Engaging the customer with augmented reality and employee services to enhance equity and loyalty

Abstract

Purpose – This study aims to understand customer equity and loyalty using augmented reality (AR) and employee services in a physical retail environment. The current study investigated how customers' experiences with AR-based and employee service affect their satisfaction, equity, and loyalty.

Design/methodology/approach - A conceptual framework was developed by reviewing the literature on AR and employee services. The Smart PLS-SEM technique was used to empirically test responses of 620 Chinese respondents.

Findings – The findings provided valuable insights into AR and employee services in a physical retail environment. In the current business climate, customers are more inclined to use augmented reality services.

Research limitations/implications – This study's sample was drawn from a single city, with a total of 620 respondents, which may not be a complete representation of China as a whole. As a result, the results may not be generalizable to a single city.

Practical implications – To retain and attract customers, retail brand managers should put more emphasis on implementing innovative technologies in the physical retail environment. Pandemic consumers are opting for innovative technologies as part of their shopping experience as a result of changes in business models.

Originality/value – The researchers recognized the concept of augmented reality and employee services as an innovative domain in physical retail stores because it can lead to increased sales, customer equity, and loyalty. As a result, the framework results are precious to practitioners interested in implementing such innovative technologies for retail stores.

Keywords – Augmented reality technology, service experience, interactivity, customer satisfaction, customer equity, customer loyalty

Paper type - Research paper

Introduction

The shopping experience of the customer has become an important factor in defining retail strategies for organisations seeking to improve performance. (Prentice and Nguyen, 2020). Several touchpoints along the way play an essential role in enhancing the customer

experience. These touchpoints serve as the foundation for organizational and customer interaction (Varnali, 2019). These interactive touchpoints in the service industry are defined as humanism and mechanical functions to benefit the customer's service experience. (Kuehnl *et al.*, 2019, Mahr *et al.*, 2019). As such, recent developments also suggest that augmented reality (AR) will be indispensable and marketers need to integrate AR in their marketing strategies (Scholz and Duffy, 2018). According to plethora of research studies, such experiences can have an impact on the customer's positive relationship with the organisation (Prentice *et al.*, 2020a). Digital payment methods, virtual reality, and augmented reality are the technologies that are strengthening the consumer-brand bond (Cuomo *et al.*, 2020, Jiang *et al.*, 2021). Augmented reality in particular, is an innovative media that integrates virtual content into customer's perception for instance furniture planner application allows you to see the furniture in your home (*Rese et al., 2017*). Our research is motivated from extant literature on customer satisfaction and real practices of AR and it revolves around AR based customer satisfaction in a physical environment. This research acts as a spring board in determining the innovative AR strategies to be implemented in a physical retail environment.

Furthermore, the quality of service in the retail environment can influence the consumer's perception of satisfaction (Wu *et al.*, 2019). Service quality (SERVQUAL) is essential for understanding new retail industry dynamics and assessing future organisational performance strategies (Chen *et al.*, 2018). As a result, SERVQUAL is essential for understanding customer behaviour a beauty retail outlet (Islam and Tabassaum, 2010). We contribute to literature by extending the framework to AR based services in achieving customer equity and loyalty in a physical environment.

The inclusion of SERVQUAL in the current framework will provide valuable insights into the consumer-brand relationship in employee and AR-based services. AR is defined as a function that can provide realism in a natural environment by utilising digital objects (Smink *et al.*, 2020). Retail brands have increased AR use in order to retain and attract customers and develop a better customer-brand relationship (Perannagari and Chakrabarti, 2019, Watson *et al.*, 2018). AR technology-based services have rapidly spread in a variety of product categories, including clothing, toys, and tourism (Shaham, 2020, Voitik and Maslov, 2019). AR-based services are also used in education to enhance the student-teacher experience (Cabero-Almenara *et al.*, 2019).

AR-based services are being implemented in retail outlets to provide customers with convenience and to enhance their shopping experience (Shams *et al.*, 2020). As a result, higher levels of interactivity are required to comprehend AR technology and consumers' relationships in the service experience. SERVQUAL has previously been used by various researchers to understand the qualitative nature of a particular service in the hospitality and banking sectors (Prentice and Nguyen, 2020, Zhou *et al.*, 2021). SERVQUAL, we believe, will be critical in defining the impact of AR-based services on satisfaction, equity, and loyalty. Previous research studies have shown how AR technological services have aided the medical, education, and tourism industries (Bursali and Yilmaz, 2019, Han *et al.*, 2018). Consumers' perceptions of interactivity may influence their decision to adopt innovative retail technology (Pillai *et al.*, 2020). The service industry has embraced AR-based services to improve the customer experience (Kovics, 2020, Poushneh, 2018). The study closes the gap between AR-based and employee services, and also customer-brand relationship. Brands value the consumer-brand relationship because it affects sales and customer retention, which leads to satisfaction and loyalty (Giovanis and Athanasopoulou, 2018, Kim *et al.*, 2018).

As existing literature still lacks in defining the impact of employee and AR-based services on overall customer equity, we address this important issue and provide an integrated framework for marketers. Thus, we answer following research questions in this research:

RQ1) Will the employee and AR-based services impact the consumer?

And RQ2) Can such services be integrated into customer experience satisfaction, equity, and loyalty?

Previous research has focused on the importance of satisfaction in the retail industry in terms of customer experience (Ying Wang *et al.*, 2017. As a result, mechanical functions such as AR-based services, in collaboration with employees, can improve the customer journey. Furthermore, satisfaction has been linked to perceived equity and loyalty (Kim and Ahn, 2017). Previous research has shown that consumers are satisfied with technology use when they believe it improves their performance (Ashfaq *et al.*, 2020). The retail experience may result in lower stress environments in consumers' consumption settings while also increasing equity and loyalty (Alexander, 2019). Recent studies suggest that AR technology plays a domineering protagonist in influencing customer's service experience (Rauschnabel, 2018, Song *et al.*, 2019). AR technology helps in increasing sales and revenues, acquiring new customers, retaining existing ones, and improving organizational efficiency (Shaham,

2020) . It is also seen that AR-based services are influencing a positive drive towards consumer satisfaction (Genç, 2018, Poushneh and Vasquez-Parraga, 2017). The following sections are the literature review, methodology, data analysis, discussion, and conclusion.

Literature review and hypotheses development

We provide relevant literature for the hypotheses and summarised the important one along with the key results in tables. Moreover, we also highlight the contribution of our research by differentiating it with other relevant ones. In the proceeding subsections, we enumerate different research studies based on the relevant themes and then we justify our hypotheses.

Humanic service experience, customer satisfaction, perceived customer equity, and customer loyalty

Service quality (SERVQUAL) is a crucial predictor for satisfaction, equity, and loyalty (Roy *et al.*, 2016). The shopping customer journey includes touchpoints, particularly humanic service, that are critical between consumer-brand relationships. The current research study investigates the humanic service experience and AR-based services from the perspective of SERVQUAL in a retail beauty brand. We provide relevant studies in **Table 1** along with the key focus. In contrast to SERVQUAL model which has five dimensions developed by Parasuraman (1998), four dimensions are used in this study regarding employee and AR-based services. The tangibility dimension is removed from the current framework, and other dimensions such as reliability, assurance, empathy, and responsiveness are used instead.

In **Table 1**, we also highlight important piece of literature on employee services and relationship with different marketing factors. Based on these pieces of literature, the customer service experience in a retail setting is dependent on the employee's attitude and behaviour, which can lead to satisfaction, equity, and loyalty (Bolton *et al.*, 2018). A positive attitude during sales process to the customer can enhance the shopping experience that can lead to satisfaction and loyalty (Delcourt *et al.*, 2013, O'reilly, 2012). Moreover, physical responses, social, emotional, affective, and customer cognitive acts are part of customer experience (Pandey and Chawla, 2018, Wang *et al.*, 2020). Previous studies have predicted that satisfaction and loyalty in the retail sector result from positive customer experience with the retailers (Flacandji and Krey, 2020, Jiménez Barreto *et al.*, 2019). Our research looks at the positive influence of employee services on customer satisfaction, equity and loyalty. Consistent with the discussion, we propose the following:

H1a: Service experience with employees positively influences customer satisfaction

H1b: Service experience with employees positively influences perceived customer equity

H1c: Service experience with employees positively influences customer loyalty

Table 1. Related literature under Humanic Services

Authors	Key Focus	Key Findings
Gillis *et al.*, 2018; O'reilly, 2012; Pöppel *et al.*, 2018	Humanic service experience	Humanic services are critical in determining the service quality (SERVQUAL). Service quality is an important aspect of expectancy disconfirmation theory. According to these authors, physical environment is strongly related with service quality.
Dong and Sivakumar, 2017; Chen *et al.*, 2018; Gössling *et al.*, 2020; Caboni and Hagberg, 2019	Customer satisfaction and behavior	SERVQUAL plays an important role for AR-based services. Even during the COVID-19 pandemic, businesses are developing innovative services to positively impact consumer behavior in the retail industry.
Darvishmotevali *et al.*, 2018, Smith *et al.*, 2004; Davies *et al.*, 2011,; Kamassi *et al.*, 2019; Li and Shang, 2020, Prentice and Kadan, 2019; Lee, 2015; Prentice *et al.*, 2020b)	Employee Services	These studies emphasize on the positive relationships of employee services on different factors like retailer's service quality based on communication and interactive process. Employee and customer interaction is an important factor in retail services' shopping experience.

The figure-1 represents the conceptual framework of this study.

Figure-1 Conceptual framework

AR service experience, customer satisfaction, perceived customer equity, and customer loyalty

In the last decade, AR technology has risen in popularity and has been adopted by retailers to attract and retain customers (Caboni and Hagberg, 2019, Statista, 2020). The mechanical function, which is AR, constitutes the customer service experience in the retail environment. AR-based services can play a pivotal role in redefining retail services and the use of innovative services have increased incredibly in the times of COVID-19 (Jiang *et al.*, 2021, Mohanty *et al.*, 2020). The immersive shopping experience with AR-based services can provide growth, sales, and new customers in the retail services (Statista, 2020, Wikitude, 2020). In **Table 2**, we summarize the important research studies regarding AR retailing services,

Table 2. Related literature under AR services experience

Authors	Key Focus	Key Findings
Alha et al., 2019; Nanji, 2019; Han et al., 2018; Scholz and Smith, 2016; Zhang, 2020; Alha *et al.*, 2019; Han *et al.*, 2018)	AR retailing services	AR reshapes the retail service experience altogether and generates sales, revenues, and loyalty for the organizations. The AR-based retail environment services can enhance the customer experience with its immersive functions. The previous studies have identified AR as a significant factor in changing the future of the retail industry.
Song et al., 2019; Insights, 2018; Perannagari and Chakrabarti,	AR Technology	AR-based services in both online and offline formats give the end-user the ability to interact, customize, and engage with brand activities or offers. AR technology can help customers in different aspects, such as try-on before buying

2019; Stangl et al., 2020)	clothing and cosmetics. AR-based services can lead to engagement and customer satisfaction.

The studies have indicated that AR tools can transform a conventional customer experience into a more interactive and immersive one (Sekhavat and Zarei, 2018). Further, AR can constitute realism through its advanced digital layouts to give the user a feeling of the real environment with its usage (Hilken *et al.*, 2020). In the current COVID-19 pandemic scenario, where retail businesses are slowed by lockdowns and fewer human-to-human interactions (Hasanat *et al.*, 2020). The new ways of intelligent technologies in the retail sector are becoming the cornerstone for organizations to increase sales and revenues (Insights, 2018, Kovics, 2020) and further lead to satisfaction and loyalty. So, on the basis of existing literature, we propose the following hypotheses:

H2a: Service experience with AR is positively influencing customer satisfaction

H2b: Service experience with AR is positively influencing perceived customer equity

H2c: Service experience with AR is positively influencing customer loyalty

The variables used in the current framework have been explored in different sectors. **The Table-3 explains the variables used in the current research study.**

Table-3 Empirical Studies

Customer satisfaction, perceived customer equity, and customer loyalty

We provide research stream related to customer satisfaction and customer equity and loyalty in retailing sector. These pieces of literature are basis of our mediation relationships which are mentioned at the end of this subsection.

Table 4. Related literature under customer satisfaction in retailing sector

Authors	Key Focus	Key Findings
Park *et al.*, 2017, Djelassi *et al.*, 2018, Gardiazabal *et al.*, 2020, Gardiazabal *et al.*, 2020; Orel and Kara, 2014, Susanti *et al.*, 2020, Moriuchi, 2019	Customer satisfaction, equity and loyalty in retailing experience	Customer satisfaction and equity are positively related to overall retailing performance of an organization. Moreover, positive retail experience also creates positive word of mouth and customer loyalty. These studies highlight that satisfaction is a strong predictor of loyalty in a retail environment.
Kantabutra, 2008, Kosiba *et al.*, 2018, Park and Ha, 2016, Rambocas *et al.*, 2018, Hilken *et al.*, 2017, Huang and Liao, 2017	Customer equity factors	These studies emphasize on customer loyalty and overall customer satisfaction with humanic and mechanical services. So, brands have integrated services like AR to attract more sales.

Based on the literature in Table 4, the current framework provides valuable insights into consumer behaviour from the perspective of AR-based services in retail services. Therefore, we propose the following hypotheses:

H3a: Customer satisfaction positively influences perceived customer equity

H3b: Customer satisfaction positively influences customer loyalty

H3c: Customer satisfaction mediates the relationship between the service experience with employees and perceived customer equity

H3d: Customer satisfaction mediates the relationship between the service experience with employees and customer loyalty

H3e: Customer satisfaction mediates the relationship between the service experience with AR and perceived customer equity

H3f: Customer satisfaction mediates the relationship between the service experience with AR and customer loyalty

The role of perceived interactivity

Interactivity is defined as how customers can interact with the seller and participate in the existing environment (Song and Zinkhan, 2008). Furthermore, interactivity level depends on the seller and the customer's environment (Butt *et al.*, 2021, Park and Yoo, 2020). The in-time responses to queries and situations in a retail setting environment can also be regarded as interactivity (Pillai *et al.*, 2020). Consumers may feel more satisfied with the use of humanic experience in retail services (Gardiazabal *et al.*, 2020). Employee service can have a positive impact on the firm and the customer. As a result, the role of perceived interactivity is critical in human-to-human interaction. The previous studies have predicted positive outcomes of customer interaction with brands services in the light of artificial intelligence (Pantano and Pizzi, 2020, Prentice *et al.*, 2020b). Innovative retail technologies such as augmented reality (AR) can interact with customers and respond to their needs and desires. (Rauschnabel, 2018).

The mechanical function, such as AR, can stimulate the customer and engage in an immersive experience due to its advanced technology (Riva *et al.*, 2016, Song *et al.*, 2019). AR-based services can interact and respond to the customer's needs and desires, producing results that can influence positive satisfaction. Hence, it can predict that the current framework will give valuable insights into consumer behaviour interactions with the employee and AR-based services. Whether it's a human-to-human or AR-based service touchpoint in a retail setting, the level of interactivity is critical for exchanging information between the organization and the customer (Dholakia and Zhao, 2009, Park and Yoo, 2020). Hence, given the discussion, we propose following hypotheses:

H4a: Perceived interactivity moderates the relationship between service experience with

employees and customer satisfaction

H4b: Perceived interactivity moderates the relationship between service experience with

AR and customer satisfaction

Methodology

Sample and measures

The research was conducted by the respondents from the city of Shanghai, China. The respondents were those who have had the experience of using AR services at a physical retail outlet of a cosmetic brand. The brand with this specific AR technology service at their retail outlets is the L'Oréal brand for this particular purpose. The L'Oréal brand is a well-known cosmetic brand around the world and in China. It's number one in the cosmetic category and has many other sub-brands to offer to different segments (Forbes, 2020). The L'Oréal cosmetic brand is a pioneer in China to provide AR-based magic mirror services and employee services to their customers (Insights, 2018). The reason for choosing respondents from China is that a well-known cosmetic brand already provides such services at their physical outlets. Secondly, the Chinese consumers are well equipped and are eager to try new technologies (Post, 2018, Zhou, 2019). Purposive sampling was employed as we have a clear criteria that 1) respondents are female beauty care product users and 2) they have experience of using AR-based innovative technologies.

The target respondents were recruited through various platforms in China, including Weibo, WeChat, and Teiba. Physical contact was the most popular method of recording responses, accounting for more than half of all responses. Students were recruited in these cities to assist the authors in gathering data. The students recruited were compensated for their assistance in data collection by the authors. The AR-based services magic mirrors currently offer female products to be tried on, such as lipsticks, hair colour, eyeshades, etc. As a result, understanding consumer behaviour toward a brand's AR and employer services requires focusing on the female demographic. At the start of the introduction, the respondents were made aware of the survey to have maximum results from those who are genuinely part of the research.

The items of the constructs were adapted from existing studies that reported high reliability and validity. The items for employee service were adapted from (Prentice and Nguyen, 2020). AR-based service items were adapted from (Kallweit *et al.*, 2014, Orel and Kara, 2014). The items for customer satisfaction, perceived customer equity, and customer loyalty from (Gardiazabal *et al.*, 2020). The perceived interactivity items were adapted from

(Pillai *et al.*, 2020). The items were measured on a 5-point Likert scale (strongly disagree to strongly agree).

Procedure

An online and physical survey was used to study the framework. The physical survey results were collected with the help of Chinese students paid to help the authors collect the data. The online survey was conducted on the lime survey platform and distributed on different social media apps mentioned earlier. A total of 649 participants took part in the survey. After filtering the invalid responses and errors, 620 respondents were included in the final data analysis. The 29 respondents who were not part of the final data analysis had similar responses, and some were male respondents. According to Chin and Newsted (1999), minimum number of the sample size should be ten times the largest number of independent variables influencing a dependent variable. In our case, the maximum number of independent variables on a dependent variable is six and according to this criterion, the minimum sample size is sixty. So, we have a sufficient sample to infer the significant results.

Non-response bias arises because of difference in responses of the early respondents and late respondents. We undertook the problem of non-response bias by comparing the first 30 responses with the last 30 responses for all the constructs. We performed t-test to see if both groups were statistically different from each other at 95% confidence interval and found that there was no significance difference between the constructs in two groups (Chen and Paulraj, 2004).

Data was analysed through Smart-PLS version 3.2, a popular partial least square structural equation modelling software. We do not assume normality of data and as such Smart-PLS is an appropriate choice for the analysis. We used first 30 samples to check the reliability of the instrument and Cronbach's alpha was acceptable (Nunnally and Bernstein, 1994).

Table 5 represents the demographic profile that explains further the descriptive details about them.

Table-5 Demographic Profile

Data analysis

Assessment of Measurement Model

We have used complete unstandardized data for all unobserved variables to analyse the measurement model. The PLS-SEM analysis technique has been used through the Smart-PLS software to analyse the constructs' reliability and validity. The reliability and validity results have been reported in Table-3, all the factor loadings are according to the standard, and no value is less than 0.65. All the AVE values are above the minimum threshold of 0.50, hence signifying enough convergent validity. The Cronbach's alpha and composite reliability values surpass the minimum standard or cut-off value (Nunnally and Bernstein, 1994) (See Table-6).

Table-6 Reliability and Validity of Constructs

Finally, we assessed the discriminant validity (DV) of the constructs and how the constructs are different in the context of the same model, and respondents differentiate between constructs. Fornell Larcker criterion used to assess AVE's and the square root of all constructs is greater than the inter-construct correlation (Fornell & Larcker, 1981), proving discriminant validity. Another measure developed is the HTMT ratio that uses Monte Carlo Simulation and calculates the correlation between constructs, and the minimum threshold is 0.90 (Henseler *et al.*, 2015). Table 7 and Table 8 represent Fornell-Larcker and HTMT ratios respectively.

Table-7 Fornell-Larcker Criterion (Discriminant Validity)

Table-8 HTMT Ratio

Assessment of Structural Model

We tested our model's R^2 as a precondition to assess the structural model. R^2 values suggested that the model's constructs explain enough variance and fulfil the standard criterion of model's acceptable nomological validity (Chin, 1998). The next step was to evaluate the structural model, the path coefficients, and relative strength through the bootstrapping technique. H1a indicates the positive and significant relationship between SEWE and CSAT.

The hypothesis is accepted based on findings reported in Table-6 (β=0.299, p<0.01). A positive and significant relationship between SEWE and PCEQ was proposed in H1b; this relationship also proved true, hence accepted (β=0.335, p<0.01). Further, results reported a positive and significant relationship between SEWE and CLOY (β=0.260, p<0.01), this relationship was proposed in H1c. Results also provided support for H2a and H2c as the beta coefficient are positive and significant (β=0.467, p<0.01) and (β=0.247, p<0.01). Figure – 2 represents the structural model, which reflects upon the hypothesis results.

Results rejected the direct effect of SEWAR on PCEQ as shown by the coefficient and p-value (β=0.044, p>0.10); hence H2b was rejected on an empirical basis. H3a (β=0.373, p<0.01). and H3b (β=0.126, p<0.10). also accepted as the results shown in Table-6 indicating the significance of these relationships. We tested for moderating effect of perceived interactivity on the direct relationship of SEWE and CSAT (H4a) and SEWAR and CAST (H4b). The moderating impact on SEWAR and CSAT's direct relationship is positive and significant, which means perceived interactivity positively moderates the said relationship. Unfortunately, results failed to support H4a; the coefficient is significant but negative, which contradicts this relationship's theory.

Table-9 Hypotheses Testing

Figure-2 Structural Model

To assess the strength of indirect/mediating relationships, we have used variance accounted for (VAF). Table-9 is illustrating the results of the mediation hypotheses of this study. H5a has complimentary partial mediation because the direct path is also significant according to the values and standard criteria. It's partial mediation because SEWE still explains a portion of PCEQ. According to the VAF value, no mediation is proved as proposed in H3c; H3d indicates a mediating effect of CSAT between SEWE and CLOY. However, the direct path of SEWE to CLOY is significant. H3e is suggesting a full mediation because the direct relationship of SEWAR and PCEQ is insignificant. This indicates that customer satisfaction plays a vital mediating role in enhancing customer equity. Finally, according to the results, CAST's mediating effect between SEWAR and CLOY is not strong.

Table-10 Indirect Effect

Goodness-of-Fit Index

The goodness of fit (GOF) index is used to measure the complete model fit to verify that model is sufficiently explaining the data (Tenenhaus *et al.*, 2005). Equation-1 was used to GOF index, where AVE was measured as (Geometric mean of Average Communalities) and average values of R^2 of all constructs (Tenenhaus *et al.*, 2005). GOF value for the model of this study is 0.53, as shown in Table-10, which is considered substantial and indicates a good model fit.

$$GoF = \sqrt{AVE * R2}$$
<div align="right">Equation-1</div>

Table-11 Goodness of Fit Index

Conclusion

The current framework provides valuable insights from the perspective of AR-based and employee services for practitioners and academicians. It gives incalculable significance of AR-based services in retail services. Innovative services such as AR are a cornerstone for retail services that transform a conventional experience into a more immersive one. It can further lead to consumer engagement in the innovative services, which drive satisfaction, customer equity, and loyalty. People use human assistance to gain more information and knowledge about the product or service. The combination of employee and AR-based services provide retail brands with a competitive advantage. The results of the current framework signify the role of AR-based services and such innovative services will reshape the physical retail services offered by brands. From the results, we infer that service experience with employees leads to customer loyalty and innovative technologies like AR also contributes to customer equity. It is an interesting insight as marketers need to strategize AR-based services as these technologies contributes directly as well as indirectly to customer equity. Moreover, customer satisfaction from service experience of employees leads to higher customer equity. So, in a crux, users of beauty care products show higher satisfaction and loyalty when they buy products based on better service experience and innovative technology like AR.

Discussion

This research highlights that AR-based service influences customer experience and improves efficiency within the service context. In the context of employee and AR-based services, consumers demonstrate positive satisfaction, which affects equity and loyalty. Nonetheless,

the use of AR-based services in the retail context improves the customer journey. Given the current situation, perceived interactivity plays a vital role as a moderator in defining the overall customer experience. The findings show that overall customer experience with AR-based and employees drives customer satisfaction, equity, and loyalty. Perhaps this is due to the COVID-19, and Chinese consumers prefer to adopt new technologies (Chen and Lee, 2017, Mohanty *et al.*, 2020). The previous literature has suggested that Chinese consumers are eager to adopt novel technologies such as digital payment methods (QR code and facial payments), virtual reality, and augmented reality (Liberatore and Wagner, 2021, Zhong *et al.*, 2021).

The overall results are auspicious, and customer satisfaction, equity, and loyalty align with the previous studies (Gardiazabal *et al.*, 2020, Prentice and Nguyen, 2020). Overall, the customer experience is positively influenced by AR-based and employee services. The employee's SERVQUAL towards the customer in the retail sector is of utmost importance and shows that employee service plays a significant role in the current business situation and aligns with previous studies (Prentice *et al.*, 2020b, Prentice and Nguyen, 2020). Hence, AR-based services may take over the retail sector's interactive services in the upcoming future in emerging and developed economies. The future of retailing, either online or offline, will be reshaped with the implementation of AR technology (Javornik *et al.*, 2016, Song *et al.*, 2019).

Theoretical contributions

Firstly, AR technology research has increased in popularity in the last decade. It has become an essential ingredient for marketing firms to retain, attract and increase the footfall and achieve customer equity and loyalty. Firstly, the research findings contribute to the literature of SERVQUAL, and it aligns with previous literature (Orel and Kara, 2014, Zhou *et al.*, 2019). The interaction with two significant touchpoints, i.e., AR-based and employee service, is vital for the retail industry to understand consumer behaviour. This study is the first of its kind because AR-based services are elaborated with the concept of SERVQUAL; hence, it has extended the literature of AR in the light of SERVQUAL. The SERVQUAL literature has been extended in the light of service quality (Chen *et al.*, 2018, Fernandes and Pinto, 2019) from the perspective of AR services.

Secondly, customer equity and loyalty are typically addressed in literature as a loyalty program and as an aggressive marketing program to compete in the market. The current study focuses on customers' experience with AR-based and employee services. It provides a new

perspective on how human-to-human and human-to-machine interactions are likely to contribute to organizational performance and customer experience. Therefore, the future of retailing services will be of utmost importance when the brands offer both human and mechanical services at their outlets. As consumer trends change, novel technologies with the traditional ones attract new customers and increase sales and revenues (Nanji, 2019, Shaham, 2020).

Thirdly, the extant literature on AR technology has focused on understanding its adoption. The current findings extend its application into the domain of customer satisfaction, equity, and loyalty. The findings of satisfaction, equity, and loyalty align with previous literature (Li and Shang, 2020, Rajaobelina *et al.*, 2021). Fourthly, the customer shopping experience is closely associated with the employee experience regarding the willingness to use; this research study approached the customer service experience and positioned it in AR-based services to understand their respective and unique variances in explaining customer satisfaction, equity, and loyalty. Hence, the AR constructs within this study contribute to the development of AR theory. The current framework provides crucial points towards the AR theory development, especially in the light of SERVQUAL.

Practical contributions

This study is related to the cosmetic retail industry; thus, the findings have implications for retail marketing and services in other sectors. Brand managers in the retail context may use these findings to develop appropriate and sustainable strategies to survive and compete. According to the findings, employee services have significant impact on the customer experience. In the retail sector, novel technologies such as augmented reality and digital payment methods are becoming significant, and retail brand managers can redefine their business models.

Second, while AR-based retail-based services are still in their infancy, they quickly become a necessity for retailers in the current pandemic. As a result, AR-based services can be used in the retail industry to provide cost-effectiveness, increase operational efficiency, reduce language barriers, increase sales and revenues, and retain and attract new customers by providing convenience and improving their service experience. Overall, AR-based technologies

Moreover, customers prefer human interaction as a service experience, particularly in a physical retail environment. To attract customers, the retail industry, such as cosmetics,

competes by offering new intelligent technologies such as facial recognition, QR code payments, and AR-based services. The current pandemic necessitates limiting human interaction; thus, retail brand managers should investigate the benefits of AR-based services before incorporating them into retail outlets. Finally, perceived interactivity with employees and AR-based services is critical for understanding consumer behaviour. As a result, to interact appropriately, an employee must identify different levels of customer behaviour. AI tools power AR-based services, and they can respond to customer needs and desires, but they are limited because they lack emotional abilities.

Limitation

This research study made every effort to ensure thoroughness; however, it has limitations that must be acknowledged. First, the analysis included Chinese market respondents who had AR services in a cosmetic brand retail outlet. This limits the generalization of findings within the context of geographic and sectorial contexts. The expansion of geographic location within a country and between two countries can help understand AR-based and employee services. Second, the respondents were the only females, and for future research studies, male respondents can be considered. The cosmetic beauty products generally relate to the female target audience, and most of the products are for females. But the male target audience can also be considered as more and more male cosmetic products are coming into the market in future studies. Third, the research can be expanded to other service industries such as furniture, education, tourism, and food services, providing more insights into customer satisfaction, perceived customer equity, and customer loyalty. The different sectors of the industry have their profiling and dimensions. Fourth, perceived customer equity and loyalty was calculated based on the consumer's perception and willingness to return to the brand. Using other brand dimensions in AR-based services, such as brand attachment, brand love, brand engagement, and so on, may further reflect on consumer behaviour.

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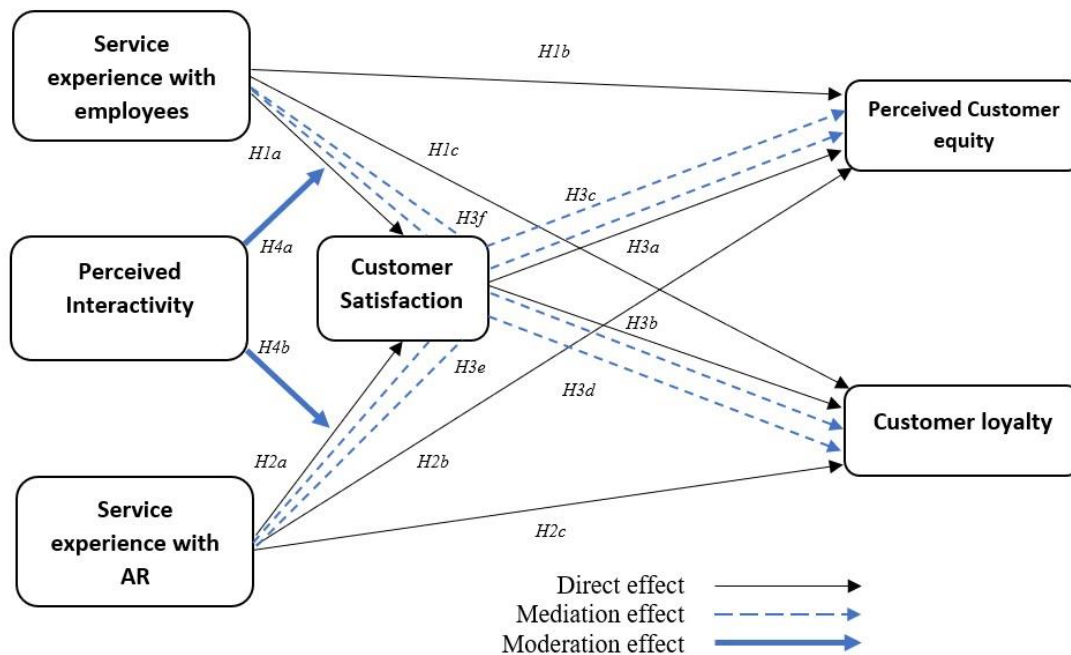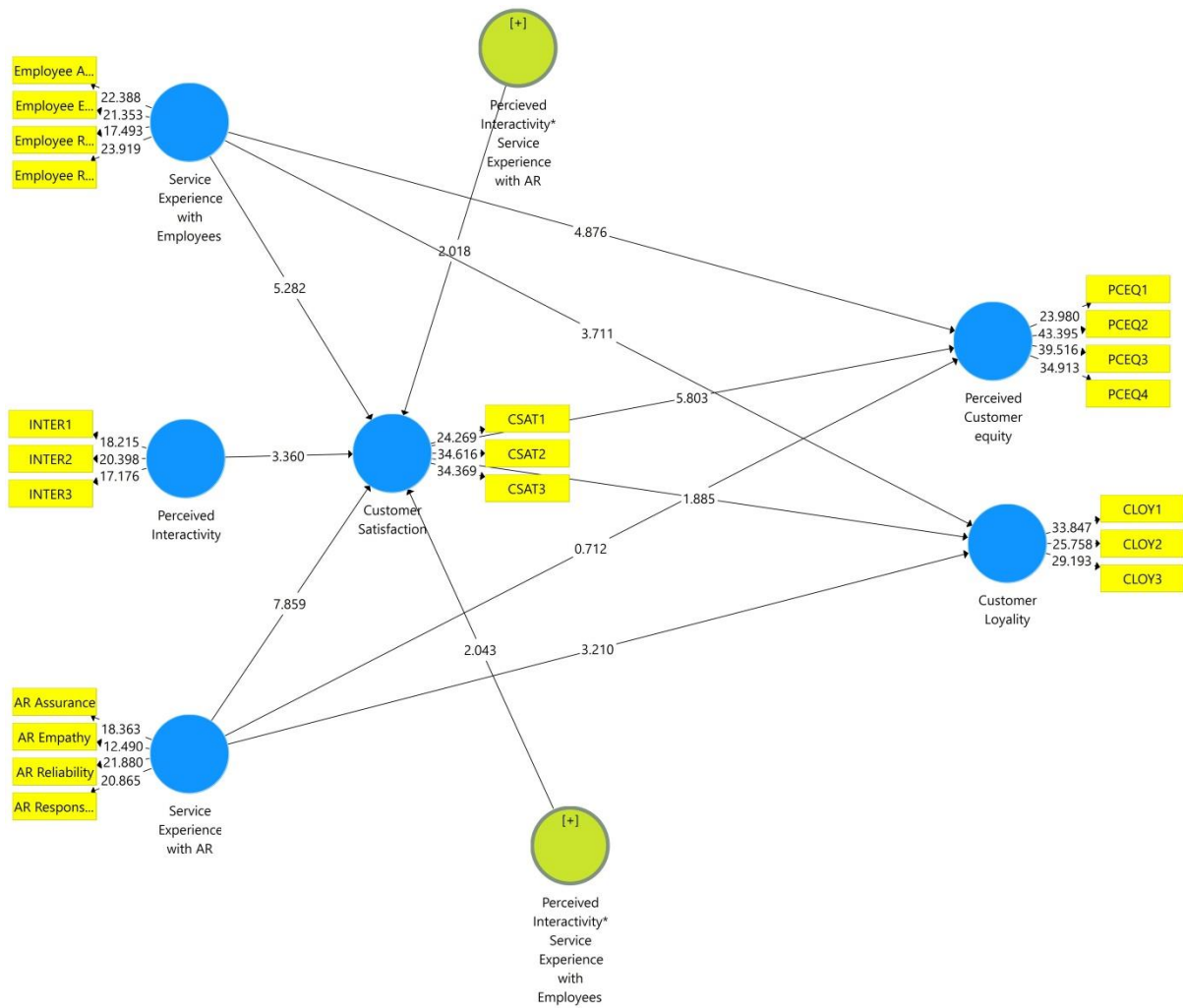
Table-I Empirical Studies on Service experience with employees, Machine and interactivity

Study	Context	Construct
(Prentice and Nguyen, 2020)	Hotel industry	Service experience with employee
(Prentice and Nguyen, 2020)	Hotel Industry	Service experience with AI
(Prentice *et al.*, 2020), (Liu and Hung, 2021)	Hotel Industry	Service experience with employee
(Prentice *et al.*, 2020), (Liu and Hung, 2021)	Hotel Industry	Service experience with AI
(Xiang and Chae, 2021)	Online Context	Perceived Interactivity
(Pillai *et al.*, 2020)	Online Context	Perceived Interactivity
(Wang *et al.*, 2021)	Online Context	Perceived Interactivity
(Tran *et al.*, 2020)	Restaurant Industry	Social, customer and service interaction
(Gardiazabal *et al.*, 2020), (Hao and Chon, 2021)	Large Supermarket, Hotel Industry	Customer Satisfaction
(Gardiazabal *et al.*, 2020), (Hao and Chon, 2021)	Large Supermarket, Hotel Industry	Perceived customer equity
(Gardiazabal *et al.*, 2020)	Large Supermarket	Customer loyalty

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Table-II Demographic Profile

Characteristics	Distribution	Frequency	%
Gender	Female	620	100.00
Age	18 - 25	195	31.45
	26 - 35	234	37.74
	36 - 45	124	20.00
	45 - Above	67	10.81
Education	Undergraduate Degree	389	62.74
	Master Degree	202	32.58
	PhD Degree	29	4.68
Occupation	Student	207	33.39
	Job	387	62.42
	Business	26	4.19
Monthly Income	0 - 5000 RMB	161	25.97
	5001 - 10000 RMB	209	33.71
	10001 - 15000 RMB	151	24.35
	15001 - 20000 RMB	68	10.97
	20000 - Above	31	5.00

Table-III Reliability and Validity of Constructs

Constructs and Related Items	Factor Loadings	VIF
AR Assurance α=0.814, CR=0.890, AVE=0.730		
AR-based services produce correct information	0.788	1.463
There are few errors in the information I obtain from AR-based services	0.909	2.448
The information provided by AR-based services is accurate.	0.863	2.269
AR Empathy α=0.752, CR=0.858, AVE=0.669		
AR-based services can flexibly adjust to new demands or conditions	0.84	1.635
AR-based services can understand what I want	0.848	1.698
AR-based services are versatile in addressing my needs	0.763	1.351
AR Reliability α=0.818, CR=0.891, AVE=0.731		
AR-based services operate reliably	0.829	1.476
AR-based services perform reliably	0.878	2.374
The operation of AR-based services is dependable	0.857	2.311
AR Responsiveness α=0.726, CR=0.879, AVE=0.785		
AR-based services provide information in a timely fashion	0.876	1.481
AR-based services return answers to my requests quickly	0.895	1.481
Customer Loyalty α=0.699, CR=0.833, AVE=0.626		
In the future, I will shop more at this L'Oréal retail outlet than I do now	0.727	1.242
If everything stays the same, I plan to shop at this L'Oréal retail outlet in the future	0.802	1.467
This L'Oréal retail outlet will be my first option next time go shopping	0.841	1.511
Customer Satisfaction α=0.764, CR=0.864, AVE=0.679		
I am 100% satisfied with the shopping experience at this L'Oréal retail outlet	0.81	1.493
I am satisfied with my decision to shop at this L'Oréal retail outlet	0.844	1.673
I am satisfied with the service provided by this L'Oréal retail outlet	0.818	1.531
Employee Empathy α=0.878, CR=0.911, AVE=0.671		
Employees at the L'Oréal outlet gave extra effort to handle my special requests	0.832	2.462
Employees at the L'Oréal outlet were sensitive to my individual needs and wants, rather than always relying on policies and procedures	0.825	2.619
Employees at the L'Oréal outlet made me feel special	0.807	2.438
Employees at the L'Oréal outlet anticipated my individual needs and wants	0.815	2.445
Employees at the L'Oréal outlet understand your specific needs for retail services	0.817	2.422
Employee Assurance α=0.885, CR=0.913, AVE=0.637		
Employees at the L'Oréal outlet can answer my questions	0.672	1.445

completely

Employees at the L'Oréal outlet made me feel comfortable and confident in my dealings with them	0.74	1.524
Employees at the L'Oréal outlet were both able and willing to give me information about the products and services	0.847	2.789
Employees at the L'Oréal outlet made me feel personally safe	0.832	2.878
Employees at the L'Oréal outlet seemed well-trained, competent and experienced	0.841	2.954
Employees at the L'Oréal outlet were sympathetic and reassuring, if something is wrong	0.839	3.054
Employee Reliability α=0.888, CR=0.918, AVE=0.691		
Employees at the L'Oréal outlet are dependable and consistent	0.804	2.228
Employees at the L'Oréal outlet had the customers' best interests at heart	0.85	2.911
Employees at the L'Oréal outlet followed through on their promises	0.871	3.026
Employees at the L'Oréal outlet did things right the first time	0.824	2.55
Employees at the L'Oréal outlet properly handled any problems that arise	0.806	2.52
Employee Responsiveness α=0.895, CR=0.920, AVE=0.658		
Employees at the L'Oréal outlet served me in a reasonable amount of time	0.729	1.814
Employees at the L'Oréal outlet quickly corrected anything that was wrong	0.786	2.079
Employees at the L'Oréal outlet seemed to handle busy times smoothly	0.813	2.495
Employees at the L'Oréal outlet provided prompt and quick service	0.864	3.174
Employees at the L'Oréal outlet were never too busy to respond to your requests	0.845	2.469
Employees at the L'Oréal outlet let you know when things would get done	0.821	2.307
Perceived Interactivity α=0.853, CR=0.900, AVE=0.694		
The interactivity at this L'Oréal retail outlet fulfills my shopping experience	0.847	1.651
Shopping at this L'Oréal retail outlet is very engaging	0.875	2.028
Shopping at this L'Oréal retail outlet is very dynamic	0.844	1.882
Perceived Customer Equity α=0.817, CR=0.891, AVE=0.732		
The results I obtained from buying at this L'Oréal retail outlet was fair	0.782	1.758
When shopping at this L'Oréal retail outlet I achieved my shopping objectives	0.864	2.244
When having to solve a problem, this L'Oréal retail outlet offered a satisfactory solution	0.845	2.09
The result from shopping at this L'Oréal retail outlet was up to my expectation	0.838	1.924

Table-IV Fornell-Larcker Criterion (Discriminant Validity)

Constructs	1	2	3	4	5	6	7	8	9	10	11	12
(1) AR Assurance	**0.86**											
(2) AR Empathy	0.33	**0.82**										
(3) AR Reliability	0.63	0.31	**0.86**									
(4) AR Responsiveness	0.28	0.34	0.29	**0.89**								
(5) Customer Loyalty	0.38	0.27	0.42	0.38	**0.79**							
(6) Customer Satisfaction	0.32	0.42	0.32	0.65	0.44	**0.82**						
(7) Employee Assurance	0.57	0.49	0.46	0.45	0.43	0.45	**0.8**					
(8) Employee Empathy	0.25	0.25	0.3	0.38	0.35	0.49	0.28	**0.82**				
(9) Employee Reliability	0.34	0.34	0.38	0.41	0.38	0.42	0.41	0.4	**0.83**			
(10) Employee Responsiveness	0.43	0.54	0.38	0.41	0.38	0.47	0.66	0.35	0.38	**0.81**		
(11) Perceived Customer Equity	0.31	0.32	0.32	0.5	0.4	0.61	0.36	0.56	0.43	0.42	**0.83**	
(12) Perceived Interactivity	0.41	0.19	0.57	0.15	0.21	0.16	0.24	0.33	0.22	0.18	0.21	**0.86**

Table-V HTMT Ratio

	1	2	3	4	5	6	7	8	9	10	11	12
(1) AR Assurance												
(2) AR Empathy	0.42											
(3) AR Reliability	0.76	0.39										
(4) AR Responsiveness	0.37	0.46	0.37									
(5) Customer Loyalty	0.51	0.38	0.56	0.53								
(6) Customer Satisfaction	0.4	0.55	0.39	0.87	0.6							
(7) Employee Assurance	0.68	0.59	0.53	0.55	0.54	0.53						
(8) Employee Empathy	0.3	0.3	0.35	0.48	0.44	0.59	0.31					
(9) Employee Reliability	0.39	0.41	0.44	0.5	0.49	0.51	0.45	0.45				
(10) Employee Responsiveness	0.5	0.66	0.44	0.51	0.49	0.57	0.74	0.39	0.43			
(11) Perceived Customer Equity	0.37	0.4	0.37	0.63	0.51	0.74	0.39	0.64	0.5	0.48		
(12) Perceived Interactivity	0.49	0.24	0.7	0.2	0.27	0.21	0.28	0.4	0.26	0.21	0.3	

Table-VI Hypothesis Testing

Hypothesis Related to Direct Effects	Path Coefficient	SD	T Statistic	P Values	Decision
H1a: Service Experience with Employees → Customer Satisfaction	0.299	0.057	5.282	0.000	Accepted
H1b: Service Experience with Employees → Perceived Customer equity	0.335	0.069	4.876	0.000	Accepted
H1c: Service Experience with Employees → Customer Loyalty	0.260	0.070	3.711	0.000	Accepted
H2a: Service Experience with AR → Customer Satisfaction	0.467	0.059	7.859	0.000	Accepted
H2b: Service Experience with AR →Perceived Customer equity	0.044	0.061	0.712	0.476	Rejected
H2c: Service Experience with AR → Customer Loyalty	0.247	0.077	3.21	0.001	Accepted
H3a: Customer Satisfaction → Perceived Customer equity	0.373	0.064	5.803	0.000	Accepted
H3b: Customer Satisfaction → Customer Loyalty	0.126	0.067	1.885	0.060	Accepted

Note: ***, **, * denotes Significance Level at 1%, 5% and 10%

Table-VII Indirect Effect

Hypothesis Related to mediation Effect	Indirect Effect	Total Effect	Variance Accounted For (VAF)
SEWE → CSAT→ PCEQ (H3c)	0.111	0.446	0.249**
SEWE → CSAT → CLOY (H3d)	0.038	0.298	0.128*
SEWAR → CSAT → PCEQ (H3e)	0.174	0.218	0.798***
SEWAR → CSAT → CLOY (H3f)	0.059	0.305	0.193*

Note: ***, **, * denotes Full, Partial and No mediation. SEWE= Service Experience with Employees, CSAT= Customer Satisfaction, CLOY= Customer Loyalty, PCEQ=Perceived Customer Equity, SEWAR= Service Experience with Augmented Reality

Table-VIII Goodness of Fit Index

Constructs	AVE	R Square
AR Assurance	0.731	
AR Empathy	0.669	
AR Reliability	0.731	
AR Responsiveness	0.785	
Customer Loyalty	0.626	0.318
Customer Satisfaction	0.679	0.463
Employee Assurance	0.637	
Employee Empathy	0.671	
Employee Reliability	0.691	
Employee Responsiveness	0.658	
Perceived Customer Equity	0.694	0.448
Perceived Interactivity	0.732	
Average	**0.692**	**0.410**
Goodness of Fit Index	**0.53**	

Note: Fitness index from SmartPLS: NFI=0.760, SRMR=0.055