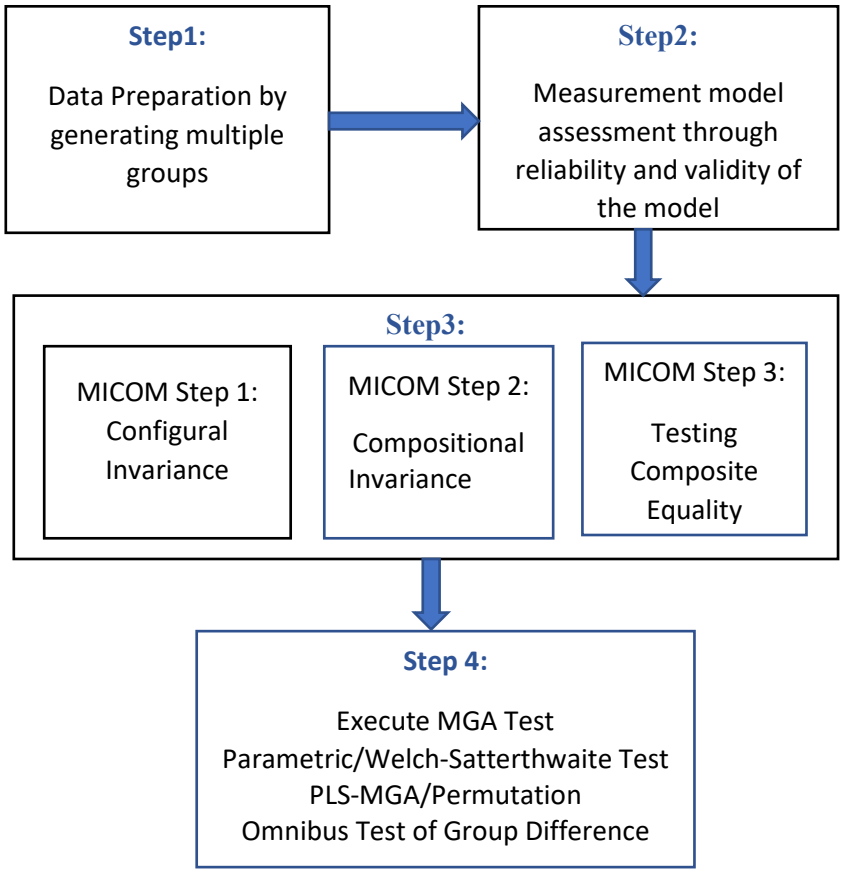

Figure 20. Procedural Steps for Executing PLS-MGA for Multiple Groups

This study may apply the PLS-MGA approach to assess the moderating effects of multiple groups considering origin culture, age group, and acculturation culture towards a more significant number of relationships in the proposed model, particularly examining the heterogeneity effects (Cheah et al., 2023; Klesel et al., 2022). After choosing the moderating variables, the data groups need to be generated. Also, it is required to maintain the sample size for the generated sub-group with a statistical power of 80% when expecting a significance level of 5% for each sub-group (Hair et al., 2022). Then, measurement model and structural model assessment can be executed through testing reliability (loadings, Cronbach's Alpha, rho-A, and composite reliability) and validity (convergent validity, average variance extracted, discriminant validity, heterotrait-monotrait (HTMT), and correlations) (Kowalczuk et al., 2021).

Before executing permutation multigroup analysis (MGA) to determine path co-efficient for multiple groups, invariances may be tested following the MICOM through configural invariance and compositional invariance and invariances through equal distribution (Henseler et al., 2016). The configural invariance of MICOM determines that the invariance can test the measurement model under multiple groups by applying identical indicators, data treatment, and algorithm settings. In the next step, the compositional invariance can test whether the original correlation is more than or equal to the value of the 5% quantile. The measurement invariance confirms "whether or not", under multiple groups of analysis studying a research phenomenon, whether measurement models can measure the constructs. The MICOM supports comparing multiple group parameters and determines measurement invariance for multiple groups (Mathews et al., 2017).

Finally, the statistical test for MGA can be used through different options considering the research contexts. SmartPLS 4.0 accommodates multiple options like the parametric, PLS-MGA procedure, Welch-Satterthwaite, and permutation (Hair et al., 2014; Henseler et al., 2016). The parametric test options are applicable to substantial to type I error and support limitations for the nonparametric PLS-SEM method because this approach accommodates distribution assumptions (Hair et al. 2022). The Welch-Satterthwaite test engages in a parametric test but does not predict

equal variances when relating the means of two distinct groups. The PLS-MGA procedure and the permutation are considered nonparametric approaches (Henseler et al., 2016). The PLS-MGA determines a probability value by considering a one-tailed test, checking each bootstrap for one group, and executing bootstrap evaluations of the same parameter in the other group (Mathews et al., 2017). Further, the PLS-MGA procedure could not test the two-tailed hypotheses because bootstrap distributions are not necessarily symmetrical (Klesel et al., 2022; Henseler et al., 2016). Therefore, this technique is suitable for multigroup analysis, especially for distinct groups.

Conversely, the permutation technique is robust for executing the composite equality test as a part of the measurement invariance composite models (MICOM). The outcomes of the path coefficients from the measurement invariance choice can be another avenue for comparing the path coefficients of the multigroup. The permutation test is more conformist than the parametric test and eliminates fit for type I errors. Moreover, recent literature recommends the permutation test to control type I errors (Cheah et al., 2023). Therefore, this study can examine the invariance using the permutation technique in MICOM to satisfy the overall probability of type I error. Further, the permutation test allows a robust technique as a nonparametric approach to compare the model-intensive hypotheses across multiple groups, which is essential for this study. The PLS-SEM accommodates the permutation technique and can generate criteria like the overall F test. Although the permutation approach is similar to an analysis of variance (ANOVA) F-test, it extends the capabilities to analyse the moderation effects for more than two groups, which would be an effective process for this study.

4.5 Data Management Plan

This study planned to manage research data and submitted a data management plan (RDMP) using Stash (request number: SCREQ0087547). The request has been granted, and 3TB of eResearch storage has been used to store data for the project. We have included human participant data to be processed for the research. We mentioned that quantitative and qualitative data should

be stored in the eResearch storage to extend the analysis. The deadline for the destruction of research data is assigned until 2030. The data classified for the research study were as follows:

(i) Types: The expected data type includes text, spreadsheet, audio clip, graph-based data, and ordered data.

(ii) Sources: We will collect data from surveys, interviews, online reviews, and interactive e-commerce applications.

(iii) Volume: The research will collect a spreadsheet for around 350 survey samples, audio files for approximately 50 interviews, and ordered data from sentiment analysis for online product reviews.

(iv) Data and file format: We will collect data formats like comma-separated values (.csv), Excel (.xls), MPEG-4 (voice recorder), and text (.txt).

(v) Validity of data: The data will be destroyed in 2030.

4.6 Ethical Consideration

This study followed guidelines for human research ethics published by UTS and the ethical review process. Also, an ethical application was submitted to the University authority. The ethical clearance was received with the participant information sheet and consent form accordingly (The ethical clearance approval number is UTS HREC REF NO. ETH22-7706) (Appendix D). Though the research study includes the necessity of involving human participants and getting their perceived experiences, there are some obligations to collect data by conducting surveys and interviews. We have ensured all the conditions for the following:

(i) Get approval from UTS by submitting an ethical review process.

(ii) Seek consent from participants before conducting the survey/interview.

(iii) Follow UTS guidelines for human research ethics.

(iv) Comply with the National Statement on Ethical Conduct in Human Research.

(v) Comply with NSW laws (Privacy and Personal Information Protection Act 1998).

(vi) Follow the Human Research Ethics Committee (HREC) to send invitations to conduct surveys/interviews and get participants' consent.

This study followed all the related rules and regulations when conducting the research.

UTS risk management policy and procedures were followed to prepare the risk assessment. The research study did not include listed groups or analysis of data from groups such as pregnant women, children, other participants highly dependent on medical care, people with cognitive and mental disabilities, Aboriginals, and Torres Strait Islanders. We did not collect personal identification information (PII) such as DNA, birth date, financial information, other health information, and fingerprints while collecting the survey and interview data. Also, the study undoubtedly received participants' consent to disclose their opinions or use their perceived experiences collectively. The study did not conduct surveys or interviews with biased groups like UTS students or staff. So, the risk level was assessed as Low Risk. The survey and interviews followed all the rules and procedures to collect human research data. The UTS Human Research Review Committee examined and approved the research design to extend research activities. Moreover, ethical consent has been received from IKEA to extend the research, considering their platform and online users.

4.7 Summary

In this chapter, a research design approach was developed, framing a mixed method through a qualitative focus group interview and a quantitative survey instrument. The focus group interviews were conducted following a non-probabilistic purposive sampling technique. Also, a descriptive quantitative data analytical method using a partial least square–-structural equation modelling (PLS-SEM) following a convenience snowball sampling technique (Abbasi et al., 2022). A mixed methodological approach was applied to identify valuable insights from participants through focus group interviews in the context of immersive technological adoption towards users' behavioural responses. Then, this study extends to construct hypotheses and a conceptual model by identifying critical factors considering an augmented reality environment.

A reflexive thematic analysis using descriptive focus coding was applied using NVivo 12.0 to develop a code book and define critical definitions of the identified factors in an immersive environment. A PLS-SEM approach was followed using SmartPLS 4.0 to execute measurement and structural model assessments in quantitative analysis. This study extended to apply the multigroup analysis through MICOM and permutation techniques to analyse the moderating effects of origin culture, age group, and acculturated culture toward relationships in an augmented reality environment.

CHAPTER 5

RESULTS

This chapter presents a summary of the results, including several summarised tables and figures that support the findings. The chapter contains themes, codes, and a summary of the focus group interview outcomes. Then, the quantitative summary includes the results regarding reliability, validity, structural equation modelling, and the moderating effects of cultural traits and age groups. Finally, the chapter describes the effects of socio-demographic factors.

5.1 Insights from Content Analysis

All participants actively attended the focus group interviews through the Zoom platform.

The interview sessions were conducted carefully within a stipulated time, and the moderator guided participants to discuss each other and share their opinions or thoughts regarding AR interactions on a mobile platform. A focus group script was followed, considering the research objective of extracting insights and values from the participants. Then, participants were allowed to discuss through engagement and share their opinions on the story towards the perceived user experience in an AR mobile platform (IKEA AR view). The text transcript was coded using reflexive thematic analysis to identify themes and sub-themes. Then, the findings were accumulated to identify critical factors that supported the first research question.

5.1.1 Sample Profile of Focus-Group Interview

In the first focus group, five young participants were invited, such as students, fresh graduates, and tech-savvy young professionals with ages ranging from 18-35 years. The group was designed with a sample population from the homogenous segment of young users habituated to using augmented reality-based mobile platforms. On the other hand, another five participants, aged 36-50, were invited from different fields like IT professionals, academics, software architects/developers, UX designers/researchers, technology solution providers, and entrepreneurs for focus group 2. This study accommodated participants from all segments to get

their valuable feedback using AR mobile platforms. On average, 60 - 90 minutes were taken to conduct interviews separately for both groups using the Zoom platform and share the focus group script to get their valuable opinions. The sample profile of the focus group is shown in Table 9. Valuable insights and thoughts were extracted from the participants, and factors, model propositions, hypotheses, and survey questionnaires were revisited.

Table 9. Sample Profile of Focus Groups

Focus Group 1				Focus Group 2			
Participant	**Age**	**Occupation**	**Location**	**Participant**	**Age**	**Occupation**	**Location**
P1	34	Masters student	South Korea	P6	43	Solution Architect	Australia
P2	34	IT Graduate	Australia	P7	42	Academic and Entrepreneur	Australia
P3	25	IT Professional	Australia	P8	46	Software Developer and Researcher	South Korea
P4	21	IT Graduate	Australia	P9	38	PhD candidate and App Developer	South Korea
P5	19	Undergraduate Student	Australia	P10	36	Technology Solutions Provider	UAE

5.1.2 Data Analysis

The NVivo 12 pro platform - a well-accepted qualitative data analytical tool was used to analyse the transcribed qualitative data. The accuracy of the transcript and classification sheets was checked and cross-examined with the recorded audio files. The NVivo 12 software was used to analyse the collected data from focus group interviews. This study applied an inductive approach to analyse the data, followed by Braun and Clarke's reflexive thematic analysis (Braun & Clarke, 2019). An inductive approach allows researchers to identify emerging patterns and understand new themes (Azungah et al., 2018). The collected and computed data were analysed using thematic analysis, considering participants' deliberations on the discussion prompt, recorded/written evidence for the interview session, and arguments for recording the perceived user experience in the context of augmented reality mobile platforms. A reflexive thematic analysis technique was applied in this study concerning the enormous scope of getting a story

about data flow patterns and the interpretation of patterns' meaning (Braun et al., 2022). Using descriptive-focused coding, multiple coding passages were generated according to our research aims and objectives (Newton et al., 2021).

A data analytic process was applied iteratively and followed the four domains of reflexive thematic analysis: a) orientation of data through inductive analysis; b) focus of meaning through semantic analysis; c) qualitative framework through experiential analysis; and d) theoretical framework through a realist, essentialist approach. Also, six stages of the reflexive thematic analysis were followed: i) familiarising with data, ii) coding, iii) generating initial themes, iv) developing and reviewing themes, v) refining, defining, and naming themes; and vi) writing up (Braun & Clarke, 2019). Initial codes were generated using transcripts from both focus group interviews, except for the irrelevant codes related to the moderator's speech. After generating initial coding, initial themes were developed, and the respondents' explanations of the themes were examined (Braun et al., 2022). Then, clusters of generated codes with initial themes were grouped and reflected on their relation to research questions through reflexive thematic analysis.

5.1.3 Results of Reflexive Thematic Analysis

This study conducted two focus group interviews, applying an inductive approach to identify emerging patterns and themes (Azungah, 2018). Initially, this study collected the video script from the Zoom platform, converted it into a transcript file (.vtt), and prepared a classification sheet for further analysis. Then, coding passages were developed according to the research requirements using a descriptive-focused coding method in the NVivo 12 Pro platform (Barta et al., 2023; Newton et al., 2021). This study executed a reflexive thematic analysis to develop a story about patterns of themes (as shown in Table 10) for identifying immersive, cognitive, and emotional factors in AR environments (Braun & Clarke, 2019).

Table 10. Reflexive Thematic Analysis to address RQ1
(Braun & Clarke, 2019; Adu, 2019)

Name	Files	References
Initial Codes	0	0
Accessibility	1	1
Insight Experience	2	5
Interactivity	2	10
Menatal Imagery	2	6
Product Beleivability	2	2
Product Dimension	2	4
Product Fit	2	20
Reviews	2	16
Screen Size	2	6
Sence of Immersion	2	3
Sense of Control	1	1
Sense of Presence	1	1
System Quality	2	3
Trust	2	9
Vividness	1	5

Name	Files	References
Initial Themes	**0**	**0**
RQ1 (Identify stimuli and cognitive factors)	**2**	**9**
Cognitive Factors	**0**	**0**
Mental Imagery	**2**	**6**
Sence of Immersion	**2**	**3**
Trust	**2**	**9**
External Stimuli Cues	**0**	**0**
Insight Experience	**2**	**5**
Online Reviews	**2**	**16**
System Quality	**2**	**3**
Internal Stimuli Cues	**0**	**0**
Vividness	**1**	**5**
Interactivity	**2**	**10**
Product Fit	**2**	**20**
Continuance Intention (decision-making)	**2**	**9**

Source: Retrieved from NVivo Platform

A thematic analysis was followed as a qualitative analytical method for identifying patterns (themes) and sub-themes in the context of augmented reality and its implications on mobile platforms. After critical analysis through generated codes using NVivo, potential themes were identified to understand the sources of information, cognitive states, and emotional factors for user-platform interactions in augmented reality. The results were arranged in a coherent sequence that considered the themes, sub-themes, and structural arrangement that correlated with the research questions. The identified major themes and sub-themes are described as follows:

Theme 1: Internal source of information

Sub-theme 1: Vividness

Participants expressed their experiences and opinions, which were reflected in the thematic analysis. The term ‘vividness’ was used to describe the quality of virtual products in augmented reality environments. It was considered an internal stimulus factor relevant to the design and UX assessment aspects. Valuable insights from participants are mentioned below:

“I am very concerned about the internal factors when using this AR platform”. (Focus group 1, P1)

"Design aspects like colour combination, interactivity, and vividness encourage users to use the AR platform". (Focus group 1, P2)

I would like to say that in an advancement of the 3D view. It means the vividness of the visualisation aspect, and AR helps us access that information. (Focus group 2, P7)

Sub-theme 2: Interactivity

Participants emphasised the value proposition of interacting with platforms that enhanced their perceived immersive experiences. Interactions with AR mobile platforms give sensory information that engages users with the product virtualisation. Further, AR involves more interaction capability in mobile platforms to support real-time tracking of products. Also, Interactions engage platforms' capability to perceive user experience. This study extracted opinions on interactivity from participants, and a few of those insights are as follows:

"Interaction might be one important factor because you can interact with things in a virtual environment. You can feel truly, for example, make-up products; the interaction is like we have makeup-up stuff. Concerning the external factors, I give my perspective on real-time tracking. With the movement, for example, like playing a game, the character, the movement. Real-time tracking does an external part for me that will influence my system use". (Focus group 1, P1)

"With stimulus one regarding the interactivity in AR, it makes it easier for the user to purchase the item". (Focus group 1, P5)

"AR design environment affects the capability of interaction". (Focus group 2, P8)

"Visual products or interaction capability. It is richer regarding insight". (Focus group 2, P9)

"So that is one thing I like when it comes to the interaction. The fact that you could rotate and, you know, play around with an object". (Focus group 2, P9)

Sub-theme 3: Accessibility

"How accessible are they? Do I see them immediately, or do I need to waste time trying to find all of them?" (Focus group 2, P9)

Theme 2: External source of information

Sub-theme 1: Product fit

When participants were discussing the prompt about stimulus factors in AR, they described the importance of placing virtual products in the physical spaces, scale measurement and tracking how the product fits or looks in their desired location. With AR, users can check and simulate virtual products with their preferences in natural spaces. Participants emphasised the virtual product placement feature, and a few of those comments are as follows:

“It would make me feel good to check that the product fits into my place. I was interacting with it. I can see, for example, if I can place it in my room where it fits and so forth. So, in general, just the believability”. (Focus group 1, P1)

“It is about the real dimensions when you put it, like when you place the item at the corner, so if it fits or not, and want to see it from all sides”. (Focus group 1, P2)

“In augmented reality, I like the colour or something that I like personally, especially if there is something I can relate to. I also like the one you said about the colour. Also, I can relate to the original product by watching, or, you know, just by listening to certain sounds or something”. (Focus group 1, P3)

“Using AR technology, you do not need to go outside to check everything, size and stuff. I cannot touch it, but I can at least see if that particular item will fit in my house or how it will look.”. (Focus group 1, P4)

“You can check and look at the product. How are you going to look in a physical location? So, if you have AR technology, you can search for any model and just put it in your space. You can see if it will fit your location or not. Which colour do you use? Alternatively, which colour should you choose for the desired stuff?” (Focus group 1, P4)

“It gives me all the prompts to know what I need about the things, such as dimensions. Whether it is available at the store, click and connect all these features”. (Focus group 1, P5)

“While you are scanning the space, it does not give you the dimensions, neither for the product nor for your area. So, as an end user, I would like to see far more to go when we scan; it needs to show the Dimensions for products and space”. (Focus group 2, P6)

With the 3D view, we can understand the proportion and how the product will fit. (Focus group 2, P7)

“AR gives you more options regarding furniture or other products so that we can see whether it fits, whether there is enough space, and how it will look. I could open my drawer virtually, put some object in it, and see how it fits my needs”. (Focus group 2, P8)

“As I mentioned, I want to see how it fits in my place, the sizes, etc. I prefer to see where the item would fit. AR capability is excellent because I can simulate it in my own space or somewhere to overlay the existing background or interior”. (Focus group 2, P9)

“Whenever you are buying or going to buy furniture, they place it in their own house, and they can see what the house looks like. This is a significant factor, so they can arrange their house on the mobile application and make a new picture”. (Focus group 2, P10)

Sub-theme 3: Network quality

“The same will happen everywhere else if people use these technologies. A fast network is a must to deliver immersive services”. (Focus group 2, P9)

In that case, the device, size, weight, and everything will be much lighter, so connectivity needs a 5G. So, the whole rendering process can be done remotely, and the device is only for display. So, it is going to play a significant role in AI. (Focus group 2, P10)

Sub-theme 4: Recommendation

“They have a filtering process. I like to use those filters; sometimes, they give you filters like they just put something on your face, and it will work because they recognise your face. Moreover,

they put those staffs perfectly on the part of the face where they should put them". (Focus group 1, P4)

"After the scan of your room, they recommend changing our room the other way, or, like, like, like different ways. Or they should give us any suggestion items". (Focus group 1, P5)

"Recommendation systems play a significant role in influencing my shopping experience. The recommendation system puts that as a strength, those that have a higher rating, or whatever their favourite is, they are putting in front of you, and you have to buy through that. Moreover, the aggregations usually come from". (Focus group 2, P8)

Sub-theme 3: Reviews

Participants demonstrated a perception of the necessity of reviews and ratings related to other users' experiences regarding product usage. Reviews could affect users' interest in interacting with AR mobile platforms. It allows users to compare products and their features.

"I always care about reviews when I buy a product. I like to see what others who already want to purchase the product think about the quality of the product". (Focus group 1, P2)

"I see the reviews for any product, which provokes my decision". (Focus group 1, P3)

"The 3D version of this visualisation can help us to triangulate it, can it? It can reduce the bias that those review ratings or the numbers are compelling to us. We can triangle it, and we can reduce the confirmation bias, like emerging those from that information. And would this immersive feeling be with the virtual interaction?". (Focus group 2, P7)

"Features of similar products are usually the same, affecting which one has a good review. As a first-time user, I will look for the highest consideration". (Focus group 2, P8)

"I would say what everyone else has said. The reviews are the most trustworthy". (Focus group 1, P5)

"All of those are important, like recommendations, ratings, reviews, the number of people who purchased/used it before, and so on". (Focus group 2, P9)

"If I see more people have purchased the same product. Moreover, I am buying something widely used; I want to see thousands of people getting it and leaving good ratings. Like everyone else, I usually compare the ratio between good positive ratings and the total number of sales". (Focus group 2, P9)

Theme 2: Cognitive and emotional engagement

Sub-theme 1: Mental imagery

"The perception comes from the believability of the product. If you use a platform, you can see the product you know. So, it affects the perception in your mind". (Focus group 1, P1)

Sub-theme 2: Sense of immersion

"I like the product if you use the AR. So yeah, when you interact, engage more, like trying to act more with the product. It gives you more comfort with immersion through product description". (Focus group 1, P2)

“It engages them more with immersion. So, they are interested in what the item is presenting, what they can achieve, and what benefits they can get from buying it”. (Focus group 1, P5)

“AR makes the experience close to reality, as you place real-time known products that we have an understanding about, that ratio of what it will look like in our known context”. (Focus group 2, P7)

Sub-theme 3: Sense of presence

“It gives you a sense of control/presence, like, you know, where you feel like you have”. (Focus group 1, P3)

“How does it look? Yes. Instead of offline shopping, you can only fill some things online using AR interactions. You can feel how it looks in your house whenever you use the AR”. (Focus group 2, P10)

Sub-theme 4: Satisfaction

“I feel more satisfied when interacting with the AR platform”. (Focus group 1, P2)

“It can trigger my pre-existing attachments or some alignment towards liking this one or that one. So, it can confirm or disagree with my previous choices. Let us say, emotional attachments or things”. (Focus group 2, P9)

Sub-theme 5: Trust

“I look for something that I like. I see the reviews for any product, which provokes my decision about whether to trust the product more. AR creates trust between the platform and the users.”. (Focus group 1, P3)

“Trust is essential if we consider this kind of social scam or social vulnerability to exploit our trust, but trust is one of the critical factors”. (Focus group 2, P8)

“And there will be few choices for the user side. Users need to be more trusting or using it, not like that, but behind the scenes will come up. People believe in the company, and the company needs to ensure they are made at that level to bring trust”. (Focus group 2, P10)

Theme 3: Continuance intention as a behavioural response

Perceived engagement influences the continued use of AR mobile platforms. Different sources of information encourage users to engage with mobile platforms, and it changes their decision-making process.

“If you can try something, this will encourage me to use the platform. You know it will remove the product uncertainty that I have. When I can try stuff and buy virtually, I can see where it fits me. Moreover, this will encourage you to continue using the system”. (Focus group 1, P1)

“It makes it easier to decide because at least you can see how it fits or not, or even try it like in your augmented reality view”. (Focus group 1, P2)

“Interacting with AR, I will feel better about that thing, and it will influence my decision-making. That thing will influence me more”. (Focus group 1, P3)

It is beneficial for me to choose the product using AR view. So yes, of course, it is going to affect my decision. (Focus group 1, P4)

"Personal opinions from other people and seeing their experience give you influence. Your decision on whether or not to use the platform or to buy the item. Because you will know whether or not it is worth purchasing". (Focus group 1, P5)

"AR influenced me to make the decisions because I can see it in some places and see what it looks like". (Focus group 2, P6)

"Alleviating product uncertainty will influence continuance intention with the purchase decision". (Focus group 2, P7)

"For example, you are putting some products in your room, even some. It has some extra features in it. However, it matches your environment and gives some elegance to your room or the place, so that it affects your decision-making". (Focus group 2, P8)

AR accommodates to fit users' faces in the virtual world. So, they use the AR and immediately put the dependent colour combination. Moreover, they are taking the vision of which one they need to buy makeup fashion automatically, any design, any dress. It will have an impact on decision-making. (Focus group 2, P10)

5.1.4 Code Book Generation

This study identified critical factors from the insights and developed the codebook (Annex G) using the NVivo platform. Thematic analysis (TA) was widely used in qualitative research, which involves recognising, examining, and framing patterns (themes) and analysing textual data through NVivo. This study explored the use of critical analysis to generate codebooks, considering the research questions and objectives, mainly focusing on identifying stimuli and cognitive and emotional factors in an AR mobile platform context. Further, a reflexive thematic analysis is characterised by its emphasis on the researcher's role in explaining the qualitative data. Braun and Clarke (2019) are pioneers in describing TA, outlining its flexibility and operability to different research questions and data types. A reflexive TA generated a codebook, following a systematic procedure that outlines the codes or categories used to classify and interpret data. The codebook is critical for ensuring consistency and transparency in data analysis. Generating a codebook involves identifying initial codes, developing categories, and refining themes (Braun et al., 20). A detailed description of the generated codebook is shown in Appendix G.

5.1.5 Results of Qualitative Study

This study extracted valuable insights from participants' opinions and thoughts regarding UX in AR mobile platforms. The results of the focus group (as shown in Table 11) interviews are summarised below:

Table 11. Inductive Themes and Sub-themes using Reflexive Thematic Analysis to address RQ1

Themes	Sub-Themes	Actual user experience of augmented reality
Internal sources of information	Product Fit	• **"If I can place the product in my room through interaction where it fits, it confirms believability."**
		• **"I would like to see the real dimensions from all sides, whether it fits."**
		• **"Real-time tracking and movement of the object influence the use of the system."**
	Vividness and Interactivity	• **"Design aspects like colour combination, interactivity, and vividness encourage me to use the AR platform."**
		• **"Stimulus regarding the vividness and interactivity of the actual AR makes it easier for me to use the app."**
		• **"Accessibility and how easy it is to use are important considerations."**
		• **"It is essential to have the interaction, and how accessible are they? Do I see them immediately?"**
	Network Quality	• **"A fast network is a must to handle massive volumes of data."**
External sources of information	Review and recommendation	• **"I always care about reviews when I buy a product."**
		• **"I usually go on my laptop, which is easier."**
		• **"I like to use filters; they give you options like they just put something analysing in physical space."**
		• **"I use my mobile phone because all the details are on it and easier to review."**
		• **"We first consider looking for extra features. However, good reviews affect products with similar characteristics."**
		• **"Rating reviews influence my shopping experience, and recommendation systems play a significant role."**
		• **"The possible cultural effect is the willingness to adopt new technology."**
Cognitive and Emotional Engagement	Sense of Immersion, Sense of Presence, and Trust	• **"When I use the AR, I engage more, like trying to act more with the product. It gives more comfort."**
		• **"AR gives me a sense of control, like, you know, where you feel like you have."**
		• **"AR engages more. So, they are interested in what the item is presenting, what they can achieve, and what benefits they can get from buying it."**
		• **"Cognitive attachment relates to the time factor. We triangulate the 3D view of a product with recommendations and interaction capability."**
		• **"AR can trigger my pre-existing attachments or some alignment towards liking the apps. So, it can confirm or disagree with my previous choices."**
		• **"Trust is crucial for confidential information in online trading. Also, the faith will depend on the brand value and image of the company."**
		• **"AR makes the decision easier because at least you can see whether it fits or even tries."**
Behavioural Response	Continuance Intention	• **"I see the reviews for any product, which provokes my decision about whether to trust the product more."**
		• **"I like something that I can relate to my choices. Then, I will feel better, and it will influence my decision-making."**
		• **"AR influenced me to make the decisions because I can see it in some places and see what it looks like."**
		• **"AR reduces users' decision load through a better context or situation. Alleviating product uncertainty influences continuance intention."**

5.1.6 Valuable Insights and Iteration Process

Qualitative research outcomes are critically analysed, both in grounded observation and perceived user experience, and are taken through participants' valuable discussions and opinions. This study identified critical sources of information as stimulus cues from the results and reframed the constructs to revisit the conceptual model. Also, this study gathered the effectiveness of including immersive, innovative, and interactive sources of information from participants' viewpoints. Most participants have discussed immersive factors like vividness, interactivity, product fit, recommendations (insight experience), and online reviews as potential stimulus cues to explain internal and external sources of information in an augmented reality environment. Also, mental imagery, sense of immersion, and trust were identified as potential organism factors to explain cognitive and emotional engagements. Then, this study generated a code book using NVivo 12 Pro to define the key factors identified through the focus group interviews. The study revisited the conceptual model through the iteration process and included the identified factors in the proposed research model.

5.2 Perceptions from Predictive Analysis

All respondents actively participated in the online survey through the shared questionnaire link or QR code. The respondents were guided to answer some mandatory questions before joining the demographic and UX questionnaires. The survey guideline informed respondents to get familiarisation with the survey process. We have collected all the responses through the Qualtrics platform.

5.2.1 Descriptive Analysis of Socio-demographic Variables

The socio-demographic variables addressed in this study are gender, age group, educational level, employment status, annual income level, and living in Australia. Initially, this study collected 1102 responses from the Qualtrics platform. We have critically checked and computed data using SPSS to clean it through the proper validation process. Finally, the sample size of 886 (N=886) was confirmed, and the data file was analysed using smart PLS 4.0. The gender distribution of respondents from Australia is shown in Table 12 and Figure 21

Table 12. Gender Distribution

Status	Characteristics	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	533	60.0	60.2	60.2
	Female	345	38.9	38.9	99.1
	I prefer not to say	8	0.9	0.9	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

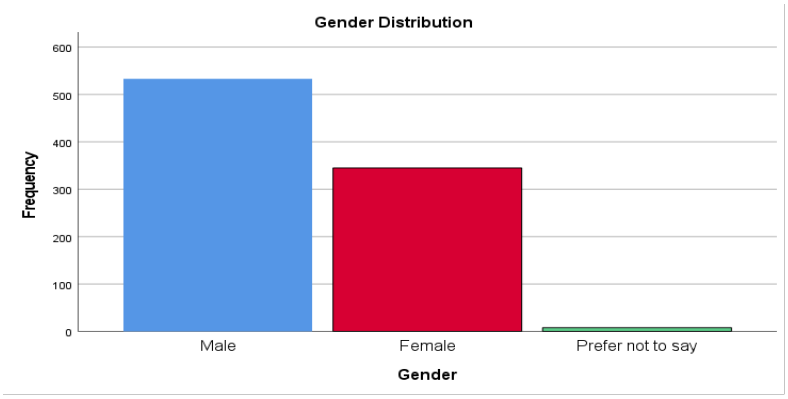

Figure 21. Gender Distribution

The distribution of age groups for respondents in Australia is shown in Table 13 and Figure 22. The age group of 27-42 years (millennials) mainly was represented (53%), followed by 18-26 years (Generation Z) (23%), 43-58 years (Generation Z) (19%) and 59 years or above (Boomers) (5%).

Table 13. Distribution of Age Group

Status	Age group	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-26 years	202	22.7	22.8	22.8
	27-42 years	471	53.0	53.2	76.0
	43-58 years	167	18.8	18.8	94.8
	59 years or above	46	5.2	5.2	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

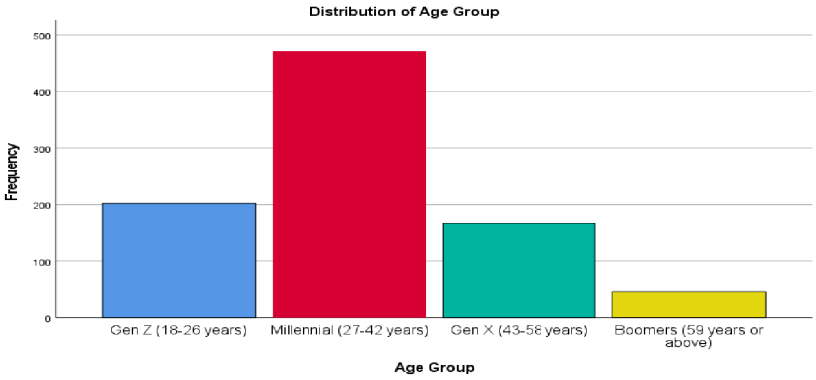

Figure 22. Distribution of Age group

The distribution of educational level for respondents in Australia is shown in Table 14 and Figure 23. Respondents with a bachelor's degree were the highest representation (40%), followed by vocational or similar (26%), not attended in Australia (20%), secondary (10%), and primary (3%).

Table 14. Distribution of Educational Level

Status	Educational level	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	30	3.4	3.4	3.4
	Secondary	84	9.5	9.5	12.9
	Bachelor's degree	359	40.4	40.5	53.4
	Vocational or similar	232	26.1	26.2	79.6
	Not attended in Australia	181	20.4	20.4	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

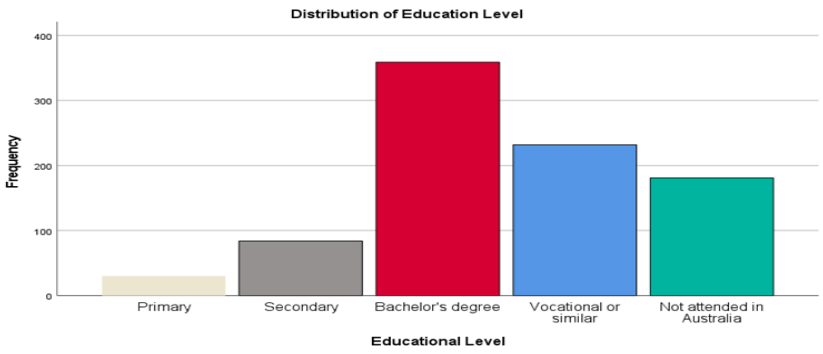

Figure 23. Distribution of Educational level

Concerning the employment status of respondents in Australia, as shown in Table 15 and Figure 24, working full-time was primarily out of the total respondents (40%), followed by students (24%), self-employed (16%), working part-time (15%), unemployed (4%), and others (1%).

Table 15. Distribution of Employment Status

Status	Employment status	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	214	24.1	24.2	24.2
	Working full-time	356	40.1	40.2	64.3
	Working part-time	130	14.6	14.7	79.0
	Unemployed	38	4.3	4.3	83.3
	Self-employed	140	15.8	15.8	99.1
	Others	8	.9	.9	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

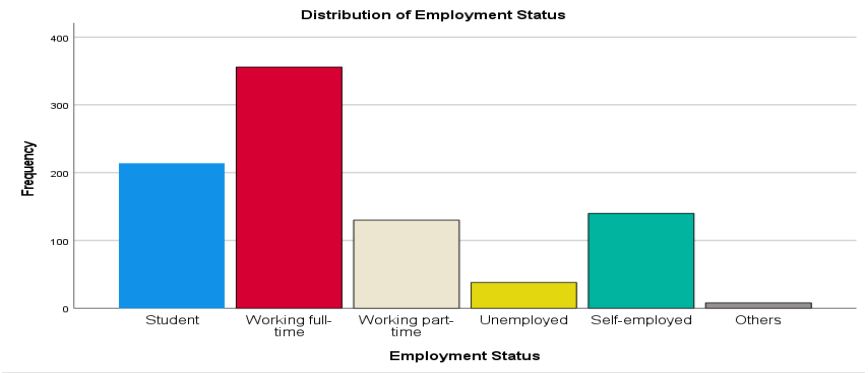

Figure 24. Distribution of Employment Status

The distribution of annual income levels in Australia is shown in Table 16 and Figure 25. Respondents with an income level of 18,201 – 45,000 AUD mainly were counted (46%), followed by 45,001 – 120,000 AUD (34%), 120,000 – 180,000 AUD (11%), more than 180,000 AUD (4.3%), and less than 18,200 AUD (4%).

Table 16. Distribution of Annual Income Level

Status	Income level	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 18,200 AUD	35	3.9	4.0	4.0
	18,201-45,000 AUD	410	46.2	46.3	50.2
	45,001-120,000 AUD	307	34.6	34.7	84.9
	120,001-180,000 AUD	96	10.8	10.8	95.7
	More than 180,000	38	4.3	4.3	100.0

	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

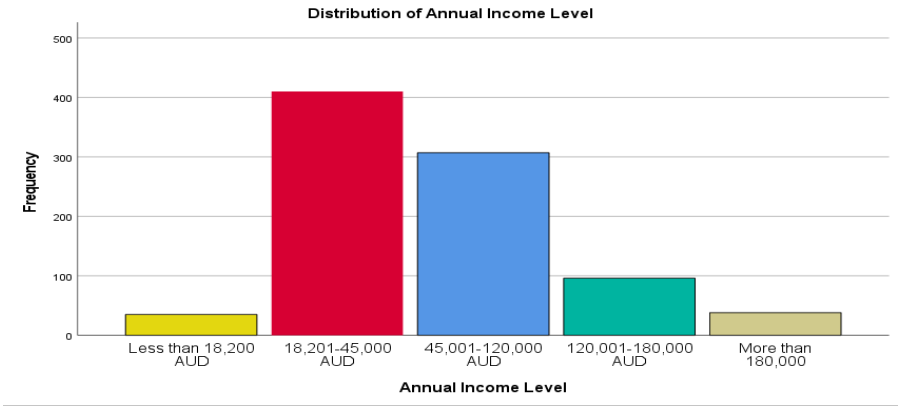

Figure 25. Distribution of Annual Income Level

Concerning the status of living in Australia, as shown in Table 17 and Figure 26, most respondents group those who have been staying in Australia for a duration of 3-4 years, followed by more than four years (25%), born in Australia (20%), 1-3 years (19.6%), and less than one year (4%).

Table 17. Distribution of Living in Australia

Status	Living period	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than one year	36	4.1	4.1	4.1
	1-3 years	174	19.6	19.6	23.7
	3-4 years	276	31.1	31.2	54.9
	More than four years	223	25.1	25.2	80.0
	Born in Australia	177	19.9	20.0	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

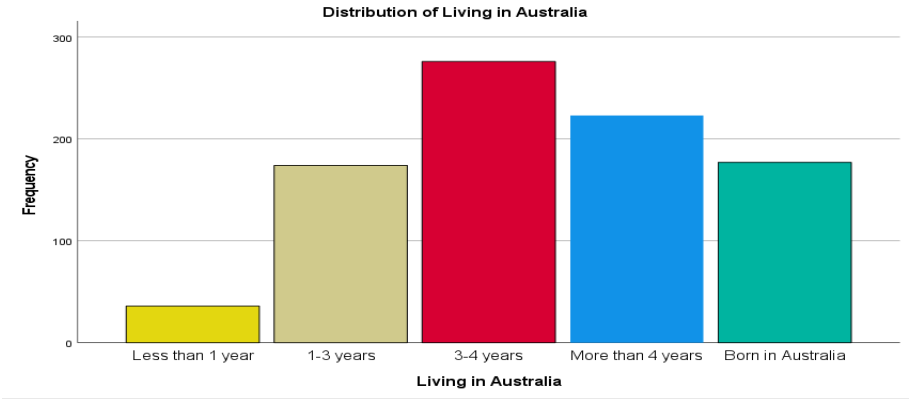

Figure 26. Distribution of Living in Australia

An online questionnaire was designed to collect respondents' origin culture. This study included the sequence of the names of cultures, considering the theoretical evidence and the census statistics for the Australian population. Although the study collected data randomly, the sample profile of respondents' origin culture reflected Australia's population proportions. Table 18 and Figure 27 show the respondents' distribution of origin culture in Australia. The frequency of origin culture with Indian was mostly attended with 182 (20%), followed by the background German with 153 (17%), Australian with 114 (13%), Chinese with 107 (12%), Italian with 107 (12%), Bangladeshi with 90 (10%), and British with 89 (10%).

Table 18. Sample profile of Respondents' Origin Culture

Status	Origin Culture	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Australian	114	12.8	12.9	12.9
	Australian Aboriginals	10	1.1	1.1	14.0
	Torres Strait Islander	9	1.0	1.0	15.0
	German	153	17.2	17.3	32.3
	Italian	107	12.0	12.1	44.4
	Indian	182	20.5	20.5	64.9
	Bangladeshi	90	10.1	10.2	75.1
	Nepalese	5	0.6	0.6	75.6
	Korean	6	0.7	0.7	76.3
	Irish	9	1.0	1.0	77.3
	Scottish	1	0.1	0.1	77.4
	Chinese	107	12.0	12.1	89.5
	British	89	10.0	10.0	99.5
	Others	4	0.5	0.5	100.0
	Total	886	99.8	100.0	
Missing	System	2	0.2		
Total		888	100.0		

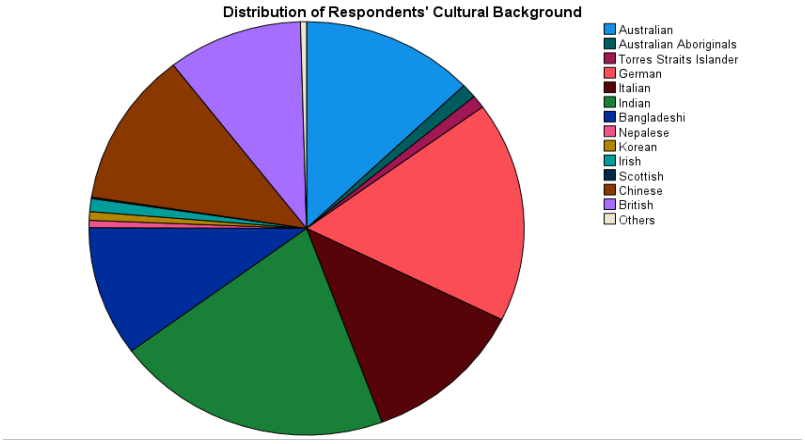

Figure 27. Distribution of Respondents' Origin Culture

The response rate was 84%. The summary of the socio-demographic characteristics and user profile of the sample is shown in Table 19.

Table 19. Respondents' socio-demographic profile (N=886)

Characteristics	Values	Frequency	Percentage (%)
Gender	Male	533	60.2%
	Female	345	38.9%
	I prefer not to say	8	0.9%
Age Group	Generation Z (18-26 years)	202	22.8%
	Millennial (27-42 years)	471	53.2%
	Generation X (43-58 years)	167	18.8%
	Boomers II (59 years or above)	46	5.2%
Education Level	Primary	26	2.9%
	Secondary	72	8.1%
	Bachelor's degree	524	59.1%
	Vocational or similar	129	14.6%
	Not attended in Australia	135	15.2%
Employment Status	Student	29	3.3%
	Working full-time	99	11.2%
	Working part-time	689	77.8%
	Unemployed	34	3.8%
	Self-employed	5	0.6%
	Others	30	3.4%
Annual Income	Less than 18,200 AUD	19	2.1%
	18,201 – 45,000 AUD	281	31.7%
	45,001 – 120,000 AUD	477	57.2%
	120,001 – 180,000 AUD	57	6.4%
	More than 180,000	22	2.5%

5.2.2 Data Analytics

The proposed research model was validated using the partial least squares structural equation modelling (PLS-SEM) statistical technique, and the variance of the constructs (Kowalczuk et al.,

2021) was explained to deliver optimum results for complex models. The SmartPLS 4.0 software was used to examine the measurement model and develop a structural model to estimate the relationships among different constructs of the proposed research model. This study followed a two-step SEM approach to analyse the data using the PLS-SEM. The proposed model used both formative and reflective constructs. Therefore, the PLS-SEM was more suitable for the study as it supported the simultaneous measurement and structural model assessment.

This study applied the PLS-SEM technique to analyse the predictive model through two phases: measurement model and structural model assessment. In the measurement model, the reliability and validity of constructs were established. Further, structural model assessment tests the hypotheses. The PLS-SEM as a statistical technique was used to analyse the collected quantitative data using the smartPLS 4.0 (Ringle et al., 2014) to estimate the relationships among different constructs of the proposed model.

Structural equation modelling (SEM) is a statistical technique to test hypotheses for conceptual models to understand the relationships between independent and dependent variables (Al-Adwan et al., 2022). The SEM is a multivariate analytical tool that can extend to predictive analysis to overcome regression and variance-based analysis (Chatterjee et al., 2021). The PLS is a variance-based (components-based) analysis, which is a preferred technique in the field of information system (IS) research that involves predictive analysis for flexibilities, complex models, more hypotheses, and both formative and reflective constructs to alleviate the limitations of covariance-based (CB) SEM such as LISREL and SPSS AMOS. CB-SEM is followed to test existing theories, whereas PLS-SEM is an advanced technique to explore complex models and predictions in the context of emerging technologies.

In this study, the PLS-SEM is applicable for predictive analysis and does not demand normality without distributional assumptions through nominal, ordinal and interval-scaled variables (Haenlein & Kaplan, 2004; Hair et al., 2014). Furthermore, the CB-SEM technique is not suitable for research because it does not support both reflective and formative variables (Henseler et al., 2009). The proposed model in this study considered both formative and reflective

constructs. Therefore, PLS-SEM is fit for this study as it supports the simultaneous assessment of structural model and path coefficients. Additionally, PLS-SEM allows the investigation of both reflective and formative constructs together in a model (Kowalczuk et al., 2021).

The measurement model was used as an outer model assessment with confirmatory factor analysis (CFA) to determine the reliability of survey instruments and the validity of constructs (Kowalczuk et al., 2021). Then, the structural model was executed as an inner model assessment to test the hypotheses (Ringle et al., 2014). Concerning the recommended PLS-SEM from previous literature, the PLS-SEM approach was an appropriate technique (Martinez et al., 2023) for this study to extend data analysis following the I-E-I model in augmented reality environments. Furthermore, the PLS-SEM is a statistical analytical technique that supports the analysis of complex hypothetical relationships among constructs. The study also included an analysis to check the effect of origin culture, age group, acculturated culture, and employment status, considering the socio-demographic characteristics of the sample profile.

5.2.3 Measurement Model Assessment

This study executed confirmatory factor analysis (CFA) to check the reliability and validity of the measurement model assessment, considering measurement items and constructs. In the model, there is a prerequisite to execute internal consistency reliability, convergent validity, and discriminant validity (Martinez et al., 2023). The measurement model was analysed through factor loadings, composite reliability (CR), Cronbach's alpha, and average variance extracted (AVE) to test the reliability of the measurement instrument. Table 20 explains the psychometric properties of all the constructs deployed in the study. As data extracted from the SmartPLS, all the outer loadings are above 0.70, and the average variance extracted (AVE) values are more than 0.50. Cronbach’s alpha value of all constructs is assessed from 0.701 to 0.912, which is greater than the prescribed value of 0.70 (Khan et al., 2022). Composite reliability (CR) values of all constructs were assessed as higher than the recommended value of 0.70 (i.e., from 0.702 to 0.922). Further, the AVE values were established to be greater than MSV (Maximum Shared Variance) and ASV

(Average Shared Variance), which explains the strength of AVE and approves the threshold for discriminant validity (Nan et al., 2020).

Table 20. Measurement model assessment results

Constructs	Items	Factor loading	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)
Vividness	VN1	0.926			
	VN2	0.919	0.826	0.827	0.852
Interactivity	IN1	0.953			
	IN2	0.958	0.904	0.906	0.913
Product fit	PF1	0.946			
	PF2	0.956	0.895	0.902	0.904
Network quality	NQ1	0.863			
	NQ2	0.903	0.720	0.732	0.780
AI-driven recommendation	AIR1	0.954			
	AIR2	0.964	0.912	0.922	0.919
Online review	OR1	0.926			
	OR2	0.937	0.848	0.852	0.868
Mental imagery	MI1	0.879			
	MI2	0.901	0.738	0.743	0.792
Sense of immersion	SI1	0.906			
	SI2	0.901	0.776	0.776	0.817
Sense of presence	SP1	0.949			
	SP2	0.940	0.776	0.776	0.817
Subjective Norm	SN1	0.783			
	SN2	0.804	0.710	0.713	0.631
	SN3	0.796			
Attitude	AT1	0.928			
	AT2	0.933	0.845	0.845	0.866
Satisfaction	SF1	0.905			
	SF2	0.888	0.756	0.760	0.804
Trust	TR1	0.923			
	TR2	0.883	0.777	0.798	0.816
Continuance intention	CI1	0.770			
	CI2	0.785	0.701	0.702	0.592
	CI3	0.753			

Then, discriminant validity was examined according to Table 21. The diagonals represent the square root of the AVEs. The square root of all AVE scores is higher than the rest of the correlations. Considering those findings, we can say that the measurement model revealed adequate reliability and validity.

Table 21. Discriminant validity and descriptive statistics of measures (Fornell-Larcker criterion)

	AIR	**AT**	**CI**	**IN**	**MI**	**NQ**	**OR**	**PF**	**SF**	**SI**	**SN**	**SP**	**TR**	**VN**
AIR	0.959													
AT	0.224	0.930												
CI	0.305	0.260	0.769											
IN	0.206	0.261	0.260	0.955										

MI	0.167	0.301	0.176	0.140	0.890									
NQ	0.154	0.289	0.241	0.203	0.246	0.883								
OR	0.218	0.242	0.239	0.134	0.181	0.208	0.932							
PF	0.290	0.153	0.305	0.118	0.155	0.130	0.208	0.951						
SF	0.272	0.160	0.382	0.176	0.137	0.221	0.222	0.309	0.896					
SI	0.180	0.227	0.252	0.217	0.192	0.249	0.180	0.230	0.213	0.904				
SN	0.199	0.177	0.288	0.146	0.178	0.194	0.152	0.183	0.275	0.214	0.794			
SP	0.199	0.173	0.276	0.179	0.212	0.214	0.246	0.220	0.276	0.158	0.258	0.944		
TR	0.270	0.267	0.327	0.188	0.207	0.245	0.245	0.279	0.267	0.266	0.216	0.238	0.904	
VN	0.198	0.242	0.259	0.180	0.281	0.311	0.242	0.199	0.196	0.260	0.226	0.250	0.255	0.923

5.2.4 Structural Model Testing

In the structural model assessment, initially, the value of R^2 for all dependent variables was examined, and then the collinearity statistics value for all the relationships was observed in this study. Table 22 shows that the value of R^2 for all the variables is within the range of 0.11- 0.25, which is recommended as a higher value. R^2 values of mental imagery (0.155), sense of immersion (0.208), sense of presence (0.194), subjective norm (0.190), attitude (0.215), satisfaction (0.234), trust (0.232), and continuance intention (0.247) showed reasonable variance explained. Also, the collinearity statistics (VIF) value for all the relationships was less than 3.0. Both the value of R^2 (0.11- 0.25) and collinearity statistics (VIF) (<3.0) confirmed that the structural model was statistically significant (as shown in Table 22).

Table 22. R-square statistics and Collinearity statistics (VIF)

R^2 Statistics			**Collinearity statistics (VIF)**	
Construct	R-square	R-square adjusted	Relationship	VIF
MI	0.155	0.153	VN -> MI	1.041
SI	0.208	0.204	PF -> MI	1.042
SP	0.194	0.191	VN -> SI	1.125
SN	0.190	0.187	IN -> SI	1.060
AT	0.215	0.212	NQ -> SI	1.135
SF	0.334	0.331	PF -> SP	1.017
TR	0.272	0.271	NQ -> SP	1.018
CI	0.389	0.387	AIR -> SN	1.050
			OR -> SN	1.242
			MI -> AT	1.038
			SI -> AT	1.042
			SP -> SF	1.072
			SN -> SF	1.072
			SP -> TR	1.374
			SN -> TR	1.195
			AT -> CI	1.176
			SF -> CI	1.087
			TR -> CI	1.140

Model Fit

In the PLS-SEM, model fit represents how well the proposed research model fits the data propositions. This study examined model fit using the Smart PLS 4.0, an analytical tool to execute PLS-SEM analysis. The path coefficients show strong relationships between constructs, with all the extracted values greater than the prescribed threshold value of 0.5. It confirmed the significant effects of the model. The R^2 values were examined, indicating that the proposed model accommodates a significant proportion of the variance in the endogenous constructs with the prescribed value range of 0.11-0.25. The Q^2 values were extracted through the blindfolding procedure and indicated predictive relevance for all constructs with values greater than zero. Also, the composite reliability values were more significant than the threshold of 0.70, confirming the internal consistency of all constructs. The AVE values are more significant than the value of 0.50, confirming that each construct is more than half of the variance in its indicators. Discriminant validity was confirmed using the Fornell-Larcker criterion, which indicates that the root of AVE for each construct is more significant than its correlation with other constructs. Considering all the key indicators, including path coefficients, R^2 values, Q^2 values, composite reliability (CR), and average variance extracted (AVE), the model fit was estimated as satisfactory.

Hypothesis Testing

This study executed a hypothesis testing using PLS-SEM with SmartPLS 4.0 to examine the empirical findings in line with our theoretical expectations framed in the proposed model. This study applied the bootstrapping procedure to investigate the significance of path coefficients. The significance of the hypotheses was tested through the path coefficient (β), *t*-value, and *p*-value in the structural model assessment.

Hypothesis Testing Results

- **H1a.** Vividness positively influences mental imagery in the user-platform interaction: The result showed that the path coefficient value was 0.261 with a t-value of 7.226, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that vividness leads to increased mental imagery.

- **H1b.** Product fit positively influences mental imagery in the user-platform interaction: The result showed that the path coefficient value was 0.103 with a t-value of 2.983, and the p-value was represented less than 0.01 (0.003), indicating a significant positive relationship. This affirms that product fit leads to increased mental imagery.

- **H2a:** Vividness positively influences sense of immersion in the user-platform interaction: The result showed that the value of the path coefficient was 0.183 with a t-value of 5.142 and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that vividness leads to an increased sense of immersion.

- **H2b:** Interactivity positively influences sense of immersion in the user-platform interaction: The result showed that the value of the path coefficient was 0.151 with a t-value of 4.394 and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that interactivity leads to an increased sense of immersion.

- **H2c:** Network quality positively influences the sense of immersion in the user-platform interaction: The result showed that the value of the path coefficient was 0.161 with a t-value of 4.644, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that network quality leads to an increased sense of immersion.

- **H3a.** Product fit positively influences sense of presence in the user-platform interaction: The result showed that the path coefficient value was 0.195 with a t-value of 5.221, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that product fit leads to an increased sense of presence.

- **H3b.** Network quality positively influences sense of presence in the user-platform interaction: The result showed that the path coefficient value was 0.188 with a t-value of 5.814, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that network quality leads to an increased sense of presence.

- **H4a.** AI-driven recommendation positively influences subjective norms in the user-platform interaction: The result showed that the path coefficient value was 0.175 with a t-value of 4.869, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that AI-driven recommendation leads to increased subjective norm.

- **H4b.** Online review positively influences subjective norms in the user-platform interaction: The result showed that the path coefficient value was 0.114 with a t-value of 3.215, and the p-value was represented less than 0.01 (0.001), indicating a significant positive relationship. This affirms that online review leads to increased subjective norm.

- **H5a.** Mental imagery positively influences attitude in the user-platform interaction: The result showed that the path coefficient value was 0.267 with a t-value of 7.889, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that mental imagery leads to an increased sense of attitude.

- **H5b.** Sense of immersion positively influences attitude in the user-platform interaction: The result showed that the path coefficient value was 0.176 with a t-value of 5.075, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that sense of immersion leads to an increased attitude.

- **H6a.** Sense of Presence positively influences satisfaction in user-platform interaction: The result showed that the path coefficient value was 0.219 with a t-value of 6.153, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that vividness leads to an increased sense of immersion.

- **H6b.** Subjective norm positively influences satisfaction in user-platform interaction: The result showed that the path coefficient value was 0.218 with a t-value of 6.718, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that subjective norm leads to increased satisfaction.

- **H7a:** Sense of presence positively influences trust in user-platform interaction: The result showed that the path coefficient value was 0.195 with a t-value of 5.584, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that sense of presence leads to an increased sense of trust.

- **H7b.** Subjective norm positively influences trust in user-platform interaction: The result showed that the path coefficient value was 0.166 with a t-value of 4.959, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that subjective norm leads to an increased sense of trust.

- **H8.** Attitude positively influences continuance intention in the user-platform interaction: The result showed that the path coefficient value was 0.157 with a t-value of 4.683, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that attitude leads to increased continuance intention.

- **H9.** Satisfaction positively influences continuance intention in the user-platform interaction: The result showed that the path coefficient value was 0.302 with a t-value of 9.476, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that satisfaction leads to increased continuance intention.

- **H10.** Trust positively influences continuance intention in the user-platform interaction: The result showed that the path coefficient value was 0.204 with a t-value of 6.656, and the p-value was represented less than 0.01 (0.000), indicating a significant positive relationship. This affirms that trust leads to increased continuance intention.

All the hypotheses were supported at the $p < 0.01$ level. The results for the AR environment showed that all hypotheses were supported and sources of information positively influence users' behavioural responses. The results of the structural model assessment (hypothesis testing) are provided in Table 23 and Figure 28.

Table 23. Hypotheses Testing Results

Hypothesis	Relationship	Original sample (O)	Mean (M)	Std. deviation	T statistics	P values	Hypothesis Result
H1a	VN -> MI	0.261	0.261	0.036	7.226	0.000	Yes
H1b	PF -> MI	0.103	0.102	0.034	2.983	0.003	Yes
H2a	VN -> SI	0.183	0.182	0.036	5.142	0.000	Yes
H2b	IN -> SI	0.151	0.151	0.034	4.394	0.000	Yes
H2c	NQ -> SI	0.161	0.162	0.035	4.644	0.000	Yes
H3a	PF -> SP	0.195	0.195	0.037	5.221	0.000	Yes
H3b	NQ -> SP	0.188	0.189	0.032	5.814	0.000	Yes
H4a	AIR -> SN	0.175	0.176	0.036	4.869	0.000	Yes
H4b	OR -> SN	0.114	0.115	0.035	3.215	0.001	Yes
H5a	MI -> AT	0.267	0.267	0.034	7.889	0.000	Yes
H5b	SI -> AT	0.176	0.176	0.035	5.075	0.000	Yes
H6a	SP -> SF	0.219	0.219	0.036	6.153	0.000	Yes
H6b	SN -> SF	0.218	0.219	0.032	6.718	0.000	Yes
H7a	SP -> TR	0.195	0.195	0.035	5.584	0.000	Yes
H7b	SN -> TR	0.166	0.166	0.033	4.959	0.000	Yes
H8	AT -> CI	0.157	0.158	0.034	4.683	0.000	Yes
H9	SF -> CI	0.302	0.303	0.032	9.476	0.000	Yes
H10	TR -> CI	0.204	0.204	0.031	6.656	0.000	Yes

*p<0.05, **p< 0.01, ***p< 0.001

The significance of the hypotheses was tested through the path coefficient (β), *t*-value, and *p*-value in the structural model assessment. As Table 26 shows, the user-platform interaction-based sources of information as stimuli cues in AR, vividness (β = 0.261, $p \leq 0.001$), and product fit (β = 0.103, $p \leq 0.01$) were significantly correlated to mental imagery, supporting H1a and H1b. Vividness (β = 0.183, $p \leq 0.001$), interactivity (β = 0.151, $p \leq 0.001$), and network quality (β = 0.161, $p \leq 0.001$) were positively related to the sense of immersion, supporting H2a, H2b, and H2c. Product fit (β = 0.195, $p \leq 0.001$) and network quality (β = 0.188, $p \leq 0.001$) were also positively related to the sense of presence with statistical significance, supporting H3a and H3b. AI-driven recommendation (β = 0.175, $p \leq 0.001$) and online review (β = 0.114, $p \leq 0.01$) were also positively related to the subjective norm with statistical significance, supporting H4a and H4b.

In perceiving cognitive and emotional engagements, mental imagery (β = 0.267, $p \leq 0.001$) and sense of immersion (β = 0.176, $p \leq 0.001$) were positively related to attitude, supporting H5a and H5b. Sense of presence (β = 0.219, $p \leq 0.001$) and subjective norm (β = 0.218, $p \leq 0.001$) were positively related to satisfaction, supporting H6a and H6b. Also, sense of presence (β =

0.195, $p \leq 0.001$) and subjective norm ($\beta = 0.166$, $p \leq 0.001$) were positively related to trust with statistical significance, supporting H7a and H7b.

In the context of behavioural responses, attitude ($\beta = 0.157$, $p \leq 0.01$), satisfaction ($\beta = 0.302$, $p \leq 0.01$), and trust ($\beta = 0.204$, $p \leq 0.001$) were also positively related to the continuance intention with statistical significance, supporting H8, H9, and H10. The results for the user-platform interactions in an AR environment show that all hypotheses are supported, and user-platform interaction-based sources of information positively influence consumers' behavioural responses through perceived cognitive and emotional engagements. The structural model results (hypothesis testing) are presented in Table 24 and Figure 28. Also, the relationship of satisfaction with continuance intention (t-value is 9.476) is higher than that of attitude (t-value is 4.683) and trust (t-value is 6.656) with continuance intention. The structural model assessment is shown in Figure 28.

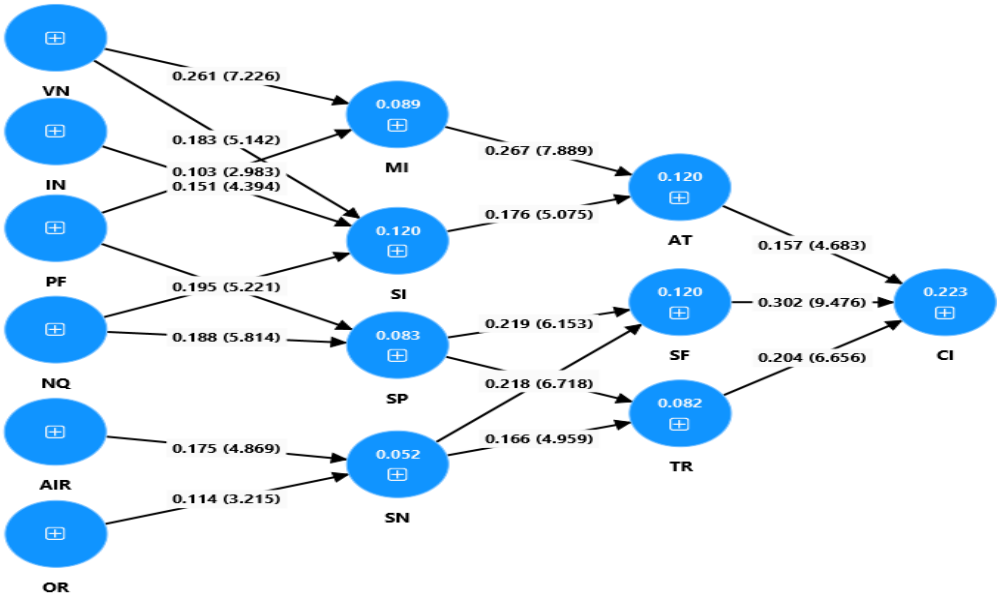

Figure 28. Structural Model Assessment

The results showed that vividness is the most influential source of information with a statistically positive significance toward the relationships with mental imagery ($\beta = 0.261$, $t = 7.226$) and sense of immersion ($\beta = 0.183$, $t = 5.142$). Whereas network quality has more

significant influences on the relationship with sense of presence (β = 0.188, t = 5.814) and AI-driven recommendation has more significant influences on the relationship with subjective norm (β = 0.175, t = 4.869). Also, towards the emotional engagements, the mental imagery has the most significant influence towards attitude (β = 0.267, t = 7.889). Further, the subjective norm has a more significant influence on satisfaction (β = 0.218, t = 6.718), and sense of presence has the most significant influence towards trust (β = 0.195, t = 5.584). Also, the result indicated that satisfaction significantly influences continuance intention (β = 0.302, t = 9.476).

Indirect Effects

In this study, indirect effects were examined to understand the mediation pathways beyond the developed hypotheses within the model. Table 24 highlights the path of the indirect effects. The SmartPLS output showed substantial impacts as mediating effects of the mental imagery, sense of immersion, sense of presence, and subjective norm towards continuance intention (p-value > 0.05 indicates mediating solid relationships). Also, findings indicated that there are significant mediating effects of vividness, interactivity, network quality, and product fit with the relationships towards attitude. Further, AI-driven recommendations, network quality, and online reviews mediate the relationships towards satisfaction. Moreover, AI-driven recommendation, network quality, online reviews, and product fit mediate the relationships towards trust.

Table 24. Indirect Effects in the I-E-I Model

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P-value	Supported
AIR -> CI	0.017	0.018	0.005	3.259	0.001	Yes
AIR -> SF	0.038	0.039	0.011	3.490	0.000	Yes
AIR -> TR	0.029	0.030	0.009	3.069	0.002	Yes
IN -> AT	0.027	0.027	0.009	2.962	0.003	Yes
IN -> CI	0.004	0.004	0.002	2.189	0.029	Yes
MI -> CI	0.042	0.042	0.011	3.703	0.000	Yes
NQ -> AT	0.028	0.029	0.009	3.097	0.002	Yes
NQ -> CI	0.024	0.025	0.006	4.065	0.000	Yes
NQ -> SF	0.041	0.041	0.010	4.003	0.000	Yes
NQ -> TR	0.037	0.037	0.010	3.726	0.000	Yes
OR -> CI	0.011	0.012	0.005	2.478	0.013	Yes

OR -> SF	0.025	0.025	0.009	2.648	0.008	Yes
OR -> TR	0.019	0.019	0.008	2.410	0.016	Yes
PF -> AT	0.027	0.028	0.010	2.648	0.008	Yes
PF -> CI	0.025	0.025	0.007	3.487	0.000	Yes
PF -> SF	0.043	0.043	0.013	3.412	0.001	Yes
PF -> TR	0.038	0.038	0.011	3.315	0.001	Yes
SI -> CI	0.028	0.028	0.009	3.017	0.003	Yes
SN -> CI	0.100	0.101	0.016	6.088	0.000	Yes
SP -> CI	0.106	0.107	0.018	5.905	0.000	Yes
VN -> AT	0.102	0.102	0.019	5.236	0.000	Yes
VN -> CI	0.016	0.016	0.005	2.963	0.003	Yes

5.2.5 MICOM Test for Multigroup Analysis

This measurement invariance of composite models (MICOM) approach was followed in this study to test configural and compositional invariance. It also accommodates equality of mean values and identifies invariances in the proposed model with the moderation effects of origin culture, age group, and acculturated culture. We extended the research to determine the measurement invariance for multigroup analysis in PLS-SEM by executing the MICOM test (Cheah et al., 2023). The study applied the MICOM through three steps such as i) examining configural invariance to evaluate the measurement model, ii) determining compositional invariance to confirm the equality of composite score for multi groups, and iii) Executing permutation multigroup analysis (MGA) to test the composite equality with the level of invariance (full invariance, partial invariance, or no invariance)

Measurement assessment was established using the PLS algorithm and Bootstrap in the PLS-SEM using SmartPLS 4.0. The results confirmed the reliability and validity of the constructs and supported the developed hypotheses. This study applied the MICOM test through configural invariance, compositional invariance, and equal distribution with mean and variance. For the MICOM step I, configural invariance was established by confirming (i) the use of equal indicators in multi groups, (ii) data treatment (mean value replacement for missing value), and (iii) similar algorithm settings (path weighting considering a maximum of 300 iterations). In MICOM step II, this study executed the permutation multigroup analysis test, and MICOM showed the results of step II for compositional invariance. The result confirmed that the original correlation is more

than 5% quantile, and the permutation's p-values are greater than 0.05 (Table 25), the recommended value for supporting MICOM step II (Cheah et al., 2023).

Table 25. Results of MICOM Step II

Construct	Original correlation	Correlation permutation mean	5.0%	Permutation p-value
AIR	1.000	0.987	0.984	0.861
AT	0.999	0.999	0.996	0.263
CI	0.999	0.989	0.968	0.920
IN	1.000	0.999	0.995	0.678
MI	0.997	0.996	0.985	0.370
NQ	0.988	0.996	0.985	0.076
OR	0.920	0.966	0.907	0.053
PF	0.998	0.999	0.996	0.139
SF	1.000	0.998	0.993	0.923
SI	0.994	0.997	0.988	0.140
SN	0.988	0.982	0.948	0.473
SP	1.000	1.000	0.999	0.458
TR	1.000	0.997	0.989	0.780
VN	0.999	0.998	0.990	0.407

In the MICOM step IIIa, this study checked the composites' equality for mean values for multiple groups (different age groups). The results showed that the mean original difference for each construct supported the 95% confidence interval. Though the mean original value of all the constructs was within the range of lower (2.5%) and upper (97.5%) thresholds, and the permutation's p-value was more significant than 0.05, step IIIa was achieved and supported the initial confirmation of invariance (As shown in Table 26).

Table 26. Results of MICOM Step IIIa (Mean)

	Original difference	Permutation mean difference	2.5%	97.5%	Permutation p-value
AIR	-0.003	0.001	-0.206	0.211	0.982
AT	0.011	0.004	-0.201	0.213	0.925
CI	0.104	0.000	-0.209	0.198	0.328
IN	-0.165	0.001	-0.208	0.209	0.111
MI	0.183	0.004	-0.215	0.202	0.088
NQ	0.060	-0.005	-0.203	0.211	0.560
OR	-0.193	0.003	-0.193	0.209	0.068
PF	0.056	0.002	-0.192	0.191	0.581
SF	0.014	0.002	-0.188	0.206	0.898
SI	0.004	-0.001	-0.207	0.194	0.999
SN	0.127	0.004	-0.197	0.212	0.224

SP	-0.018	0.002	-0.212	0.194	0.864
TR	-0.006	0.000	-0.194	0.214	0.951
VN	-0.001	-0.001	-0.199	0.183	1.000

In the MICOM step IIIb, this study checked the composites' equality for variances for multiple groups (different age groups). The results showed that the mean original difference for each construct supported the 95% confidence interval (except for two constructs). The results confirmed that the mean original value of MI (-0.381) and the value of NQ (-0.403) were above the upper boundary (97.5%), and the permutation's p-value was smaller than 0.05 (As shown in Table 27). Therefore, the step IIIb results showed that composite variances for all the constructs were not equal, and only this study proceeded for partial measurement invariance.

Table 27. Results of MICOM Step IIIb (Variance)

	Original difference	**Permutation mean difference**	**2.5%**	**97.5%**	**Permutation p-value**
AIR	-0.136	0.005	-0.278	0.276	0.342
AT	-0.173	0.002	-0.291	0.287	0.279
CI	-0.237	0.000	-0.331	0.356	0.180
IN	-0.204	-0.003	-0.237	0.240	0.107
MI	-0.381	0.001	-0.337	0.327	0.013
NQ	-0.403	-0.008	-0.352	0.359	0.026
OR	0.014	0.000	-0.235	0.247	0.913
PF	-0.099	0.005	-0.237	0.244	0.442
SF	-0.070	-0.005	-0.252	0.250	0.570
SI	-0.088	0.001	-0.297	0.295	0.551
SN	-0.220	0.004	-0.324	0.330	0.173
SP	-0.142	0.003	-0.223	0.223	0.204
TR	-0.174	0.003	-0.252	0.241	0.182
VN	-0.404	-0.012	-0.460	0.391	0.055

Concerning the above results of steps IIIa and IIIb, this study executed the Bootstrap multigroup analysis considering the partial measurement invariance in the SmartPLS. Then, we followed the bootstrapping results to analyse the partial measurement invariance.

Moderating Effects of Origin Culture

A Bootstrap multigroup analysis (MGA) was executed for multiple groups of origin cultures after confirming Step II, Step IIIa, and Step IIIb of the MICOM test. For a better understanding of the moderating effects of users' origin culture, this study executed the MGA for different backgrounds within a multicultural society, considering individualism/collectivism (individualistic origin culture versus individualistic origin culture, individualistic culture versus collectivistic origin culture, collectivistic origin culture versus collectivistic origin culture). The results (Table 28) showed that multiple relationships are invariant between origin cultural groups (Australian versus British, German versus Chinese, and Bangladeshi versus Indian). The study considered the invariant case by analysing the case with both p-values more than or less than 0.05. Though the permutation test is applicable for pairwise comparisons to test the invariance of hypotheses/relationships in MGA, this study subdivided origin culture groups into three pairs to extend the multigroup analysis to get better comparative results (Cheah et al., 2023). The results showed that in several relationships, there were significant differences among the path coefficients of each pair, and the p-values for the origin cultures were less than or more than 0.05 (as shown in Table 28). Therefore, the results confirmed that the origin culture considering individualism/collectivism has significant moderating effects on all the relationships proposed in the I-E-I model.

Table 28. Permutation Test Results for Origin Culture

Relationships	**Australian Vs British**			**German Vs Indian**			**Indian Vs Chinese**		
	P-value for Aus	*P*-value for Bri	Invariant	*P*-value for Ger	*P*-value for Chinese	Invariant	*P*-value for Bangla	*P*-value for Indian	Invariant
AIR -> CI	0.090	0.505	Yes	0.572	0.156	Yes	0.062	0.000	No
AIR -> SF	0.100	0.734	Yes	0.042	0.771	No	0.288	0.019	No
AIR -> TR	0.041	0.182	No	0.235	0.066	Yes	0.366	0.369	Yes
IN -> AT	0.098	0.391	Yes	0.005	0.062	No	0.004	0.000	Yes
IN -> CI	0.007	0.020	Yes	0.387	0.130	Yes	0.041	0.001	Yes
MI -> CI	0.575	0.118	Yes	0.926	0.390	Yes	0.365	0.098	Yes
NQ -> AT	0.617	0.264	Yes	0.162	0.396	Yes	0.175	0.517	Yes
NQ -> CI	0.131	0.011	No	0.347	0.570	Yes	0.017	0.001	Yes
NQ -> SF	0.000	0.000	Yes	0.680	0.481	Yes	0.023	0.001	Yes
NQ -> TR	0.031	0.077	No	0.000	0.221	No	0.000	0.000	Yes
OR -> CI	0.614	0.609	Yes	0.263	0.455	Yes	0.356	0.000	No

OR -> SF	0.080	0.057	Yes	0.001	0.067	No	0.000	0.018	Yes
OR -> TR	0.121	0.113	Yes	0.879	0.450	Yes	0.001	0.021	Yes
PF -> AT	0.286	0.595	Yes	0.271	0.456	Yes	0.281	0.000	No
PF -> CI	0.002	0.002	Yes	0.312	0.198	Yes	0.416	0.024	No
PF -> SF	0.094	0.034	No	0.141	0.061	Yes	0.162	0.147	Yes
PF -> TR	0.303	0.697	Yes	0.154	0.082	Yes	0.001	0.000	Yes
SI -> CI	0.297	0.837	Yes	0.700	0.750	Yes	0.138	0.003	No
SN -> CI	0.229	0.635	Yes	0.572	0.156	Yes	0.062	0.000	No
SP -> CI	0.295	0.678	Yes	0.042	0.771	No	0.288	0.019	No
VN -> AT	0.344	0.015	No	0.235	0.066	Yes	0.366	0.369	Yes

Hypothesis Testing Results (for origin culture)

- **H11.** We hypothesise that the origin culture significantly moderates relationships in the user-platform interaction: The result showed that the value of the path coefficient with a p-value for each origin culture has significant differences, and a p-value was represented less than or more than 0.05 for several cases, indicating significant moderation effects. This asserts that users' origin culture significantly moderates the relationships among sources of information, perceived user experience, and continuance intention in the context of AR.

The proposed hypothesis was supported with $p < 0.05$ or $p > 0.05$. The results showed that the hypothesis regarding the origin culture was supported. The structural model results (hypothesis testing) for the moderating effects of origin culture toward relationships were retrieved from the SmartPLS platform, as shown in Table 29, using SmartPLS 4.0, followed by executing the bootstrapping MGA process.

Moderating Effects of Age Group/Generation

A Bootstrap multigroup analysis (MGA) was executed for multiple groups of generation/age groups after confirming Step II, Step IIIa, and Step IIIb of the MICOM test. The results (Table 30) showed that multiple relationships are invariant between groups (Gen Z Vs Gen X, Gen Z Vs Millennial, and Gen X Vs Millennial). The study considered the invariant case by analysing the case with both p-values more than or less than 0.05. Though the permutation test is applicable for pairwise comparisons to test the invariance of hypotheses/relationships in MGA, this study was subdivided into three pairs to extend the multigroup analysis (Cheah et al., 2023). The results showed that in several relationships, there were significant differences among the path coefficients of each pair, and the p-values for the age groups were less than or more than 0.05 (as

shown in Table 29). Therefore, the results confirmed that age group or generation has significant moderating effects on all the relationships being proposed in the I-E-I model.

Table 29. Permutation Test Results for Generation/Age group

Relationships	Gen Z Vs Gen X			Gen Z Vs Millennial			Gen X Vs Millennial		
	P-value for Gen Z	*P*-value for Gen X	Invariant	*P*-value for Gen Z	*P*-value for Millennial	Invariant	*P*-value for Gen X	*P*-value for Millennial	Invariant
AIR -> CI	0.006	0.501	No	0.006	0.000	Yes	0.501	0.000	No
AIR -> SF	0.232	0.000	No	0.232	0.001	No	0.000	0.001	Yes
AIR -> TR	0.023	0.039	Yes	0.023	0.004	Yes	0.039	0.004	Yes
IN -> AT	0.006	0.002	Yes	0.006	0.000	Yes	0.002	0.000	Yes
IN -> CI	0.053	0.064	No	0.053	0.000	No	0.064	0.000	No
MI -> CI	0.405	0.000	No	0.405	0.004	No	0.000	0.004	Yes
NQ -> AT	0.477	0.011	No	0.477	0.040	No	0.011	0.040	Yes
NQ -> CI	0.223	0.105	Yes	0.223	0.003	No	0.105	0.003	No
NQ -> SF	0.008	0.002	Yes	0.008	0.001	Yes	0.002	0.001	Yes
NQ -> TR	0.000	0.000	Yes	0.000	0.000	Yes	0.000	0.000	Yes
OR -> CI	0.057	0.007	Yes	0.057	0.001	No	0.007	0.001	Yes
OR -> SF	0.014	0.002	Yes	0.014	0.000	Yes	0.002	0.000	Yes
OR -> TR	0.014	0.909	No	0.014	0.000	Yes	0.909	0.000	No
PF -> AT	0.181	0.001	No	0.181	0.000	No	0.001	0.000	Yes
PF -> CI	0.220	0.000	No	0.220	0.000	No	0.000	0.000	Yes
PF -> SF	0.403	0.001	No	0.403	0.000	No	0.001	0.000	Yes
PF -> TR	0.045	0.001	No	0.045	0.000	Yes	0.001	0.000	Yes
SI -> CI	0.024	0.005	Yes	0.024	0.000	Yes	0.005	0.000	Yes
SN -> CI	0.006	0.501	No	0.006	0.000	Yes	0.501	0.000	No
SP -> CI	0.232	0.000	No	0.232	0.001	No	0.000	0.001	Yes
VN -> AT	0.023	0.039	Yes	0.023	0.004	Yes	0.039	0.004	Yes

Hypothesis Testing Results (for Age group/Generation)

- **H12.** We hypothesise that age group significantly moderates relationships in the user-platform interaction: The result showed that the value of the path coefficient with a p-value for each age group has significant differences, and a p-value was represented less than or more than 0.05 for several cases, indicating significant moderation effects. This asserts that users' age group significantly moderates the relationships among sources of information, perceived user experience, and continuance intention in the context of AR.

The proposed hypothesis was supported with $p < 0.05$ or $p > 0.05$. The results showed that the hypothesis regarding age group was supported. The structural model results (hypothesis testing) for the moderating effects of age group toward relationships were retrieved from the SmartPLS platform, as shown in Table 30, using SmartPLS 4.0, followed by executing the bootstrapping MGA process.

Moderating Effects of Acculturated Culture

A Bootstrap multigroup analysis (MGA) was executed for multiple groups of acculturated cultures after confirming Step II, Step IIIa, and Step IIIb of the MICOM test. This study identified two major factors, such as living period in Australia and attaining educational degrees from Australian institutions, to define acculturated culture for a multicultural society like Australia. Therefore, the two bootstrap MGAs were executed for both groups of living periods, and educational levels were attained separately to identify the moderating effects of those two factors.

In the first case, the results (Table 31) showed that multiple relationships are invariant between groups (Living from 1 to 3 years Vs Living from 3 to 4 years, Living from 3 to 4 years Vs Living more than 4 years, and Living more than 4 years Vs Born in Australia). The study considered the invariant case by analysing the case with both p-values more than or less than 0.05. Though the permutation test is applicable for pairwise comparisons to test the invariance of hypotheses/relationships in MGA, this study was subdivided into three pairs to extend the multigroup analysis for living periods in Australia (Cheah et al., 2023). The results showed that in several relationships, there were significant differences among the path coefficients of each pair, and the p-values for the living period were less than or more than 0.05 (as shown in Table 30). Therefore, the results confirmed that the living period significantly affects all the relationships proposed in the I-E-I model.

Table 30. Permutation Test Results for Living Period in Australia

Relationships	**Living from 1 to 3 Vs Living from 3 to 4**			**Living from 3 to 4 Vs Living more than 4**			**Living for more than 4 Vs Born in Australia**		
	P-value for 1_3	*P*-value for 3_4	Invariant	*P*-value for 3_4	*P*-value for More_4	Invariant	*P*-value for More_4	*P*-value for Born_Aus	Invariant
AIR -> CI	0.008	0.458	No	0.458	0.000	No	0.000	0.000	Yes
AIR -> SF	0.000	0.004	Yes	0.004	0.455	No	0.455	0.003	No
AIR -> TR	0.000	0.220	No	0.220	0.620	Yes	0.620	0.003	No
IN -> AT	0.000	0.001	Yes	0.001	0.000	Yes	0.000	0.000	Yes
IN -> CI	0.669	0.006	No	0.006	0.013	Yes	0.013	0.068	No
MI -> CI	0.000	0.022	Yes	0.022	0.150	No	0.150	0.081	No
NQ -> AT	0.648	0.269	Yes	0.269	0.084	Yes	0.084	0.006	No
NQ -> CI	0.651	0.162	Yes	0.162	0.244	Yes	0.244	0.000	No
NQ -> SF	0.052	0.108	Yes	0.108	0.093	Yes	0.093	0.000	No
NQ -> TR	0.000	0.002	Yes	0.002	0.000	Yes	0.000	0.000	Yes

OR -> CI	0.000	0.158	No	0.158	0.063	Yes	0.063	0.120	Yes
OR -> SF	0.010	0.213	No	0.213	0.000	No	0.000	0.000	Yes
OR -> TR	0.034	0.014	Yes	0.014	0.002	Yes	0.002	0.001	Yes
PF -> AT	0.013	0.004	Yes	0.004	0.041	Yes	0.041	0.001	Yes
PF -> CI	0.088	0.007	No	0.007	0.377	No	0.377	0.000	No
PF -> SF	0.030	0.000	Yes	0.000	0.000	Yes	0.000	0.006	Yes
PF -> TR	0.010	0.000	Yes	0.000	0.000	Yes	0.000	0.000	Yes
SI -> CI	0.017	0.063	No	0.063	0.083	Yes	0.083	0.001	No
SN -> CI	0.008	0.458	No	0.458	0.000	No	0.000	0.000	Yes
SP -> CI	0.000	0.004	Yes	0.004	0.455	No	0.455	0.003	No
VN -> AT	0.000	0.220	No	0.220	0.620	Yes	0.620	0.003	No

In the second case, the results (Table 31) showed that multiple relationships are invariant between groups with educational levels (Secondary Vs Bachelor's Degree, Bachelor's Degree Vs Vocational, and Vocational Vs Not attained in an Australian educational institute). The study considered the invariant case by analysing the case with both p-values more than or less than 0.05. Though the permutation test is applicable for pairwise comparisons to test the invariance of hypotheses/relationships in MGA, this study was subdivided into three pairs to extend the multigroup analysis for attained degrees in Australia (Cheah et al., 2023). The results showed that in several relationships, there were significant differences among the path coefficients of each pair, and the p-values for the educational levels were less than or more than 0.05 (as shown in Table 31). Therefore, the results confirmed that educational level significantly affects all the relationships proposed in the I-E-I model.

Table 31. Permutation Test Results for Educational Levels in Australia

Relationships	**Secondary Vs Bachelor**			**Bachelor Vs Vocational**			**Vocational Vs Not attained in Australia**		
	P-value Sec	*P*-value Bach	Invariant	*P*-value Bach	*P*-value for Vo	Invariant	*P*-value for Vo	*P*-value for Not attained	Invariant
AIR -> CI	0.355	0.001	No	0.001	0.031	Yes	0.031	0.001	Yes
AIR -> SF	0.083	0.004	No	0.004	0.448	No	0.448	0.000	No
AIR -> TR	0.162	0.002	No	0.002	0.271	No	0.271	0.003	No
IN -> AT	0.052	0.000	No	0.000	0.001	Yes	0.001	0.000	Yes
IN -> CI	0.022	0.022	Yes	0.022	0.012	Yes	0.012	0.021	Yes
MI -> CI	0.077	0.042	No	0.042	0.001	Yes	0.001	0.022	Yes
NQ -> AT	0.524	0.152	Yes	0.152	0.702	Yes	0.702	0.006	No
NQ -> CI	0.683	0.009	No	0.009	0.050	Yes	0.050	0.031	Yes
NQ -> SF	0.004	0.003	Yes	0.003	0.124	No	0.124	0.007	No
NQ -> TR	0.000	0.000	Yes	0.000	0.000	Yes	0.000	0.001	Yes
OR -> CI	0.001	0.007	Yes	0.007	0.126	No	0.126	0.016	No
OR -> SF	0.013	0.000	Yes	0.000	0.080	No	0.080	0.000	No
OR -> TR	0.162	0.004	No	0.004	0.022	Yes	0.022	0.000	Yes
PF -> AT	0.005	0.000	Yes	0.000	0.026	Yes	0.026	0.036	Yes

PF -> CI	0.355	0.007	No	0.007	0.010	Yes	0.010	0.001	Yes
PF -> SF	0.000	0.001	Yes	0.001	0.000	Yes	0.000	0.012	Yes
PF -> TR	0.005	0.000	Yes	0.000	0.000	Yes	0.000	0.000	Yes
SI -> CI	0.066	0.002	No	0.002	0.025	Yes	0.025	0.001	Yes
SN -> CI	0.355	0.001	No	0.001	0.031	Yes	0.031	0.001	Yes
SP -> CI	0.083	0.004	No	0.004	0.448	No	0.448	0.000	No
VN -> AT	0.162	0.002	No	0.002	0.271	No	0.271	0.003	No

The above results analysed in the Bootstrapping MGA affirmed that the moderating effects of acculturated culture through the living period and educational level were significant primarily on relationships.

Hypothesis Testing Results (for Acculturated Culture)

- **H13.** We hypothesise that acculturated culture significantly moderates relationships in the user-platform interaction. The result showed that the value of the path coefficient with a p-value for each group of living period and educational level has significant differences, and a p-value was represented less than or more than 0.05 for several cases, indicating significant moderation effects. This asserts that users' acculturated culture significantly moderates the relationships among sources of information, perceived user experience, and continuance intention in AR.

The proposed hypothesis was supported with the level of $p < 0.05$ or $p > 0.05$. The results showed that the hypothesis regarding acculturated culture was supported. The structural model results (hypothesis testing) for the moderating effects of acculturated culture toward relationships were retrieved from the SmartPLS platform, as shown in Table 29, using SmartPLS 4.0, followed by executing the bootstrapping MGA process.

5.2.6 Effects of Socio-demographic Factors

This study collected data to address origin culture, acculturated culture (living in Australia, Education in Australia, and language), age group (defining users' generation), employment status, and annual income levels as attribute independent variables. Theoretically, these variables may have a significant impact on continuance intention. This study investigated the effects of different attribute independent variables in the context of AR mobile platforms, assessing potential effects on users' responses to continue using AR mobile platforms.

Effects of Origin Culture

In this study, respondents from different origin cultures can be considered as an attribute-independent variable, as it was theoretically evident that origin culture influences users' continuance intention to use AR mobile platforms. Cultural identities were collected from respondents during the data collection process, and dummy variables were created to represent the origin of the respondents' cultures. For the origin culture variable, this study formed dummy variables for each cultural identity with a reference category. This study included the origin culture of respondents in comparison with population representations in Australia (as shown in Table 3). The PLS-SEM results showed (as shown in Table 26) that the origin culture of Australian ($\beta = 0.115$, t-value = 2.527, $p < 0.05$), German ($\beta = 0.119$, t-value = 2.472, $p < 0.05$), and British ($\beta = 0.148$, t-value = 3.340, $p < 0.05$), Chinese ($\beta = 0.125$, t-value = 3.244, $p < 0.05$), Indian ($\beta = 0.108$, t-value = 2.252, $p < 0.05$), and Bangladeshi ($\beta = 0.130$, t-value = 2.355, $p < 0.05$) had a significant positive impact on continuance intention. Also, the results showed that the effect of this variable did not change the strength of hypothesised relationships in the proposed model but rather signified the results regarding the influences of culturally embedded experiences of respondents on adopting interactive AR mobile platforms through continuance intention. The results also showed that demographic factors, such as users from different origin cultures, significantly influence users' continuance intention in a multicultural society as a user retention process, considering user-platform interactions in an augmented reality environment. The findings were consistent with prior research indicating that users with individualistic cultures have more intentions to continue using mobile platforms than those of collectivistic cultures.

In addition, the result shows (as shown in Table 32) that users from origin cultures with individualism, like British ($\beta = 0.148$, t-value = 3.340), Australian ($\beta = 0.115$, t-value = 2.527), and German ($\beta = 0.119$, t-value = 2.472) have higher influences on continuance intention in the context of AR mobile platforms than origin cultures with collectivism like Chinese ($\beta = 0.125$, t-value = 3.244), Indian ($\beta = 0.108$, t-value = 2.252), and Bangladeshi ($\beta = 0.130$, t-value = 2.355). The results also showed the effects of origin culture with uncertainty avoidance towards

continuance intention. These findings suggested that users' origin culture, individualistic versus collectivistic orientations and low versus high uncertainty avoidance considering personalisation, user control, and norms are influenced by external innovative sources of information that significantly influence users' continuance intention to use AR mobile platforms in a multicultural society.

Table 32. Effects of Origin Culture

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P* values
Australian -> CI	0.115	0.114	0.045	2.527	0.012
Bangladeshi -> CI	0.130	0.129	0.049	2.355	0.008
British -> CI	0.148	0.147	0.044	3.340	0.001
Chinese -> CI	0.125	0.124	0.056	2.244	0.025
German -> CI	0.119	0.118	0.052	2.472	0.023
Indian -> CI	0.108	0.108	0.042	2.252	0.011

The results showed that users' backgrounds from different origin cultures in a multicultural society, considering personal beliefs, platform capabilities, immersive interactions, and social influences through recommendations and reviews, influenced continuance intention in line with the host culture. This study revealed that backgrounds from different origin cultures (both individualistic and collectivistic) have significantly different values but positively influence continuance intention.

Effects of Age Group/Generation

In this study, we controlled for respondents from different age groups, as this factor was supported theoretically by the fact that the age group identified users' generation, influencing users' continuance intention to use AR mobile platforms. The age group was represented by a dummy variable with different generations collected by respondents during the data collection process. For the age group variable, we formed dummy variables for each generation with a reference category. This study included the age group of respondents in comparison with population representations in Australia.

The PLS-SEM results presented (as shown in Table 33) that Generation Z ($\beta = 0.543$, t-value $= 2.459$, $p < 0.05$), Millennial ($\beta = 0.485$, t-value $= 2.221$, $p < 0.05$), and Generation X ($\beta = 0.508$,

t-value = 2.244, $p < 0.05$) had a significant positive impact toward users' continuance intention. Also, it was confirmed that the effect of this attribute independent variable did not change the strength of hypothesised relationships in the proposed model but rather signified the results regarding the influences of different age groups of respondents, which would be critical for marketing professionals to address different user groups and the way of understanding the effects of different generation on adopting interactive AR mobile platforms through continuance intention. The findings are consistent with prior research outcomes indicating that demographic factors like users from different age groups in a multicultural society can significantly influence continuance intention as a user retention behaviour considering user-platform interactions in the context of an augmented reality environment.

Moreover, the result identified that the intervening effects of Generation Z (2.459) towards continuance intention are much higher than those of Generation X (2.244) and Millennials (2.221), as shown in Table 33, in the context of AR mobile platforms. These findings justified the inclusion of the age group as an attribute-independent variable in the proposed model to examine the intervening effects of users' generation toward continuance intention. The results suggested that users' age group/generation significantly impacts their developed continuance intention in a multicultural society.

Table 33. Effects of Age Group/Generation

Relationships	Original sample (O)	Standard deviation (STDEV)	T-statistics	*P* values
Age group/Generation				
Gen_Z -> CI	0.543	0.021	2.459	0.014
Millennial -> CI	0.485	0.018	2.221	0.026
Gen_X -> CI	0.508	0.026	2.244	0.025

Effects of Acculturated Culture

In this study, we controlled for respondents with some questionnaires like staying/living period in Australia and educational background/attended educational institute in Australia to identify cultural acculturation, as this factor was supported theoretically, influencing users'

continuance intention to use AR mobile platforms. The acculturated culture was represented by a dummy variable living in Australia and attending educational institutes in Australia collected by respondents during the data collection process. For the case of living in Australia, this study formed dummy variables for each category with a reference value for the living in Australia variable. This study included a living period in Australia as a respondent variable compared to population representations (Table 17 and Figure 26).

In addition, the result shows (as shown in Table 34) that users from living born in Australia (β = 0.211, *t*-value = 0.807) has most significant effect on continuance intention with the successive effects with living 3 to 4 years (β = 0.174, *t*-value = 0.651), living with more than four years (β = 0.119, *t*-value = 0.462), and living with 1 to 3 years (β = 0.030, *t*-value = 0.098) in the context of AR mobile platforms. These findings suggested that users' living/staying period in Australia significantly influences users' continuance intention to use AR mobile platforms in a multicultural society.

Table 34. Effects of Living Period in Australia

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Living_1to3 -> CI	0.030	0.036	0.308	0.098	0.001
Living_3to4 -> CI	0.174	0.174	0.268	0.651	0.017
Living_Born_Australia -> CI	0.211	0.207	0.262	0.807	0.010
Living_More_4 -> CI	0.119	0.115	0.258	0.462	0.007

For the case of educational level, this study formed dummy variables for each category with a reference value for attending degrees through educational programs. This study included degrees attained and attended educational institutes in Australia as a variable for respondents compared to population representations in Australia (as shown in Table 14 and Figure 18).

In addition, the result showed (as shown in Table 35) that users who never attended Australian academic institutes (β = 0.022, *t*-value = 0.216, $p > 0.05$) have no significant effect on continuance

intention in an augmented reality environment. Whereas, users with educational background of bachelor in Australia (β = 0.568, *t*-value = 5.884) have the most significant effect on continuance intention with the successive effects with secondary (β = 0.383, *t*-value = 3.421), and educational background with vocational (β = 0.316, *t*-value = 3.307) in the context of AR mobile platforms. These findings suggested that users who attained degrees by attending educational institutions in Australia significantly influence users' continuance intention to use AR mobile platforms in a multicultural society.

Table 35. Effects of Educational Levels in Australia

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P* values
Edu_Not_in_Australia -> CI	0.022	0.023	0.100	0.216	0.415
Education_Bachelor -> CI	0.568	0.569	0.097	5.884	0.000
Education_Secondary -> CI	0.383	0.378	0.112	3.421	0.000
Education_Vocational -> CI	0.316	0.314	0.096	3.307	0.000

Effects of Gender

In addition to testing the proposed hypotheses, we investigated the effects of users from different gender classifications, as collected data from surveys conducted (As shown in Table 12 and Figure 21), on users' continuance intention. The result showed no positive influence of gender in perceiving behavioural intentions. However, the results (as shown in Table 36) showed the influences of males toward continuance intention (β = 0.089, *t*-value = 0.734, $p > 0.05$) and of females toward continuance intention (β = 0.045, *t*-value = 0.372, $p > 0.05$) for the gender status. Therefore, the findings revealed that gender does not influence users' continuance intention in the context of AR mobile platforms.

Table 36. Effects of Gender

Gender	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P* values
Female -> CI	0.045	0.048	0.121	0.372	0.355
Male -> CI	0.089	0.092	0.122	0.734	0.231

Effects of Employment Status

In addition to testing the proposed hypotheses regarding origin culture, age group, and acculturated culture, we investigated the moderating effects of users from different employment statuses (within Australia) as collected data from conducted surveys (As shown in Table 15 and Figure 24) on the relationships of attitude, satisfaction, and trust towards continuance intention. The result showed no moderating effects for students regarding the employment status in the relationships toward continuance intention. However, the results (as shown in Table 37) showed that the relationships of users' attitudes toward continuance intention (β = 0.325, *t*-value = 2.477, $p < 0.05$), satisfaction toward continuance intention (β = 0.425, *t*-value = 2.547, $p < 0.05$), and trust toward continuance intention (β = 0.310, *t*-value = 2.524, $p < 0.05$) for the employment status with self-employed had significant moderating effects. In the case of working full-time group, the relationships of users' attitudes toward continuance intention (β = 0.268, *t*-value = 2.435, $p < 0.05$), satisfaction toward continuance intention (β = 0.309, *t*-value = 2.485, $p < 0.05$), and trust toward continuance intention (β = 0.276, *t*-value = 2.202, $p < 0.05$) had significant moderating effects. However, the relationships of users' attitudes toward continuance intention (β = 0.228, *t*-value = 2.186, $p < 0.05$), satisfaction toward continuance intention (β = 0.238, *t*-value = 2.226, $p < 0.05$), and trust toward continuance intention (β = 0.312, *t*-value = 2.498, $p < 0.05$) for the employment status with working part-time had significant moderating effects.

Table 37. Effects of Employment Status

Relationships	Original sample (O)	Standard deviation (STDEV)	T statistics	*P* values
Employment Status				
Self-employed x AT -> CI	0.325	0.031	2.477	0.013
Self-employed x SF -> CI	**0.425**	0.031	**2.547**	0.011
Self-employed x TR -> CI	0.310	0.023	2.524	0.012
Working_full_time x AT -> CI	0.268	0.010	2.435	0.015
Working_full_time x SF -> CI	**0.309**	0.010	**2.485**	0.015
Working_full_time x TR -> CI	0.276	0.023	2.202	0.018
Student x AT -> CI	0.054	0.042	0.550	0.582
Student x SF -> CI	0.054	0.038	0.550	0.582
Student x TR -> CI	0.121	0.032	1.173	0.241
Working_part_time x AT -> CI	0.228	0.052	2.186	0.014
Working_part_time x SF -> CI	0.238	0.052	2.226	0.018
Working_part_time x TR -> CI	**0.312**	0.041	**2.498**	0.012

The findings represented more significant moderating effects on the relationship of satisfaction toward continuance intention rather than the relationships of attitude and trust toward continuance intention for both self-employed and working full-time employees. Also, the findings revealed more significant moderating effects on the relationship of trust toward continuance intention rather than the relationships of attitude and satisfaction toward continuance intention for working part-time employees. Among those, the self-employed group holding employment status was the most significant group compared to other groups affecting relationships.

Effects of Annual Income

In the case of annual income in Australia, this study formed dummy variables for each category with a reference value for the group with the annual income level in Australia. This study included annual income levels in Australia as a respondent variable compared to population representations (Table 16 and Figure 25). In addition, the result (as shown in Table 38) shows that users from different annual income levels in Australia significantly affect continuance intention. The findings showed that the effect of the income level group of 45,000 – 120,00 AUD (β = 0.167, *t*-value = 2.753) has the most significant effect on their continuance intention with the successive effects of the group of more than 180,000 AUD (β = 0.152, *t*-value = 2.139), income level with 120,000 -180,000 AUD (β = 0.139, *t*-value = 1.928), and the group of 18,000 – 45,000 AUD (β = 0.084, *t*-value = 1.595) in the context of AR mobile platforms. These findings suggested that users' annual income level in Australia significantly influences users' continuance intention to use AR mobile platforms in a multicultural society.

Table 38. Effects of Annual Income Level

Annual Income	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*P* values
Income_120_180k -> CI	0.139	0.140	0.072	1.928	0.027
Income_18_45k -> CI	0.084	0.084	0.053	1.595	0.046
Income_45_120k -> CI	0.167	0.168	0.061	2.753	0.003
More_180k -> CI	0.152	0.149	0.071	2.139	0.016

5.3 Summary

This chapter explains the results through critical analysis. A thematic analysis was executed using NVivo 12.0. A codebook has been generated by defining key factors and retrieved from the analytical platform. Then, the proposed model was validated, and the relationships were tested by conducting a descriptive analysis using a PLS-SEM approach. The results identified vividness, interactivity, product fit, AI-driven recommendations, and online reviews as immersive factors to explain sources of information in an augmented reality environment. Also, the study identified mental imagery, sense of immersion, sense of presence, and trust as organism factors to explain cognitive and emotional engagements.

The results established the moderating effects of origin culture, age group, and acculturated culture toward relationships among sources of information, perceived user experience, and continuance intention in an AR environment. Further, the study investigated the effects of socio-cultural factors like origin culture, age group, and acculturated culture, as well as other socio-demographic factors like gender, employment status, and income level for users in Australia, considering the context of AR mobile platforms. The study affirmed that all the hypotheses were supported and that sources of information positively influence users' behavioural responses through cognitive and emotional engagements. The results revealed that the effects of variables like origin culture, age group, and acculturated culture significantly influence the strength of hypothesised relationships in the proposed model, as well as influence users' continuance intention to use AR mobile platforms.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

This chapter represents the discussions, implications, and recommendations of the study. The summary of the results of this thesis is presented in this chapter. We have revisited the aims, objectives, research questions, and developed hypotheses of the study, considering the research outcomes. Then, we discuss the research findings in detail to explain the appropriateness of adopting constructs in this study. Also, this chapter identified theoretical, methodological, managerial, and practical implications considering the research context. Finally, we describe the study's limitations and recommend extending future research.

6.1 Revisiting the Research Aims, Research Questions, and Hypotheses

Before discussing the research findings, this study reviewed the correlations among research aims, objectives, and hypotheses, and an iteration process was used to address the associated results. Chapter 3 Figure 13 represents the validated research model uniquely developed in this study. Table 39 shows the revisited research problem, aim, objectives, and correlations between research questions and hypotheses developed in this study.

Table 39. Revisiting the Research Aims, Research Questions, and Hypotheses

Research Problem
In the context of AR mobile platforms, it demands an understanding of the perceived user experience through cognitive engagements that are impactful in developing users' attitudes, satisfaction, and trust towards continuance intention. Also, the moderating effects of socio-cultural factors like origin culture, age group, and acculturated culture on relationships among sources of information, perceived user experience, and continuance for a multicultural society in the context of augmented reality mobile platforms are unexplored.
Research Aims and Objectives
The study examines users' perceived user experience through cognitive and emotional engagements that influence continuance intention, with the effects of origin culture, age group, and acculturated culture in an AR mobile platform perspective. Addressing the research aim, the research objectives are described as follows: • To determine immersive and innovative sources of information that impact the perception of user experience for user-platform interactions in an augmented reality mobile platform perspective. • To propose an interaction-engagement-intention model for AR mobile platforms by accommodating cognitive engagements (mental imagery, sense of immersion, sense of presence, and subjective norm) and emotional engagements (attitude, satisfaction, and trust) towards users' continuance intention. • To investigate the moderating effects of origin culture, age group, and acculturated culture as socio-cultural factors towards relationships proposed in the interaction-engagement-intention (I-E-I) model.

- To investigate the effects of socio-demographic factors like origin culture, age group, acculturated culture, gender, employment status, and annual income level as attribute independent variables towards users' continuance intention in the proposed I-E-I model in an augmented reality environment context.
- To empirically validate the I-E-I model in a multicultural society like Australia.
- To determine empirical evidence for the AR mobile platform industry, user experience researchers, e-commerce platform developers, and marketing professionals to make a comprehensive understanding of how user-platform interactions engage positive user experience, enhance continuance intention, and also how user's origin culture, age group, and acculturated culture impacts on their behavioural intention.

Factors/Attributes	Research Questions	Analogy/Interpretation/Hypotheses
Immersive, internal, external, and innovative sources of information for an augmented reality environment.	1. How do we investigate critical immersive, external, and innovative factors to explain user experience, considering user-platform interactions in an augmented reality environment?	Identify critical factors for augmented reality as an emerging field of study through focus group interviews.
Vividness, product fit, and mental Imagery	2.a: What is the relationship between vividness, product fit, and mental imagery for user-platform interactions in AR mobile platforms?	H1a. The relationship between vividness and mental imagery is significant in the user-platform interaction. H1b: The relationship between product fit and mental imagery is significant in the user-platform interaction.
Vividness, interactivity, network quality, and sense of immersion	2.b: What is the relationship among vividness, interactivity, network quality, and sense of immersion for user-platform interactions in AR mobile platforms?	H2a. The relationship between vividness and a sense of immersion is significant in the user-platform interaction. H2b: The relationship between interactivity and a sense of immersion is significant in the user-platform interaction. H2c: The relationship between network quality and sense of immersion is significant in the user-platform interaction.
Product fit, network quality, and sense of presence	2.c: What is the relationship between product fit, network quality, and sense of presence for user-platform interactions in AR mobile platforms?	H3a. The relationship between product fit and sense of presence is significant in the user-platform interaction. H3b: The relationship between network quality and sense of presence is significant in the user-platform interaction.
AI-driven recommendation, online review, and subjective norm	2.d: What is the relationship between AI-driven recommendations, online reviews, and subjective norms for user-platform interactions in AR mobile platforms?	H4a. The relationship between AI-driven recommendation and subjective norms is significant in the user-platform interaction. H4b: The relationship between the online review and the subjective norm is significant in user-platform interaction.
Mental imagery, sense of immersion, and attitude	2.e: What is the relationship among mental imagery, sense of immersion, and attitude for user-platform interactions in AR mobile platforms?	H5a. The relationship between mental imagery and attitude is significant in the user-platform interaction. H5b: The relationship between a sense of immersion and attitude is significant in the user-platform interaction.
Sense of presence, subjective norms, and satisfaction	2.f: What is the relationship between a sense of presence, subjective norms, and	H6a. The relationship between a sense of presence and satisfaction is significant in the user-platform interaction.

	satisfaction for user-platform interactions in AR mobile platforms?	H6b: The relationship between subjective norms and satisfaction is significant in the user-platform interaction.
Sense of presence, subjective norm, and trust	2.g: What is the relationship between a sense of presence, subjective norm, and trust for user-platform interactions in AR mobile platforms?	H7a. The relationship between a sense of presence and trust is significant in the user-platform interaction. H7b: The relationship between subjective norms and trust is significant in the user-platform interaction.
Attitude, satisfaction, trust, and continuance intention	2.h: What is the relationship among attitude, satisfaction, trust, and continuance intention for user-platform interactions in AR mobile platforms?	H8. The relationship between attitude and continuance intention is significant in the user-platform interaction. H9: The relationship between satisfaction and continuance intention is significant in the user-platform interaction. H10: The relationship between trust and continuance intention is significant in the user-platform interaction.
Origin culture towards relationships	3.a: What are the moderating effects of origin culture on relationships among sources of information, perceived user experience, and continuance intention in AR mobile platforms?	H11: The origin culture significantly moderates the relationships among sources of information, UX, and continuance intention.
Age group towards relationships	3.b: What are the moderating effects of age groups toward relationships among sources of information, perceived user experience, and continuance intention in AR mobile platforms?	H12: The age group significantly moderates the relationships among sources of information, UX, and continuance intention.
Acculturated culture towards relationships	3.c: What are the moderating effects of acculturated culture toward relationships among sources of information, perceived user experience, and continuance intention in AR mobile platforms?	H13: The acculturated culture significantly moderates the relationships among sources of information, UX, and continuance intention.
Effects of socio-cultural factors on continuance Intention	4. a: What are the intervening effects of socio-cultural factors like origin culture, age group, and acculturated culture toward users' continuance intention to use AR mobile platforms?	H14: Socio-cultural factors like origin culture, age group, and acculturated culture positively influence users' continuance intention to use AR mobile platforms.
Effects of socio-demographic factors on continuance Intention	4. b: What are the intervening effects of socio-demographic factors like age, income level, and employment status on users' continuance intention to use AR mobile platforms?	H15: Socio-demographic factors like age, income level, and employment status positively influence users' continuance intention to use AR mobile platforms.

6.2 Discussion on Research Findings

After critical data analysis with both qualitative and quantitative approaches, this study reveals potential findings extending research in the information systems (IS) field. Also, this study identifies potential research outcomes in an emerging field of assessing user experience considering user-platform interactions in AR mobile platforms. In some points, the results are consistent with previous studies; however, some results complement and enhance the values of the existing knowledge in the UX research areas.

6.2.1 Findings on Mental Imagery

User-platform interactions with AR allow users to sketch mental imagery of a virtual product on mobile platforms. The findings from the Australian samples revealed that vividness and product fit affect users' mental imagery as a cognitive engagement. Hypotheses H1a and H1b argued that sources of information positively impact users' mental imagery using user-platform interactions in an AR environment. Importantly, vividness rather than product fit has more influence towards mental imagery in the AR context. It confirms that users from Australia perceived mental imagery after interacting with AR mobile platforms. Concerning emotional feelings, the findings show that perceived mental imagery influences users' attitudes after interacting with AR mobile platforms. Hypothesis H5a argued that the relationship between mental imagery and attitude is significant in AR.

6.2.2 Findings on Sense of Immersion

User-platform interactions with AR engage sensory information and allow users to perceive a sense of immersion in a virtual product in AR mobile platforms. The findings from the Australian samples revealed that vividness and interactivity affect sense of immersion as a cognitive engagement. Hypotheses H2a and H2b argued that sources of information positively impact users' sense of immersion using user-platform interactions in an AR environment. Conclusively, vividness rather than interactivity has the most influence on perceiving a sense of immersion. It confirms that users from Australia perceive a sense of immersion after interacting with AR mobile platforms. Concerning emotional feelings, the findings show that the perceived

sense of immersion influences the user's attitude after interacting with AR mobile platforms. Hypothesis 5b argued that the relationship between sense of immersion and attitude is significant in AR.

6.2.3 Findings on Sense of Presence

User-platform interactions through AR and virtual product placement in a desired physical space engage sensory information that allows users to perceive a sense of presence in AR mobile platforms. The findings from the Australian samples revealed that product fit and network quality affect the user's sense of presence as a cognitive engagement. Hypotheses H3a and H3b argue that sources of information positively impact a user's sense of presence through user-platform interactions in an AR environment. Notably, network quality rather than product fit has more influence in developing a sense of presence in AR. It confirms that users from Australia perceive a sense of presence after interacting with AR mobile platforms. Concerning emotional feelings, the findings show that a perceived sense of presence influences users' satisfaction after interacting with AR mobile platforms. Hypothesis 6a argued that the relationship between sense of presence and satisfaction is significant in AR.

6.2.4 Findings on Subjective Norm

External innovative sources of information engage social influences that allow a user to perceive subjective norms in AR mobile platforms. The findings from the Australian samples revealed that AI-driven recommendations and online reviews affect users' subjective norms as a cognitive engagement. Hypotheses H4a and H4b argued that sources of information positively impact users' subjective norms using user-platform interactions in an AR environment. Importantly, AI-driven recommendations rather than online reviews have more influence in perceiving subjective norms. It confirms that users from Australia perceive subjective norms after interacting with AR mobile platforms. Concerning emotional feelings, the findings show that perceived subjective norm influences users' satisfaction and trust after interacting with AR mobile platforms. Hypotheses H6b and H7b argued that the relationships among subjective norms, satisfaction, and trust are significant in AR.

6.2.5 Findings on Attitude

Perceived cognitive engagements influence users' emotional feelings in AR mobile platforms. The findings from the Australian samples revealed that mental imagery and sense of immersion affect the user's attitude as an emotional engagement. Hypotheses H5a and H5b argued that cognitive engagements positively impact users' attitudes using user-platform interactions in an AR environment. Findings showed that mental imagery rather than sense of immersion has more influence on developing users' attitudes. It confirms that attitude is developed for users from Australia as a consequence of perceived cognitive engagements in AR mobile platforms. Concerning behavioural response, the findings show that the developed attitude influences the user's continuance intention after interacting with AR mobile platforms. Hypothesis H8 argued that the relationship between attitude and continuance intention is significant in AR.

6.2.6 Findings on Satisfaction

Perceived cognitive engagements influence users' emotional feelings in AR mobile platforms. The findings from the Australian samples revealed that sense of presence and subjective norm affect user satisfaction as an emotional engagement. Hypotheses H6a and H6b argued that cognitive engagements positively impact user satisfaction using user-platform interactions in an augmented reality environment. Notably, subjective norms rather than sense of presence have more influence on satisfaction. It confirms that satisfaction is developed for users from Australia due to perceived cognitive engagements in AR mobile platforms. Concerning behavioural response, the findings show that the developed satisfaction influences the user's continuance intention after interacting with AR mobile platforms. Hypothesis H9 argued that the relationship between satisfaction is significant in AR.

6.2.7 Findings on Trust

Perceived cognitive engagements influence users' emotional feelings in AR mobile platforms. The findings from the Australian samples revealed that sense of presence and subjective norms affect user trust as an emotional engagement. Hypotheses H7a and H7b argued

that cognitive engagements positively impact users' trust using user-platform interactions in an augmented reality environment. Notably, sense of presence rather than subjective norms has more influence on trust. It confirms that trust is developed for users from Australia as a consequence of perceived cognitive engagements in AR mobile platforms. Concerning behavioural response, the findings show that the developed trust influences the user's continuance intention after interacting with AR mobile platforms. Hypothesis H10 argued that the relationship between trust and continuance intention is significant in AR.

6.2.8 User Experience (Cognitive, Emotional based) and Continuance Intention

Perceived user experience is explained through cognitive engagements that include mental imagery, sense of immersion, sense of presence, and subjective norm. The findings from the Australian samples revealed that perceived cognitive engagements affect users' attitudes, satisfaction, and trust as emotional engagements. Hypotheses H5a, H5b, H6a, H6b, H7a, and H7b argued that cognitive engagements positively impact users' emotional engagements/feelings using user-platform interactions in an AR environment. It confirms that emotional engagements are developed for users from Australia due to perceived cognitive engagements in AR mobile platforms. Notably, satisfaction has more influence than attitude and trust toward continuance intention. Concerning behavioural response, the findings showed that the developed attitude, satisfaction, and trust influence users' continuance intention after interacting with AR mobile platforms. Hypotheses H8, H9, and H10 argue that the relationships of attitude, satisfaction, and trust toward continuance intention are significant in the context of AR.

6.2.9 Effect of Origin Culture

Users' origin culture significantly moderates relationships among sources of information, perceived UX, and continuance intention in AR. Additionally, the origin culture positively influences users' continuance intention to use AR mobile platforms. The findings from the Australian samples revealed that the user's origin cultures have significant moderating effects on relationships and intervening effects on continuance intention in the context of AR. Hypothesis H11 argued that origin culture or ethnic background significantly moderates relationships and

positively impacts users' continuance intention using user-platform interactions in an AR environment. It confirms that continuance intention is impacted by the user's origin culture, considering the cultural dimensions of individualism and uncertainty avoidance. Notably, users from individualistic cultures with low uncertainty avoidance have more influence on continuance intention to use AR mobile platforms than collectivistic cultures with high uncertainty avoidance within Australia. Concerning behavioural response, the findings show that users from different ethnic backgrounds or origin cultures have different moderation effects toward relationships and influences on continuance intention after interacting with AR mobile platforms in a multicultural society.

6.2.10 Effect of Age Group

Users' age groups significantly moderate relationships among sources of information, perceived user experience, and continuance intention in AR. Additionally, users' behavioural intention is influenced by age group in a multicultural society. The findings from the Australian samples revealed that the user's age group has significant moderating effects on relationships and influences the development of continuance intention. Hypothesis H12 argued that age group significantly moderates relationships and positively impacts users' continuance intention using user-platform interactions in an augmented reality environment. It confirms that continuance intention is impacted by the user's age group/generation. Importantly, findings show that user groups with Generation Z have more influence towards continuance intention than those of Generation X and Millennials in AR environments. Concerning behavioural response, the findings show that users from different generations have different moderation effects toward relationships and influence on continuance intention after interacting with AR mobile platforms.

6.2.11 Effect of Acculturated Culture

Users' acculturated culture significantly moderates relationships among sources of information, perceived UX, and continuance intention in AR. Additionally, acculturated culture in a multicultural society influences users' behavioural intentions. The findings from the Australian samples revealed that the user's acculturated culture has significant moderating effects

on relationships and influences the developed continuance intention. Hypothesis H13 argued that acculturated culture through living periods in a host culture and attaining educational degrees from a host culture significantly moderates relationships. Also, users' acculturated culture positively impacts the user's continuance intention using user-platform interactions in an augmented reality environment. Concerning behavioural response, the findings show that users from different acculturated cultures have different moderation effects toward relationships and influence continuance intention after interacting with AR mobile platforms. Notably, users born in Australia and who have attained bachelor's degrees from Australian universities are mostly acculturated in the host culture, like in Australia, rather than other groups who live in Australia for a living period or attained different degrees from Australia or outside. Further, the results showed that the acculturated group, those born in Australia and who attained bachelor's degrees from Australian universities, significantly influenced continuance intention.

6.2.12 Effect of Socio-demographic Factors

Different socio-demographic factors may influence users' behavioural intentions in a multicultural society. The findings from the Australian samples revealed that the user's gender classification does not influence users' continuance intention. However, the findings also show significant influences of users' employment status and annual income levels on users' continuance intention to use AR mobile platforms. Conclusively, findings show more moderating effects on the relationship of satisfaction toward continuance intention than other relationships for self-employed and working full-time employees. Also, the findings reveal more significant intervening effects on the relationship of trust toward continuance intention than other relationships for working part-time employees. In the context of income level, the findings showed that the user group with an income level of 45,000 – 120,00 AUD has the most significant effect on their continuance intention compared to other groups of users.

6.3 Contribution and Implications of the Study

This thesis extracted valuable insights from participants' perceived UX regarding AR mobile platforms and identified critical immersive, innovative, and interactive sources of information as

stimulus cues and other organism factors. The study revisited the conceptual model through an iterative process, included identified factors, and re-framed hypotheses in the proposed I-E-I model. The results confirmed all constructs' reliability and the model's validity. Further, all the hypotheses were supported to establish the proposed model.

This study explains new information system (IS) knowledge on how user-platform interactions in AR engage users to perceive UX through cognitive and emotional engagements, influencing the decision-making process toward continuance intention. Based on the S-O-R framework, this study followed other relevant theories and models to develop the I-E-I model, which theorises sources of information as stimulus cues considering user-platform interactions that impact users' cognitive and emotional engagements, resulting in behavioural responses. In this study, vividness, interactivity, product fit, network quality, AI-driven recommendation, and online review were identified as sources of information in the context of AR environments.

The proposed model extends the theoretical implications by adopting cognitive engagements incorporating mental imagery, sense of immersion, sense of presence, and subjective norm. We followed the Schema theory, the Flow theory, the Situated Cognition theory, and the theory of Planned Behaviour to explain the process of perceiving cognitive engagements that define organisms in the SOR framework more appropriately in the context of AR environments. The model included attitude, satisfaction, and trust as emotional engagements to explain the confirmation of expectations through virtual realism, followed by the Theory of Planned Behaviour, the Expectation-Confirmation theory, and the Trust Technology model. The emotional engagements supported the model in assessing the users' emotional feelings as consequences of perceived cognitive engagements. It theorises a more robust and effective way to investigate the perceived UX through user-platform interactions in an AR environment. Finally, the study incorporated continuance intention as a behavioural response in the model to address the user retention process. The influences of perceived user experience on behavioural response through organism variables were examined to provide evidence of cognitive and emotional assessments that influence consumers' continuance intention.

The study explains that cognitive engagements through perceived mental imagery, sense of immersion, sense of presence, and subjective norms develop users' attitudes, satisfaction, and trust in emotional engagements. These are positive and significant factors that influence users' continuance intention to use AR mobile platforms. Continuing the previous studies, our findings supported that the impact of perceived cognitive (Kumar et al., 2023) and emotional values (Sany et al., 2023) influences continuance intention, which provides evidence for the importance of investigating users' immersive perceptions with user-platform interactions toward AR applications. Online shopping benefits through interactive AR mobile platforms are exposed in this study as an integral part of marketing and information system research fields 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 the AR mobile platform perspective (Barta et al., 2023).

In the context of processing sensory information through multi-modal user-platform interactions with AR, this study confirms that the correlations among mental imagery, sense of immersion, sense of presence, subjective norm, attitude, satisfaction, and trust are consistent with the previous research findings (Cheng et al., 2023; Wang et al., 2021). This study identifies the user-platform interaction-based sources of information as stimulus cues for assessing UX through perceived cognitive engagements and explains the development process of users' attitudes, satisfaction, and trust as a new way of understanding user experience from cognitive and emotional viewpoints. The I-E-I model enhanced the theoretical framework to investigate UX through situated and immersive values and its consequences toward the user's continuance intention to address the user retention process. The results reflected the same outcome and are consistent with previous research that the emotional engagements of attitude, satisfaction, and trust influence users' intention to use AR mobile platforms (Nguyen, 2021; Ameen et al., 2021). Attitude, satisfaction, and trust were found to mediate the causal relationships of mental imagery, sense of immersion, sense of presence, and subjective norms towards continuance intentions. Therefore, to ensure user retention through perceived cognitive and emotional engagements by

alleviating uncertainty and the need to touch the products, UX researchers, designers and app developers should focus on technological adoption and complements to provide user comfort.

This study determined four cognitive variables to present evidence as a claim that users respond to user-platform interactions-based sources of information and co-create values through cognitive engagements. Also, this study examined three emotional variables to complement users' emotional reactions. Users perceive UX through these perceived cognitive and emotional engagements, consequently influencing users' continuance intention to use AR mobile platforms. The results show the significance of understanding how user-platform interactions in AR provide immersive and situated experiences for users and impact their behavioural intention to continue using mobile platforms as an extension of sustainable growth of the platform economy. On the contrary, users might get a more immersive and interactive environment through user-platform interactions and prefer to interact with AR mobile platforms. The results showed that users' attitude, satisfaction and trust levels increase cognitive values.

This study affirms that mental imagery has more influence on users' attitudes, whereas sense of presence has more influence on users' satisfaction and trust. Also, the study suggests that satisfaction has more impact on users' continuance intention to use AR mobile platforms. The study also confirms that interactivity has a positive influence towards satisfaction. Trust and continuance intention are indirect effects. Also, the findings show that subjective norms and a sense of presence have a positive influence towards continuance intention.

This study affirms that origin culture significantly moderates relationships among sources of information, perceived UX, and continuance intention in an AR environment. Even so, the results suggest that origin culture considering pair groups between individualistic backgrounds, individualistic and collectivistic, and between collectivistic backgrounds significantly moderates relationships developed in the I-E-I model. The results confirm that age group/generation significantly moderates relationships. Further, pair groups like Generation Z and Generation X, Generation Z and millennials, and Generation X and millennials show significant invariance in the relationships. Additionally, acculturated culture through living periods in Australia and

attaining educational degrees in Australian educational institutions significantly moderates the relationships.

This study identified the effects of socio-cultural factors and revealed the significant influences on users' continuance intention to use AR mobile platforms. The results affirm that users' origin culture, including individualism and collectivism, significantly moderates the relationships developed in the proposed model. Further, the study suggests that origin cultures of individualistic backgrounds with relatively low uncertainty avoidance have more influence on continuance intention than those from collectivistic backgrounds with high uncertainty avoidance in an AR environment. In another context, this study showed that users' age group/generation significantly moderates relationships. Generation Z has more significant effects on continuance intention than Generation X and Millennials.

Furthermore, findings affirm that acculturated culture significantly influences users' continuance intention in AR. This study defines acculturated culture through staying/living periods in Australia and educational background/attending educational institutes in Australia. Notably, users born in Australia have more influence on their continuance intention to use AR mobile platforms. Also, AR significantly influences users with bachelor's degrees from Australian educational institutes.

This study uniquely developed a research model that considers user-platform interactions-based sources of information as stimulus cues that influence continuance intention through perceived cognitive and emotional engagements. The findings of this study involve both theoretical and practical implications.

This study also investigated the effects of independent variables like gender, employment status, and annual income level on users' continuance intention to use AR mobile platforms. The findings confirm that gender status does not influence users' continuance intention. The results indicate that employment status with self-employed and working full-time employees moderates mainly on the relationship of satisfaction toward continuance intention. Further, the findings

reveal that the employment status of part-time employees is moderated mainly by the relationship of trust toward continuance intention rather than other relationships. In the context of income level, the findings affirm that the user group with an annual income level of 45,000 – 120,00 AUD has the most significant effect on their continuance intention compared to other groups of users.

6.3.1 Theoretical Contributions

This thesis sheds extensions on how augmented reality enhances UX and its consequences on users' behavioural responses. The study explained how AR-oriented sources of information impact mental imagery, sense of immersion, sense of presence, and subjective norm. The thesis proposed the model to explain the cognitive and emotional engagements from the sources of information in AR, subsequently influencing continuance intention to use AR mobile platforms. It also affirms that emotional feelings through attitude, satisfaction, and trust mediate the effects of perceived cognitive engagements towards users' continuance intention.

This study contributes to the theoretical understanding of perceived UX by considering user-platform interactions in AR mobile platforms, identifying and validating cognitive and emotional engagements, and investigating their impacts on users' continuance intention. Although some of those variables have been determined in other contexts, this study extended to empirical evidence of their applicability with user-platform interactions in the AR mobile platform context. The proposed model theorises the development of UX in AR by highlighting the roles of mental imagery, sense of immersion, sense of presence, subjective norm, attitude, satisfaction, and trust toward continuance intention. The thesis extended the theoretical implications by adopting cognitive and emotional engagements towards behavioural intentions. The findings confirm the significance of the relationships between cognitive and emotional engagements, extending the value of co-creation in perceiving UX through user-platform interactions in AR environments.

The current literature investigates the effects of AR on UX, considering either purchase intention (Barta et al., 2023) or continuance intention (Nikhashemi et al., 2021; Qin et al., 2021). This study identified user-platform interactions-based sources of information as stimulus cues.

Further, it extended the knowledge by examining both users' cognitive and emotional engagements that support the assessment of immersive and situated experiences. User-platform interactions are considered a paradigm for creating more value in AR mobile platforms to develop users' interaction capabilities and co-create immersive engagement toward continuance intention to avoid product uncertainty and physically touch the products (Sun et al., 2022). Consistent with prior literature, this study extends to explain the process of perceiving UX by interacting with AR mobile platforms through cognitive and emotional engagements, influencing behavioural responses as an extension of describing the user retention process in the platform economy.

The proposed model included multiple perspectives in determining the effects of user-platform interactions in perceiving user experience through cognitive engagements (Kumar et al., 2023). We incorporated emotional engagements to explain the confirmation of users' expectations after interacting with AR mobile platforms. The proposed model considered continuance intention as a behavioural response that supported the assessment of user retention. Therefore, the model gives a rich proposition with the user-platform interaction paradigm toward AR mobile platforms, extending previous research that emphasised either immersive, technological, socio-cultural, or psychological factors. Finally, this study validated the importance of including user-platform interactions-based constructs in AR, followed by the S-O-R framework and other relevant theories to define cognitive and emotional engagements (Jessen et al., 2022) to construct the I-E-I model. This explains that users' decision-making process in AR, considering user-platform interactions, is challenging in assessing UX and its extension to relate with users' behavioural responses.

This study uniquely theorised the moderation effects of origin culture, age group, and acculturated culture on relationships among sources of information, perceived UX, and continuance intention in an AR environment. The inclusiveness of sociocultural effects through value propositions was explained in the research model, considering the AR perspective. The model extended the theoretical lenses in information system engineering, human science,

cognitive psychology, marketing, and business management, which proposed a comprehensive understanding of perceiving UX with the effects of socio-cultural values.

6.3.2 Methodological Contributions

After extracting critical factors, the study framed a conceptual model followed by the SOR paradigm and relevant theories and developed hypotheses. This study designed a mixed methodological approach to extend the UX assessment process in the context of AR mobile platforms. The study applied focus group interviews as a qualitative method to fit an emerging field of study and identified critical stimulus factors considering AR characteristics. The qualitative method applied a reflexive thematic data analytical technique to get valuable insights in an AR environment. An online survey was chosen to collect quantitative data, confirm the reliability and validity of constructs and test the hypotheses through a PLS-SEM technique. Additionally, the study designed an innovative way of analysing the multigroup analysis (MGA) for more than two groups by introducing pair-group analysis following the permutation multigroup analysis.

6.3.3 Managerial Implications

Practically, this study guides developers and designers in optimising AR mobile platforms to enhance UX and drive continued engagement. Marketers can leverage the study's findings to develop targeted marketing strategies that appeal to different demographic segments, particularly Generation Z. Emphasising trust-building initiatives, formation of attitudes, and leveraging satisfaction can shape users' perceptions and foster continued usage. Companies operating AR mobile platforms can focus on incorporating AR technology to enhance user comfort and feedback mechanisms to address user preferences, build trust, and improve overall satisfaction. Product presentation, recommendation loops, network qualities, and transparent communication channels can contribute to continuous improvement and users' intention to use AR mobile platforms. Additionally, insights from the potential generation effects on user behaviour suggest that online retailers can plan to expand their AR platforms globally and should consider nuances

on generation gaps in their strategies. Tailoring UX to different age groups can enhance market penetration and user retention in diverse groups. Immersive shopping benefits are shown to be essential considerations in IS research to extend virtual marketing strategies by alleviating product uncertainty and the need for touch.

UX with AR mobile platforms can provide comfort where perceived cognitive and emotional engagements influence continuance intention. Augmented reality engages immersive characteristics, interactive features, and social influences in mobile platforms, which involve innovative sources of information. In other words, network quality is essential in providing uninterrupted immersive services through AR mobile platforms. In AR, UX comes with mental images, situated presence, and social influences with virtual interactions that persuade users' emotional feelings through attitude, satisfaction, and trust. Subsequently, these emotional engagements impact users' continuance intention. Retailers could understand augmented reality's cognitive and emotional effects on platform usage and extend those product virtualisations to the user retention process. For example, the IKEA AR mobile app supports users in viewing 3D products with immersive values, interacting with virtual products, locating and scaling measurements, and engaging deeply in a situated environment. Therefore, designers and app developers require an integrated UX model to understand how users respond to immersive technologies through perceived user experience in the product development cycle.

Moreover, perceived UX through cognitive and emotional engagements is an essential consideration in the proposed model. This study explains the correlations of how users perceive positive UX with the increased value of mental imagery, sense of immersion, sense of presence, and subjective norm that consequently develop higher attitudes and satisfaction levels by building positive trust towards the AR mobile platforms. It subsequently influences users' continuance intention to use AR mobile platforms. Therefore, retailers and app developers shall extend their analytical capacity to understand users' flow of experiences and make more immersive engagement with user-platform interactions to provide optimum levels of comfort and accommodate user preferences.

Finally, value propositions from users of different origin cultures, age groups, and acculturated cultures with the moderation effects on different relationships and influences on continuance intention are essential considerations in designing UX, product development, preparing business models, and promoting marketing strategies. Nowadays, all mobile platform owners are accommodating augmented reality into their applications to provide immersive UX. This study's research outcomes and valuable insights could guide UX researchers, developers, business promoters, marketing professionals, and solution providers to understand how cultural traits and age group affect users on technology adoption to continue using technological platforms in a multicultural society

6.3.4 Technological Implications

This study explored UX in immersive technologies and their implications for decision-making. Value co-creation through augmented reality in the platform industry was realised. Further, the study explored virtual realism through technological adoption toward continuance intention to use AR mobile platforms. The study identified immersive capabilities to engage user-platform interactions in an AR environment. This research demonstrated the effective use of AR for interactive mobile applications, setting a foundation for assessing UX as an emerging study and implementation in related fields. It expanded the understanding of AR capabilities in user-platform interactions with a detailed explanation of constructs, relationships, and the benefits of adopting cognitive and emotional engagements.

6.4 Limitations and Future Research

The focus on a specific AR platform, the IKEA app, may limit the generalizability of findings. Although few mobile platforms accommodated AR technology into their applications or responsive websites, there were some limitations not conducting case studies other than IKEA: (i) Only IKEA has given consent to conduct research considering their platform and online IKEA users, (ii) Other AR mobile platform like Sephora has a particular subscriber base with gender orientation, and (iii) true-to-scale measurement feature was necessary for this study that could

measure users' perceptions towards situated experience. This study used IKEA as an extreme case to accommodate users from different age groups and cultures to investigate the cultural effects.

Despite providing an option to interact with an AR mobile platform to get service features, there is a limitation on user capabilities to adopt immersive technologies. Further, this study extended a new research phenomenon that might have heterogeneous effects on the results. Concerning the small samples from a portion of the demography that could not approach a homogenous number of user groups from different origin cultures within Australia, the generalisability of the study might be limited.

This study used a limited sample for qualitative and quantitative analysis, and few were unfamiliar with AR interactions using mobile platforms. Moreover, this study could collect controlled data from homogenous samples considering origin cultures, age groups, and income levels. However, the research could collect experimental data through laboratory or usability testing as an extension of the qualitative data collection method, considering the emerging nature of the study.

Concerning the limited number of respondents who interact with AR-based mobile platforms, this study does not claim that the findings can apply to only some of the spectrum of virtual platforms. Future research could address these limitations by collecting more extensive and versatile samples, using objective measurement scales, exploring different AR mobile platforms with other industrial contexts, and considering cross-cultural influences.

Researchers and industry professionals can extend their research collaboration to get valuable insights and predictive intelligence by applying the I-E-I model for different industries like health, tourism, education, retail, and gaming in the context of virtual interactions. 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 understanding of the perceived UX and their relevance to impulse buying or continuance intention in AR mobile platforms.

Further research can be explored to assess cumulative UX by investigating continuous engagements of users over a long period with an augmented reality (AR)/virtual reality (VR)/extended reality (XR) environment. UX assessment can be extended to an extended reality or metaverse environment, where different senses of information, like the sense of sound, sense of smell, and sense of taste, would be accommodated in a platform. The proposed model can be validated considering the senses of information in an environment. In future, the research can include other stimulus factors related to the sense of information and how users react to those sources of information. Future research can be extended by considering digital transformation through brain-computer interaction, IoT, Metaverse, extended reality, interventions, AI, and big data analytics. Moreover, the samples may be collected from users using AR for a long time to assess cumulative UX. Also, this research can be extended to assess UX in the product design life cycle from the low-fidelity prototype to the high-fidelity prototype stage. Even so, the proposed methodological approach can be applied in the UX design field from different aspects.

6.5 Conclusions

In conclusion, UX was explored through user-platform interactions in an AR mobile platform environment. The effects of sources of information with AR towards cognitive and emotional engagements and correlations with continuance intention are investigated. The study shows how origin culture, age group, and acculturated culture influence relationships among sources of information, UX, and continuance intention.

This thesis unfolded how AR provides co-created values to users through user-platform interactions and involves cognitive engagements through mental imagery, sense of immersion, sense of presence, and subjective norm. Consequently, these perceived cognitive states develop users' attitudes, satisfaction, and trust, influencing their intention to use AR mobile platforms.

This study investigates the effects of origin culture, age group, and acculturated culture towards continuance intention to use AR mobile platforms in a multicultural society like Australia. In practice, the study explains the UX assessment in AR mobile platforms that involve

user context, platform capabilities, socio-cultural values, network qualities, and social recommendations—conducted focus group interviews to determine critical factors.

The UX is crucial for IS researchers, and this study explains the consequences of perceived UX on continuance intention as user retention to achieve sustainable growth of AR mobile platforms in the e-commerce industry toward users' continuance intention. As a sustainable growth in the retail sector, user-platform interactions with augmented reality engage in immersive and interactive experiences, and this study confirms the significance of examining the consequences of user-platform interactions in AR and its effects on continuance intention.

This research and theoretical and methodological contributions will inspire exploratory approaches to new knowledge. Product uncertainty and the need for touch may be the obstacles to retaining online platforms that could prevent much of this scholarly research outcome for user-platform interactions in AR. The study extends to upholding the transformative way of assessing UX through user-platform interactions for an interactive AR environment.

6.6 Summary

In this chapter, findings were discussed by analysing the research findings. Also, the chapter explained the theoretical and practical implications of this study. Furthermore, limitations and future directions to extend research, considering the research phenomenon, were presented, along with a conclusion.

RECENT STUDIES

A recent study developed a framework to link user expectations and perceived user experience for AR fashion apps, following a triangulation qualitative approach to identify critical features that influence customer behaviour (Davis & Aslam, 2024). A progression towards the UX study explores the multimodal sensory sensation through tactile and kinesthetic interactions, adopting affective and cognitive responses toward behavioural responses (Chen et al., 2024; Nawres et al., 2024). However, extending the research by experimenting with commercialised products may consider interaction capabilities with tactile, olfactory, and kinesthetic technologies. Further, Hsu argued that the immersive characteristics of AR may trigger users towards impulse buying, following the SOR framework (Hsu et al., 2024). Therefore, multimodal interactions with new dimensions engage more sources of information that influence user experience. In another context, the research may include the influences of social interactions that significantly affect users' repurchase intention when users receive product reviews by surfing blogs or review sites through social networking sites (Suri et al., 2023).

Recent literature studies on assessing UX in the metaverse on how extended reality (XR), in combination with virtual reality (VR) and AR, influences immersive experience through interaction and acceleration effects (Chen et al., 2023). Similarly, it is suggested that interactions with the metaverse as a futuristic platform influence UX through trust, brand knowledge, and engagements that subsequently impact purchase intention (Payal et al., 2024). A research interest in adopting artificial intelligence (AI) and the versatile use of generative AI to enhance recommendations or personalisation toward user experience is an emerging area where organisational or individual-level user experience study can be extended (Gupta et al., 2024).

REFERENCES

ABS Census Report (2022a). Cultural diversity: Census. Australian Bureau of Statistics. https://www.abs.gov.au/statistics/people/people-and-communities#:~:text=Top%205%20ancestries%20were%20English, Hinduism%20(2.7%20per%20cent).

Acharya, N., Sassenberg, A.-M., & Soar, J. (2023). The Role of Cognitive Absorption in Recommender System Reuse. Sustainability (Basel, Switzerland), 15(5), 3896–. https://doi.org/ 10.3390/su15053896.

Adel, A. M., Dai, X., & Roshdy, R. S. (2022). Investigating consumers' behavioural intentions toward suboptimal produce: an extended theory of planned behaviour – a cross-cultural study. British Food Journal (1966), 124(1), 99–139. https://doi.org/10.1108/BFJ-03-2021-0211.

Adeola, A., Olayemi, T., & Opeyemi, S. (2020). Digital Natives: A Study of the Generation Z and Their Digital Interaction Patterns. Journal of Contemporary Media Studies, 12(3), 45-67.

Ajzen, I. (1980). Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Ajzen, I. (1991). The Theory of Planned Behavior, Organizational Behavior and Human Decision Processes, 50, 1, 179–211.

Alcántara-Pilar, J. M., & Del Barrio-García, S. (2015). Antecedents of attitudes toward the website: The moderating role of long-term orientation and individualism. Cross Cultural Management, 22(3), 379–404. https://doi.org/10.1108/CCM-04-2014-0044.

Alimamy, S., & Gnoth, J. (2022). I want it my way! The effect of perceptions of personalisation through augmented reality and online shopping on customer intentions to co-create value. Computers in Human Behavior, 128, 107105-. https://doi.org/10.1016/j.chb.2021.107105.

Ålund, A. (1999). Ethnicity, multiculturalism and the problem of culture. European Societies, 1(1), 105–116. https://doi.org/10.1080/14616696.1999.10749927.

Allen, S., C. (2007). Likert scales and data analyses Quality Progress, 40, 64.

Al-Adwan, Al-Debei, M. M., & Dwivedi, Y. K. (2022). E-commerce in high uncertainty avoidance cultures: The driving forces of repurchase and word-of-mouth intentions. Technology in Society, 71, 102083–. https://doi.org/10.1016/j.techsoc.2022.102083.

Al Amin, M. (2022). The Influence of Psychological, Situational and Interactive Technological Feedback-Related Variables on Customers' Technology Adoption to Use Online Shopping Applications. Journal of Global Marketing, 35(5), 384–407. https://doi.org/10.1080/08911762. 2022.2051157.

Ameen, Tarhini, A., Shah, M. H., & Nusair, K. (2021). A cross-cultural study of gender differences in omnichannel retailing contexts. Journal of Retailing and Consumer Services, 58, 102265–. https://doi.org/10.1016/j.jretconser.2020.102265.

Annual Retail Trade Survey: 2020 and 2021, US Census 2022, https://www.census.gov/library/visualizations/interactive/arts-2020-2021.html.

Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., MacIntyre, B., 2001. Recent advances in augmented reality. IEEE Comput. Graph. Appl. 21 (6), 34–47. https:// doi.org/10.1109/38.963459.

Azungah, T. (2018). Qualitative research: deductive and inductive approaches to data analysis. Qualitative Research Journal, 18(4), 383–400. https://doi.org/10.1108/QRJ-D-18-00035.

Balakrishnan & Dwivedi, Y. K. (2021). Role of cognitive absorption in building user trust and experience. Psychology & Marketing, 38(4), 643–668. https://doi.org/10.1002/mar.21462.

Barta, S., Gurrea, R., & Flavián, C. (2023). Using augmented reality to reduce cognitive dissonance and increase purchase intention. Computers in Human Behavior, 140, 107564. https://doi.org/10.1016/j.chb.2022.107564.

Belanche, Casaló, L. V., & Flavián, C. (2019). Artificial Intelligence in FinTech: understanding robo-advisors adoption among customers. Industrial Management + Data Systems, 119(7), 1411–1430. https://doi.org/10.1108/IMDS-08-2018-0368.

Beldad, A. D., & Hegner, S. M. (2018). Expanding the Technology Acceptance Model with the Inclusion of Trust, Social Influence, and Health Valuation to Determine the Predictors of German Users' Willingness to Continue using a Fitness App: A Structural Equation Modeling Approach. International Journal of Human-Computer Interaction, 34(9), 882–893. https://doi.org/10.1080/10447318.2017.1403220.

Berry, J.W. (1997). Immigration, acculturation, and adaptation. Applied Psychology, 46(1), 5–34. doi:10.1111/j.1464-0597.1997.tb 01087.x.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. Management Information Systems Quarterly, pp. 25, 351–370. https://doi.org/10.2307/3250921.

Billewar, J., K., S., V., A., D. A., M. A., S., G., K., & Bhasin, D. N. K. K. (2022). The rise of 3D E-Commerce: online shopping gets real with virtual and augmented reality during COVID-19. World Journal of Engineering, pp. 19, 244–253. https://doi.org/10.1108/WJE-06-2021-0338.

Bimber, O., & Raskar, R. (2005). Spatial Augmented Reality: Merging Real and Virtual Worlds. CRC Press.

Bonetti, P., E., W., G., & Quinn, L. (2019). Augmenting reality: fusing consumers' experiences and interactions with immersive technologies in physical retail settings. International Journal of Technology Marketing, pp. 13, 260–284. https://doi.org/10.1504/IJTMKT.2019.104592.

Braun, V., Clarke, V.: Reflecting on reflexive thematic analysis. Qual. Res. Sport Exerc. Health 11(4), 589–597 (2019). https:// doi. org/ 10. 1080/ 21596 76X. 2019. 16288 06.

Braun, V., Clarke, V., Hayfield, N., Davey, L., Jenkinson, E. (2022). Doing Reflexive Thematic Analysis. In: Bager-Charleson, S., McBeath, A. (eds) Supporting Research in Counselling and Psychotherapy. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-13942-0_2.

Caboni, H., J. (2019). Augmented reality in retailing: a review of features, applications and value. International Journal of Retail & Distribution Management, 47, 1125-1140. https://doi.org/10.1108/IJRDM-12-2018-0263.

Cabrera-Sánchez, J. P., Ramos-De-luna, I., Carvajal-Trujillo, E., & Villarejo-Ramos, Á. F. (2020). Online recommendation systems: Factors influencing use in E-commerce. Sustainability, 12(21), 1–15. https://doi.org/10.3390/su12218888.

Cao, J., Lam, K.-Y., Lee, L.-H., Liu, X., Hui, P., & Su, X. (2023). Mobile Augmented Reality: User Interfaces, Frameworks, and Intelligence. ACM Computing Surveys, 55(9), 1–36. https://doi.org/10.1145/3557999.

Cavanaugh, J. C., & Sanguinetti, J. (2002). The role of mental imagery in product evaluation: A focus on consumer preferences. Journal of Consumer Research, 29(3), 437-450.

Chandler, T., Richards, A.E., Jenny, B. (2022). Immersive landscapes: modelling ecosystem reference conditions in virtual reality. Landsc Ecol 37, 1293-1309. https://doi.org/10.1007/s10980-021-01313-8.

Chauhan, Kumar, P., & Jaiswal, M. (2022). A meta-analysis of M-commerce continuance intention: moderating impact of culture and user types. Behaviour & Information Technology, 41(13), 2905–2923. https://doi.org/10.1080/0144929X.2021.1960607.

Chatterjee, S., Chaudhuri, R., Vrontis, D., & Thrassou, A. (2022). The influence of online customer reviews on customers' purchase intentions: a cross-cultural study from India and the UK. International Journal of Organizational Analysis (2005), 30(6), 1595–1623. https://doi.org/10.1108/IJOA-02-2021-2627.

Cheah, J.-H., Amaro, S., & Roldán, J. L. (2023). Multigroup analysis of more than two groups in PLS-SEM: A review, illustration, and recommendations. Journal of Business Research, 156, 113539-. https://doi.org/10.1016/j.jbusres.2022.113539.

Chen, C., Zhang, K. Z. K., Chu, Z., & Lee, M. (2024). Augmented reality in the metaverse market: the role of multimodal sensory interaction. Internet Research, 34(1), 9–38. https://doi.org/10.1108/INTR-08-2022-0670.

Chen, S. C., & Shari S.C. Shang. (2021). Sustaining User Experience in a Smart System in the Retail Industry. Sustainability, p. 13. https://doi.org/10.3390/su13095090.

Chunhua Sun, Y. F., Meng Kong, Xiayu Chen, Yezheng Liu. (2022). Influence of augmented reality product display on consumers' product attitudes: A product uncertainty reduction perspective. Journal of Retailing and Consumer Services, 64(102828). https: //doi.org/ 10.1016/ j. jretconser.2021.102828.

Chylinski, H., J., Hilken, T., Keeling, D. I., Mahr, D., & de Ruyter, K. (2020). Augmented reality marketing: A technology-enabled approach to situated customer experience. Australasian Marketing Journal, 28, 374-384. https://doi.org/10.1016/j.ausmj.2020.04.004.

Clarinda Rodrigues & Amélia Brandão (2021). Measuring the effects of retail brand experiences and brand love on word of mouth: a cross-country study of IKEA brand, The International Review of Retail, Distribution and Consumer Research, 31:1, 78-105, DOI: 10.1080/09593969.2020.1768577.

Coves-Martínez, Sabiote-Ortiz, C. M., & Frías-Jamilena, D. M. (2023). How to improve travel-app use continuance: The moderating role of culture. Tourism Management Perspectives, 45, 101070–. https://doi.org/10.1016/j.tmp.2022.101070.

Cramer-Flood E. (2022). Global Ecommerce Forecast 2022. https://www-emarketer-com.ezproxy.lib.ryerson.ca/content/global-ecommerce-forecast-2022.

Creswell, J. W., & Creswell, J. D. (2023). Research design: qualitative, quantitative, and mixed methods approaches (Sixth edition.). SAGE Publications, Inc.

Csikszentmihalyi, M. (1997). Finding flow: the psychology of engagement with everyday life (1st ed.). Basic Books.

Daassi, M., & Debbabi, S. (2021). Intention to reuse AR-based apps: The combined role of the sense of immersion, product presence and perceived realism. Information & Management, 58(4), 103453–. https://doi.org/10.1016/j.im.2021.103453.

David, A., Senn, W. D., Peak, D. A., Prybutok, V. R., & Blankson, C. (2021). The value of visual and service quality to augmented reality enabled mobile shopping experience. The Quality Management Journal, 28(3), 116–127. https://doi.org/10.1080/10686967.2021.1920868.

Davis, L., & Aslam, U. (2024). Analyzing consumer expectations and experiences of Augmented Reality (AR) apps in the fashion retail sector. Journal of Retailing and Consumer Services, 76, 103577-. https://doi.org/10.1016/j.jretconser.2023.103577.

Dang, & Raska, D. (2022). A systematic review of national cultures and their impact on electronic word of mouth. International Marketing Review, 39(5), 1182–1225. https://doi.org/10.1108/IMR-12-2020-0316.

Dargan, S., Bansal, S., Kumar, M., Mittal, A., & Kumar, K. (2023). Augmented Reality: A Comprehensive Review. Archives of Computational Methods in Engineering, 30(2), 1057–1080. https://doi.org/10.1007/s11831-022-09831-7.

Dey, B. L., Alwi, S., Yamoah, F., Agyepong, S. A., Kizgin, H., & Sarma, M. (2019). Towards a framework for understanding ethnic consumers' acculturation strategies in a multicultural environment: A food consumption perspective. International Marketing Review, 36(5), 771–804. https://doi.org/10.1108/IMR-03-2018-0103.

Dirin, A., & Laine, T. H. (2018). User experience in mobile augmented reality: Emotions, challenges, opportunities and best practices. Computers (Basel), 7(2), 33–. https://doi.org/10.3390/computers7020033.

Djafarova, E., & Trofimenko, O. (2021). Social Media Influence on Identity Formation among Generation Z. Journal of Social Media Studies, 8(2), 112-129.

Elsharnouby, T. H., & Maher, A. A. (2023). Local consumer well-being in a multicultural marketplace: From conflict to engagement. International Journal of Consumer Studies, 47(4), 1397–1415. https://doi.org/10.1111/ijcs.12916.

Ericsson. (2022). The internet of senses. https://www.ericsson.com/en/reports-and-papers/ consumerlab/ reports/10-hot-consumer-trends-2030 – The internet of senses.

Fan, Chai, Z., Deng, N., & Dong, X. (2020). Adopting augmented reality in online retailing and consumers' product attitude: A cognitive perspective. Journal of Retailing and Consumer Services, 53, 101986–. https://doi.org/10.1016/j.jretconser.2019.101986.

Faqih. (2022). Factors influencing the behavioural intention to adopt a technological innovation from a developing country context: The case of mobile augmented reality games. Technology in Society, p. 69, 101958–. https://doi.org/10.1016/j.techsoc.2022.101958.

Feng, & Mueller, B. (2019). The State of Augmented Reality Advertising Around the Globe: A Multi-Cultural Content Analysis. Journal of Promotion Management, 25(4), 453–475. https://doi.org/10.1080/10496491.2018.1448323.

Fiona Keegan, E. L. R. a. N. S. (2022). The Changing Landscape of Consumerism – Advancing the SOR Framework of Stimuli that Encourages Impulsive Online Consumption (P. et al., Ed.). Emerald Publishing Limited. http://ebookcentral.com/lib/uts/detail.action?docID=6484569.

Fishbein, M., and Ajzen, I. (1975). Belief, attitude, intention and behaviour: An introduction to theory and research. Reading, MA: Addison-Wisely.

Foroudi, P., Marvi, R., & Kizgin, H. (2020). THE OTHERS: The role of individual personality, cultural acculturation, and perceived value towards a firm's social media and acculturation orientation. International Journal of Information Management, 52, 102075–17. https://doi.org/10.1016/j.ijinfomgt.2020.102075.

Frederick F. Reichheld. (2001). Loyalty rules: How Today's Leaders Build Lasting Relationships. Harvard Business School Press. https://store.hbr.org/product/loyalty-rules-how-today-s-leaders-build-lasting-relationships/6870?srsltid.

Gartner. (2023). Hype Cycle for Customer Experience Analytics & Management, 2023.

Gefen, D. (2000). The Role of Perceived Ease of Use and Perceived Usefulness in the Acceptance of E-Commerce Technology. Journal of E-Commerce Research, 1(1), 24–36.

Giannopulu, I., Brotto, G., Lee, T. J., Frangos, A., & To, D. (2022). Synchronised neural signature of creative mental imagery in reality and augmented reality. Heliyon, 8(3), e09017-. https://doi.org/10.1016/j.heliyon.2022.e09017.

Global mobile app usage report 2023, Statista, https://www.statista.com/statistics/1401281/app-global-downloads/.

Goel, P., Garg, A., Sharma, A., & Rana, N. P. (2023). Impact of Sensory Perceptions on the Urge to Buy Impulsively. The Journal of Computer Information Systems, ahead-of-print(ahead-of-print), 1–17. https://doi.org/10.1080/08874417.2023.2224748.

Goti, A., Querejeta-Lomas, L., Almeida, A., de la Puerta, J. G., & López-de-Ipiña, D. (2023). Artificial Intelligence in Business-to-Customer Fashion Retail: A Literature Review. Mathematics (Basel), 11(13), 2943-. https://doi.org/10.3390/math11132943.

Greenberg, D. L., & Verbrugge, R. R. (1983). Mental Imagery and Schema Theory. Journal of Experimental Psychology: Human Learning and Memory, 9(4), 604-614.

Growe, A. (2019). Developing trust in face-to-face interaction of knowledge-intensive business services (KIBS). Regional Studies, 53(5), 720–730. https://doi.org/10.1080/00343404.2018.1473567.

Grubert, J. (2021). Mixed Reality Interaction Techniques. arXiv.Org. https://doi.org/10.48550/arxiv.2103.05984.

GSMA. (2023). The mobile economy report 2023, GSMA. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-economy/wp-content/uploads/2023/03/270223-The-Mobile-Economy-2023.pdf.

Gupta, R., Nair, K., Mishra, M., Ibrahim, B., & Bhardwaj, S. (2024). Adoption and impacts of generative artificial intelligence: Theoretical underpinnings and research agenda. International Journal of Information Management Data Insights, 4(1), 100232-. https://doi.org/10.1016/j.jjimei.2024.100232.

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. (2014). Partial least squares structural equation modelling (PLS-SEM): An emerging tool in business research. European Business Review, 26(2), 106–121. doi:10.1108/EBR-10-2013-0128.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A primer on partial least squares structural equation modeling (PLS-SEM) (Third edition.). SAGE Publications, Inc.

Hassenzahl M, D. S., Göritz A (2010). Needs, affect, and interactive products—facets of user experience. Interact Compute 22, 353-262.

Hazarika, A., & Rahmati, M. (2023). Towards an Evolved Immersive Experience: Exploring 5G- and Beyond-Enabled Ultra-Low-Latency Communications for Augmented and Virtual Reality. Sensors (Basel, Switzerland), 23(7), 3682-. https://doi.org/10.3390/s23073682.

Heider, F. (1946). Attitudes and cognitive organisation. The Journal of Psychology, pp. 21, 107–112.

Heller, Chylinski, M., de Ruyter, K., Mahr, D., & Keeling, D. I. (2019). Touching the Untouchable: Exploring Multi-Sensory Augmented Reality in the Context of Online Retailing. Journal of Retailing, 95(4), 219–234. https://doi.org/10.1016/j.jretai.2019.10.008.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. International Marketing Review, 33(3), 405–431. doi:10.1108/IMR-09-2014-0304.

Hilken, d. R., K., Chylinski, M., Mahr, D., & Keeling, D. I. (2017). Augmenting the eye of the beholder: Exploring the strategic potential of augmented reality to enhance online service experiences. Journal of the Academy of Marketing Science, 45, 884–905. https://doi.org/10.1007/s11747-017-0541-x.

Hong Qin, D. A. P., Victor Prybutok. (2021). A virtual market in your pocket: How does mobile augmented reality (MAR) influence consumer decision-making? Journal of Retailing and Consumer Services, 58(102337). https://doi.org/10.1016/j.jretconser.2020.102337.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). Cultures and organisations: Software of the mind (3rd ed.). McGraw-H.

Hofstede, G. (1980). “Culture and organisations”, International Studies of Management and Organization, Vol. 10 No. 4, pp. 15–41.

Hofstede, G. and Bond, M.H. (1988). “The Confucius connection: from cultural roots to economic growth”, Organizational Dynamics, Vol. 16 No. 4, pp. 5-21.

Ho, J. C., Wu, C.-G., Lee, C.-S., & Pham, T.-T. T. (2020). Factors affecting the behavioural intention to adopt mobile banking: An international comparison. Technology in Society, 63, 101360–. https://doi.org/10.1016/j.techsoc.2020.101360.

Howe, N., & Strauss, W. (2009). Millennials rising: The next great generation. Vintage.

Hsu, S. H.-Y., Tsou, H.-T., & Chen, J.-S. (2021). “Yes, we do. Why not use augmented reality?” customer responses to experiential presentations of AR-based applications. Journal of Retailing and Consumer Services, 62, 102649-. https://doi.org/10.1016/j.jretconser.2021.102649.

Hsu, W. C., Lee, M. H., & Zheng, K. W. (2024). From virtual to reality: The power of augmented reality in triggering impulsive purchases. Journal of Retailing and Consumer Services, 76, 103604-. https://doi.org/10.1016/j.jretconser.2023.103604.

Hsieh, H. P., Hsu, H. C., & Lu, H. P. (2019). Factors influencing user satisfaction with augmented reality applications in education: A case study of high school students. Computers & Education, 134, 51-61.

Hung, Chang, C.-W., & Ma, Y.-C. (2021). A new reality: Exploring continuance intention to use mobile augmented reality for entertainment. Technology in Society, 67, 101757–. https://doi.org/10.1016/j.techsoc.2021.101757.

Huang, M.-H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. Journal of the Academy of Marketing Science, 49(1), 30–50. https://doi.org/10.1007/s11747-020-00749-9.

Huang, Z., Xiong, C., Ni, H., Wang, D., Tao, Y., & Sun, T. (2023). Standard Evolution of 5G-Advanced and Future Mobile Network for Extended Reality and Metaverse. In IEEE internet of things magazine (Vol. 6, Number 1, pp. 20–25). IEEE. https://doi.org/10.1109/IOTM.001.2200261.

ISO. (2019). Ergonomics of human-system interaction (Human-centred design for interactive systems), ISO 9241-210:2019. https://www.iso.org/standard/77520.html.

ITA (2023). Australia – Country Commercial Guide. International Trade Organisation, USA, https://www.trade.gov/country-commercial-guides/australia-ecommerce#.

Izogo, J., C. (2018). Online shopping experience in an emerging e-retailing market: Towards a conceptual model. Journal of Consumer Behaviour, 17, 379-392. https://doi.org/ 10.1002/cb.1715.

Jessen, Hilken, T., Chylinski, M., Mahr, D., Heller, J., Keeling, D. I., & de Ruyter, K. (2020). The playground effect: How augmented reality drives creative customer engagement. Journal of Business Research, 116, 85–98. https://doi.org/10.1016/j.jbusres.2020.05.002.

Jia Wertz. (2018). Forbes report, https:// www.forbes.com/sites/jiawertz/2018/09/12/ dont-spend-5-times-more-attracting - new - customers -nurture-the-existing-ones/? sh=77a7b7a95a8e.

Jiang, S., J., Yang, C., & Gu, C. (2022). The impact of perceived interactivity and intrinsic value on users' intention to use mobile augmented reality virtual shoe-try-on function. Systems (Basel), 10. https://doi.org/10.3390/systems10010003.

Jumaan, I. A., Hashim, N. H., & Al-Ghazali, B. M. (2020). The role of cognitive absorption in predicting mobile internet users' continuance intention: An extension of the expectation-confirmation model. Technology in Society, 63, 101355–. https://doi.org/10.1016/j.techsoc. 2020.101355.

Jung, Lee, H., Chung, N., & tom Dieck, M. C. (2018). Cross-cultural differences in adopting mobile augmented reality at cultural heritage tourism sites. International Journal of Contemporary Hospitality Management, 30(3), 1621–1645. https://doi.org/10.1108/IJCHM-02-2017-0084.

Jaiswal, M., & Zane, L. (2022). National culture and attitudes' impact on diffusion of sustainable new technology-based products. New England Journal of Entrepreneurship, 25(1), 5–25. https://doi.org/10.1108/NEJE-09-2021-0059.

Hall, S., & Ghazoul, F. (2012). Cultural identity and diaspora. Alif (Cairo, Egypt), 32, 257.

Hassenzahl, M. (2018). The thing and I: understanding the relationship between user and product. Funology 2: from usability to enjoyment, 301-313.

Kabir, Z. S., & Kang, K. (2024). The Impact of Augmented Reality Through User-Platform Interactions Towards Continuance Intention with the Effect of User Generation. Information, 15(12), 758. https://doi.org/10.3390/info15120758.

Kabir, Zian Shah; Kang, Kyeong, & Sohaib, Osama. (2024a). Perceived Subjective Norms Influence Continuance Intention in Augmented Reality Platforms: A User Experience Study. AMCIS 2024 Proceedings. 4. https://aisel.aisnet.org/amcis2024/cog_res/ cog_res/4.

Kabir, Z., & Kang, K. (2024b). How User-Platform Interactions Influence Continuance Intention in Augmented Reality Mobile Platforms. In: Tareq Ahram and Waldemar Karwowski (eds) Human Factors in Design, Engineering, and Computing. AHFE (2024) International Conference. AHFE Open Access, vol 159. AHFE International, USA. http://doi.org/10.54941/ahfe1005640.

Kang, J. Y. M., Kim, J.-E., Lee, J.Y. and Lin, S. H. (2022). How mobile augmented reality digitally transforms the retail sector: examining trust in augmented reality apps and online/offline store patronage intention. Journal of Fashion Marketing and Management. https://doi.org/10.1108/JFMM-12-2020-0273.

Kim, Y. Y. (2001). Becoming intercultural: an integrative theory of communication and cross-cultural adaptation (1st ed.). SAGE. https://doi.org/10.4135/9781452233253.

Kim, J. H., Kim, M., Park, M., & Yoo, J. (2023). Immersive interactive technologies and virtual shopping experiences: Differences in consumer perceptions between augmented reality (AR) and virtual reality (VR). Telematics and Informatics, 77, 101936-. https://doi.org/10.1016/j.tele.2022.101936.

Kim, M. J. (2021). Revitalisation of offline fashion stores: Exploring strategies to improve the smart retailing experience by applying mobile technology. Sustainability (Basel, Switzerland), 13(3434). https://doi.org/10.3390/su13063434.

Kim, M. J., & Gorman, B. K. (2022). Acculturation and Self-rated Health Among Asian Immigrants: The Role of Gender and Age. Population Research and Policy Review, 41(1), 89–114. https://doi.org/10.1007/s11113-021-09642-x.

Klesel, M., Schuberthmathe, F., Niehaves, B., & Henseler, J. (2022). Multigroup Analysis in Information Systems Research using PLS-PM: A Systematic Investigation of Approaches. ACM SIGMIS Database: The DATABASE for Advances in Information Systems, 53(3), 26–48. https://doi.org/10.1145/3551783.3551787.

Kowalczuk, Siepmann (née Scheiben), C., & Adler, J. (2021). Cognitive, affective, and behavioural consumer responses to augmented reality in e-commerce: A comparative study. Journal of Business Research, 124, 357–373. https://doi.org/10.1016/j.jbusres.2020.10.050.

Koscielniak, M., Bojanowska, A., & Gasiorowska, A. (2024). Religiosity Decline in Europe: Age, Generation, and the Mediating Role of Shifting Human Values. Journal of Religion and Health, 63(2), 1091–1116. https://doi.org/10.1007/s10943-022-01670-x.

Kosslyn, S. M. (1994). Image and Brain: The Resolution of the Imagery Debate. Harvard University Press.

Kumar, A., Chakraborty, S., & Bala, P. K. (2023). Text mining approach to explore determinants of grocery mobile app satisfaction using online customer reviews. Journal of Retailing and Consumer Services, p. 73, 103363–. https://doi.org/10.1016/j.jretconser.2023.103363.

Lave, J., & Wenger, E. (1991). Situated Learning: Legitimate Peripheral Participation. Cambridge University Press.

Lee & Huang, R. (2021). Consumer responses to online fashion renting: exploring the role of cultural differences. International Journal of Retail & Distribution Management, 49(2), 187–203. https://doi.org/10.1108/IJRDM-04-2020-0142.

Li, H., Zhang, H., & Wang, Y. (2020). "A Survey of Markerless Augmented Reality Techniques: From Feature-Based to Semantic-Based Approaches." ACM Computing Surveys (CSUR), 53(5), 1–36.

Liébana-Cabanillas, F., & Alonso-Dos-Santos, M. (2017). Factors that determine the adoption of Facebook commerce: The moderating effect of age. Journal of Engineering and Technology Management, 44, 1–18. https://doi.org/10.1016/j.jengtecman.2017.03.001.

Liu, Y., Li, Y., & Huang, W. (2017). Context-aware augmented reality: Enhancing the sense of presence through contextual information. Journal of Augmented Reality, 8(2), 112-126.

Liu, Y., & Wang, Y. (2021). "Augmented Reality and Flow Theory: Exploring the Dynamics of Immersion and Interaction." Journal of Interactive Media, 2021(3), 1-15.

Lucas, G. A., Lunardi, G. L., & Dolci, D. B. (2023). From e-commerce to m-commerce: An analysis of the user's experience with different access platforms. Electronic Commerce Research and Applications, 58. https://doi.org/10.1016/j.elerap.2023.101240.

Lyons, S. T., Duxbury, L., & Higgins, C. (2007). An empirical assessment of generational differences in basic human values. Psychological Reports, 101(2), 339–352. https:// doi. org/ 10. 2466/ pr0. 101.2. 339- 352.

Ma, Z., & Xia, Y. (2021). Acculturation strategies, age at migration, and self-rated health: An empirical study on internal migrants in China. Social Science Research, 93, 102487–102487. https://doi.org/10.1016/j.ssresearch.2020.102487.

Mannheim, K. (1970). The problem of generations. Psychoanalytic Review, 57(3), 378–404.

Matthews, L., Noonan, R., & Latan, H. (2017). Applying Multigroup Analysis in PLS-SEM: A Step-by-Step Process. In Partial Least Squares Path Modeling (pp. 219–243). Springer International Publishing. https://doi.org/10.1007/978-3-319-64069-3_10.

McCormick, T., & Quinn, S. (2020). "User Experience of Augmented Reality Applications: A Review of Literature and Directions for Future Research." Journal of Augmented and Virtual Reality, 1(1), 22–39.

McKnight, D. H., Choudhury, V., & Kacmar, C. J. (2002). Developing and Validating Trust Measures for E-Commerce: An Integrative Typology. Information Systems Research, 13(3), 334–359.

McLean, W., A. (2019). Shopping in the digital world: Examining customer engagement through augmented reality mobile applications. Computers in Human Behavior, pp. 101, 210–224. https://doi.org/10.1016/j.chb.2019.07.002.

Mehrabian, R., J. A. (1974). An approach to environmental psychology. MIT Press.

Milgram, P., & Kishino, F. (1994). "A taxonomy of mixed reality visual displays." IEICE TRANSACTIONS on Information and Systems, E77-D (12), 1321-1329.

Miocevic, D., & Zdravkovic, S. (2020). Acculturation of Expatriate Consumers: Conditional Effects of Mental Attachments to Home Country. Journal of Global Marketing, 33(3), 193–206. https://doi.org/10.1080/08911762.2019.1710642.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. BMJ, 339(7716), 332–336. https://doi.org/10.1136/bmj.b2535.

Moradi, M., & Zihagh, F. (2022). A meta-analysis of the elaboration likelihood model in the electronic word-of-mouth literature. International Journal of Consumer Studies, 46(5), 1900–1918. https://doi.org/10.1111/ijcs.12814.

Mortimer, Grimmer, M., Grimmer, L., Wang, S., & Su, J. (2022). A cross-cultural examination of "off-price" fashion shopping. International Journal of Retail & Distribution Management, 50(12), 1494–1517. https://doi.org/10.1108/IJRDM-09-2021-0457.

Nadir, Z., Taleb, T., Flinck, H., Bouachir, O., & Bagaa, M. (2021). Immersive Services over 5G and Beyond Mobile Systems. IEEE Network, 35(6), 299–306. https://doi.org/10.1109/MNET.121.2100172.

Nan, D., Kim, Y., Park, M. H., & Kim, J. H. (2020). What motivates users to keep using social mobile payments? Sustainability, 12(17), 6878-. https://doi.org/10.3390/SU12176878.

Nawres, D., Nedra, B. A., Yousaf, A., & Mishra, A. (2024). The role of augmented reality in shaping purchase intentions and WOM for luxury products. Journal of Business Research, 171, 114368-. https://doi.org/10.1016/j.jbusres.2023.114368.

Nazir, S., Khadim, S., Ali Asadullah, M., & Syed, N. (2023). Exploring the influence of artificial intelligence technology on consumer repurchase intention: The mediation and moderation approach. Technology in Society, 72, 102190-. https://doi.org/10.1016/j.techsoc.2022.102190.

Neves, Oliveira, T., & Santini, F. (2022). Sustainable technologies adoption research: A weight and meta-analysis. Renewable & Sustainable Energy Reviews, 165, 112627–. https://doi.org/10.1016/j.rser.2022.112627.

Newton, A., Awuviry-Newton, K., Oppong Nkansah, J., & Abekah-Carter, K. (2022). Understanding older adults' functioning and health-seeking behaviour during the COVID-19 pandemic in Ghana: A descriptive qualitative study. Health & Social Care in the Community, 30(3), e823–e831. https://doi.org/10.1111/hsc.13452.

Nguyen, H., M.-T. (2021). The role of user adaptation and trust in understanding continuance intention towards mobile shopping: An extended expectation-confirmation model. Cogent Business & Management, 8, 1-19. https://doi.org/10.1080/23311975.2021.1980248.

Nhan, T., L. T., Dung, H. T., & Vu, N. T. (2022). A conceptual model for studying the immersive mobile augmented reality application-enhanced experience. Heliyon, 8. https://doi.org/e10141.

Nwobodo, S., & Weissmann, M. A. (2024). Common traits in online shopping behavior: A study of different generational cohorts. Global Business and Organizational Excellence, 43(3), 46–60. https://doi.org/10.1002/joe.22236.

Odarchenko, R., Abakumova, A., Bondar, S., Bogachuk, Y., & Maratkyzy, K. (2020). Advanced Method for QoE Evaluation and Improvement in Modern Cellular Networks. 2020 IEEE International Conference on Problems of Infocommunications Science and Technology, PIC S and T 2020 - Proceedings, 289–294. https://doi.org/10.1109/PICST51311.2020.9468036.

Oliver. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. Journal of Marketing Research, p. 17. https://doi.org/10.2307/3150499.

Olson, W., O. C., & Ruekert, R. W. (1995). Organising for Effective New Product Development: The Moderating Role of Product Innovativeness. Journal of Marketing, p. 59. https:// doi.org/10.2307/1252014.

Ozturkcan, S. (2021). Service innovation: Using augmented reality in the IKEA Place app. Journal of Information Technology Teaching Cases, 11(1), 8–13. https://doi.org/10.1177/2043886920947110.

Pangaribuan, C. H., Wijaya, D., Antari, K. Y., Sherisa, L. A., & Putra, C. A. (2020). Consuming organic instant noodles: Exploring environmental concern, health consciousness, and moral norm (Evidence from Indonesian Consumers). International Journal of Advanced Science and Technology, 29(5), 6912-6927.

Park, C., & Kim, S. (2020). "Acculturation and user engagement with mobile applications: Evidence from Asian American users." Journal of Interactive Marketing, 50, 45-59. doi: 10.1016/j.intmar.2020.03.002.

Park, Y., J. (2020). Effects of perceived interactivity of augmented reality on consumer responses: A mental imagery perspective. Journal of Retailing and Consumer Services, p. 52. https:// doi.org/10.1016/j.jretconser.2019.101912.

Park, E., Kim, H., & Ohm, J. Y. (2015). Understanding driver adoption of car navigation systems using the extended technology acceptance model. Behaviour & Information Technology, 34(7), 741–751. https://doi.org/10.1080/0144929X.2014.963672.

Pathak, K., & Prakash, G. (2023). Exploring the role of augmented reality in purchase intention: Through flow and immersive experience. Technological Forecasting & Social Change, 196, 122833-. https://doi.org/10.1016/j.techfore.2023.122833.

Payal, R., Sharma, N., & Dwivedi, Y. K. (2024). Unlocking the impact of brand engagement in the metaverse on Real-World purchase intentions: Analyzing Pre-Adoption behavior in a futuristic technology platform. Electronic Commerce Research and Applications, 65, 101381-. https://doi.org/10.1016/j.elerap.2024.101381.

Peña-García, N., Gil-Saura, I., Rodríguez-Orejuela, A., & Siqueira-Junior, J. R. (2020). Purchase intention and purchase behaviour online: A cross-cultural approach. Heliyon, 6(6), e04284–e04284. https://doi.org/10.1016/j.heliyon.2020.e04284.

Pereira, A. C., Alves, A. C., & Arezes, P. (2023). Augmented Reality in a Lean Workplace at Smart Factories: A Case Study. Applied Sciences, 13(16), 9120-. https://doi.org/10.3390/app13169120.

Permatasari, I., Sensuse, D. I., & Santoso, H. B. (2019). Cultural Aspects Influencing the Application of E-Learning: A Literature Review. Journal of Physics: Conference Series, 1235(1), 12026-. https://doi.org/10.1088/1742-6596/1235/1/012026.

Perry, M., Greene, M., & Lee, J. (2021). Individual Differences in Mental Imagery and Their Impact on Augmented Reality Interaction. Human-Computer Interaction, 36(2), 163-187.

Peter Adams (2019). Retail Dive Report on E-commerce. https://www.retaildive.com/news/kmart-australia-deploys-ar-furniture-demos-in-web-based-ads/560333/

Piaget, J. (1952). The Origins of Intelligence in Children. International Universities Press.

Poushneh, A. (2018). Augmented reality in retail: A trade-off between user's control of access to personal information and augmentation quality. Journal of Retailing and Consumer Services, 41, 169–176. https://doi.org/10.1016/j.jretconser.2017.12.010.

Prakashyadav, S., & Rai, S. (2017). Generation Z's Preference for Innovative Content: An Analysis. International Journal of Digital Marketing, 8(1), 23–36.

Priporas, C.-V., Stylos, N., & Fotiadis, A. (2017). Generation Z Consumers' Expectations of Experiences in Retailing. Journal of Retailing and Consumer Services, 38, 23-34. DOI: 10.1016/j.jretconser.2017.05.007.

Purohit, A. K., Schöbel, S., Bill, O., & Holzer, A. (2023). Nudging to Change, the Role of Digital Health. In Digital Health (pp. 137–154). Springer International Publishing AG. https://doi.org/10.1007/978-3-031-17666-1_10.

Rheingold, H. (1993). The virtual community: homesteading on the electronic frontier (Revised ed.). The MIT Press.

Ringle, C. M., Sarstedt, M., & Schlittgen, R. (2014). Genetic algorithm segmentation in partial least squares structural equation modelling. OR SPECTRUM, 36(1), 251–276. https://doi.org/10.1007/s00291-013-0320-0.

Roto, V., Law, EL.-C., Vermeeren, APOS., & Hoonhout, J. (2011). User experience white paper: Bringing clarity to the concept of user experience. s. n.

S.R. Nikhashemi, H. H. K., Khaldoon Nusair, Cheng Boon Liat. (2021). Augmented reality in smart retailing: A (n) (A) Symmetric Approach to continuous intention to use retail brands' mobile AR apps. Journal of Retailing and Consumer Services, p. 60. https:// doi.org/ 10.1016/ j.jretconser. 2021.102464.

Sanjit K. Roy, G. S., Megan Hope, Bang Nguyen & Paul Harrigan (2019). The rise of smart consumers: role of smart servicescape and smart consumer experience co-creation. Journal of Marketing Management, p. 35, 1480 1513. https://doi.org/10.1080/0267257X.2019.1680569.

Santoso, & Schrepp, M. (2019). The impact of culture and product on the subjective importance of user experience aspects. Heliyon, 5(9), e02434 – e02434. https://doi.org/10.1016/j.heliyon.2019. e02434.servicescape and smart consumer experience co-creation. Journal of Marketing Management, 35, 1480-1513. https://doi.org/10.1080/0267257X.2019.1680569.

Sephora Virtual Artist. https://www.sephora.com.au/pages/virtual-artist?srsltid=AfmBOoq0wzZuVl1 JHprRH5Alkzi-pvSMVif88fVjCbsXYb0j3US1Pzk1.

Schlosser, A. E. (2003). Experiencing Products in the Virtual World: The Role of Goal and Imagery in Influencing Attitudes versus Purchase Intentions. The Journal of Consumer Research, 30, 184-198. https://doi.org/10.1086/376807.

Schmiedel, T., vom Brocke, J., & Recker, J. (2018). The Role of Subjective Norms in Technology Adoption: A Systematic Review of the Literature. European Journal of Information Systems, 27(4), 496-515.

Schubert. (2009). A New Conception of Spatial Presence: Once Again, with Feeling. Communication Theory. 19, 2, 161–187. https://doi.org/10.1111/j.1468-2885.2009.01340.x.

Smink, A. R., van Reijmersdal, E. A., van Noort, G., & Neijens, P. C. (2020). Shopping in augmented reality: The effects of spatial presence, personalisation and intrusiveness on app and brand responses. Journal of Business Research, 118, 474–485. https://doi.org/10.1016/j.jbusres.2020.07.018.

Smith, A., Wang, H., & Peterson, T. (2020). Collaborative AR experiences: The role of social presence in enhancing engagement. Journal of Interactive Media, 15(4), 341-356.

Sohaib, O., Miliszewska, I., & Kang, K. (2019). Uncertainty Avoidance and Consumer Cognitive Innovativeness in E-Commerce. Journal of Global Information Management, 27(2), 59–77. https://doi.org/10.4018/JGIM.2019040104.

Shopify with an immersive shopping experience. https://www.shopify.com/au/ar.

Sung, E. (Christine), Han, D. D., & Choi, Y. K. (2022). Augmented reality advertising via a mobile app. Psychology & Marketing, 39(3), 543–558. https://doi.org/10.1002/mar.21632.

Suri, A., Huang, B., & Sénécal, S. (2023). This Product Seems Better Now: How Social Media Influencers' Opinions Impact Consumers' Post-failure Responses. International Journal of Electronic Commerce, 27(3), 297–323. https://doi.org/10.1080/10864415.2023.2226898.

Sweller, J., Ayres, P., & Kalyuga, S. (2011). Cognitive load theory (1st ed., Vol. 1, pp. 3–261). Springer. https://doi.org/10.1007/978-1-4419-8126-4.

Serravalle, F., Vannucci, V., & Pantano, E. (2022). "Take it or leave it?": Evidence on cultural differences affecting return behaviour for Gen Z. Journal of Retailing and Consumer Services, 66, 102942–. https://doi.org/10.1016/j.jretconser.2022.102942.

Tang, Y. M., Kuo, W. T., & Lee, C. K. M. (2023). Real-time Mixed Reality (MR) and Artificial Intelligence (AI) object recognition integration for digital twin in Industry 4.0. Internet of Things (Amsterdam. Online), 23, 100753-. https://doi.org/10.1016/j.iot.2023.100753.

Tapscott, D. (2009). Grown-up digital: How the next generation is changing your world. McGraw-Hill.

Tarhini, A., Hone, K., Liu, X. and Tarhini, T. (2017). "Examining the moderating effect of individual-level cultural values on users' acceptance of E-learning in developing countries: a structural equation Modeling of an extended technology acceptance model", Interactive Learning Environments, Vol. 25 No. 3, pp. 306-328.

Tavakoly Sany, S. B., Aman, N., Jangi, F., Lael-Monfared, E., Tehrani, H., & Jafari, A. (2023). Quality of life and life satisfaction among university students: Exploring subjective norms, general health, optimism, and attitude as potential mediators. Journal of American College Health, 71(4), 1045–1052. https://doi.org/10.1080/07448481.2021.1920597

Tawira, L., & Ivanov, A. (2023). Leveraging personalisation and customization affordances of virtual try-on apps for a new model in apparel m-shopping. Asia Pacific Journal of Marketing and Logistics, 35(2), 451–471. https://doi.org/10.1108/APJML-09-2021-0652.

Taylor. (2005). Culture Transition: Fashion's Cultural Dialogue between Commerce and Art. Fashion Theory, 9(4), 445–459. https://doi.org/10.2752/136270405778051112.

Torres Vega, L., C., Abadal, S., Papapetrou, E., Jain, A., Mouhouche, B., Kalem, G., Ergüt, S., Mach, M., Sabol, T., Cabellos-Aparicio, A., Grimm, C., De Turck, F., & Famaey, J. (2020). Immersive Interconnected Virtual and Augmented Reality: A 5G and IoT Perspective. Journal of Network and Systems Management, 28, 796-826. https://doi.org/10.1007/s10922-020-09545-w.

Trivedi, J., Kasilingam, D., Arora, P., & Soni, S. (2022). The effect of augmented reality in mobile applications on consumers' online impulse purchase intention: The mediating role of perceived value. Journal of Consumer Behaviour, 21(4), 896–908. https://doi.org/10.1002/cb.2047.

Trompenaars, F., & Hampden-Turner, C. (2021). Riding the Waves of Culture: Understanding Diversity in Global Business, Fourth Edition (Fourth Edition). McGraw-Hill.

Vaidyanathan, N. a. H., S. (2022). Designing augmented reality services for enhanced customer experiences in retail. Journal of Service Management. https://doi.org/10.1108/JOSM-01-2022-0004.

Verma, D., Prakash Dewani, P., Behl, A., Pereira, V., Dwivedi, Y., & Del Giudice, M. (2023). A meta-analysis of antecedents and consequences of eWOM credibility: Investigation of moderating role of culture and platform type. Journal of Business Research, 154, 113292-. https://doi.org/10.1016/j.jbusres.2022.08.056.

Vo, K. N., Le, A. N. H., Tam, L. T., & Xuan, H. H. (2022). Immersive experience and customer responses towards mobile augmented reality applications: The moderating role of technology anxiety. Cogent Business & Management, 9(1), 1–17. https://doi.org/10.1080/23311975.2022.2063778.

Wey Smola, K. W., & Sutton, C. D. (2002). Generational differences: Revisiting generational work values for the new millennium. Journal of Organizational Behavior, 23(4), 363–382. https:// doi. org/ 10. 1002/ job. 147.

Williams, M. S., & Liu, C. (2023). Who Am I and Where Do I Belong? The Impact of Heritage Cultural Identity Salience on Immigrant Workers Acculturation Strategies. Journal of International Migration and Integration, 24(2), 793–815. https://doi.org/10.1007/s12134-022-00978-7.

Wirth, H., T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H., Saari, T., Laarni, J., Ravaja, N., Gouveia, F. R., Biocca, F., Sacau, A., Jäncke, L., Baumgartner, T., & Jäncke, P. (2007). A Process Model of the Formation of Spatial Presence Experiences. Media Psychology, 9:3, 493-525, DOI: 10.1080/15213260701283079.

Wilson, B. (2019). Book Review: Marketing to Gen Z: The Rules for Reaching This Vast and Very Different Generation of Influencers [Review of Book Review: Marketing to Gen Z: The Rules for Reaching This Vast and Very Different Generation of Influencers]. Journal of Macromarketing, 39(2), 228–230. SAGE Publications. https://doi.org/10.1177/0276146719830156.

Xu, J., & Cheng, C. (2021). Uncertainty Avoidance, Individualism and the Readiness of Business-to-Consumer E-commerce. The Journal of Asian Finance, Economics, and Business, 8(1), 791–801. https://doi.org/10.13106/jafeb.2021.vol8.no1.791.

Yao, M., & Zhang, X. (2021). "The Role of Multisensory Feedback in Augmented Reality: Enhancing Flow and Immersion." Computers in Human Behavior, 120, 106725.

Yi Fang Wu, a. E. Y. K. (2022). Users' Perceptions of Technological Features in Augmented Reality (AR) and Virtual Reality (VR) in Fashion Retailing: A Qualitative Content Analysis. Mobile Information Systems (3080280), 13. https://doi.org/10.1155/2022/3080280.

Yim, M. Y.-C., Chu, S.-C., & Sauer, P. L. (2017). Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective. Journal of Interactive Marketing, 39, 89–103. https://doi.org/10.1016/j.intmar.2017.04.001.

Yin, J., & Qiu, X. (2021). Ai technology and online purchase intention: Structural equation model based on perceived value. Sustainability (Basel, Switzerland), 13(10), 5671. https://doi.org/10.3390/su13105671.

Yuntao Wang, Z. S., Ning Zhang, Rui Xing, Dongxiao Liu, Tom H. Luan, Xuemin Shen. (2022). A Survey on Metaverse: Fundamentals, Security, and Privacy. IEEE Communications Surveys & Tutorials. https://doi.org/10.1109/COMST.2022.3202047.

Zhang, B., S. E., & Walsh, G. (2008). Review and future directions of cross-cultural consumer services research. Journal of Business Research, 61(3), 211–224. https://doi.org/ 10.1016/j.jbusres. 2007.06.003.

Zhang, Y., Wang, Z., Zhang, J., Shan, G., & Tian, D. (2023). A survey of immersive visualization: Focus on perception and interaction. Visual Informatics (Online), 7(4), 22–35. https://doi.org/10.1016/j.visinf.2023.10.003.

Zhang, Z., Wen, F., Sun, Z., Guo, X., He, T., & Lee, C. (2022). Artificial Intelligence-Enabled Sensing Technologies in the 5G/Internet of Things Era: From Virtual Reality/Augmented Reality to the Digital Twin. Advanced Intelligent Systems, 4(7). https://doi.org/10.1002/aisy.202100228.

Zhang, L., J. Zhu, & Q. Liu. (2012). "A Meta-Analysis of Mobile Commerce Adoption and the Moderating Effect of Culture." Computers in Human Behavior 28 (5): 1902–1911.

Zheng, L., & Yang, X. (2022). Social Augmented Reality: The Role of Subjective Norm in Collaborative AR Experiences. Virtual Reality, 26(1), 33-50.

Zhou, J., X.-L., Fang, Y., & Vogel, D. (2015). Toward a theory of perceived benefits, affective commitment, and continuance intention in social virtual worlds: cultural values (indulgence and individualism) matter. European Journal of Information Systems, 24(3), 247–261. https://doi.org/10.1057/ejis.2014.27.

Zhu, Y., Lynette Wang, V., Wang, Y. J., & Wei, J. J. (2022). How to craft humorous advertisements across diverse cultures? Multi-country insights from Brazilian, Chinese and American consumers. International Journal of Consumer Studies, 46(3), 716–730. https://doi.org/10.1111/ijcs.12720.

Appendix A: Focus Group Guideline

Focus Group Guideline

Research Title: Exploring User Experience through User-Platform Interactions in Augmented Reality: An Interaction-Engagement-Intention Model Perspective.

Focus group interview: We get valuable insights through your perceived experiences through interactions with the AR mobile platform (IKEA app or IKEA responsive mobile website.) By completing this interactive session, we will accommodate all your given opinions to extend our UX research (under a higher degree by research program). We have prepared the focus group script to get information on how you feel about interacting with AR features on the e-commerce mobile platform. Your valuable opinions or feedback will enhance our understanding of the stimulus and cognitive factors related to users' continuance intention. We will provide sequential questions with discussion prompts in the interview session to extend the discussions on the research areas to better understand market dynamics, user demands, technology adoption, user satisfaction, and behavioural intention to use AR mobile platforms. Feel free to discuss anything else you prefer and inform us about your desire to identify new features for the end users to assess user experience.

I hope that the information given finds you well. Please ask your questions if you need to clarify anything before starting the focus group interview session. Please ensure the phone option is silent during the focus group discussion.

Focus group objective: To identify the relevant stimulus and cognitive factors influencing continuance intention to use augmented reality (AR) mobile platforms.

Recruitment procedure: We have followed a non-probabilistic purposive sampling technique to select participants for the focus-group interview. The selected participants are divided into two focus groups (Group 1 and Group 2), considering users' homogenous characteristics.

Research platform: In this qualitative study, participants are requested to interact with an AR mobile platform before participating in the focus group session. We have received consent from IKEA to extend our research using the **IKEA app** (AR mobile app) or the **IKEA responsive mobile website**.

Downloading/using the platform: The IKEA app is registered with the Apple App Store and Google Play Store. The participants are requested to download the below app from their respective app stores.

The participants can quickly watch the video below to understand how to use the IKEA Place app on their smartphones: https://www.youtube.com/watch?v=eeCuAd_1A9Q.

Alternatively, participants can directly enter the IKEA responsive website using their smartphones. The URL link for the IKEA responsive mobile website is: (https://www.ikea.com/au).

Interactions with the IKEA Place app or responsive website:

Please download the IKEA app or use the responsive website https://www.ikea.com to interact with the virtual product:

All the products are still not available for 3D and augmented view. So, you can choose a malm drawer using the link below through your smartphone:

https://www.ikea.com/au/en/p/malm-chest-of-4-drawers-white-20354646/

Click the View in 3D button and then click the AR  button on the page.

Focus group session:

For group 1:

Session length: Approximately **30-45** minutes.
Time/Date: **11.30 am, AEST** (GMT+10)/ **10.30 am**, South Korea (KST), **Friday, 08 September, 2023**.
Location:

For group 2:

Session length: Approximately **30-45** minutes.
Time/Date: **2.00 pm, AEST** (GMT+10)/ **1.00 pm**, South Korea (KST)/ **8.00 am**, UAE, **Saturday, 09 September, 2023**.

You can enter the focus group session using any of the options for the Zoom platform:

Option 1:
https://utsmeet.zoom.us/my/ziankabir?pwd=REtYa2JSZjJNYzExNnpDSzZFT1hKZz09, Meeting ID: 993 370 8534, and passcode: 997526.

Option 2: https://zoom.uts.edu.au/j/9933708534; Passcode: 997526

Focus group script:

Introduction and explanation in a focus group session

Introductory discussion	Self-introduction: name, age, online shopping habits, interacting with augmented reality (AR) features in mobile platforms (apps or responsive website)
Explaining the research topic, procedures to interact with AR mobile platforms, and critical concepts (explained above)	
Discussion Prompt 1: *Stimulus factors in using the AR platform*	Which stimulus (influential) factors (internal and external sources of information) do you feel to get an immersive feeling when interacting with the AR mobile platform? - Internal factors come from the AR platform, virtual product, or interaction capability. - External factors come from recommendations, ratings, reviews, or any other external sources of information.
Discussion Prompt 2: *Impact of AR features on user experience (cognitive feeling from memory)*	Does AR engage cognitive attachment from internal and external stimulus factors during the interactions with the platform? Why?

Discussion Prompt 3: *Impact of AR on behavioural intention*	Does AR enhance decision-making by alleviating product uncertainty to influence continuance intention (post-usage)? How? Using AR, users are engaging with virtual try-on with the products: - Would this encourage users to try an online product by alleviating product uncertainty? - How do internal (AR features) and external (AI recommendation, reviews, and ratings) sources of information change cognitive feeling? - Would this immersive feeling with the virtual interactions change the user's intention to continue using the platform?
Greetings and closing remarks	

Recording: We will conduct the focus-group interview through the Zoom platform. Please note that this session will be recorded to prepare the focus-group report.

Non-disclosure and privacy: We assure you that your name and particulars will not be disclosed in any published documents. Also, the collected data will be analysed using a secured analytical tool.

Closing remarks: Thanks for giving me your valuable time to extend our research work.

Focus group report: We will prepare a report to get valuable insights from the session.

Appendix B: Questionnaire Survey Guideline

Survey Guideline for Participant

Survey Objective: To validate and test the reliability of the research model in perceiving user experience on continuance intention to use augmented reality (AR) mobile platforms.

Research Instruments: The study will survey online users to assess their user experience (UX). We have developed eight demographic and 27 UX questionnaires, which might take 20-30 minutes.

Recruitment procedure: We follow a convenience snowball sampling technique to select participants for the survey.

Research platform: Participants are requested to interact with an AR mobile platform before participating in the questionnaire survey. We prefer that participants interact with the IKEA mobile app or responsive website with an augmented reality (AR) view.

Downloading/using the platform: The IKEA app is registered with the Apple App Store and Google Play Store. The participants are requested to download the app. Alternatively, participants can enter the IKEA responsive website using their smartphones using the link https://www.ikea.com/au.

All the products are still not available for 3D and augmented view. So, you can choose a malm drawer using the link below on your smartphone: https://www.ikea.com/au/en/p/malm-chest-of-4-drawers-white-20354646/. Alternatively, scan the QR code.

Click the View in 3D button and press the AR  button on the page to locate the virtual product in your physical space.

Participate in the survey: After interacting with the IKEA mobile platform, you are requested to attend an online survey following any of the below options:

Option 1: Use a survey link to get access from a computer or phone.

https://utsau.au1.qualtrics.com/jfe/preview/previewId/8a101ce9-bef6-438c-9106-a20410b587f5/SV_6kZQJpfobRyB40u?Q_CHL=preview&Q_SurveyVersionID=current

Option 2: Scan the QR code to participate in the survey.

Non-disclosure and privacy: We assure you that a secure analytical tool will collectively analyse your thoughts and opinions.

Your valuable experience will give us immense support in extending our research. Thank you again for your cooperation. If you have further queries about the research survey, please get in touch with Zian Shah Kabir (PhD Student) at zian.kabir@student.uts.edu.au.

Appendix C. Measurement items and scales

Construct	Items	Factors	Measurement Scales
Sources of information such as Stimuli cues for AR mobile platforms	VN	Vividness Yim (2017) and Mclean (2019)	VN1: The visual display through the AR mobile platform is precise and detailed. VN2: The visual display through the AR mobile platform is vivid and sharp.
	IN	Interactivity Yim (2017) and Roy (2019)	IN1: I was in control of navigating the AR mobile platform. IN2: The AR mobile platform was responding to my specific needs quickly and efficiently.
	PF	Product Fit Hong & Pavlou (2014), and Sun (2022)	PF1: I could no longer doubt that the product would fit my desired spaces. PF2: I could measure the product size to check for my desired space.
	NQ	Network Quality Kowalczuk (2021)	NQ1: The AR mobile platform performs its functions quickly and efficiently. NQ2: The AR mobile platform is reliable (it is always active and running, performs without errors, and does what it is supposed to do).
	AIR	AI-driven recommendation Yin & Qiu (2021)	AIR1: When interacting with the platform, AI marketing technology recommends what I want based on browsing habits. AIR2: With the support of AI marketing technology, the AR mobile platform can arouse my shopping desire.
	OR	Online review Chatterjee (2022)	OR1: Online user review is a deciding factor in continuing to use the AR mobile platform. OR2: I follow the online review score to choose a product or service using the AR mobile platform.
	MI	Mental Imagery Sun (2022) and Park (2022)	MI1: The product image that I have in my head is intense and lifelike. MI2: The AR mobile platform includes features that help you to visualise a product trial.
Cognitive engagement as an organism	SI	Sense of Immersion Dassi (2021)	SI1: During the interactions, my body was in a physical place, but my mind was in the virtual world. SI2: The AR mobile platform made me forget my immediate surroundings.
	SP	Sense of Presence Hanh (2022), Hilken (2017)	SP1: I felt like the virtual product was enmeshed with the AR mobile platform. SP2: It appeared to me that I could do whatever I wanted with the virtual products in the AR mobile platform.
	SN	Subjective norm	SN1: AI-driven recommendations arouse my platform usage.

		Yin & Qiu (2021) and Chatterjee (2022)	SN2: In my culture, online reviews play an essential role when using a mobile platform. SN3: Most people I know would like to continue using the platform after observing the online trends.
Emotional Engagement as an organism	AT	Attitude Sin (2010)	AT1: I think that an AR mobile platform would benefit me. AT2: I have gained positive perceptions about using an AR mobile platform.
	SF	Satisfaction Park (2015) and David (2022)	SF1: Overall, I am satisfied with the AR mobile platform. SF2: The AR mobile platform meets my expectations.
	TR	Trust Li et al. (2022), and Alimamy & Gnoth (2022)	TR1: I feel safer using the AR mobile platform. TR2: I am pretty sure of what to expect from the platform.
Behavioural Response	CI	Continuance Intention Nikhashemi (2021), Qin (2021), and Hsu (2021)	CI1: I intend to stay on as a member of using this AR mobile platform. CI2: I will frequently use the AR mobile platform in future. CI3: I would prioritise the AR mobile platform over other alternative means.

Appendix D

UTS UNIVERSITY OF TECHNOLOGY SYDNEY

PARTICIPANT INFORMATION SHEET

[UTS ethical clearance: UTS HREC REF NO. **ETH22-7706**] - Exploring User Experience through User-Platform Interactions in Augmented Reality: An Interaction-Engagement-Intention Model Perspective.

WHO IS CONDUCTING THIS RESEARCH?

My name is *Zian Shah Kabir,* and I am a Ph.D. student at UTS. My supervisor is Dr. Kyeong Kang, Faculty of Engineering & IT.

WHAT IS THE RESEARCH ABOUT?

The research study investigates user experience (UX) factors and key reasonings to perceive UX by explaining cognitive and emotional engagements that influence the continuance intention to use the e-commerce augmented reality (AR) mobile platforms. We have prepared all the questions related to getting information on how you feel by interacting with AR mobile platforms (IKEA Place app or IKEA responsive website). Your valuable opinions or feedback will enhance our understanding of critical stimuli and cognitive factors related to continuance intention.

WHY HAVE I BEEN INVITED?

You have been invited to participate because you have experience interacting with AR mobile platforms and can also give rich insights into revisiting the research model and hypotheses. We will analyse your valuable feedback to extend our research. Before participating in this research study, please check the selection criteria.

Selection criteria:

Using e-commerce augmented reality (AR) apps or responsive websites.
Interacting with apps or responsive websites to view AR features.

WHAT DOES MY PARTICIPATION INVOLVE?

The study (Focus Group Interview or survey) is conducted with a guideline and will take approximately 60 minutes to complete. The analytical tool will collect and analyse the focus group/survey script.

If you consent to participate and use your valuable experience, you can choose a moderated session to attend the focus group interview.

ARE THERE ANY RISKS/INCONVENIENCES?

You might be tired of the long session to continue the focus group discussions/survey. Your opinions will be analysed collectively to retrieve valuable insights. The research study deals with collective measurement, not individual analysis.

DO I HAVE TO TAKE PART IN THIS RESEARCH PROJECT?

Participation in this study is voluntary. It is completely up to you whether you decide to participate. If you decide not to participate or withdraw from the session, it will not affect your relationship with the researchers or the University of Technology Sydney.

WHAT IF I WITHDRAW FROM THIS RESEARCH PROJECT?

If you wish to withdraw from the study once it has started, you can do so at any time without having to give a reason, by contacting *Zian Shah Kabir [zian.kabir@student.uts.edu.au and]*.

WHAT WILL HAPPEN TO INFORMATION ABOUT ME?

By signing the consent form, you consent to the research team collecting and using personal information about you for the research study. All this information will be treated confidentially. The research data will be maintained in a secure database and processed under close supervision.

It is anticipated that the results of this research study will be published and presented in various forums. Information will be provided in any publication and presentation, so you cannot be identified without your permission.

Following relevant Australian and NSW Privacy laws, you have the right to request access to the information about you that is collected and stored by the research team. You also have the right to request that any information you disagree with be corrected. Please inform the research team member named at the end of this document if you would like to access your information.

The results of this research may also be shared through open-access (public) scientific databases, including Internet databases. This will enable other researchers to use the data to investigate other important research questions. Results shared this way will always be de-identified by removing all personal information (e.g. name, address, e-mail address, phone number, date of birth, etc.).

WHAT IF I HAVE ANY QUERIES OR CONCERNS?

If you have queries or concerns about the research that you think *I (Zian Shah Kabir)* or my supervisor (Dr. Kyeong Kang) can help you with, please feel free to contact us *at zian.kabir@student.uts.edu.au or [Dr. Kyeong Kang, kyeong.kang@uts.edu.au]*.

You will be given a copy of this form to keep.

NOTE:

This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC] guidelines. If you have any concerns or complaints about any aspect of the conduct of this research that you wish to raise independently of the research team, please get in touch with the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number. Any matter raised will be treated confidentially, and investigated, and you will be informed of the outcome.

CONSENT FORM

[UTS ethical clearance: UTS HREC REF NO. **ETH22-7706**] - Exploring User Experience through User-Platform Interactions in Augmented Reality: An Interaction-Engagement-Intention Model Perspective.

I agree to participate in the research study by *Zian Shah Kabir [zian.kabir@student.uts.edu.au and]*.

I have read the Participant Information Sheet, and I understand it.

I understand the research purposes, procedures and associated risks described in the Participant Information Sheet.

I have had an opportunity to ask questions, and I am satisfied with the answers I have received.

I freely agree to participate in this research study as described and understand that I can withdraw at any time without affecting my relationship with the researcher or the University of Technology Sydney.

I understand that I will be given a signed copy of this document to keep.

I am aware that I can contact *Zian Shah Kabir and, if applicable, supervisor Dr. Kyeong Kang [Kyeong.kang@uts.edu.au]* if I have any concerns about the research.

(User to participate in the Study) (Date of participation)

Name and Signature [participant] Date

Zian Shah Kabir 01 / 09 / 2023

Name and Signature [researcher] Date

[Alternatively, you can enter the Google form to give consent online: https://docs.google.com/forms/d/e/1FAIpQLScmac8bqjaO3FSUjJLdl7t7OUZFjJEqpOLI16HneikTfB_wZQ/viewform?usp=sf_link]

Appendix E. Focus Group Script

Introduction and explanation in a focus group session	
Introductory discussion	Self-introduction: name, age, online shopping habits, AR features for mobile platforms (apps or responsive website)
Explaining the research topic, procedures to interact with AR mobile platforms, and critical concepts	
Discussion Prompt 1: *Stimulus factors in using the AR platform*	Which stimulus (influential) factors (internal and external) do you feel to get an immersive experience when interacting with the AR mobile platform? - Internal factors come from the platform, virtual product, or interaction capability - External factors come from recommendations, ratings, reviews, or any other external sources of information
Discussion Prompt 2: *Impact of AR features on cognitive absorption (cognitive and Emotional feeling from memory)*	Does AR engage cognitive and emotional attachment from internal and external stimulus factors during the interactions with the platform? Why?
Discussion Prompt 3: *Impact of AR on behavioural intention*	Does AR enhance the users' decision-making process to influence behavioural intention (post-usage)? How?
	Using AR, users are engaging with virtual try-on with the products: - Would this encourage users to try an online product by alleviating product uncertainty? - How do internal (AR features) and external (AI recommendation, reviews, and ratings) sources of information change cognitive feeling? - Would this immersive feeling with the virtual interactions change the user's intention to continue using the platform?
Greetings and closing remarks	

Appendix F: Survey Questionnaire (From Qualtrics)

Take a quick survey on User Experience in AR mobile platforms

Consent Matter					
By agreeing to participate, you consent that you are at least 18 and acknowledge the attached consent form.					
O Yes, Agree O No					
Platform Interaction					
You are requested to interact with a virtual product through an augmented reality (AR) mobile platform using the following link. Click the View in 3D button and press the AR button on the page to locate the virtual product in your physical space (For PC users, you are requested. To scan the QR code using your mobile phone). 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/					
Confirmation					
By agreeing to participate, you confirm that you have interacted with a virtual product through 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 3D 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					
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
What best describes your employment status over the last three months?					
Student	Working full-time	Working part-time	Unemployed	Self-employed	others
What was your total household income before taxes during the past 12 months?					
Less	18,201 - 45,000 AUD	45,001 -	120,001 - 180,000 AUD	More than 180,000 AUD	

than 18,200 AUD		120,000 AUD		

How many years have you been staying in Australia?				
Less than 1 year	1-3 years	3-4 years	More than 4 years	Born in Australia

Which language do you mainly speak at home?									
English	Chinese	German	Spanish	Bengali	Nepali	Italian	Hindi	Arabic	Other

Which of the following best describes your cultural (ethnic) identity?													
Australian	Aboriginal	British	Torres	German	Italian	Indian	Bangladeshi	Nepalese	Korean	Irish	Scottish	Chinese	Others

Survey Questionnaire – Stimuli Cues

How clear and detailed was the visual display of the IKEA mobile platform?				
Extremely unclear	Somewhat unclear	Neither unclear nor clear	Somewhat clear	Extremely clear

How vivid and sharp was the visual display of the AR mobile platform?				
Not vivid	Somewhat not vivid	Neither vivid nor not vivid	Somewhat vivid	Vivid

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 did the IKEA mobile platform perform its functions quickly and efficiently?				
Inefficient	Somewhat inefficient	Neither inefficient nor efficient	Somewhat efficient	Efficient
How did you feel about the reliability of using the IKEA AR mobile platform (it is always active and running, performs without errors, and does what it is supposed to do)?				
Unreliable	Somewhat unreliable	Neither unreliable nor reliable	Somewhat reliable	Reliable
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 imagine the product after interacting with the AR mobile platform?				
Not intensive	Somewhat not intensive	Neither intensive nor not intensive	Somewhat intensive	Intensive
How did the AR mobile platform engage you in visualising a product trial?				
Non-engaged	Somewhat non-engaged	Neither non-engaged nor engaged	Somewhat engaged	Engaged
During the interactions, your body was in a physical place, but your mind was in the virtual world. How would you describe the statement?				
Strongly Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
The AR mobile platform made you forget your immediate surroundings. How would you describe the statement?				
Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree

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
Are you satisfied with using the IKEA mobile platform (with AR view)?				
Dissatisfied	Somewhat dissatisfied	I am neither satisfied nor dissatisfied	Somewhat satisfied	Satisfied
Do you think that the IKEA mobile platform meets your expectations?				
Far short of expectations	Short of expectations	Equals expectations	Exceeds expectations	Far exceeds expectations
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

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				

Appendix G. Generated Code Book through a Reflexive Thematic Analysis

Name	Description
Initial Theme	
RQ1 (Identify stimuli and cognitive factors)	1. How do we determine the stimuli and cognitive factors to explain user experience in AR mobile platforms?
Cognitive Factors	
Mental Imagery	Mental imagery is an internal cognitive process to generate mental images reflecting a virtual AR mobile platform product.
Sense of Immersion	Sense of immersion is a degree of perceiving cognitive feeling to experience virtually embedded computer-generated objects from the virtual to the physical world.
Trust	Trust is the degree to which a user relies on the virtual product in a situated environment and affects the intention to use the AR platform by alleviating product uncertainty and the need for touch.
Continuance Intention (decision-making)	Continuance intention is defined as a behavioral response to continue using the AR mobile platforms after interactions.
External Stimuli Cues	
Insight Experience	Insight experience is a technique adopted in the AR mobile platform that considers predictive information regarding user characteristics based on previous activities.
Online Reviews	Online reviews is defined as users' feedback and opinions regarding mobile apps and virtual product information using different online channels like app review sites, SNSs, search engines, etc.