WOW, the make-up AR app is impressive: A comparative study between China and South Korea

Abstract

Purpose – Consumers today actively participate in online purchasing experiences. As a result, it is critical to comprehend the behavioral aspects of novel technology usage, such as augmented reality (AR). AR apps enable beauty companies to create and design more immersive experience services. This study aims to highlight consumers' perspectives on their continued desire to use AR app services.

Design/methodology/approach – A comparative study between China and South Korea was conducted with sample sizes of 458 and 315, respectively. Smart PLS was used for analysis.

Findings – The findings suggest that AR apps influence innovative consumers in China and South Korea to be satisfied with and continue to use such services. Previous research on technology acceptance model (TAM), information system success (ISS), AR, and artificial intelligence (AI)-context-specific variables supported the findings.

Practical implications – This study contributes to the development of AR apps for beauty brands, as such technology revolutionizes how beauty brands work and grow. As a result, AR apps can pave the way for brands to provide immersive experience to their customers.

Originality/value – The current study contributes to AR and AI drivers in the context of beauty brands by utilizing novel technologies such as AR. AR integration with AI-context-specific variables indicates that consumers in China and South Korea are innovative and accept such technologies when purchasing beauty products online.

Keywords – AR content quality, AR environment embedding, AR satisfaction, AR interactivity, AR enjoyment, AR customization, ISS, TAM

Paper type – Research paper

Introduction

The world economy has changed dramatically in the last year because of the novel COVID-19 (Bartik *et al.*, 2020, Ostrom *et al.*, 2021). Only a few countries, such as China and South Korea, were able to deal with the virus strategically by utilizing cutting-edge technology. Both countries maintained their commercial interests and continued to operate services and manufacturing for exports and imports. As global trade leaders, the Asia-Pacific Economic

Cooperation (APEC) zone, China, and South Korea comprise a three-tiered economic system. Consumers in China and South Korea accept new technologies as they become available in the market (Hwangbo *et al.*, 2017). According to one report, online shopping in Korea has risen to $96 billion (Export.Gov, 2019). These online purchases account for 6.27 percent of the Korean GDP ($1.53 trillion) (Export.Gov, 2019). Innovative technologies, such as augmented reality for shopping, have grown in popularity (Chung *et al.*, 2018, Lee *et al.*, 2020). Furthermore, Korean cosmetics sales have increased over the last decade because of quality, domestic and international purchasing power, and effective advertising campaigns (Asgari and Hosseini, 2015, Shalehah *et al.*, 2019). To attract and retain customers, business models have changed, necessitating innovative technologies in both online and offline formats. Previous systematic literature on augmented reality (AR) has demonstrated how it aids retail, gaming, and medicine (Parekh *et al.*, 2020). As a result, organizations are increasingly turning to innovative retail technologies, such as augmented reality, to boost sales and revenue while building brand loyalty (Thomas, 2020, Van Esch *et al.*, 2019). AR is defined as an interactive experience that augments the immediate environment with digital layouts to provide a sense of realism (Hilken *et al.*, 2020). AR can engage customers while they shop, influencing satisfaction and long-term intent. Emerging and developed economies are focusing on implementing cutting-edge digital infrastructure to make life easier for end users (Thomas, 2020). Such interactive technology can assist businesses in increasing sales and revenues, as well as attracting new customers (Heller *et al.*, 2021, Rauschnabel, 2018).

China is another country with many online shopping transactions (Ziaullah *et al.*, 2017) and a massively populated country with significant purchasing power (Zhou, 2019). The Chinese e-commerce industry is expected to remain ahead of the American and European e-commerce industries by 2025 (Zhang *et al.*, 2017). The Chinese e-commerce industry is expanding as internet services, smartphones, and purchasing power have become more widely available (Statista, 2020). China has grown to become the world's third-largest cosmetics industry, with a market value of more than $5 billion USD (Lim, 2018). It is expected to become a beauty industry leader in the coming years. The Chinese digital economy has boomed in recent years, with an increase of 36 trillion yuan in 2019. (Daily, 2020). As a result, the digital economy, such as QR codes and facial payments (Lou *et al.*, 2017), AR/VR technology usage (Jeet, 2019), and other retail innovative technologies (Rafaeli *et al.*, 2017, Zhou, 2019), is on the rise in China, particularly for online shopping. The current study identifies the predictors that influence consumer satisfaction and ongoing interest in AR-based service usage.

The purpose of this study was to examine the factors that influence satisfaction and long-term intent to use AR in beauty brand online shopping from consumers in Korea and China. According to previous research, satisfaction with the AR experience can lead to continued intention (Alha *et al.*, 2019, Li and Chen, 2019). Both countries' economies are thriving, and their cosmetic brands are gaining popularity worldwide. As a result, a comparative study will provide insights into Chinese and Korean consumers who purchase cosmetic products using AR technology. Academics and managers have received strategic recommendations for the use of augmented reality and virtual reality in online retail formats from the existing literature (Marinova *et al.*, 2017). AR in retail demonstrates how companies are implementing such technologies to boost sales and revenues while attracting new customers. Innovative technologies meet customers' ever-changing desires for an exciting shopping experience. International brands, such as the L'Oréal brand, enter these markets and gain market share (Insights, 2018).

Despite the fact that both countries are technologically advanced, international brands enter the beauty sector by utilizing cutting-edge technology (Forbes, 2020, Hollebeek *et al.*, 2021). This research study includes L'Oréal brand customers in China and Korea who have used AR services online to purchase cosmetics. Previous research has shown that AR technology improves the shopping experience of consumers through various omni-channels (Manis and Choi, 2019). The ISS model determines the factors that influence satisfaction with a specific technology (Li and Shang, 2020). SERVQUAL, another service quality model, is used to predict consumers' behavior toward qualitative services while using technology(Parasuraman, 1998, Zeithaml *et al.*, 2000). The current framework focuses on understanding the qualitative content and information quality that augmented reality provides to the consumer; thus, using the ISS model is deemed more appropriate and will provide valuable insights into the satisfaction and ongoing intention of AR technology. The desire to use technology is driven by its ease of use and benefits (Naranjo-Zolotov *et al.*, 2019). AR technology has the potential to provide such experience to end users. The current framework will gain insights from comparative data in understanding satisfaction with AR and its ongoing intention to use AR.

Previous studies on AR technologies have focused on perceived usefulness; therefore, the current study considers perceived ease of use. As a result, we emphasize perceived ease of use as the primary focus in the current framework to comprehend the basic functionality of AR-based services in an online setting environment. Environmental embedding provides

information about consumer behavior when using AR technology in a specific situation, such as who it integrates with the user's ability and how they perceive it to be real (Poushneh, 2018). As a result, such a variable will aid in understanding consumer behavior in China and South Korea in terms of how they believe AR is real while shopping online. Customers' behavioral input for AR-based services will be provided by the AI-context-specific variables enjoyment (entertaining factor while using AR-based services), interactivity (quick responses), and customization (modified information about products, services, and promotions).   Previous research on consumer behavior and augmented reality in retail has shown that it is beneficial (Liberatore and Wagner, 2021) and academicians and managers would benefit from a comparative study in the current framework. L'Oréal is a well-known global brand with flagship stores in China and South Korea. In a limited number of stores, L'Oréal has begun to use augmented reality technology, such as smart or magic mirrors, within their physical environment (Insights, 2018). Its unique features and functionality are gaining popularity among the young people. L'Oréal launched its AR website and application a few years ago to assist consumers while they shop online (Hsu, 2017). As more brands adopt such technologies, more research is needed to better understand consumers and motivate them to continue using such services that provide satisfaction, enjoyment, customization, and interactivity. This study attempts to answer the following research questions:

RQ1. Can the consumer's satisfaction and continuous intention be predicted with AR technology?

RQ2. Will innovative technologies such as AR offer convenience while shopping to Chinese and South Korean consumers?

AR can improve the shopping experience in the real world by utilizing advanced digital layout content (Pantano *et al.*, 2017). AR is available online via various apps and websites, and many other brands are already utilizing it (Hilken *et al.*, 2017, Pantano *et al.*, 2017). AR with AI variables can provide end-users with interactivity, customization, and enjoyment. Consumers in China and South Korea are aware of and have used such technologies. It is still a relatively new concept in the beauty industry, but it is gaining traction. Artificial intelligence (AI) is another cutting-edge technology that strategically develops services for end-users (Huang and Rust, 2021). AI can provide human-like services to the end-user in different formats, such as chatbots or robots, through its machine learning ability (Bhutani, 2019, Huang and Rust, 2018).

This study provides insight into the online use of AR services in a beauty brand through a comparative study between China and South Korea. AR and AI are already being used for online shopping and have provided detailed information about digital transactions (Kang, 2014, Mcleay *et al.*, 2021). This research study focuses on consumers who have had AR experiences while using beauty brands online, but from a comparative study perspective. The differences between the users in the two countries will help us understand the determinants of satisfaction and continuous intention. The following sections include literature review, methodology, research analysis, discussion, limitations, and conclusions.

Literature review and framework

ISS – System quality (SYQLTY) and service quality (SQLTY)

The success of information systems (ISS) determines consumer satisfaction and intent to use a product (Al-Fraihat *et al.*, 2020, Yusuf *et al.*, 2018). ISS aids in the understanding of end-user behavior toward a specific product or service (Delone and Mclean, 2016, Schaarschmidt and Höber, 2017). Considering the ISS model, this study focuses on understanding consumer behavior in the context of AR technology. AR technology is a new phenomenon in the retail industry, which is still being investigated. Some consumers embrace technology quickly, while others take time to adapt to such changes. As a result, AR in an online context is still being studied, and more research is needed to understand consumer psychology. The ISS model will aid in learning more about consumers' reactions and responses to such technologies while shopping. From the perspective of AR, this study focuses on system quality (SYQLTY) and service quality (SQLTY). More research is needed in the literature on ISS from the perspective of AR. The current study will provide more in-depth details on the use of AR-based services for cosmetic products in China and South Korea in the online context using SYQLTY and SQLTY. Previous research has demonstrated the key benefits of mobile AR for end-users (Lim *et al.*, 2019).

System quality (SYQLTY) infrastructure includes intelligent devices and web browsing services (Leong *et al.*, 2017). SYQLTY focuses on comprehending the digital infrastructure of AR technology on online retail platforms. A high-quality system can persuade customers to continue using this technology (Kim and Hwang, 2012, Van Pinxteren *et al.*, 2019). Previous research has demonstrated the significance of SYQLTY from various perspectives (Leong *et al.*, 2017, Sharma and Sharma, 2019). Previous research has not paid much attention to

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understanding the qualitative digital infrastructure of AR technology in online retail platforms. As a result, SYQLTY will provide valuable insights into consumer behavior toward innovative technologies such as AR. SYQLTY aids ISS in functionality, integration, data quality, usability, and usefulness (Delone and Mclean, 2003, Freeze *et al.*, 2019). The current research framework emphasizes the significance of strong digital infrastructure in SYQLTY to bring AR-based services to a close in the online context. Consumers in China and South Korea are aware of recent online technologies. As a result, while AR is not new in the online context, it is still relatively new in the beauty context, as not many brands offer this service. Thus, SYQLTY can be understood from AR's perspective and can be used in the future as AR system quality if the results favor the conceptual framework.

Furthermore, service quality is critical in determining the efficacy of an ISS model (Li and Shang, 2020, Zhao *et al.*, 2012). Service quality (SQLTY) in AR is determined by the quality of the system and the qualitative content of the AR. Incorporating AI-context-specific variables, such as enjoyment, interactivity, and customization, allows the end-user to comprehend and select precisely what they want to see and explore based on their needs and desires. As a result, as explained in previous studies, the quality of service provided by AR can entice the end-user to continue using such services (Ismagilova *et al.*, 2019, Wang and Hajli, 2017). AR-based quality services are expected to have a positive impact on consumer satisfaction. AR with AI-context-specific variables can improve the ability of the end-user to modify and interact with the service. AR quality content with SYQLTY and SQLTY can quickly influence consumers to use the service and increase satisfaction. SQLTY enables businesses to provide more personalized services to their customers by leveraging cutting-edge technology (Zheng *et al.*, 2019). The greater the SQLTY of a service, the greater the consumer satisfaction (Kim and Hwang, 2012, Murali *et al.*, 2016). With the continued use of this technology, high levels of satisfaction improve customer experience (Liu *et al.*, 2017). Therefore, the SYQLTY of AR services with SQLTY can influence consumers to develop cosmetic products' continuous intention in the online context using AR technology. Accordingly, we suggest the following:

H1. System quality has a positive effect on perceived ease of use

H2. Service quality has a positive effect on perceived ease of use

AR content quality (ARC)

AR is a disruptive technology that positively impacts retail sales and growth (Nanji, 2019, Poushneh and Vasquez-Parraga, 2017). The ISS information quality dimension is similar to the

AR content quality (ARC) in that the service's information is critical. Technology with high-quality content can entice customers and lead to satisfaction. AR technology enhances the end-immediate user experience by emphasizing realism through digital layouts (Rauschnabel *et al.*, 2019, Zaki, 2019). As a result, AR digital content can entice consumers to pursue the brand's services and shop online. The quality of information has already been shown to positively impact consumer satisfaction (Veeramootoo *et al.*, 2018). As a result, we used AR content quality to understand the AR perspective using a beauty brand's AR app in this study. The ARC can be defined as an outstanding qualitative experience delivered via an AR app by delivering digital content in a real-world environment relevant to consumers' goals. AR technology's digital content can attract consumers and influence them towards the satisfaction and continuous intention of AR technology.

In a beauty brand, consumers try to feel and see a product in person. However, with the help of AR, consumers can now have a sense of feeling that can make them believe it is real. The feeling is developed with AR functions to provide digital content to consumers in their immediate environment. AR technology in retail has provided such a source of feelings to consumers in retail settings (Huang and Liao, 2015). Information quality related to the content quality of technology can influence consumers to continue using a particular technology. Hence, the AR features' qualitative content must sufficiently provide realism; otherwise, it may negatively affect such services. The better the information and qualitative content, the higher the preferences for service usage (Legner *et al.*, 2017, Silva *et al.*, 2017). Therefore, we propose:

H3. AR content quality has a positive effect on perceived ease of use

AR environmental embedding (AREE)

Online beauty brands that use AR services focus on providing high-quality environmental embedding to provide a pleasurable experience (Hilken *et al.*, 2017). Immersive and interactive technologies, such as AR, require environmental embedding (Bonetti *et al.*, 2019, Scholz and Smith, 2016). AREE not only improves consumers' immersive experience; it is critical to understand consumers' immersive experiences with innovative services (Sakhdari, 2016, Wang *et al.*, 2020). AREE can play a critical role in providing a real-time environment with high-quality content and information in a beauty brand. In previous studies, environmental embedding has been used to assess different aspects of consumer psychology (Fang *et al.*, 2019, Hwangbo *et al.*, 2017).

AR services are used both online and offline to provide consumers with an immersive experience of how a product or service will look (Broom *et al.*, 2019; Butcher *et al.*, 2019). Further research is needed to understand consumer attitudes toward innovative services. As a result, environmental embedding could play an important role in emphasizing consumers' and brands' innovative services. This application of AREE has been highlighted in the gaming industry, and it has influenced consumers to participate more in the game (Alha *et al.*, 2019, Ghazali *et al.*, 2019). Figure 1 presents the conceptual framework of this study. AR is successful only if it can provide a real-time environment through its virtual layout. AREE can provide valuable insights into consumer behavior usage and the continuous intention to use such technology. Hence, we propose the following hypothesis:

H4. AR environmental embedding has a positive effect on perceived ease of use

Figure 1 Conceptual framework

Perceive ease of use (POU) - TAM dimension

The technology acceptance model (TAM) is widely used in technology adoption (Kaushik and Rahman, 2015). Previous research employed the TAM model in tourism (Chung *et al.*, 2015) and online shopping (Mclean and Wilson, 2019), with a greater emphasis on the perceived usefulness of AR (Ahmad *et al.*, 2020, Alha *et al.*, 2019). Perceived usefulness emphasizes the benefits of technology, whereas perceived ease of use emphasizes the ease with which technology can be used (Jiang *et al.*, 2021). As a result, the current study focuses on the perceived ease of use of AR-based services and how consumers perceive AR services to be simple to use while shopping. The perceived ease of use (POU) reveals the user's perceptions of how technology can improve its functionality (Abdullah *et al.*, 2016). AR POU may persuade customers to be pleased with such a service from a beauty brand.

From the perspective of AR, the satisfaction construct can highlight various benefits, such as convenience, time, and quick response. As a result, perceived ease of use reflects a more appropriate way to understand consumer behavior in online retail platforms regarding AR technology. In a technological context, the less effort required, the greater the satisfaction and intention to use a specific product or service (Sheng and Zolfagharian, 2014, Wang *et al.*, 2021). As a result, POU in AR can encourage consumers to be satisfied and continue using online AR services. Consumers in China and South Korea are well equipped with cutting-edge technologies, such as AR and QR code payments (Jung *et al.*, 2015, Zhang *et al.*, 2017). We propose the following:

H5. Perceived ease of use positively effects AR satisfaction

AR context-specific variables

Perceived enjoyment (PENJ)

Perceived enjoyment (PENJ) refers to a task that can provide a pleasurable experience apart from its outcomes (Holdack *et al.*, 2020, Van Pinxteren *et al.*, 2019). AR services in a beauty brand online can provide a fleeting PENJ experience (Olsson et al., 2013). The entertainment factor is also important in traditional services at a physical store, but it is more firmly predicted as a strong contender in virtual stores (Sara Kim et al., 2016; Benoit et al., 2017). PENJ has shown significant findings in the online context of how it influences consumers towards different products and services (Alalwan *et al.*, 2018, Rouibah *et al.*, 2016). Therefore, we can predict that AR services with AI-context-specific variables will satisfy consumers and continue using these services. Previous studies have highlighted PENJ as a vital predictor of continuous intention towards technology usage (Alalwan *et al.*, 2018, Lee *et al.*, 2019).

Like AR, the virtual world has transformed the traditional shopping experience into a more pleasurable and wonderful experience (Butt *et al.*, 2021, Holdack *et al.*, 2020, Jang and Park, 2019). Such an immersive environment helps consumers immerse in AR services as it provides entertainment value while shopping (Yeo *et al.*, 2017). The entertainment technology factor can influence consumers to continue using such services as they offer an immersive experience (Alha *et al.*, 2019). PENJ is considered an essential factor in the study of AR apps (Rese *et al.*, 2017). Consumers in China and South Korea may find AR apps to be more entertaining while shopping. Hence, we propose:

H6a. Perceived enjoyment has a positive effect on AR satisfaction

H6b. Perceived enjoyment has a positive effect on continuous intention to use

Perceived interactivity (PINTY)

AR apps can help consumers modify information or content according to their needs and wants. The ability to change the existing environment's information and respond according to the customer's needs and wants is termed interactivity (Carlson *et al.*, 2018, Steuer, 1992). Perceived interactivity (PINTY) can influence consumers to communicate with sellers through interactive technology. AR apps with AI-context-specific variables can provide such experiences to end users. AR services allow end-users to modify the content and information

and interact with the retailer according to their will (Goyal *et al.*, 2013). The purpose of PINTY is to highlight how innovative technologies and consumers interact in a given environment. Quickly responses to the user's needs and wants can influence them to continue using products or services. The interactivity aspect can provide consumers with psychological insights into the use of innovative technologies. PINTY can provide such functionality to the end-user, and previous studies have focused on PINTY in gaming and online shopping (Spielmann and Mantonakis, 2018).

From the AR perspective, the main idea of interactivity is frequent responses and reactions in the mediated environment in real time. Using AI variables such as PINTY can encourage the end-user to easily modify the information, interact, respond, or react based on their needs and desires (Kimberly, 2016). As a result, in the current study, PINTY will aid in understanding the psychological behavior of Chinese and South Korean consumers. It gives the consumer the ability to change information as they see fit. PINTY can attract customers' attention to the shopping experience (Fang, 2017, Robertson *et al.*, 2016). AR beauty apps are attractive and interactive, which undoubtedly impact consumer shopping behavior and influence them to continue using such services. Hence, we propose:

H7. Perceived interactivity has a positive effect on continuous intention to use

Perceived customization (PCC)

Perceived customization (PCC) refers to the ability to change product information or the product itself, and customize promotional alerts in a mediated environment (Kim *et al.*, 2015). PCC has been identified as an important factor in changing products or services according to their needs and desires in the online shopping experience (Lee *et al.*, 2015). Standardized products are unsuitable for retail customers who prefer more control and freedom over the product or service (Pillai *et al.*, 2020). Customization allows customers to modify products or services to meet their specific needs and desires. The use of PCC in AR apps in a beauty brand can assist end-users in personalizing the online shopping experience. Customization may take the form of digital screens, product alerts, or the use of chatbots (Kimberly, 2016).

As a result, the use of AI aspects can help consumers interact and enjoy more in the context of AR. In online shopping experience, PCC has become a strong predictor of consumer behavior (Scholl-Grissemann *et al.*, 2020). Perhaps AR apps' interactivity, enjoyment, and

customization capabilities in an online context can make consumers more accessible and powerful. AR technology in the retail context, both online and offline, alters consumer perceptions and influences them to shop more frequently. AR with AI aspects is powerful for retailers, as it can influence consumer satisfaction and long-term intention. Hence, we propose the following hypothesis:

H8. Perceived customization has a positive effect on continuous intention to use

AR satisfaction (SATT)

Satisfaction is regarded as an essential technology variable when assessing the ISS model related to innovative technology (Ashfaq *et al.*, 2020, Yeoh and Koronios, 2010). Fulfilling one's needs and desires is referred to as satisfaction according to his beliefs (Benoit *et al.*, 2017). Satisfaction can lead to positive experiences for users when using a product or service (Chung et al., 2013; Minjee and *Minor*, 2018a). This study focuses on AR satisfaction (SATT) and how it can influence consumers' willingness to continue using a specific service such as AR, which is still a relatively new concept in retail, and few brands have integrated technology into their services. As a result, the study of SATT in this context will add value to theories and provide valuable insights into consumer behavior.

More research into SATT literature is needed to understand its impact on consumers' ongoing interest in innovative technologies. The studies yielded positive results as a strong predictor of service reuse in the context of satisfaction (Lee *et al.*, 2018, Orel and Kara, 2014). As a result, SATT may play an essential role in studying consumer behavior in China and South Korea. Because AR has not been thoroughly researched, the use of satisfaction is critical in the framework. As a result, SATT highlights the use of AR apps in the cosmetic industry in an online context. We can also assume that AR apps for beauty brands will persuade consumers to continue using them. Higher customer satisfaction rates predict positive returns and customer returns (Keiningham *et al.*, 2017, Poushneh and Vasquez-Parraga, 2017).

H9. AR Satisfaction has a positive effect on continuous intention to use

Methodology

This study examines how Chinese and Korean consumers behave when using the beauty brand's AR app. The two-country perspective will provide more in-depth information on how AR apps with AI context-specific variables satisfy and influence consumers. For data collection, we hired a private firm called research management consultant. Using the Lime Survey

platform, the research firm conducted an online survey on their websites. The research firm ensured that those who took part in the survey had a recent experience with AR apps or the L'Oréal brand's AR website. Recent experience with AR apps can provide valuable insights into consumer satisfaction and continued intent to use such services. From August to September 2020, the firm collected data from China and South Korea. Responses from these two countries were collected over two months. Respondents had had AR commerce experience on the L'Oréal website and with their AR app YouCamMakeup, available on Google Play and AppStore. A convenience sampling approach was deployed to obtain data from both countries. This approach was viable for the current framework, as in the times of COVID; it is easy to collect data on the time of COVID-19 dynamics. Therefore, using the questionnaire on an online platform was considered viable for gathering data in the current business scenario.

The questionnaire was created in English and then translated into two other languages: Chinese and South Korean. University professors properly screened the questionnaires, and the errors were removed after thorough screening. Because the beauty brand is primarily associated with women, the respondents were all female. The L'Oréal website includes AR features that allow users to interact, customize, and have fun. Table 1 depicts the respondents' perceptions of China and South Korea. The reason for selecting the L'Oréal brand is that it is a global beauty brand widely available online and offline in both countries. Four hundred seventy-one responses were collected from Chinese consumers aware of AR and used the L'Oréal AR website and AR app for beauty product purchase. Of the 471 responses, 13 were discarded because they contained male responses, and some were not fully answered. Thus, a total of 458 responses were used for the final data analysis from China. In South Korea, 338 responses were recorded. Of these, 23 responses were removed from the final data as they contained male responses, and some of the responses were not fully answered. A total of 315 responses from South Korea were used for the final data analysis.

Table 1 Respondent's Profile

The goodness of Fit Index (GOF)

Tenenhaus *et al.* (2005) developed a global fitness index to measure the overall goodness of fit of the model. The developer claimed that GOF is comprehensive and mitigates previously developed fit model problems by considering both the measurement and structural model simultaneously. This GOF has been used by many renowned researchers in their work (Chin,

2010, Tenenhaus *et al.*, 2005, Vinzi *et al.*, 2010). The GOF value is .553, which confirms the global fitness of the model used in this study.

Coefficient of Determination (R^2)

The R square is the in-sample predictive power and can be calculated as the squared correlation of the dependent variable's predicted and actual values (Rigdon, 2012). This coefficient of determination reports the collective effect of all the independent variables on the dependent variable. The R^2 values were always between 0 and 1. An R^2 value of 0.75, deemed suitable, 0.50 is considered normal, and 0.25 is considered weak (Hair *et al.*, 2011, Henseler *et al.*, 2009). The R^2 values for CI, POU, and SATT were 0.438 and 0.412 and 0.389, respectively.

Data analysis and Results

Reliability and Validity

Cronbach's alpha was used to measure material composite reliability. Simultaneously, the composite reliability is measured using the load index and error variance of the load index. Finally, the average variance was extracted to measure the constructs' convergent validity (Black and Babin, 2019). The reliability and validity results are reported in Table-2. All the values in table-2 are indicating the goodness of the measurement model and higher composite reliability (Black and Babin, 2019, Nunnally, 1994).

Table 2 Construct Reliability and Validity

Discriminant Validity

Discriminant validity measures how different the study constructs are in the context of the same structural model (Hair *et al.*, 2019). Henseler *et al.* (2015) suggested a sophisticated measure to test DV: the HTMT ratio. As recommended by (Henseler *et al.*, 2015). (See Table-3)

Table 3 Discriminant Validity (Complete Sample)

Hypothesis testing results (Overall Sample)

The structural model tests the hypothesized relationship's strength and significance—table-4 reporting the hypothesis testing results of the study's overall sample study. Overall, the results

were fruitful, except that one hypothesis was rejected based on empirical grounds. H3 was rejected because the results did not favor the framework.

Table 4 Hypothesis Test Results (Complete Sample)

Hypothesis testing results (Chinese Sample)

Here, we report the Chinese sample results in Table-5, and hypothesis numbering and order remain the same in the overall results. H1: SYQLTY and POU (β=0.123, T-stats=2.012, p<0.05). H2, indicating a positive effect of SQLTY on POU (β=0.212, T-stats=3.242, p<0.001). H3: ARC on POU and H4: AREE on POU was also accepted. H5: POU and SATT, as indicated by the results, are positive and significant (β=0.461, T-stats=8.823, p<0.001), and hence accepted. H6a: PENJ and SATT, and H6b: The empirical results also accept PENJ and CI (β=0.330, T-stats=7.244, p<0.001) and (β=0.180, T-stats=3.495, p<0.001), respectively. Hypotheses H7, H8, and H9 are also accepted empirically, as indicated in Table-5. In H7, we proposed a positive and significant effect of PINTY on CI; this hypothesis was accepted based on empirical values (β=0.125, T-stats=2.769, p<0.001). Similarly, we proposed a positive and significant relationship between PCC and CI, which supported this hypothesis (β=0.303, T-stats=4.715, p<0.001). H9 was also robustly accepted based on quantitative results (β=0.237, T-stats=3.441, p<0.001), and H9 proposed a positive and significant impact of SATT on CI.

Table 5 Hypothesis Test Results (China)

Hypothesis testing results (Korean Sample)

Table-6 reporting the Korean Sample and hypothesis order results are the same as reported in previous Tables. H1: SYQLTY and POU, this hypothesis is accepted based on empirical results provided in Table-7 (β=0.232, T-stats=2.746, p<0.05). H2 indicated a positive and significant effect of SQLTY on POU by results (β=0.229, T-stats=2.738, p<0.001). H3: ARC on POU was rejected by the results presented in the below table. H4: AREE on POU is accepted based on results. H5: POU and SATT accepted by the results (β=0.293, T-stats=4.331, p<0.001). H6a: PENJ and SATT, and H6b: PENJ and CI accepted by the empirical results (β=0.430, T-stats=7.289, p<0.001) and (β=0.106, T-stats=1.907, p<0.10) respectively. In H7, a positive relationship between PINT and CI was proposed. In H8, PCC's positive impact on CI was proposed, and H9 proposed a positive and significant relationship between SATT and CI. All

these hypotheses are accepted except H8 (PCC -> CI); this hypothesis is rejected based on empirical results as the coefficient is not significant.

Table 6 Hypothesis Test Results (Korea)

Discussion

The purpose of this research was to examine the behavioral insights of Chinese and South Korean consumers. The conceptual framework results included AR and AI-context-specific variables with TAM dimension and ISS model with PLS-SEM, and they provided valuable insights into both countries. According to the ISS dimensions, system quality, and service quality from the perspective of AR, consumers positively comply with technology if the digital infrastructure conforms to their beliefs. These ISS model results are consistent with those of previous studies in which consumers are pleased with and continue to use a technology (Pai and Huang, 2011). Furthermore, the importance of AR content quality was validated by highlighting the importance of quality content during the use of AR technology. This is also consistent with previous research, which found that consumers consider information quality a key predictor of satisfaction and continuous intention (Ashfaq *et al.*, 2020). As discussed in previous studies, the quality content of services always influences consumers' satisfaction and continued intention (Al-Dweeri *et al.*, 2019, Prentice *et al.*, 2020).

AR environmental embedding has also shown a positive influence on AR services on online retail platforms. This variable highlights how consumers believe that the shopping experience is more interactive, engaging, and more realistic, and is in line with previous studies (Moorhouse *et al.*, 2018, Tom Dieck and Jung, 2018). These results predict that satisfaction and continuous intention can lead to ease when consumers are fully immersed in such technology. Previous studies have also indicated that a higher immersive experience can lead to positive outcomes (Fang *et al.*, 2019, Scholz and Smith, 2016). AR is becoming an integral part of beauty brands, and more R&D is being done to develop more suitable, viable, and functional AR apps for online and physical environments. Hence, these results can help academicians and practitioners develop better AR technology strategies in retail platforms. Overall, the results predict that AR positively influences consumer satisfaction, which leads to a brand's continuous intention. Hence, we understand from the analysis that AR, as expected, affects consumers to adopt or reuse the brand. The dimensions of ISS, SYQLTY, SQLTY, and ARC positively influenced end-user satisfaction levels.

The L'Oréal brand user found the AR app to be a valuable, comfortable, and pleasurable experience. These findings support previous literature on the ISS model (Ashfaq *et al.*, 2020, Chung and Kwon, 2009). ARC was rejected in the South Korean model; perhaps AR apps are still in the introduction stage and need more time to grow and develop into the maturity stage. AREE in both China and South Korea positively influenced the ease of use of AR, as supported by previous findings (Javornik *et al.*, 2016, Mclean and Wilson, 2019). The PCC in South Korea was rejected; perhaps consumers did not believe that it provided absolute customization through the AR app.

Theoretical Contribution

The critical contributions of this comparative study are an extension of system quality, service quality, and content quality (Delone and Mclean, 2003) from the perspective of AR. First, the ISS model has been widely used to understand the digital infrastructure of different online services. The current study focused on understanding AR services using the ISS model to understand how consumers behave towards the system, service, and information content quality. According to previous studies, the results showed that consumers are willing to continue using AR services from the ISS model's perspective, according to previous studies (Freeze *et al.*, 2019, Mudzana and Maharaj, 2017). Therefore, it contributes to the ISS model from an AR perspective. Second, the AR conceptual framework contributes to the TAM dimension in augmented reality. Previous studies have focused on the use of perceived usefulness rather than perceived ease of use. The current study highlights the perceived ease of use of AR and compares China and South Korea to how the consumers of both countries perceive it to be suitable. The results align with the previous literature on perceived ease of use in different technology usage (Hilken *et al.*, 2017, Rauschnabel *et al.*, 2019).

Third, the study focused on understanding how easy AR services are to be used in cosmetic buying in online retail formats, and the results align with those of previous studies (Camilleri and Camilleri, 2019, Fagan *et al.*, 2012). Further, both countries' results show positive results, which gives us the idea that this novel technology is booming and influences its end-user. The results of this study contribute to the literature on AR regarding consumer behavior in China and South Korea. AR content quality and AR environment embedding signify AR technology's importance regarding consumers' willingness to use them in online and offline retail formats. The results align with previous studies in which consumers felt that using AR services is factual and excellent (Bonetti *et al.*, 2019, Scholz and Smith, 2016). Hence,

it contributes to the literature on AR and will help in the development of AR theory. Currently, AR does not have any theory, but the framework will contribute to its development. AR is not limited to one particular industry, and it is being used in different fields such as education, medicine, and shopping (Cabero-Almenara *et al.*, 2019, Rauschnabel *et al.*, 2019).

Fourth, satisfaction plays a significant role in understanding consumer behavior in different service aspects. The study results show that consumers are satisfied with AR services for buying cosmetics, which is in line with previous studies (Genç, 2018, Wu and Li, 2017). Lastly, the conceptual framework contains AI-context-specific variables, PENJ, PCC, and PINTY, positively influencing end-user satisfaction and continuous intention. The AI variables showed a significant positive influence on consumers of L'Oréal. These results align with previous literature on AI-context-specific variables (Pillai *et al.*, 2020). These AI-context-specific variables contribute to the theoretical development of AI. AI is the next big thing for businesses worldwide. In developed and developing countries, AI and other novel technologies are at the forefront of adoption.

Practical Implications

This study provides valuable insights to marketing practitioners and retail brands that beauty brands AR apps are a future market for AR applications. First, the results indicate that consumers are satisfied with AR technology, and beauty purchase intention has transformed from a conventional to a more immersive experience. Hence, brand managers should integrate such technologies into online and offline retail platforms to engage customers. The satisfactory shopping experience of AR can lead to the continuous intention of AR technology, as predicted in previous studies (Lee *et al.*, 2018, Wu and Li, 2017). Second, the results highlight AR apps' functionality, usability, credibility, and innovativeness to purchase beauty products. Cosmetic companies and others can further explore such AR functions by conducting R&D so that customers have a more immersive experience. Previous studies have shown that technology enhances consumer experience due to advanced features (Talukder *et al.*, 2019, Tsai *et al.*, 2019). AR content quality and AR environmental embedding help consumers feel the product even in the online context (Javornik *et al.*, 2016, Kang, 2014). AR's novelty indicates that beauty product users have digitally transformed and are ready to accept such technologies. Hence, the integration of AR with AI is a crucial aspect of such apps.

Third, China (Daily, 2020) and South Korea (Export.Gov, 2019) are highly innovative countries; therefore, the satisfaction and continuous intention to use AR apps are higher. Hence,

countries such as those adopting novel technologies are higher than less conducive countries to foster innovativeness in their citizens (Steenkamp, 2019). It is understandable from the results and previous studies (Min *et al.*, 2019, Tsai *et al.*, 2019) that consumers from these countries happily accept the use of innovative technologies. Fourth, consumers are looking for pleasant experiences online and offline. AI and AR integration provide such an immersive experience to the user of beauty products. Previous studies have predicted that the enjoyment factor in technology usage leads to satisfaction and continuous intention (Otto *et al.*, 2020, Roy *et al.*, 2016). Entertainment, customization, and interactivity factors can play a vital role in influencing, engaging, and attracting customers. Hence, brands should invest more in such novel technologies to give the end-user a more thrilling experience from a conventional one. Lastly, AR app implementation is not limited to an online perspective. It can be further implemented in physical stores, and many brands have already introduced such technology at limited stores. Additionally, brand managers of a beauty brand can develop multiple channels to provide the same AR services for their end-users.

Limitation and future directions

The study of China and South Korea provided positive results, but it had a few limitations. First, a beauty brand that had an AR app was used. Other international beauty brands also use AR apps. Perhaps a comparative study of the two brands can provide more insights to users. Second, L'Oréal is a global brand, but China and South Korea's local brands also get fame in the Asian market. Perhaps for future study, local brands available in both markets can be part of the research study. This can provide more insight into consumer behavior. Third, the TAM and ISS models are part of this research framework. Other theories related to technology can be adopted as a future reference to see the impact of the AR stream. Fourth, the study results should not be generalized to the overall population of China and South Korea. The increased sample size can be considered for future studies to gain a better understanding of the data. Lastly, other variables can be added to the framework to understand consumer behavior, such as AR psychological engagement, AR attitude, AR expertise, and AR vividness.

Conclusion

The results highlight a positive influence for both countries' consumers by using AR apps to buy cosmetic products. The virtual product try-on creates an enchanting experience through AR aspects and AI-context-specific variables. The entertainment factor involves engaging consumers to try such novel services. Consumers in both countries are satisfied with AR apps

and have a continuous intention to purchase the brand. Consumers of beauty products usually try a product in a real-time environment to observe its effects. AR apps are trying to provide exact real-time impact in an online context. This study shows that AR apps in beauty product purchases are helpful and provide a product's realistic experience. The AR apps evoke fascination, satisfaction, and pleasurable experiences through AI-context-specific variables; hence, they can be adopted by different beauty brands in the future. s

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