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# The rise of smart consumers: role of smart servicescape and smart consumer experience co-creation

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## ABSTRACT

Rapid technological advancements have led to the emergence of smart services and smart consumers. This study focuses on smart consumers who voluntarily engage in value creation activities, in order to conceptualise smart experience co-creation (SEC) and the smart servicescape. Drawing on the Stimulus-Organism-Response (SOR) framework, a model is proposed and tested around the impacts of smart servicescape dimensions (aesthetics, superior functionality, social presence, perceived interactivity and perceived personalisation) on smart consumer experience co-creation. SEC is conceptualised as a second-order construct consisting of cognitive, hedonic, social/personal, and pragmatic/economic first-order dimensions. Results show that the technological environmental cues of the smart servicescape (S) collectively influence smart experience co-creation (O), and this co-created experience eventually influences consumers' service brand equity and word-of-mouth (WOM) intentions (R). A major novelty of this study lies in uncovering the relationship between experience co-creation and service brand equity. Findings have theoretical and managerial implications for smart services.

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## Introduction

Engaging consumers to ideate, design and develop new products and services through co-creation is an area of significant interest for marketing researchers and managers (Essamri, McKechnie, & Winklhofer, 2019; Prahalad & Ramaswamy, 2004). The market's leading brands are all engaging consumers design solutions that improve their experience (Milbrath, 2016). DHL, BMW, and Lego are a notable few. Consumers are creating memorable experiences by utilising, in particular, the latest smart technologies in services contexts like hospitality and tourism (Campos, Mendes, Valle, & Scott, 2018; Morosan & DeFranco, 2016) and retailing (Foroudi, Gupta, Sivarajah, & Broderick, 2018; Roy, Balaji,

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Quazi, & Quaddus, 2018). Lately, service firms have leveraged the use of these numerous-advanced technologies to facilitate their co-creation activity (Voorhees et al., 2017). Amongst several technologies, 'smart technology' is one of the most influential technologies to influence co-creation behaviour (Grewal, Roggeveen, & Nordfält, 2017; Inman & Nikolova, 2017). 'Smart' represents the socio-economic and technological improvements driven by rapid developments in information and communication and connected technologies (Demirkan & Spohrer, 2014). Smart technology is defined as 'value-creating connected and synchronised smart objects or devices that interact with one another, sense the environment, and guide and control their functions autonomously' (Roy, Balaji, Sadeque, Nguyen, & Melewar, 2017, p. 258). The active users who voluntarily extend efforts to directly help others in the smart servicescape are referred to as 'smart consumers' (Chen, Drennan, & Andrews, 2009; Chen, Drennan, Andrews, & Hollebeek, 2018). In a smart services context, interactions not only occur in provider-consumer dyads but also in the network of actors, including employees and others (Brodie, Fehrer, Jaakkola, & Conduit, 2019; Wunderlich et al., 2015). Hence, these smart consumers share and co-create experiences collectively in groups developed around shared interests (Cova & Dall'i, 2009). Given its utmost importance, the extant literature has conceptualised (Jaakkola, Helkkula, & Aarikka-Stenroos, 2015) and identified the determinants of consumer experience co-creation (Verleye, 2015). However, the literature is still at a nascent stage in understanding the conceptual relationships in the broader nomological network of 'smart consumer' experience co-creation.

In response to this gap, this study responds to the call for more research on the enhanced understanding of several precursors and effects of smart consumer experience co-creation (hereafter, SEC). To achieve this objective, the paper considers antecedents, outlined through the lens of smart servicescape and interaction with employees, since these are the crucial elements of smart service environments (Grace & O'Cass, 2004; Larivière et al., 2017). Further, the consequences of SEC are measured utilising service brand equity and word-of-mouth (hereafter, WOM). Whilst there has been aforementioned research concerning brand equity and customer experience (Kumar, Dash, & Malhotra, 2018), none has been able to conclusively link it to the smart services context and specifically to smart consumers. The value of incorporating brand equity in this research underscores the importance of SEC to service firms, if it can be found to lead to service brand equity. WOM is considered an effective outcome of buying behaviour due to its cognitive and rational nature (Campos et al., 2018) and has been explicitly linked to co-creation (Cambra-Fierro, Pérez, & Grott, 2017).

Hence, the objectives of this study are the following:

- (1) To examine the concept of smart experience co-creation.
- (2) To examine the antecedents and consequences of smart experience co-creation.

The context of this study is the smart retailing. Smart retailing describes a retail landscape in which both the stakeholders (i.e. retailers and consumers) leverage smart technologies to revamp and bolster their roles in the sharing service economy and eventually ameliorate their experiences (Pantano & Timmermans, 2014; Roy et al., 2017). Smart retail is a particularly important area of focus, with predicted investment in this area tipped to reach around \$36 billion by 2020 (Research and Markets, 2015). It

follows that we can anticipate an increase in the number of interactions between consumers and smart technologies, and consequently an increase in several adoptions related concerns and unwanted behavioural reactions. Hence, there is a pressing need to investigate the antecedents and consequences of smart experience co-creation in this study in the smart retailing context.

The rapidly changing business landscape coupled with the accelerated development of smart services is altering the very nature of service encounters between consumers and service providers (Larivière et al., 2017). Thus, this study draws on the Stimulus-Organism-Response (SOR) framework (Mehrabian & Russell, 1974) to identify the antecedents and consequences of smart experience co-creation in the smart services context. This underpinning ensures that this study responds to the calls for more research on understanding the dynamic field of technology-mediated smart services (Pantano, Priporas, & Dennis, 2018; Priporas, Stylos, & Fotiadis, 2017).

This paper is structured as follows. Section one provides a theoretical background that details the overarching framework used in this study. In section two, key constructs used in the study along with the relevant literature are reviewed. Next, hypotheses related to the research model are proposed. Next, the research methods, operationalisation of constructs, data collection and sampling are discussed. Finally, we present the findings of the study followed by the theoretical and managerial implications, and discuss the limitations and future research directions.

## Theoretical background and literature review

The proposed research model (as shown in [Figure 1](#)) is based on the SOR framework (Mehrabian & Russell, 1974). This model, which is grounded in environmental psychology, implies that several dimensions of the environment act as stimuli (S) that act as a combined influence on consumers' internal states (O), which eventually influence consumers' behavioural responses (R). The model has been used in the physical retail context, where studies have mapped environmental cues such as aesthetics, design, interactivity, personalisation and others as stimuli. The perception and assessment of consumers largely reflect their internal states. The responses may be measured through several metrics such as purchase-repurchase behaviour and recommendations (Zhang, Lu, Gupta, & Zhao, 2014). The SOR framework has been widely used as an overarching theory in studies related to the servicescape phenomenon including m-servicescape (Lee, 2018) and e-servicescape (Roy, Lassar et al., 2014). However, this paper is one of the initial attempts to use the SOR framework in the smart retail services context. The SOR framework is used in this study because, first, it has been used in research related to consumers' response in the form of WOM (Wang, Wang, Xue, Wang, & Li, 2018) and service brand equity (Kumar et al., 2018). Second, considering the important role of technology in the context of smart retailing in affecting consumer behaviour, the SOR framework offers a structured approach to determine the role of technologically grounded environmental cues on consumer experience co-creation, and ultimately towards their WOM behaviour and service brand equity.

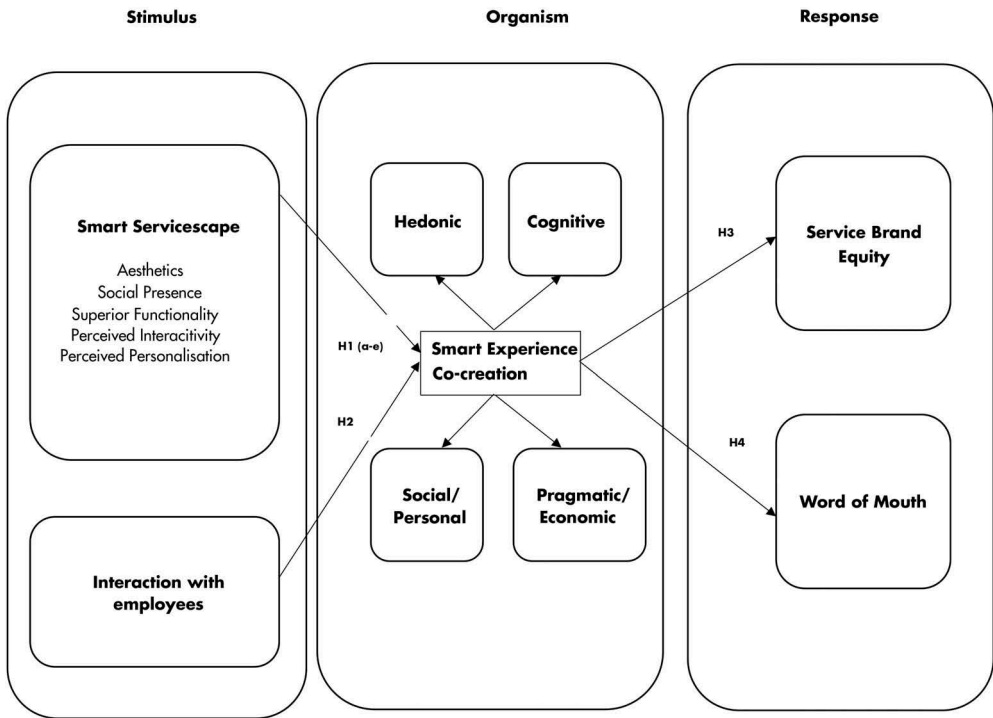


Figure 1. Research model.

### Smart services

Services delivered through intelligent products that feature awareness and connectivity are called 'smart services' (Allmendinger & Lombreglia, 2005). The intelligent object of a smart service may be linked to an individual consumer, a group of consumers, or a firm (Wunderlich et al., 2015). The data collected through intelligent objects are used to ameliorate service offerings and enables consumers to benefit from a highly personalised service. For example, smart payment services (e.g. Bankwest's Halo ring), interactive breakdown assistance, remote health-care diagnostics and smart retailing among others. Technology characteristics, consumer characteristics and context-specific perceptions affect the perception and adoption of smart services (Wunderlich, Wangenheim, & Bitner, 2013). Smart services are incorporated in both business-to-business (B2B) and business-to-consumer (B2C) settings (Fano & Gershman, 2002) and bring significant efficiency gains to both service providers and consumers. These gains include cost reductions, increased flexibility, increased access, and time savings, many of which are outlined by Allmendinger and Lombreglia (2005). These authors also present four business models available to organisations keen to embrace smart services. Despite the great potential possessed by smart services, consumers tend to perceive them as risky (Keh & Pang, 2010) and tend to show resistance (Mani & Chouk, 2017, 2018). Smart services are defined through 5Cs; connection, collection, computation, communications, and co-creation (Lim & Maglio, 2018). Incorporating smartness into different contexts has been a recent trend, with some prominent examples including smart tourism (Li, Hu, Huang, & Duan, 2017), smart retailing (Roy

et al., 2017), smart cities (Letaifa, 2015), and smart healthcare (Sakr & Elgammal, 2016), among others. For the purposes of this study, and consistent with Mani and Chouk (2018), smart services are defined as smart technology-based services with new capabilities, intelligence, autonomy, connectivity, ubiquity and higher levels of interactivity.

### **Smart consumers**

The extant marketing literature defines the smart environment as the platform where several heterogeneous smart devices are consistently working to allow inhabitants to live with greater comfort (Cook & Das, 2004). However, at the core of the smart environment is not the devices, but the users, referred to as smart consumers (Cook, Augusto, & Jakkula, 2009; Mavrommati & Darzentas, 2006). Chen et al. (2018) define smart consumers as those consumers who voluntarily engage and are competent to participate in experience sharing. User experience sharing behaviour may be defined as *'customers' initiation effort made for the direct benefit of others in their service network'* (Chen et al., 2018, p. 1157). Smart consumers engage in both co-production and co-creation activities. From the co-production perspective, smart consumers create value through direct and indirect interactions with service firms and/or participating in the firm-initiated value-creating activities (Bendapudi & Leone, 2003). However, from the co-creation perspective, smart consumers create value through resource integration and their willingness to interact and create value for other actors in the service ecosystem (Hilton, Hughes, & Chalcraft, 2012). Based on the above discussion and for the purposes of this study, smart consumers are defined as informed, connected and aware consumers who share and participate in firm initiated activities and are engaged in voluntary activities for the benefit of other actors. Consistent with the propositions of Chen, Drennan and Andrews (2012) and Schneider & Bowen (2010), we identify the distinguishing characteristics of smart consumers which are: first, smart consumers have increased control and consciousness of their decision-making; second, smart consumers expect greater service customisation and personalisation; third, smart consumers are empowered; and four, smart consumers are willing to participate in value co-production and co-creation processes.

### **Smart servicescape (S)**

Servicescape relates to the service encounters that occur in a physical and social environment (Bitner, 1992). The extant literature concludes that ambient conditions, spatial layout and signs, symbols, and artefacts are three core elements of the physical environment. The social environment incorporates social relationships, including direct and indirect interactions. Direct interactions are in the form of employee – consumer interactions and firm –consumer interactions, while indirect interactions take the form of interactions with other consumers and other actors in the service system (Rosenbaum & Massiah, 2011). Several scholars have adapted the conceptual foundation of servicescape in the online context and theorised an 'e-servicescape' (Harris & Goode, 2010; Roy, Lassar, & Butaney, 2014). The studies concluded that the e-servicescape consists of three primary elements; namely aesthetics, interactivity, and navigation. Ballantyne and Nilsson (2017) argue for an adaptation of the traditional servicescape for digital services, and propose

that consumers are no longer passive recipients, but active participants in the digital servicescape.

Extending the significance of the traditional servicescape, we argue that the servicescape perspective is also relevant and required for the smart services context, which encompasses the characteristics of both physical and digital services. In line with Kang, Kwon, Kim, and Park (2017), we propose the concept of a 'smart servicescape' for smart services. While taking into consideration the differentiating characteristics of smart services, the 'smart servicescape' framework incorporates new dimensions that have not been identified in conventional servicescape frameworks. These include a smart device, datascape, connected scape, and design aspects (Kang et al., 2017). The smart servicescape consists of the direct and indirect interactions between consumers, smart devices and service firms and other elements in the service environment.

Theoretically, the smart servicescape is conceptualised as consisting of the following dimensions: aesthetics, social presence, superior functionality, perceived interactivity, and perceived personalisation. Aesthetics is the overall impressiveness of smart technology. It is referred to as the degree to which consumers perceive smart technology as attractive and appealing (Harris & Goode, 2010). Social presence is defined as the potential of smart technology to engross consumers in the technological environment. Superior functionality encompasses the degree to which smart technology provides consumers with superior and advanced functions in comparison to other schemas of technology. Perceived interactivity relates to the consumers subjective and overall assessment of the interaction with smart technology (Scardamalia & Bereiter, 2014). It is defined as the extent to which smart technology can assist consumers in meeting their shopping goals. Perceived personalisation relates to the potential of smart technology to provide consumers with customised and personalised service (Neuhofner, Buhalis, & Ladkin, 2015).

### ***Interaction with employees (S)***

Employees are imperative for the execution of service within the service environment. Research suggests that employee interactions is the most important factor in consumer satisfaction (Mosley, 2007). Employees make up part of the experiential aspect of a service because they are a means for consumers to interact with the brand, and they support the service experience. The manner in which an employee delivers the service is important to consumers evaluating the experience (Grace & O'Cass, 2004). Howard Schultz, the Starbucks founder, claims that employees are the most important part of the service brand because they create the experience for the consumers to enjoy (Mosley, 2007). For most consumers, their primary experience is through the interactions with frontline employees (Bitner, Brown, & Meuter, 2000). Lin and Mattila (2010) contend that consumers start evaluating their experience as soon as they interact with the service employees.

Research investigating the role of employees in creating consumer experience has consensus on the importance of employees to the overall consumer experience. Frow and Payne (2007) examined how to achieve the 'perfect' consumer experience, and found that interaction with employees was an important predictor. These authors found that, in order to achieve a 'perfect' consumer experience, service providers need to enhance employee motivation. Grace and O'Cass (2004) also acknowledge the role of employees as a major contributing factor in the consumer experience. They suggest that employees are

inseparable from the core service, and interpersonal interactions with employees that provoke consumer responses. It is believed that a lack of employee commitment has negative consequences towards the service firm, such as negative word-of-mouth (Kimpakorn & Tocquer, 2010). In line with the significance of employees in creating the overall consumer experience, we particularly posit that interactions with employees also play a critical role in case of smart services.

### ***Smart consumer experience co-creation (O)***

Co-creation refers to a mutually beneficial interaction and collaboration among at least two participants that may result in value creation for those participants (Frow, Payne, Wilkinson, & Young, 2011). The fundamental premise of co-creation is Service-Dominant Logic (SDL), which prioritises services in comparison to products at the core of the economic exchange (Vargo & Lusch, 2004). According to SDL, *'intangibility, exchange processes, and relationships are central'* (Vargo & Lusch, 2004, p. 2). SDL also submits that the role of consumers should not be restricted to recipients of goods and services; rather they should be seen as co-creators (Vargo & Lusch, 2016). Though this perspective has gained attention, there is limited research investigating the relationship between consumer experience and the role of the active consumer. There is also limited research on service experience co-creation (Helkkula, 2011; Skålén & Edvardsson, 2016) despite its importance. Extending the concept of service experience (Jaakkola et al., 2015, p. 193) define service experience co-creation as the *'interpersonal interaction with other actors in or beyond the service setting, which influences an actor's subjective response to or interpretation of the elements of the service'*. Service experience co-creation may encompass lived or imaginary experiences in the past, present and future, and may occur in the interaction between the consumer and service provider(s), other consumers, and/or other actors. Jaakkola et al. (2015) argue that an understanding of service experience co-creation is mandatory for a better clarity around and understanding of the value co-creation process. Underpinning the co-creation phenomenon is a range of different experience research perspectives, specifically SDL, consumer culture theory, service management, and service innovation and design (Jaakkola et al., 2015). Jaakkola et al. (2015) further proposed service experience co-creation as a multidimensional concept consisting of spatial, control, temporal, facture, organisational, and locus dimensions. Verleye (2015) is one of the few studies that has gone on to develop a valid measure of co-creation experience. The author conceptualised service experience co-creation as consisting of multiple dimensions; hedonic, cognitive, social/personal, and pragmatic/economic. Since the essence of smart services, value co-creation and service experience co-creation is the ubiquitous interaction between different actors, this study argues for the existence of a new construct labelled as *'smart experience co-creation'*, which also encapsulates the interactions with smart technologies. One of the acknowledged examples of the experience economy are smart retailing services (Anderson & Bolton, 2015). In the context of smart retailing, for experience co-creation to occur, it is essential that smart retailing service providers and consumers work together with an intent to create better offerings, which eventually enhance value for consumers, smart service providers, and other actors in the service



system (Balaji & Roy, 2017; Foroudi et al., 2018). Consistent with Verleye (2015), we consider smart experience co-creation as a multi-dimensional construct consisting of hedonic, cognitive, social/personal, and pragmatic/economic experiences.

### **Service brand equity (R)**

Brand equity is one of the important metrics to differentiate a firm's offering with respect to the competing firm's offering (Yoo, Donthu, & Lee, 2000). This concept is relevant for both goods and services, but the applicability of a traditional conceptualisation of brand equity (Aaker, 1991; Keller, 1993) to the services context is contested. Mackay (2001) claims that there are significant differences between products and services that warrant a different marketing approach. Berry (2000) developed a conceptualisation of service brand equity, which is distinct from traditional brand equity for goods/products. Berry (2000) argues that service brand equity is developed from brand awareness and brand meaning, which are created through external communications, the presented brand, and experience with the brand. It is argued that strong brands increase customers' trust of the invisible service, enabling them to better visualise and understand what is intangible and reduce perceived financial, social or safety risks (Kayaman & Arasli, 2007; Krishnan & Hartline, 2001). Essentially, having a strong brand with high brand equity reduces the perceived risk for consumers (Berry, 2000). Kimpakorn and Tocquer (2010) integrated the consumer goods branding approach with the specifics of services branding and also conceptualised the concept of service brand equity. They identified six dimensions that are relevant for measuring the value of a service brand with a consumer perspective. These include brand awareness, perceived quality, brand differentiation, brand association, brand trust, and brand relationship. Kumar et al. (2018) highlighted the importance of the consumer experience in building brand equity. They reinforced that the consumer experience is the focal mediating variable for the relationship between marketing activities and brand equity.

### **Word-of-mouth (R)**

WOM is an uncontrolled and often external source of brand communication, which consumers use to reduce the risks associated with a service. *'WOM communication plays an important role in shaping consumers' attitudes and behaviours'* (Brown & Reingen, 1987, p. 30). Traditional WOM is informal oral communication between individuals, where they share information about their experiences with a brand or service provider, and there is no commercial link (Roy, Butaney, Sekhon, & Butaney, 2014). Consumers often rely on WOM, that is, other consumers' perceptions of the experience and the service, where *'the intangible core makes it impossible for consumers to perceive and evaluate the experience without it occurring'* (Berry, 2000, p. 128). WOM occurs outside of the service setting, where there is a consumer-to-consumer interaction about the service. WOM is a traditional touchpoint in the service experience and, despite it occurring outside the service setting, it influences consumers' satisfaction and experience.

Past literature has examined the role of WOM and its relationship with consumer experience (Roy, Lassar et al., 2014). Baxendale, Macdonald, and Wilson (2015) tested the impact of different touchpoints on the service experience and found that WOM was

the fourth most influential touchpoint on brand consideration. Berry and Seltman (2007), in their study concerning the Mayo Clinic, found that WOM was less influential than a company's controlled communications. However, WOM was still successful in presenting unbiased information with a personal perspective on a service, and therefore, was still valued by consumers (Berry & Seltman, 2007). WOM is particularly important for service companies, as negative WOM can ruin a brand. Therefore, when considering experience beyond the boundaries of the service setting, it is important to acknowledge the importance of WOM and its relationship with past consumer experiences (White, 2010). The marketing literature has acknowledged the significant relationship between customer value co-creation and WOM (Xie, Tsai, Xu, & Zhang, 2018). In addition, co-created value has also positively influenced e-WOM (Dowell, Garrod, & Turner, 2019; Frassetto-Deltoro, Alarcón-del-Amo, & Lorenzo-Romero, 2019). However, there is inadequate literature support to understand the relationship between co-created experience and WOM.

## Research model and hypotheses

### *Hypotheses development*

#### *Relating servicescape and smart experience co-creation*

The notion of aesthetics is borne of a western perspective on beauty and the range of aesthetic experience (Sibley, 2001). Aesthetics have been used in psychology and marketing (Toufani, Stanton, & Chikweche, 2017) and in contexts such as the physical servicescape (Lin, 2016), the e-servicescape (Wu, Quyen, & Rivas, 2017), and the m-servicescape (Lee, 2018). Aesthetic characteristics of the servicescape, irrespective of the format of the servicescape, deal with visual appeal, pleasing characteristics and the potential to incite all human senses.

In all formats of servicescape, aesthetic design plays a critical role in persuading consumers (Vieira, 2010). For instance, Harris and Goode (2010) examined the e-servicescape and found aesthetic appeal as one of the critical dimensions that influenced consumers' trust in the website and their purchase intentions. Similarly, Lee (2018) concluded that aesthetic design influenced consumers' emotional arousal and eventually impact their engagement behaviour. Appreciating the related characteristics of the smart servicescape with respect to the e-and m-servicescapes, it is reasonable to assume that aesthetics of the smart servicescape would have a significant impact on smart consumers' emotional and cognitive evaluation. Specifically, since the smart retailing is highly technology centred, it involves a lot of interactions among the smart consumer and related servicescape dimensions. These interactions should result in superior experience and eventually in co-creation (Jaakkola et al., 2015; Verhoef et al., 2009). Based on the empirical evidence and discussion above the following hypothesis is proposed:

H1 (a). Aesthetics is positively related to smart experience co-creation.

Social presence is referred to as the sense of being with another (Biocca, Harms, & Burgoon, 2003). In the technology-mediated retail environment, social presence is considered to be consumers' increasing engagement in "quasi-social relationships with new forms of artificially intelligent beings," such as smart retail technology (Biocca & Harms,

2002, p. 10). In the context of the smart servicescape, social presence is referred to as the ability of smart technology to engage consumers in the technology-centred environment. This improves consumer satisfaction (Kim, Kwon, & Cho, 2011), generates trust (Gefen & Straub, 2004) and ameliorates usefulness (Shin, 2013) and enjoyment (Hassanein & Head, 2005). Social presence may induce psychological proximity among consumers and the smart retail technology. In addition, consumers who perceive high social presence through personal social interactions with the platform enjoy better comfort, emotional satisfaction and superior experience. The improved experience may encourage them to get further engrossed in the interactions, enabling them to co-create. Hence, the following hypothesis is proposed:

H1 (b). Social presence is positively related to smart experience co-creation.

The superior functionality dimension of the smart servicescape takes into consideration the ability of smart technology to provide superior and advanced functions with respect to other technologies (Bloch, 2011). Functionality also takes into consideration the way in which information is conveyed to the consumers. The functionality dimensions may include quality and reliability of smart technology which is linked to its functional, utilitarian or physical performance (Yang & Jolly, 2006). When consumers communicate with the smart technology and receive prompt and reliable responses, consumers will positively evaluate the functionality of the smart technology. Conversely, the inability of a smart retail technology platform to respond to consumer queries may lead to disappointment. The ability of the smart retail technology to meet utilitarian expectations certainly improves satisfaction (Chitturi, Raghunathan, & Mahajan, 2008). Further, an improved emotional and cognitive evaluation may encourage consumers to further interact and co-create an experience. Hence, the following hypothesis is advanced:

H1 (c). Superior functionality is positively related to smart experience co-creation.

In the context of the smart servicescape, the interaction among consumers and smart retail technology happens in different ways. This includes during the content transfer, sharing experiences, offering testimonials, and offering suggestions/recommendations. Such interactions enable consumers to showcase themselves and gives them a chance to offer informational and emotional support to others interested. Considering social exchange theory (Blau, 2017), which claims that consumers reciprocate with other consumers when they obtain benefits from them, it may be justified to assume that smart retail technology with greater interactivity may act as convenient host to allow consumers to express themselves, contribute towards content creation and eventually an exchange of support among other consumers. All of these interactions will leverage a healthy experience for the participating consumers and may encourage them to further absorb and co-create with the smart technology. Empirical evidence suggests that the perceived interactivity of e-retail websites impacts online consumer experience and behaviour (Roy, Lassar et al., 2014; Van Noort, Voorveld, & Van Reijmersdal, 2012). Thus, we propose the following hypothesis:

H1 (d). Perceived interactivity is positively related to smart experience co-creation.

Perceived personalisation refers to how a retailer can meet consumers' personal preferences and needs. In the context of smart servicescape, consumers might expect smart technology to generate customised recommendations in order to satisfy their individual preferences and needs. The ability of the smart technology to classify recommended items under a distinct label such as *personalised recommendations for you* further encourages consumers to initiate mutual interaction with the technology (Wattal, Telang, & Mukhopadhyay, 2009). For example, the recommendation system of Amazon. As a result of technological advancements, consumers are actively co-creating their experiences and they seek more personalised services (Neuhofer, Buhalis, & Ladkin, 2012). Recent research recognises the importance of smart technologies in creating more personalised consumer experiences (Neuhofer et al., 2015; Roy et al., 2017). It is argued that, if implemented strategically, smart technologies can collect and analyse data and address consumer needs and personalise their experiences accordingly. Smart technologies have the potential to transform standardised services into more personalised experiences (Hilken, de Ruyter, Chylinski, Mahr, & Keeling, 2017). In addition, based on relationship investment theory (De Wulf, Odekerken-Schröder, & Iacobucci, 2001), if the smart technology offers the consumers benefits that meets their needs, they will recognise that the personalisation of smart technology represents a higher relationship investment. In exchange of their personal information, consumers in the smart services context expect a more personalised service that is offered seamlessly and consistently (Minkiewicz, Evans, & Bridson, 2014). Thus, we propose the following hypothesis:

H1 (e) Perceived personalisation is positively related to smart experience co-creation.

Jaakkola et al. (2015) argue that service experience co-creation results from interpersonal interaction with other actors in the service ecosystem. In the context of smart servicescape, apart from technology-centred dimensions, employees act as an important stakeholder in the service setting. The consumer may desire interaction with an employee in order to completely exploit the potential of a smart technology, which may, in turn, develop the relationship and overhaul the consumer experience (Verhoef et al., 2009). Such a superior consumer experience may encourage extended interactions and may eventually result in co-creation. Hence, the following hypothesis is proposed:

H2. Interaction with employees positively influences smart experience co-creation.

Understanding how consumer experience and brand equity interact have been a source of growing interest amongst academics and practitioners. Consequently, Kumar, Dash, and Chandra Purwar (2013) found that experience predicts brand equity dimensions (e.g. brand awareness, perceived quality, brand trust, brand association and brand loyalty). Biedenbach and Marell (2010) investigated the impact of experience on brand equity in a business-to-business context and found a positive relationship between consumer experience and brand equity. Both studies use traditional goods-based conceptualisations of brand equity, and Biedenbach and Marell (2010) suggest that Berry's (2000) conceptualisation should be used to evaluate the relationship between consumer

experience and service brand equity. Despite brand equity being an important outcome valuable to services, it has only recently become a focus for research, which could be due to the dominating presence of the goods-dominant logic. However, the shift towards SDL, which emphasises the importance of service, experience and value creation, has heralded a renewed interest in service brand equity research.

A co-created experience enables the smart consumer to perceive a sense of empowerment that eventually influences their intention to use the smart retail technology (Pantano & Viassone, 2015; Zwass, 2010). This is synchronous with the general understanding that consumers' perception of value has a significant impact on the intention to re-purchase the service (Parasuraman & Grewal, 2000). The re-purchasing of the service develops a sense of brand loyalty among smart consumers, which positively impacts service brand equity (Delgado-Ballester & Luis Munuera-Alemán, 2005). Based on the above discussion, we propose that smart experience co-creation may lead to higher service brand equity, and propose the following hypothesis:

H3. Smart experience co-creation is positively related to service brand equity.

WOM is one of the most widely researched constructs in the marketing literature. However, considering its high implication, its relationship is still being examined in several under-researched contexts, including smart services. There are calls for more research on the relationship between value co-creation and non-financial performance metrics, such as WOM (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010). WOM is considered an effective predictor of consumer behaviour because of its cognitive and rational features (Campos et al., 2018). It has been explicitly related to co-creation (Cambra-Fierro et al., 2017). These authors found a strong positive impact of consumers' intention to co-create and their intentions to engage in WOM activities. The literature offers sufficient support to generalise the statement that if consumers perceive comfort in their relationships with service organisations, it is highly likely that they would spread positive WOM (Shin, Song, & Biswas, 2014). Similarly, it is argued that, in the case of smart services enabled by smart technologies, when consumers co-create their own experiences and their co-created experience is positive, they may engage in WOM activities. Hence, the following hypothesis is advanced:

H4. Smart experience co-creation is positively related to word-of-mouth.

Finally, this study examines the mediating effects of smart experience co-creation, and posits that smart experience co-creation is a mediator between (a) smart servicescape and service brand equity, and (b) smart servicescape and word-of-mouth. Cultivating a smart servicescape through aesthetics, social presence, superior functionality, perceived interactivity, personalisation and interaction with employees facilitates smart experience co-creation, and subsequently improvement of overall service brand equity. Smart servicescape facilitates co-creation by creating a context whereby an ongoing dialog between the consumer and retailer is encouraged (Yu, Roy, Quazi, Nguyen, & Han, 2017). For service brands that emphasise smart co-creation, the smart servicescape provides continuing monitoring of consumer-retailer interactions, such that consumer needs can be learnt, detected and met (Nguyen, Yu, Melewar, & Chen, 2015). In response to the increased

learning, dialog and collaboration via smart technologies, overall service brand equity will be increased.

Furthermore, the study expects that smart experience co-creation will lead to increased WOM, due the smart servicescape. Mutually beneficial smart co-creation involves a learning process (e.g. Alzaydi, Al-Hajla, Nguyen, & Jayawardhena, 2018). This is particularly true because of the newness of the innovative smart context, which prompts advice from other consumers and users. For example, there is a tendency to share experiences on different platforms, including forums and social media via WOM (Hallier Willi, Nguyen, Melewar, Gupta, & Yu, 2019). This development in competitive smart markets suggests that a smart servicescape also requires greater knowledge-sharing propensities. Increased smart consumer experience co-creation exhibits a degree of efficiency associated with greater availability of information and knowledge (Roy et al., 2017) and with increased co-creation in a smart servicescape context, such information may increase in volume and be shared more widely (Klaus, Gorgoglione, Buonamassa, Panniello, & Nguyen, 2013).

Overall, both smart experience co-creation efforts and smart servicescape require a commitment to strong technological capabilities and high resource investments, which influence service brand equity and WOM intentions among the users. Thus, this study posits that the association between smart consumer experience co-creation and service brand equity and word of mouth is mediated by servicescape, arguing that the complex mediating relationships are stronger under conditions of smart servicescape. Accordingly, the study presents the following hypotheses:

H5: Smart experience co-creation mediates the relationship between smart servicescape (aesthetics, social presence, superior functionality, perceived interactivity, and personalisation) and service brand equity.

H6: Smart experience co-creation mediates the relationship between smart servicescape (aesthetics, social presence, superior functionality, perceived interactivity, and personalisation) and word-of-mouth intentions.

## Research methods

The measurement items (shown in Table 1) for all the constructs were adapted from extant studies. Based on the guidelines provided by Hair, Ringle, and Sarstedt (2011), we specify all the constructs to be reflective in nature. All items were measured using seven-point Likert type scales, anchored at '1 = strongly disagree' and '7 = strongly agree'. Each question was slightly modified to capture the context of this study (i.e. smart retailing services). Smart retailing was chosen as the smart service context to examine because of the following reasons:

- (i) The Internet of Things (IoT) is revolutionising the retailing and service industries (Lamarre & May, 2019)
- (ii) The retail industry is highly competitive and needs technological innovations for growth and efficiency (Caro & Sadr, 2019).

**Table 1.** Measurement instrument.

| Constructs                               | Sub-dimensions/(Sources)                                     | Measurement items   |
|--|--|---|
| Smart Experience<br>Co-creation<br>(SEC) | Hedonic (Verleye, 2015)                                      | I think the experience at SMARTAIL would be nice. (H1)<br>I feel that SMARTAIL would be fun. (H2)<br>I would enjoy SMARTAIL. (H3)   |
|  | Cognitive (Verleye, 2015)                                    | I would be able to improve my skills using SMARTAIL. (C1)<br>By using SMARTAIL, I feel I can gain new knowledge/<br>expertise.(C2)<br>I would be able to test my capabilities using SMARTAIL. (C3)  |
|  | Social and Personal<br>(Verleye, 2015)                       | I would find the interaction with shopping at SMARTAIL would<br>be pleasant and easy. (SP1)<br>I would be able to connect with other people through my<br>opinion of using SMARTAIL for shopping. (SP2)<br>I would be able to make a good impression on others, on<br>using SMARTAIL for shopping. (SP3)<br>I had the knowledge and skills to do what was expected of me<br>while shopping at SMARTAIL. (SP4) |
|  | Pragmatic and Economic<br>(Verleye, 2015)                    | I would have control over the quality of the experience at<br>SMARTAIL The quality was in my hands. (PE1)<br>The quality of the experience is in my hands when using the<br>SMARTAIL. (PE2)<br>I had an impact on the degree to which my preferences were<br>met, while using SMARTAIL. (PE3)<br>I would be given enough time and support to use the<br>SMARTAIL and would do what was expected of me. (PE4)  |
| Smart Servicescape<br>(SSC)              | Aesthetics<br>(O'Brien & Cairns, 2015)                       | I think the SMARTAIL would appeal to my visual senses (A1)<br>I think interaction with the SMARTAIL would be aesthetically<br>appealing (A2)<br>Using SMARTAIL would be visually pleasing (A3)  |
|  | Social Presence (Balaji & Roy,<br>2017)                      | Using SMARTAIL for shopping would make me feel comfortable,<br>as if I am with a friend (S1)<br>There is a sense of human contact with shopping at<br>SMARTAIL, I would feel included (S2)<br>There would be a sense of sociability with shopping at<br>SMARTAIL. (S3)  |
|  | Superior Functionality (Balaji &<br>Roy, 2017)               | SMARTAIL would offer superior and interactive shopping<br>features than traditional retail stores. (F1)<br>The technology involved in SMARTAIL is aware and responds to<br>its environment (e.g. my needs, recommendations, etc.).<br>(F2)<br>Shopping at SMARTAIL would offer me real-time product and<br>purchase information. (F3)   |
|  | Perceived Interactivity (Choi &<br>Taylor, 2014)             | The SMARTAIL has the ability to respond to my specific needs<br>quickly and efficiently. (I1)<br>I would be in control of my navigation while engaging with<br>SMARTAIL. (I2)<br>I have some control over the content of the SMARTAIL that<br>I wanted to see. (I3)<br>I would be in control over the pace while engaging with<br>SMARTAIL. (I4)  |
|  | Perceived Personalisation<br>(Veloutsou & McAlonan,<br>2012) | SMARTAIL would understand my specific needs. (P1)<br>SMARTAIL knows what I want. (P2)<br>SMARTAIL stores my preferences and offers me extra services<br>based on my preferences. (P3)<br>SMARTAIL does a pretty good job guessing what kinds of<br>things I might want and making suggestions. (P4)   |
| Interaction with<br>Employees<br>(EMPL)  | (Grace & O'Cass, 2004)                                       | Employees of SMARTAIL provide prompt service. (E1)<br>Employees of SMARTAIL are willing to help. (E2)<br>I can trust employee of SMARTAIL. (E3)   |
| Service Brand<br>Equity (SBE)            | (Yoo & Donthu, 2001)   | It makes sense to do shopping at SMARTAIL instead of any other<br>retailer, even if they are the same. (SBE1)<br>Even if another smart retailer has the same features as<br>SMARTAIL, I would prefer to buy from SMARTAIL. (SBE2)<br>If another smart retailer is not different from SMARTAIL in any<br>way, it seems smarter to purchase from SMARTAIL. (SBE3)   |
| Word-of-mouth<br>(WOM)                   | (Roy, Butaney et al., 2014)                                  | I would like to introduce SMARTAIL to others. (W1)<br>I will speak favourably about SMARTAIL to others. (W2)<br>I will tell others positive things about SMARTAIL. (W3)   |

- (iii) Unlike traditional retailing, smart retailing services involve interactions between consumers, smart devices, products (brands), retailers, and retail touchpoints (Roy et al., 2017).

To operationalise service brand equity, Yoo and Donthu (2001) items on overall brand equity were employed. These items were chosen for their simplicity and reflection of Berry's (2000) service brand equity conceptualisation. Yoo and Donthu (2001) scale for measuring service brand equity was selected in this study because of its ability to capture individual consumers' brand equity. Though there were previous scales that measured individual consumers' brand equity (e.g. Cobb-Walgren, Ruble, & Donthu, 1995; Park & Srinivasan, 1994; Rangaswamy, Burke, & Oliva, 1993), they were considered relatively less appropriate for use in this study. This was due to limitations associated with their psychometric properties. The other scales (e.g. Mahajan, Rao, & Srivastava, 1994; Simon & Sullivan, 1993) measured brand equity of aggregate products at the industry or firm level.

Smart experience co-creation was measured using Verleye's (2015) scale. The ability of the Verleye (2015) scale in capturing the different components of smart consumer experience co-creation makes it the most appropriate scale for this study. In adapting the scale to the smart retail context, only those measurement items that aligned with the central tenet of co-creation (i.e. interactions) were used in the instrument. Thus, the adapted scale limited itself to those items that captured some form of interaction between consumers and the smart interface, which eventually resulted in the development of experience co-creation. For instance, Verleye's (2015) original scale incorporated some items grounded in intrinsic motivation to co-create consumer experience. However, it does not explicate any form of interaction. Therefore, these were omitted from the adapted scale. Among the servicescape dimensions, aesthetics were measured using three items from O'Brien and Cairns (2015), perceived interactivity using items from Choi and Taylor (2014), social presence using items from Balaji and Roy (2017), perceived personalisation using items from Veloutsou and McAlonan (2012), and superior functionality using items from Balaji and Roy (2017). Interaction with employees was measured using items from Grace and O'Cass (2004) and WOM using items from Roy, Butaney et al. (2014).

## ***Data collection and sampling***

### ***The context***

Retailing is a major sector in the Australian economy. It accounts for various subsectors, specifically consumer goods and supermarket retailing. The retailing sector contributes approximately 4.5% directly, plus a further 4% indirectly, to Australia's GDP annually. The supermarkets and grocery market is an approximate \$103 billion industry in Australia. Woolworths and Coles accounted for over 65% of industry revenue in 2018. (IBIS World, 2018). It is expected that traditional retailers will be forced to adapt their business models and marketing strategies to attract customers, and to compete with multichannel retailers, or otherwise perish (Magner, 2016). It is evident that the consumer goods retail industry in Australia is going through major changes with the introduction of new technology.



Supermarkets have seen a proliferation in self-service technologies and other forms of new technologies (e.g. smart shopping carts, shopping assistants, near field communications, smart payment systems, and AI-based technologies), and it is predicted that it will become commonplace in retail outlets across Australia over the next 5 years (Sibal, 2018). Other technological advances have been made in this industry, including the introduction of smartphone applications that enhance the consumers' experience (Sibal, 2018). These applications allow customers to access the products and order them more quickly and easily, with the added option of home delivery. This is extremely attractive to time-poor customers (Deloitte, 2018; Sibal, 2018).

### *Sampling*

The sampling technique employed for this research was chain referral sampling. Chain referral sampling is a type of convenience sampling, used to access hard to reach populations, or for populations where boundaries are hard to determine. Unlike snowball sampling, chain referral relies on multiple networks that are strategically accessed to expand the scope of the population. This provides a better chance to form a sample that more closely resembles the population (Biernacki & Waldorf, 1981; Groth, Hennig-Thurau, & Walsh, 2009; Penrod, Preston, Cain, & Starks, 2003). It is commonly used in the marketing domain. Chain referral is used as an informal method to reach the target consumer population, and is often justifiable when the research is exploratory (Atkinson & Flint, 2001; Brady, Voorhees, & Brusco, 2012). Further, chain referral sampling was chosen because it is a cost and time-effective one. Initial respondents were gathered through existing contacts, and asked to participate voluntarily. Respondents were then requested to provide a reference (either a family member or a friend). The survey was then distributed based on these referral email addresses.

### *Data collection and sample profile*

Data were collected via a web-based online platform (i.e. Qualtrics) using a questionnaire. To efficiently measure the relationships between constructs and effectively capture this study's definition of smart experience co-creation concerning joint-actions in a smart retailing services context, a hypothetical retailing scenario (shown in Appendix A) was created for participants. This scenario asked participants to imagine that a smart retail 'SMARTAIL' is coming up in their neighbourhood. This smart retail store enables shopping using apps and smart basket (i.e. a shopping basket that detects items in it, calculates the bill and bags items) and provides a seamless shopping experience to its consumers. The realism of the scenario was tested by using the following measurement item in the questionnaire: 'The scenario described was realistic in today's technologically advanced environment'. On a scale of 1 to 7, respondents mean rating was 5.05 which shows that the scenario was realistic.

All the items in the questionnaire were adapted to fit within this scenario's context. None of the items in the questionnaire contained the word 'co-creation' or any permutation of this, as it would be an alien concept to most consumers (Neghina, Bloemer, van Birgelen, & Caniels, 2017).

Due to the complex adaption of items from various sources, a pre-test was administered prior to the main data collection phase. This pre-test was carried out on a mixture of

40 trusted students. Participants were asked to complete the questionnaire in full, making comments on any confusion or ambiguity they may have found in the items, and providing suggestions on how to improve the questionnaire. This led to slight adjustments in the wording of multiple items in the original instrument, to improve clarity and understanding.

The final instrument was then distributed via Qualtrics. It was distributed to existing contacts that were retail shoppers in Australia. Responses were obtained through a referral from participants, and a total of 451 completed responses were collected. Of these 389 were usable for this study. The number of collected surveys exceeded the appropriate number required for a sample, as suggested by Soper (2014).

The sample respondents consisted of 57% female and 43% male. Fifty-nine per cent of this sample were between 18 and 25 years old, 15% were between 25 and 35 years old, 8% were between 35 and 45 years old, and 28% were between 45 and 55 years old. Eighty-six per cent noted that their typical retail experience involved using a technology interface, and 77% of respondents said they visit a retail store at least once a week. Most of the respondents identified they use a technology interface (e.g. self-service counters, mobile apps) more than half the time (67%), whilst 69% said that they had proficient skills to use technology for shopping.

## **Data analysis and results**

Partial least squares path modelling (PLS-PM), with SmartPLS 3.2.3 software, was used to test the hypothesised relationships in our research model. This method has gained popularity with researchers in the areas of marketing (Hair, Sarstedt, Ringle, & Mena, 2012; Sarstedt, Ringle, & Hair, 2017), tourism and hospitality (Ali, Rasoolimanesh, Sarstedt, Ringle, & Ryu, 2018; Do Valle & Assaker, 2016), human resource management (Ringle & Sarstedt, 2016), and social science generally (Sawatsky, Clyde, and Meek, 2015). This study considers PLS-PM as appropriate for several reasons: first, PLS-PM is flexible in handling non-normal data, unlike covariance-based structural equation modelling (Lowry & Gaskin, 2014); second, PLS-PM has the ability to manage complex predictive models by maximising the variance explained in the ultimate dependent variable (Sarstedt et al., 2019); third, PLS-PM allows the weights of indicators of a scale to vary as it contributes to the composite score of the latent variables; and fourth, PLS-PM is best suited for theory development, which was the basis of this research (Chin, 1998). PLS-PM also considers the total variance of the measurement items in estimating the structural model; allows for testing the proposed hypotheses with a prediction focus and is not constrained by identification issues when the model is complex (Hair, Sarstedt, Ringle, & Gudergan, 2017).

Based on the propositions of Hair, Ringle, and Sarstedt (2013), we test the proposed research model in two stages: first, the outer model (measurement model) is evaluated in terms of reliability and validity and, second, the proposed hypotheses are tested.

### ***Variance inflation factor (VIF) and Common method bias (CMB)***

In this study, we performed a full VIF test to check for the multi-collinearity among the constructs. Results show that the full VIF value was 2.47. Hence, there is no concern

around multi-collinearity (Petter, Straub, & Rai, 2007). Since the full VIF score was less than the cut-off value of 3.30, CMB is also not an issue in this study (Kock, 2015).

### ***Measurement model properties***

Table 2 shows the measurement properties of the constructs in the research model. To test the convergent validity, factor loadings, composite reliability and average variance extracted (AVE) were computed from the output (Chin, 1998). Acceptable results for these tests of convergence are composite reliability scores for each construct greater than .7, AVE scores of all the constructs greater than .5, and factor loadings of each of the items greater than .6 and statistically significant (Gefen, Straub, & Boudreau, 2000; Hair et al., 2011).

Results show that the measurement model possesses discriminant validity, since the correlation between the respective pair of constructs is less than the square root of the AVE of respective constructs (Fornell & Larcker, 1981). We also established discriminant validity using the HTMT-ratio approach. The threshold discriminant validity values for the HTMT ratio and confidence interval (< 0.90 and 1.00, respectively) are met (Henseler, Ringle, & Sarstedt, 2015). The cross-loadings were also examined, and showed that each item loaded highest on the underlying constructs, providing further support for the discriminant validity of the outer measurement model.

### ***Assessing the multidimensional nature of smart consumer experience co-creation***

Based on the suggestions of Jarvis, MacKenzie, and Podsakoff (2003) and Becker, Klein, and Wetzels (2012), we consider smart experience co-creation as a type I reflective higher (second) order construct (consisting of the reflective first order and reflective second-order factors). We used the repeated indicator approach to specify the second-order construct SEC. Results show that for the type I SEC model, the indicator weights of each of the dimensions (hedonic, cognitive, social/personal, pragmatic/economic) are significant; the composite reliability (CR) and the average variance extracted (AVE) for each of the first-order factors of SEC are greater than the cut-off values of 0.7 and 0.5, respectively.

Further, the R-square values of each of the first-order dimensions of SEC are greater than 0.5, and correlations between these dimensions are less than their factor loadings on the second-order constructs. The path coefficients from each of the first-order factors on the higher-order factor range from 0.61 for cognitive to 0.89. The factor loadings between SEC and the first-order dimensions were significant, (see Table 3). The R<sup>2</sup> values for each of the first-order dimensions exceeded recommended value of 0.5): hedonic (0.63), cognitive (0.37), pragmatic/economic (0.75), social/personal (0.79). As shown in Table 3, the correlations between the first-order dimensions were less than the respective factor loadings on the higher-order SEC, which supports the use of the higher-order factor in this model (Roy, Lassar, & Shekhar, 2016). Thus, we find support for the conceptualisation of SEC as a second-order construct consisting of six first-order dimensions, which are hedonic, cognitive, social, personal, pragmatic and economic. Hereafter, we tested and present the results relating to the overall research model (Becker et al., 2012; Chin, 2010).

**Table 2.** Measurement properties.

| Constructs and Items             | Factor Loadings | t-Value (p-value) | Cronbach's Alpha | Composite Reliability | Average Variance Extracted |
|----------------------------------|-----------------|-------------------|------------------|-----------------------|----------------------------|
| <i>WOM</i>                       |                 |                   |                  |                       |                            |
| W1                               | 0.87            | 21.16**           | 0.86             | 0.91                  | <b>0.78</b>                |
| W2                               | 0.88            | 25.40**           |                  |                       |                            |
| W3                               | 0.9             | 45.27**           |                  |                       |                            |
| <i>Smart Servicescape</i>        |                 |                   |                  |                       |                            |
| <i>Aesthetics</i>                |                 |                   |                  |                       |                            |
| A1                               | 0.88            | 4.31**            | 0.93             | 0.9                   | <b>0.76</b>                |
| A2                               | 0.75            | 3.12**            |                  |                       |                            |
| A3                               | 0.98            | 4.27**            |                  |                       |                            |
| <i>Social Presence</i>           |                 |                   |                  |                       |                            |
| S1                               | 0.85            | 18.76**           | 0.84             | 0.91                  | <b>0.76</b>                |
| S2                               | 0.9             | 41.64**           |                  |                       |                            |
| S3                               | 0.87            | 26.96**           |                  |                       |                            |
| <i>Superior Functionality</i>    |                 |                   |                  |                       |                            |
| F1                               | 0.78            | 8.98**            | 0.78             | 0.87                  | <b>0.69</b>                |
| F2                               | 0.87            | 23.94**           |                  |                       |                            |
| F3                               | 0.81            | 17.37**           |                  |                       |                            |
| <i>Perceived Interactivity</i>   |                 |                   |                  |                       |                            |
| I1                               | 0.91            | 91.36**           | 0.82             | 0.9                   | <b>0.85</b>                |
| I2                               | 0.92            | 78.67**           |                  |                       |                            |
| I3                               | 0.91            | 89.98**           |                  |                       |                            |
| <i>Perceived Personalisation</i> |                 |                   |                  |                       |                            |
| P1                               | 0.81            | 40.99**           | 0.82             | 0.85                  | <b>0.66</b>                |
| P2                               | 0.77            | 28.35**           |                  |                       |                            |
| P3                               | 0.81            | 39.85**           |                  |                       |                            |
| P4                               | 0.79            | 38.17**           |                  |                       |                            |
| <i>SEC</i>                       |                 |                   |                  |                       |                            |
| <i>Hedonic</i>                   |                 |                   |                  |                       |                            |
| H1                               | 0.75            | 17.09**           | 0.76             | 0.86                  | <b>0.68</b>                |
| H2                               | 0.66            | 11.41**           |                  |                       |                            |
| H3                               | 0.71            | 13.09**           |                  |                       |                            |
| <i>Cognitive</i>                 |                 |                   |                  |                       |                            |
| C1                               | 0.6             | 8.16**            | 0.9              | 0.92                  | <b>0.51</b>                |
| C2                               | 0.73            | 14.13**           |                  |                       |                            |
| C3                               | 0.76            | 16.25**           |                  |                       |                            |
| <i>Pragmatic/Economic</i>        |                 |                   |                  |                       |                            |
| PE1                              | 0.71            | 17.53**           | 0.87             | 0.92                  | <b>0.79</b>                |
| PE2                              | 0.73            | 15.25**           |                  |                       |                            |
| PE3                              | 0.84            | 15.85**           |                  |                       |                            |
| PE4                              | 0.72            | 28.01**           |                  |                       |                            |
| <i>Social/Personal</i>           |                 |                   |                  |                       |                            |
| SP1                              | 0.87            | 15.50**           | 0.85             | 0.9                   | <b>0.63</b>                |
| SP2                              | 0.9             | 40.88**           |                  |                       |                            |
| SP3                              | 0.9             | 47.19**           |                  |                       |                            |
| SP4                              | 0.91            | 29.56**           |                  |                       |                            |
| <i>SBE</i>                       |                 |                   |                  |                       |                            |
| SBE1                             | 0.81            | 22.47**           | 0.86             | 0.91                  | <b>0.71</b>                |
| SBE2                             | 0.83            | 25.05**           |                  |                       |                            |
| SBE3                             | 0.8             | 20.07**           |                  |                       |                            |
| <i>EMPL</i>                      |                 |                   |                  |                       |                            |
| E1                               | 0.88            | 21.29**           | 0.78             | 0.87                  | <b>0.69</b>                |
| E2                               | 0.75            | 7.97**            |                  |                       |                            |
| E3                               | 0.86            | 19.85**           |                  |                       |                            |

Note: \*\* indicates  $p \leq 0.01$

### Test of hypotheses

Bootstrapping using SmartPLS was employed to test the proposed hypotheses, which can analyse hypotheses without parametric tests (Chin, 2010). Bootstrapping draws on a large

**Table 3.** Higher-order smart consumer experience co-creation.

| Second-Order Factor                   | First-Order Factors | Loadings | t- value (p-value) |
|---------------------------------------|---------------------|----------|--------------------|
| Smart Consumer Experience Co-Creation | Cognitive           | 0.61     | 10.51**            |
|                                       | Hedonic             | 0.8      | 18.63**            |
|                                       | Social/Personal     | 0.89     | 50.89**            |
|                                       | Pragmatic/Economic  | 0.87     | 33.25 **           |

Note: \*\* indicates that factor loadings are significant at  $p \leq 0.01$

number of subsamples and determines the appropriate values, and is recommended for use in PLS-PM analysis (Hair et al., 2011). Nonparametric bootstrapping is used to obtain standard errors for hypothesis testing, from repeated random sampling (Hair et al., 2011). In this study, bootstrapping was executed with 389 cases and 5000 resamples (Henseler, Ringle, & Sinkovics, 2009).

The  $R^2$  value of WOM intention is 0.51 (with a large effect size of ~25%) (Cohen, 1988), which was greater than the cut-off of 0.01 (Falk & Miller, 1992). This indicates that WOM is well explained by the SEC. The  $R^2$  value of service brand equity is 0.49, which indicates that the endogenous variable SBE is explained by SEC. In addition, the Stone-Geisser  $Q^2$  values, which examine predictive accuracy, are positive for all the endogenous constructs in this study, proving the predictive validity of the research model. The goodness of fit index (GoF) is 0.47, which is above the suggested threshold level of 0.36 for a large sample (Wetzels, Odekerken-Schröder, & Van Oppen, 2009). These results suggest the model has a good fit to the data and indicate good overall predictive validity of the tested research model.

Results (see Table 4) shows that aesthetics of smart services has a significant positive effect on SEC ( $\beta = 0.27$ ,  $p < 0.05$ ,  $t = 2.11$ ); social presence has a significant positive effect on SEC ( $\beta = 0.16$ ,  $p < 0.01$ ,  $t = 2.75$ ); and superior functionality has a significant positive effect on SEC ( $\beta = 0.25$ ,  $p < 0.01$ ,  $t = 4.21$ ). These results support hypotheses H1a-c. Results also show that perceived interactivity ( $\beta = 0.36$ ,  $p < 0.00$ ,  $t = 5.19$ ) and perceived personalisation ( $\beta = 0.50$ ,  $p < 0.01$ ,  $t = 9.50$ ) have significant positive effects on SEC. These results support hypotheses H1d-e.

SEC has a significant positive effect on service brand equity ( $\beta = 0.40$ ,  $p < 0.00$ ,  $t = 4.45$ ) and WOM intentions ( $\beta = 0.34$ ,  $p < 0.01$ ,  $t = 6.85$ ). These results support hypotheses H3 and H4. Since 'interaction with employees' did not have a significant impact on SEC, hypothesis H2 is rejected.

### **Mediation analysis**

In this study, H5 and H6 proposed that SEC plays a key mediating role between the different dimensions of the smart servicescape (aesthetics, social presence, perceived interactivity, superior functionality, and perceived personalisation) and service brand equity and WOM. The mediating role of SEC was investigated by examining the indirect effects and bias-corrected bootstrap confidence intervals (Nitzl, Roldan, & Cepeda, 2016). Results of the mediation analysis are presented in Table 4.

Results show significant indirect effects of the different dimensions of the smart servicescape on service brand equity. It follows that SEC is a significant mediator between the smart servicescape and service brand equity. Table 4 suggests that the direct effects of

**Table 4.** Results of hypothesis testing.

| Hypothesis                            | Relationship                    | Path Coefficient | p-value    | Inference     |
|---------------------------------------|---------------------------------|------------------|------------|---------------|
| H1a                                   | Aesthetics → SEC                | 0.27             | <0.05      | Supported     |
| H1b                                   | Social Presence → SEC           | 0.16             | <0.01      | Supported     |
| H1c                                   | Superior Functionality → SEC    | 0.25             | <0.01      | Supported     |
| H1d                                   | Perceived Interactivity → SEC   | 0.36             | <0.00      | Supported     |
| H1e                                   | Perceived Personalisation → SEC | 0.50             | <0.01      | Supported     |
| H2                                    | EMPL → SEC                      | 0.01             | 0.87       | Not-supported |
| H3                                    | SEC → Service Brand Equity      | 0.40             | <0.00      | Supported     |
| H4b                                   | SEC → Word-of-mouth             | 0.34             | <0.01      | Supported     |
| Mediation Hypotheses                  | Indirect Effect                 | P Values         | LCL (2.5%) | UCL (97.5%)   |
| Aesthetics → SEC → SBE                | 0.11                            | 0.00             | 0.06       | 0.22          |
| Social Presence → SEC → SBE           | 0.14                            | 0.00             | 0.08       | 0.29          |
| Superior Functionality → SEC → SBE    | 0.10                            | 0.02             | 0.02       | 0.15          |
| Perceived Interactivity → SEC → SBE   | 0.15                            | 0.00             | 0.05       | 0.24          |
| Perceived Personalisation → SEC → SBE | 0.35                            | 0.00             | 0.31       | 0.45          |
| Aesthetics → SEC → WOM                | 0.03                            | 0.29             | −.03       | .09           |
| Social Presence → SEC → WOM           | 0.14                            | 0.00             | 0.09       | 0.19          |
| Superior Functionality → SEC → WOM    | 0.10                            | 0.02             | 0.19       | 0.22          |
| Perceived Interactivity → SEC → WOM   | 0.04                            | 0.41             | −.06       | 0.08          |
| Perceived Personalisation → SEC → WOM | 0.06                            | 0.31             | −0.04      | 0.15          |

Note: All the indirect effects are significant at  $p < 0.001$  and  $p < 0.05$

three smart servicescape dimensions on service brand equity are also significant, which indicates that SEC plays the role of complementary mediation (Zhao et al., 2010). Since the bias-corrected bootstrap confidence interval of SEC as a mediator is different from zero for aesthetics (0.06 to 0.22), superior functionality (0.02 to 0.15), perceived interactivity (0.05 to 0.24), social presence (0.08 to 0.29) and perceived personalisation (0.01 to 0.19), we conclude that SEC is a significant mediator between the smart servicescape dimensions and service brand equity. This suggests that hypothesis H5 can be accepted. The bias-corrected bootstrap confidence interval of SEC as a mediator, on the other hand, includes the value of zero for aesthetics, perceived personalisation, and perceived interactivity. This indicates that SEC is not a significant mediator between these smart servicescape dimensions and WOM. However, bias-corrected bootstrap confidence interval of SEC as a mediator does not include zero for superior functionality and social presence, indicating that SEC is a significant mediator between these smart servicescape dimensions and WOM. Thus, it can be concluded that hypothesis H6 is partially supported.

## Discussion

Although the extant literature provides evidence on the benefits of involving customers in creating their own experiences (Åkesson, Edvardsson, & Tronvoll, 2014; Gustafsson, Kristensson, & Witell, 2012; Heinonen, Campbell, & Ferguson, 2019), there is scant attention on the determinants of experience co-creation in the technology-mediated smart service environment. To the best of our knowledge, there is no holistic examination of

smart consumer experience co-creation (SEC) in the context of the smart servicescape and smart consumers. Thus, the aims of this study were to conceptualise SEC and identify its antecedents and consequences. We identified servicescape dimensions (aesthetics, social presence, superior functionality, perceived interactivity, and perceived personalisation) and interaction with employees as primary antecedents of SEC. We also tested important outcomes of SEC, in the form of service brand equity and word-of-mouth intentions. We find that SEC is a multidimensional construct consisting of the following first-order dimensions: cognitive, hedonic, social/personal, and pragmatic/economic experience. In line with the SOR framework, results show that the technological environmental cues of the smart servicescape (S) collectively influence smart experience co-creation (O), and this co-created experience eventually influences consumers' service brand equity and WOM intentions (R).

Looking into our results, we find that perceived personalisation has the strongest effect on SEC, and its effect size is greater than those of perceived interactivity, aesthetics, superior functionality and social presence. The significant effect of the perceived personalisation dimension of smart servicescape on SEC may be attributed to the ability of smart technology to adapt its content to meet consumers' preferences, which should eventually result in meaningful interaction (Kumar & Benbasat, 2006). This finding complements the claim by Nilsson and Ballantyne (2014) and Prahalad and Ramaswamy (2004) that co-creation of value can only occur when there is a purposeful interaction where parties actively work together in a constructed environment.

The effect of the aesthetics of the smart servicescape on SEC is quite important as present literature claims that aesthetics can generate positive attitudes towards the technology (Li & Yeh, 2010). It may also be implied from the results that the aesthetics aspect of the smart servicescape encourages greater consumer absorption and participation in the smart environment. This differentiated aesthetic experience through smart servicescape results in SEC.

Similarly, results show that superior functionality is a significant predictor of SEC. This finding stresses the significance of producing a better value proposition to consumers to reduce resistance towards the smart servicescape. That is, the extent to which smart retail provides enhanced functional value relative to other formats of retail, impacts on consumer participation, which ultimately improves the SEC.

A relatively lower effect strength of the social presence dimension of the smart servicescape on SEC may be attributed to the fact that consumers interact with smart technology mainly to obtain the latest information rather than building and maintaining social relationships (Virk, 2011).

Although most of our hypotheses highlighting antecedents of SEC are supported, interaction with employees was not found to be significant in influencing SEC. One plausible explanation is that interaction with employees could not create a supportive environment for co-creation activities, rather serving an informational purpose (Virk, 2011). This outcome is contradictory to Jaakkola et al.'s (2015) conceptualisation in the service management paradigm that service experience is co-created within the service relationship between the employee and the customer.

The results reveal that SEC directly influences service brand equity. This is one of the most important findings of this study. Improving brand equity is the paramount goal of any service firm. Therefore, this finding is remarkably meaningful because it indicates

a new antecedent to achieving brand equity. This finding is significant to the changing context of experience. It supports the service-dominant logic that consumers are no longer merely the passive recipients and shows that co-creation offers service firms beneficial outcomes and provides an incentive for implementing co-creation opportunities (Vargo & Lusch, 2016). This finding underlies how engaging a customer in creating their own experiences leads to service brand differentiation, which ultimately leads to brand equity (Kam Fung So & King, 2010; Vargo & Lusch, 2016). We build on Jaakkola et al.'s (2015) work on value co-creation and Jaakkola and Alexander (2014) work on customer engagement, where service experience co-creation is directly linked to value co-creation and leads to brand equity. This is also consistent with the propositions of Prahalad and Ramaswamy (2004) which outlined the linkages between experiences that allow the customer to co-create and increased value for the firm and customer.

Results also show that SEC positively impacts WOM intentions. One of the probable explanations may be linked to the positive consumer co-created experience during interactions with the smart technology. This outcome is likely to develop trust in the smart technology, which eventually motivates consumers to engage in WOM activities about the smart technology (Balaji & Roy, 2017).

### ***Theoretical implications***

This paper makes several key theoretical contributions. First, and broadly, this study is one of the first to empirically examine smart experience co-creation, which is clearly a burgeoning research area. Second, this study is one of the initial attempts to explore the dimensions that constitute the smart servicescape, in comparison to other servicescape formats (Lee, 2018). Third, this study examines the impact of those smart servicescape dimensions on smart experience co-creation, adding to the literature on smart consumers (Chen et al., 2009, 2018). Fourth, this study presents an inaugural finding that smart experience co-creation directly influences brand equity. This finding is a direct response to calls for research to identify measurable consequences of value co-creation activities (Cambra-Fierro et al., 2017; Grisseman & Stokburger-Sauer, 2012; Jamilena Frias, Polo Pena, & Rodríguez Molina, 2017). Fifth, this study illustrates the role of technology in value creation, which responds to calls for more research on technological interdependencies in the service encounter (Voorhees et al., 2017). Finally, we build on previous research looking at the role of technology in retail marketing, such as self-service technologies (Meuter, Bitner, Ostrom, & Brown, 2005), innovative payment systems (Giebelhausen, Robinson, Sirianni, & Brady, 2014), and mobile augmented reality (Dacko, 2017).

### ***Managerial implications***

This study has direct relevance for retail marketing managers looking to develop a smart servicescape that encourages SEC and eventually enhances service brand equity and WOM intentions. First, marketing managers should understand consumers' focus on technological personalisation, aesthetics, functionality, interactivity and social presence while participating in co-creation. As one example, marketing managers can enhance interactivity by incorporating real-time, and less-restrained interactions between



consumers and the smart technology (e.g. Chatbots, personal digital services, and home automation among others). As another example, personalisation may be incorporated by leveraging technology to categorise consumers with similar needs into one clusters based on their shopping goals.

Also, it is typical that organisations employ staff at their smart retail stores to facilitate customers. For instance, the National Australia Bank have employed staff at their smart stores to further educate customers about the smart settings and also assist customers in completing their registration process for online banking, if required. The results in this study inform that interaction with employees is not significant in developing SEC in smart settings. Hence, companies should reorient their focus more on strengthening the smart technological interface.

Second, marketing managers need to understand the exact constitution of the SEC. We show that it is made up of hedonic, cognitive, social/personal, and pragmatic/economic experiences. As one example, marketing managers could facilitate hedonic experiences by underscoring the aesthetics and design aspects of smart retail technology (e.g. use of augmented and virtual reality). As another example, marketing managers could facilitate pragmatic/economic experiences by making the shopping experience convenient and time-saving (e.g. Amazon Go)

Finally, marketing managers can be confident that investing in the SEC will result in tangible return-on-investment, through brand equity and WOM. No longer can marketing managers treat consumers as passive recipients of a marketing message, particularly in the developing smart technology environment. In reality, if marketing managers fail to engage customers through co-creation opportunities, it will be detrimental to their brand.

### ***Limitations and future research***

The present study is not without limitations. First, convenience sampling, particularly chain referral sampling, may not produce a representative sample. Future research could plan resources to undertake probability sampling, which for example, could provide a more representative sample in terms of respondent age. In our study, all respondents were under 55 years old, which eliminates a valuable market segment for retail marketing managers, and a group for whom technology is less native. Second, this study adapted the co-creation scale proposed by Verleye (2015). Considering the unique characteristics of smart retail settings, the future research could create and validate a new SEC scale specifically for smart retailing. Future research could also examine the cross-cultural validity of the smart co-creation experience and empirically identify the characteristics of smart consumers.

Thirdly, brand equity was measured using Yoo and Donthu (2001) scale, which includes brand loyalty as one of the components of brand equity. There are alternative ways to conceptualise brand equity that future research could draw on. For instance, Nam, Ekinci, and Whyatt (2011) proposed brand loyalty to be an outcome rather than an antecedent of brand equity. Çifci et al. (2016), extended the conceptual framework of Nam et al. (2011) by incorporating brand awareness as an additional dimension of brand equity. Future researchers may incorporate competing models of brand equity (Çifci et al., 2016; Nam et al., 2011) and determine if there were any improvements in the model fit between SEC and brand equity.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Appendix A. Scenario

Imagine a world where you never wait in line or even open your wallet. A world where retail stores know so much about you that they recommend products and lead you right to them. Smartail is a smart retail store that is coming up in your neighbourhood. Before you can shop at Smartail you must instal the store app and create an account. When you want to shop at the store, you can scan your personalised barcode from the app and enter the store. Hundreds of cameras and sensors track your every move, keep tabs on what products you put in the smart basket (i.e. a shopping basket that detects items in it, calculates the bill and bags items) and offer you a recommendation of products on sale or products that can complement what you put in your basket. The weight sensors on each shelf know when you've removed something, and when you've changed your mind and put it back. Also, each product has a unique code which the sensors in the basket reads and puts in your virtual shopping cart in the app to display the price, promotional offers, and other product recommendations. When you complete your shopping you can simply walk out of the store. The receipt will be displayed in your app and the amount will be charged in your credit or debit card.