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Innovative Spaces, Loyal Faces: Unpacking the Influence of Servicescape Perception on Customer Outcomes in Smart Fast-Food Kiosks

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ABSTRACT

Prior research has tackled the impacts of Servicescape on customer responses in physical service environments, neglecting the same effects in online spaces. In response to this knowledge and empirical gap, this study expands the Servicescape framework to the innovative self-service fast-food industry. As such, this study has quantitatively surveyed 386 users who have experienced smart fast-food kiosks in Cairo. An online questionnaire has been developed and distributed to a non-probability convenience sample of customers. PLS-SEM analysis has been conducted via WarpPLS version 7 software to test the postulated hypotheses. The results showed a substantial influence of all Smart Servicescape dimensions, including aesthetics, functionality, symbolism, and financial security, on customer inspiration (CI). CI directly enhances both customer satisfaction and loyalty. In addition, CI mediates the relationships between the composite S-Servicescape and the satisfaction and loyalty of kiosk users. The study improves the theoretical understanding of service evaluation and its consequences in Eastern cultures regarding fast-food consumption. Similarly, the study offers practical advice to practitioners on assessing and maximizing customer-oriented benefits in fast-food self-service outlets by adopting essential S-Servicescape elements.

1. Introduction

Food service involves employees handling reservations, customer inquiries, orders, menu preparation, and delivering gourmet cuisine (Kim & Jang, 2016; Wen et al., 2021). Even though most restaurants still offer traditional services, innovative dining settings reflect a modern dining out approach, featuring digital advancements, robotics, and suitability for workers and customers. Wong et al. (2022) have challenged this tradition around. Abhari et al. (2020) suggested that consumers should leverage new technology, like smart ordering services, as they can significantly enhance their satisfaction (Elgarhy et al., 2021). In addition, technology plays a significant role in the success of innovative services, providing dynamic, quality solutions that are convenient for customers and co-create value throughout all phases (Beverungen et al., 2019).

Rita et al. (2019) mentioned that technologically advanced restaurants are now more than just eateries; they embody trends and lifestyles, driven by advanced innovations and intelligent technology. Additionally, modern restaurants prioritize technology, incorporating ordering, self-service, and automatic payment systems, among others, to enhance customer service and cater to consumers' growing demand for convenience (Jaiswal et al., 2023; Najihah et al., 2024).

Smart kiosks have been defined as the integration of smart devices and technologies for self-service purposes in a restaurant without requiring significant employee intervention (Wong et al., 2022). The rise of smart fast-food kiosks (SFFK) in the dining business challenges traditional service and quality evaluation understandings. In the 1980s, Parasuraman et al. (1988) proposed and implemented many service elements to establish the unique complete SERVQUAL framework. The authors offered a fresh understanding of how service excellence is evaluated in the service sector, including hospitality.

Various scholars recently confirmed the need for additional studies on how adopting Smart SERVQULA (SSQ) affects customer responses. To maintain commercial success, a restaurant must meticulously curate its service ambiance, including both tangible and intangible settings (Lee, 2018). Technological advancements significantly enhance the self-service environment, improving client experiences (Ozturk et al., 2016).

Saha & Mukherjee (2022); Wong et al. (2022) explained that the lack of research on SSQ is one of the common areas of interest in hospitality. Adel (2022) suggested that further inquiries are needed to cover SSQ determinants, enabling the updating of existing quality measurement scales to reflect customer perceptions accurately. In the same vein, Lee (2018); Marinakou et al. (2023); Prihantini & Farid Shamsudin (2023) asserted that future research should continue to explore emerging trends, technology-integrated service, quality, and service technologies to enhance customer outcomes at fast food restaurants.

Although smart technology fosters customer satisfaction (CS) and loyalty (CL), scant research has examined the outcomes of SSQ adoption in international fast-food chains. The sub-dimensions of SSQ within a smart context include servicescape, reliability, responsiveness, empathy, and assurance (Adel, 2022; Wong et al., 2022). This article focuses on the first dimension, namely, Smart Servicescape (S-Servicescape). Rahayu et al. (2024) recommended that policymakers

prioritize the integration of servicescape with technology, particularly in service contexts, to evoke customer desires.

Little is known about the consequences of S-Servicescapes, which has made it an important research topic that has not been sufficiently addressed (Adel, 2022). Hence, this research considers the outcomes of S-Servicescape adoption in smart fast-food kiosks in Cairo. We examine whether S-Servicescapes amplifies customer inspiration (CI), CS, and CL in the digital fast-food environment.

Indeed, there is a scarcity of research that covers the nexus between CI and consumer intentions in the hospitality sector. In this research, S-Servicescape indicates the service environment within a restaurant's smart kiosk framework (Li et al., 2023; Roy et al., 2022). Specifically, this study examines the influences of the four layout factors of the S-Servicescape: aesthetics, functionality, symbolism, and financial security (Lee, 2018; Tankovic & Benazic, 2018; Wong et al., 2022).

Previous investigations have neglected the influential roles of S-servicescape in the context of SFFK. For instance, Lee (2018) investigated consumer interaction behavior and brand loyalty development based on consumer desires with S-servicescape. Similarly, Rahayu et al. (2024) assessed behavioral intention and the S-Servicescape by surveying consumers who actively utilize mobile applications. Besides, the topic is also studied in online shopping (Ardiansyahmiraja et al., 2025; Harris & Goode, 2010; Hermantoro, 2022; Li et al., 2024; Tankovic & Benazic, 2018; Yadav & Mahara, 2020).

Accordingly, this study's findings contribute to SSQ research by focusing on the S-servicescape dimension, which received little attention in the digital fast-food spaces. This study also contributes by holistically underscoring CS and CL in the smart kiosk context, with particular attention to CI as a mediator factor.

2. Literature Review

2.1. Smart fast-food kiosks

The world is developing quickly, and with technological advances arrives new established encounters that must be considered and highlighted (Abhari et al., 2020). Additionally, many chains have adopted tableside apps to enable guests to order meals, pay the bill, and provide details about the meal's ingredients. In addition, it speeds up the ordering process and saves time for service staff (Berezina et al., 2019).

Technology in the restaurant and food service sectors primarily includes digital scheme management, automation, information analytics, and customer-facing devices (Abhari et al., 2020). Importantly, innovative restaurant services offer users benefits like hedonic, cheap, comfortable, secure, and privacy-safety. This necessitates thoughtful consideration of services and consumers/users for developing and popularizing smart technology (Park et al., 2018).

Smart technology advances enable F&B entrepreneurs to integrate smart devices in restaurants, resulting in automated establishments that provide higher-quality food and hygiene, while reducing

workforce (Abhari et al., 2020). According to Abhari et al. (2020), the future of innovative dining depends on their ability to effectively utilize new technology and design it to meet customer needs. Mani & Chouk (2017) found that the excellence of novel services and technology significantly impacts CS and CL with smart services. On the other hand, poor service quality often leads to customer displeasure and adverse experience appraisals (Saadilah et al., 2021).

The modern technologies used in fast food restaurants include smart kiosks, self-service interactive tablets, or touchscreen computers that allow users to complete ordering their products or services without dealing directly with staff (Park et al., 2021). Since late 2013, phone apps, touch tablets, and self-ordering kiosks have been revolutionizing the restaurant industry, allowing customers to easily browse food menus, self-request, and modify their meal, enhancing customer engagement and service (Ahn & Seo, 2018; Park et al., 2021). For example, kiosks were implemented across 14,000 Taco Bell and McDonald's outlets in the U.S. to expedite service transactions and reduce the time (Papandrea, 2019). Also, kiosks allow food firms to deliver their facilities with fewer workers (Park et al., 2021).

Understanding customer usage of SFFK is crucial, although some users struggle with this technology due to its complexity and numerous steps to follow (Najihah et al., 2024). The user interface's difficulty or precise instructions could lead to increased waiting time and customer dissatisfaction if the instructions are not clear and precise (Joe et al., 2022). Additionally, studying service technology and SFFK as a unique category within hospitality research facilitates the generalization and evaluation of this service (Vakulenko et al., 2019).

2.2. Smart SERVQUAL framework

According to Helless & Liao (2021), SSQ refers to managing the caliber of innovative services provided remotely via digital systems without requiring clients and service providers to meet in person. Abhari et al. (2022) defined smart services as efficient and skilled interactions that reflect service quality, emphasizing their growing importance in the hospitality industry. Adel (2022) defined the smart service as a systematic service outlet defined by constant, system-facilitated interactions that produce real-time data sharing from multiple sources linked in a software ecosystem. Moreover, "contactless" digital services are rendered through emerging technologies that do not require in-person communication between clients and workers (Lee et al., 2023). The SSQ definition differs from conventional meanings by emphasizing "Smart" for significant service dimensions, reflecting innovative service concepts successfully embedded inside the service experiment (Wong et al., 2022). Until now, based on the aforementioned literature, a clear definition of SSQ in the fast-food sector is absent.

The popularity of SERVQUAL in hospitality research for more than 30 years has shown its relevance in evaluating services (Malatji et al., 2020). However, it is no longer sufficient with tech-development and increased technological adoption for service delivery in the hospitality business (Santiago et al., 2024). Wong et al. (2022) highlighted a powerful function of technology in service quality, recasting it via the lens of digitalization and synthesizing the 5-S model of SSQ for smart hospitality contexts. The SSQ (as shown in Figure 1) includes the four categories within the smart

context: reliability, responsiveness, empathy, and assurance. There are parallels between these four categories and Parasuraman's framework (Wong et al., 2022). This study tackles the fifth dimension, which has been expanded to include a concrete service that can be combined with other physical attributes to create an S-servicescape, consisting of aesthetics, functionality, symbolism, and financial security (Lee, 2018; Tankovic & Benazic, 2018). However, the measurement of tangibles independently often ignores other non-physical and intellectual attributes (Li et al., 2023; Roy et al., 2022; Wong et al., 2022). Also, in a service environment, smart services facilitate direct and remote connections between customers, digital systems, and product providers (Ayvaz-Çavdaroğlu et al., 2024).

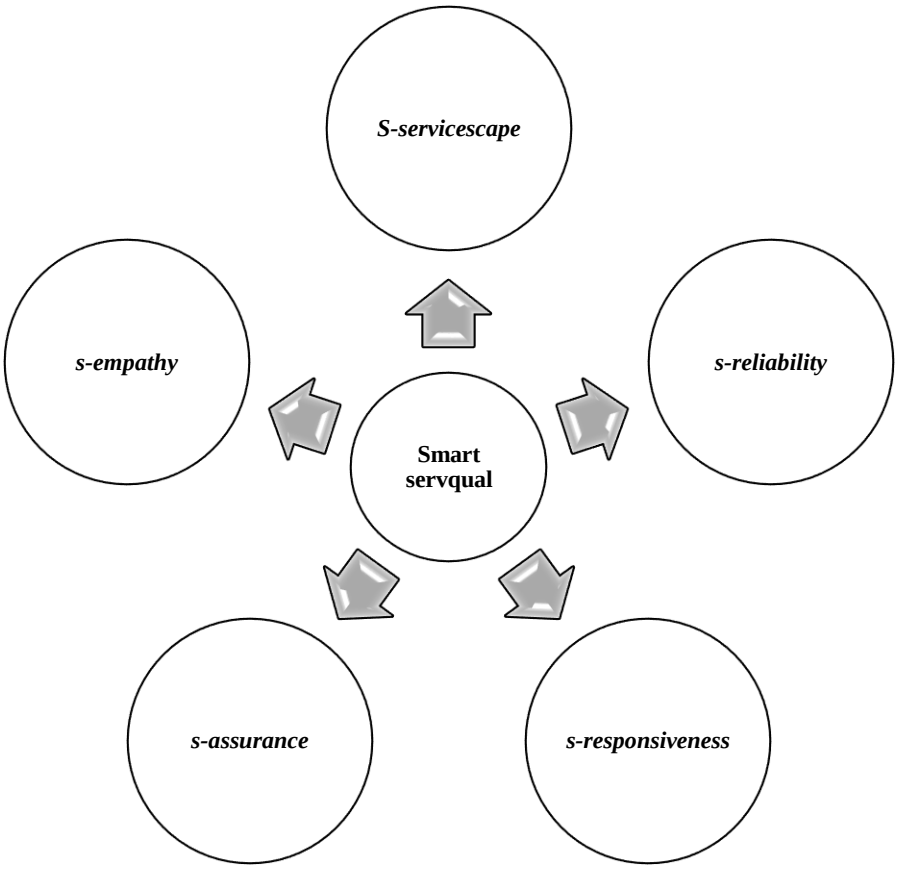

Figure 1. SSQ framework, source: adopted from Wong et al. (2022, p.2281).

2.3. S-Servicescape adoption in the hospitality industry

Researchers confirmed that it is necessary to create new models for assessing customer responses and emotions when utilizing technology for ordering (Xi & Balakrishnan, 2023). The s-servicescape carefully resounds with the palpable part of (Parasuraman et al., 1988) outlook, which refers to the physical space that depends on assessing users' provision. Tangible includes equipment, physical facilities, and personal appearance (Parasuraman et al., 1988). The servicescape theory subsequently underwent expansion and evolution in the internet context by Harris & Goode (2010), referred to as online servicescape. Lee & Jeong (2012) confirmed that e-

servicescape is the positive development of tangibility in service quality, where traditional service is transformed into a virtual environment. Moreover, e-servicescape has an important role as it allows the customer to observe the service settings before ordering (Hakim & Deswindi, 2015). However, it may also be constructed using elements of social services and service products that use the intelligent concept (Björk & Kauppinen-Räisänen, 2019; Lin & Wong, 2020). This S-servicescape entails how the smart service environment should be (Wong et al., 2022).

This analysis raises the concept of SSQ within the fast-food restaurant sector by emphasizing the role of the digital service environment. Specifically, it builds upon the tangible dimension of service rate initially suggested by Parasuraman et al. (1988), adapting it to the evolving context where technology is increasingly integrated with service development. In this regard, the servicescape becomes a critical component, reflecting the modern, technology-enabled environment where customers interact with smart services. This study focuses on the S-Servicescape in service kiosks, measuring servicescape as a key dimension of SSQ. This approach is grounded in the theoretical perspective of (Wong et al., 2022). By incorporating S-Servicescape into the framework of SSQ, this analysis strives to furnish a more comprehensive knowledge of how technological advancements influence CS and loyalty in fast-food diners.

Aesthetics and customer inspiration

Aesthetic markers of a structure determine a product's visual appeal and appealing features, engaging all the senses (Lee, 2018). Aesthetic appeal is the overall impression that includes three subdimensions: uniqueness of design, graphic appeal, and enjoyment worth (Rahayu et al., 2024). The concept of aesthetics emerged from a Western philosophical tradition, where scholars prioritized beauty and the extent of the aesthetic adventure (Sibley, 2001). After that, the idea has been discussed in diverse domains, like psychology (Berlyne, 1974), commerce (Holbrook & Zirlin, 1985), or digitalization (Tankovic & Benazic, 2018). For instance, Vakulenko et al. (2019) demonstrated that the value of sensual inspiration is conveyed by the kiosk's design aesthetics, including visual elements and auditory features such as colors and speech tone.

Ardiansyahmiraja et al. (2025); Rahayu et al. (2024) highlighted that aesthetics positively affects customers' behavioral intentions. Also, Aesthetics were identified as influencing customers' emotional arousal (Lee, 2018). Harris & Goode (2010); Yadav & Mahara (2020) identified aesthetic attractiveness as the primary predictor of trust. In contrast, Tankovic & Benazic (2018) reported that aesthetic attraction has no notable influence on perceived value and emotional responses (Li et al., 2024). Aesthetics is expected to inspire customers. Hence, the following assumption is suggested:

H1: Perceived aesthetic significantly affects customer inspiration when using smart fast-food kiosks.

Functionality and customer inspiration

Functionality embodies clients' perceptions regarding a product's capacity to achieve its intended mission (Bloch, 2011). The functionality of a platform refers to how well it communicates and can

complete its tasks while also clarifying information for customers (Lee, 2018). Also, functionality is defined as design aspects that can create enjoyable user interactions and experiences. Functionality has subdimensions: ability to do their job, effectiveness, and performance (Rahayu et al., 2024). Vakulenko et al. (2019) reported that functionality attributes influencing CI before service time are conveyed by seeing other customers ordering from SFFK quickly and efficiently.

Rahayu et al. (2024) highlighted that the layout and functionality dimension positively affect customer behavioral intention. Also, spatial functionality increases customer purchase decisions (Ardiansyahmiraja et al., 2025), emotional responses (Li et al., 2024), and perceived value (Hermantoro, 2022). Additionally, functionality was identified as influencing quality expectation arousal (Lee, 2018). Functionality is seen as an inspirational tool in the food service sector. Therefore, the following hypothesis is examined:

H2: Perceived functionality significantly affects customer inspiration when using smart fast-food kiosks.

Symbolism and customer inspiration

Symbolism refers to how objects or their utilization convey messages to others, reflecting an individual's self-image, personality, or values (Bloch, 2011). Additionally, the physical setting feature is a symbolic, spatial, and sensory stimulation (Njo et al., 2022). For instance, customers acquire meaning from engaging with SFFK and constructing their self-identity during interaction. While signs and symbols in restaurants help customers understand behavior and norms, communicate symbolic meaning, and create an aesthetic impression of the service quality of materials used in artwork and technology (Iyadi & Egwuenu, 2017). Besides, customer outcomes are compared to other outcomes (Lee, 2018). Moreover, perceived authenticity was studied as a symbolic facet of the enlarged servicescape. As predicted, authenticity symbolically positively influenced customer responses (Lee & Chuang, 2022).

Restaurants employ product design metaphorically to assist consumers in interpreting the significance of service operations (Zeithaml et al., 2018). That symbolic dimension emphasizes the essence of a product, so shaping a consumer's imagination through design features (Homburg et al., 2015). Candi et al. (2017) proposed the significance of metaphoric format in boosting consumers' emotions in online spaces. (Lee, 2018) identified that symbolism influences customers' emotional arousal. Also, Baek & Ok (2017) clarified the beneficial impact of symbols on buyers' inspirational conditions within the framework of hotel web pages. Thus, the subsequent hypothesis is developed:

H3: Perceived symbolism significantly affects customer inspiration when using smart fast-food kiosks.

Financial security and customer inspiration

Financial security pertains to the degree to which shoppers perceive the expenditure procedure as safe and the degree to which the kiosk's setup and conditions guarantee the security of ongoing transactions (Harris & Goode, 2010). Also, it is described as a protective implement used when consumers make payments. Financial security has subdimensions, namely perceived security and ease of payment (Rahayu et al., 2024). For instance, the main dimension customers use in evaluating kiosks is security procedures that offer detailed payment procedures and are security-conscious (Kurniawati & Yaakop, 2021).

Financial security positively and significantly impacts a customer's trust before an order (Harris & Goode, 2010; Kurniawati & Yaakop, 2021). Rahayu et al. (2024) highlighted that financial security positively affects customer behavioral intention. Also, the most potent result on intention was caused by the monetary safety factor (Ardiansyahmiraja et al., 2025). On the other hand, financial security was demonstrated to have no substantial impact on customer arousal (Nuralam, 2023). Given the importance of financial security for inspiring customers, the following hypothesis is postulated:

H4: Perceived financial security significantly affects customer inspiration when using smart fast-food kiosks.

2.4. Customer inspiration, satisfaction, and loyalty

The notion of inspiration, originating from psychology, is a motivating condition elicited by exterior and interior incentives that compels humans to translate thoughts into action and fosters autonomous actions (LIU et al., 2012) .CI is a customer's temporary motivated state that makes it easier for them to move from accepting a marketing-induced concept to pursuing an objective of consumption (Böttger et al., 2017) .Three primary aspects characterize inspiration: transcendence is a constructive and optimistic sentiment that enables individuals to perceive better options, evocation indicates that creativity is not spontaneous but instead stimulated by other factors, and motivation is the energy that compels individuals to act upon or disseminate novel concepts (Chen et al., 2024).

Böttger et al. (2017) linked the idea of inspiration with marketing practices. CI is characterized as a transient motivating condition that facilitates the acceptance of marketing stimuli and expedites the internal pursuit of consumption objectives. Few research reflections on extended reality have examined inspiration to comprehend how it may provide motivating experiences that drive customer reactions (Nikhashemi et al., 2021). Furthermore, the "*inspired-by*" & "*inspired-to*" states make up the higher order element of CI (Dai et al., 2022). The first is consumers absorbing commerce announcements and recognizing new possibilities; the second pertains to the customers' drive to execute new ideas (Chen et al., 2024).

One's behavior is guided by inspiration, and consumers are expected to respond favorably to the intended behavior. Therefore, inspiration's motivating quality creates a desire to take action (Saha

& Mukherjee, 2022). For example, adding technological ways of offering the service through self-order kiosks in restaurants offers inspiring and valuable experiences. Undoubtedly, inspiration encompasses a motivating element that acts as a catalyst for altering habitual consumption behaviors (Böttger et al., 2017). Motivation is also a state of inspiration brought on by a trigger that aims to convert realized knowledge into action.

It has been noted that CI as an intrinsic motivational state may benefit CS and CL (Böttger et al., 2017; Ghouri et al., 2019). Saha & Mukherjee (2022) showed a significant positive nexus between CI, CS, and CL in meal-ordering and delivery services on the Internet. In addition, CI can effectuate enduring alterations in customer attitudes, encompassing enhanced CS and loyalty (Frasquet & Ieva, 2024). On the other hand, CI has been demonstrated to encourage consumers' purchasing decisions (Chen et al., 2024). Moreover, an inspired consumer is often more predisposed to purchase food. We hypothesize the following accordingly.

H5: Customer inspiration significantly affects customer satisfaction when using smart fast-food kiosks.

H6: Customer inspiration significantly affects customer loyalty when using smart fast-food kiosks.

2.5. The mediating function of CI

According to Böttger et al. (2017), CI is a transient motivational value in service market experiences, so researchers have identified its facilitating roles. Kwon & Boger, (2021) proposed the function of CI as a mediator within consumer behavior research. Inspiration may act as a mechanism for enhancing brand connection and fortifying consumer relationships. Furthermore, Böttger et al. (2017; Khan & Ghouri, 2018) indicated that evidence of CI is associated with attitudinal outcomes, including CS and CL.

Xie et al. (2022) demonstrated that the novelty of automated services drives buyers' co-creation intentions via inspiration. Also, Fang et al. (2023) pointed out that the appearance of short-form media might increase inspiration, thus influencing travel intentions. Additionally, CI significantly mediates user purchase preferences and actions (Zhang et al., 2024). Furthermore, Tsaur et al. (2024) found that restaurant innovativeness positively impacts CI and memorable dining experiences, with CI acting as a mediator. Consequently, inspiration starts with receiving a creative idea, like SFFK, leading to motivation and emotional responses, with factors like restaurant innovation playing a key role in inspiring customers.

While few studies have used CI as a mediator variable (Chen et al., 2024; Saha & Mukherjee, 2022; Tsaur et al., 2024; Yang et al., 2024; Zhang et al., 2024), all of them were in the field of marketing at online food ordering or robot service, but none of the researchers progressed in recruiting them in service quality research. A dearth of research uses inspiration for CS (Saha & Mukherjee, 2022) and loyalty (Böttger et al., 2017). Likewise, Frasquet & Ieva (2024) highlighted that future research may broaden the concept by examining CS and CL intentions as outcomes of CI within the

hospitality sector. The study hypotheses are illustrated in Figure 2. Based on these arguments, we formulated the mediating hypothesis:

H7: When using smart fast-food kiosks, CI mediates the nexus between perceived S-servicescape and CS.

H8: When using smart fast-food kiosks, CI mediates the nexus between perceived S-servicescape and CL.

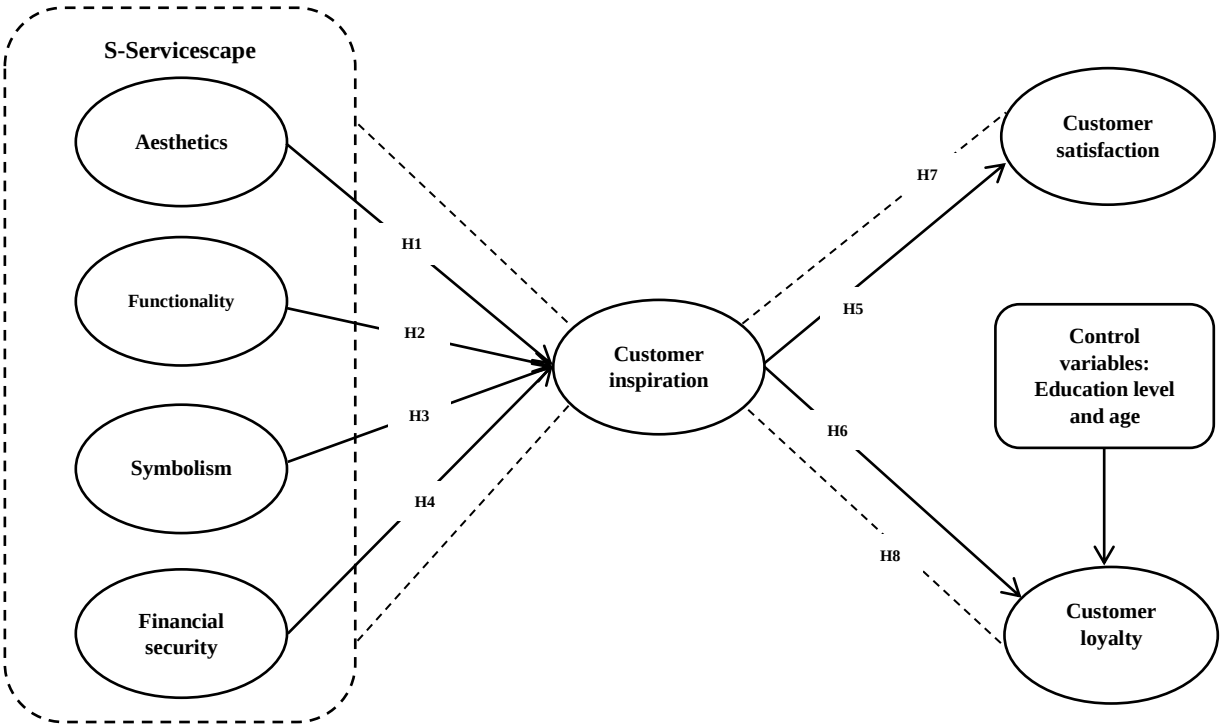

Figure 2. Diagram of conceptual framework.

3. Methodology

3.1. Sampling and data acquisition

The population under investigation is SFFK's consumers in both local and international restaurants in Cairo. Fast food restaurants were chosen for their rapid development and spread in the past few years, as well as the development of technological means, as it is a suitable field for service innovation (Abdulmawla et al., 2024).

Data for quantitative examination were gathered through a questionnaire prepared and administered online through google forms, as younger persons prefer this design (Kagerbauer et al., 2013). The survey took place in March 2025.

The participants were selected non-probabilistically using a convenience sampling strategy of customers who had experienced SFFK in Cairo. The sample size is determined by the KMT system (Krejcie & Morgan, 1970), which determines the sample size in the social sciences. The KMT

criterion recommends that a sample of 384 or higher is acceptable for a population of +1,000,000 respondents. Thus, 384 participants have been remarkably identified as the ideal sampling size in business management articles and theses (Memon et al., 2020).

Participants in the fieldwork were invited to rate the statements on a five-point Likert scale. ' Strongly Disagree' was denoted by 1, while 'Strongly Agree' was denoted by 5, the highest score on the scale. Furthermore, the survey yielded 411 completed questionnaires across gender and age demographics, of which 386 were accurately filled out and utilized in the study, exceeding the KMT's 384 threshold.

3.2. Measures

In this study, the survey is structured into several units, see Table 1. The first part collects demographic data, including age, educational level, gender, etc. The second section focuses on the independent variable, S-servicescape, which is measured using 12 items for all four dimensions. Following this, the mediating variable (CI) was assessed through 10 items for both "inspired by" and "inspired to" sub-parts, and then CS was measured with three items. Finally, CL is evaluated with five items.

A comprehensive theoretical appraisal was conducted, and multi-indicator measures were adopted from established measurements on S-Servicescape, CI, CS, and CL, adjusted to fit the research environment. The constructs utilized in S-Servicescape were derived from SSQ (El Khatib et al., 2021; Wong et al., 2022). CI was implemented by stressing the preference component ('inspired to' and 'inspired by' condition). Each consists of five items, with 10 indicators in total. CS was adjusted from the scales of Ha & Janda (2008); Muskat et al. (2019). CL is characterized as a synthesis of attitudinal dedication (Villanueva et al., 2023; Zeithaml et al., 1996).

3.3. Data analysis

A PLS-SEM procedure was utilized, and the suggested hypotheses in the conceptual model were evaluated using Warp PLS Version 7. This data analysis technique is used for several reasons. First, PLS-SEM is a solution for handling complex models with multiple latent constructs, as Sarstedt et al. (2016) stated. Second, data that deviates from a normal distribution can be analyzed using PLS-SEM. Additionally, PLS-SEM resolves the clear division between predictive and confirmatory outcomes, and this method is employed to anticipate the predictive precision of the proposed models (Ringle et al., 2015).

4. Results

4.1. Respondent profile

More than half of the sample were female (53.4%). Almost 60.1% were between 20 and 29 years of age, followed by 30 and 39 years (23.8%) and less than 19 (9.9%). In terms of education, more than half of the sample respondents had a Bachelor's degree (65.3 %), followed by 20.2% % for High school. As for the previous experience of SFFK, 44.0% of the respondents said that they used

kiosks less than three times, followed by 30.1% for those with three to five uses. Table 1 depicts the demographic information of the participating customers in detail.

Table 1. Demographic profile.

Characteristics	**Descriptions**	**No.**	**(%)**
Gender	Male	206	53.4
	Female	180	46.6
Age	Less than 19	38	9.9
	20-29	232	60.1
	30-39	92	23.8
	40-49	22	5.7
	More than 50	2	0. 5
Education	High school and Diploma	78	20.2
	Bachelor degree	252	65.3
	Post graduate	56	14.5
Number of uses	Less than 3	170	44.0
	3-6	116	30.1
	7-10	40	10.4
	More than 10	60	15.5

4.2. Measurement model

Hair et al. (2019) asserted that analyzing the factor loadings of latent items and examining construct reliability and validity is crucial for effective model measurement. Convergent validity, reliability, and internal consistency are the main elements of this evaluation. In this study, we followed the steps recommended by (Fornell & Larcker, 1981) to check the measurement, and we used Cronbach's alpha (α), a standard method, to assess how reliable the scale was. As shown in table 2, all loadings (α) are higher than 0.8, exceeding the required reliability threshold. Also, all other descriptive statistics, i.e., means and SD, showed logical and acceptable values. Skewness and kurtosis are statistical metrics that assess data distribution, specifically its deviation from normality. As a result, the study's SK and KU values ranged from -2 to 2, indicating that it is generally an excellent indication that the study data is normally distributed (Ba et al., 2021).

PLS-SEM gives other essential evaluations in this context, including composite reliability (CR) (Hair et al., 2019). Besides, AVE is utilized to evaluate the model's convergent validity, which must surpass the minimum value of 0.50 (Fornell & Larcker, 1981). The full collinearity (VIF) is a measure of collinearity among indicators, and a VIF of 5 or higher suggests potential issues in linear regression (Ringle et al., 2020). However, high correlations between these indicators can affect the estimation of weights and their statistical significance (Hair et al., 2011). Thus, the convergent validity and internal reliability for our model were both at a satisfactory level. The results displayed in Table 2 demonstrate that all test values surpass the acceptable and necessary levels (Ali et al., 2018).

Table 2. reliability, convergent validity, and distribution normality.

Variable	L	Mean	SD	SK	KU	CR	α	AVE	VIF
Aesthetics (AES) (Lee, 2018)						0.922	0.873	0.798	2.295
AES1. X's smart kiosks are visually striking.	0.871	3.990	0.796	-0.910	1.803				
AES2. X's smart kiosks are good-looking.	0.904	3.984	0.799	-0.889	1.716				
AES3. X's smart kiosks look appealing.	0.905	3.953	0.824	-0.919	1.515				
Functionality (FUN) (Lee, 2018)						0.926	0.881	0.808	2.997
FUN1. X's smart kiosks perform well.	0.875	3.933	0.770	-0.500	0.439				
FUN2. X's smart kiosks are capable of doing their job.	0.915	4.021	0.749	-0.851	1.863				
FUN3. X's smart kiosks are functional.	0.905	3.969	0.808	-0.829	1.472				
Symbolism (SYM) (Lee, 2018)						0.930	0.887	0.816	3.241
SYM1. X's smart kiosks help me establish a distinctive image.	0.904	3.782	0.908	-0.765	0.598				
SYM2. X's smart kiosks help me to distinguish myself from others.	0.93	3.803	0.866	-0.761	0.725				
SYM3. X's smart kiosks would accurately symbolize my achievements.	0.874	3.824	0.940	-0.959	1.008				
Financial security (FS) (Tankovic & Benazic, 2018)						0.933	0.892	0.823	3.615
FS1. X's smart kiosks offer detailed payment procedures.	0.863	3.850	0.805	-0.680	0.864				
FS2. X's smart kiosks reassure me with the security procedures.	0.923	3.803	0.947	-0.960	1.229				
FS3. X's smart kiosks seem security-conscious.	0.933	3.927	0.825	-0.643	0.642				
Customer Inspiration (CI) (Böttger et al., 2017; Chen et al., 2024; Tsaur et al., 2024)						0.965	0.960	0.733	3.866
CI1. X's smart kiosks stimulated my imagination.	0.862	3.907	0.860	-0.557	0.003				
CI2. I was intrigued by a new idea with X's smart kiosks.	0.879	3.964	0.867	-1.031	1.579				
CI3. X's smart kiosks gave me new ideas unexpectedly and spontaneously.	0.877	3.886	0.887	-0.491	-0.241				
CI4. X's smart kiosks broadened my horizon.	0.867	3.865	0.907	-0.818	0.760				
CI5. I discovered something new with using X's smart kiosks.	0.869	3.953	0.861	-0.694	0.468				
CI6. X's smart kiosks inspired me to buy something.	0.816	3.813	0.863	-0.896	1.412				
CI7. X's smart kiosks made me feel a desire to buy something.	0.84	3.943	0.842	-0.887	1.267				
CI8. X's smart kiosks increased my interest in buying something.	0.85	3.850	0.885	-1.100	1.580				
CI9. X's smart kiosks motivated me to buy something.	0.841	3.922	0.846	-0.882	1.206				
CI10. X's smart kiosks made me feel an urge to buy something.	0.86	3.860	0.904	-0.863	0.856				
Customer Satisfaction (CS) (Muskat et al., 2019)						0.951	0.924	0.867	4.255
CS1. I am satisfied with my experience with X's smart kiosks.	0.931	4.026	0.818	-1.016	1.829				

Variable	L	Mean	SD	SK	KU	CR	α	AVE	VIF
CS2. I am pleased to have visited X's smart kiosks.	0.929	3.938	0.800	-0.680	0.919				
CS3. I enjoyed myself at X's smart kiosks.	0.933	3.959	0.782	-0.711	1.153				
Customer Loyalty (CL) (Villanueva et al., 2023)						0.964	0.953	0.842	4.797
CL1. I intend to visit X's smart kiosks more than once shortly.	0.875	3.917	0.805	-0.628	0.477				
CL2. I will recommend this X's smart kiosks to others.	0.933	3.933	0.822	-0.717	0.816				
CL3. I will encourage my relatives and friends to visit this X's smart kiosks.	0.936	3.953	0.848	-0.780	0.981				
CL4. I will share an optimistic response on my social media pages regarding my experience in this X's smart kiosks.	0.908	3.974	0.825	-0.620	0.285				
CL5. I believe that X's smart kiosks deserve my loyalty.	0.936	3.896	0.900	-0.780	0.768				

Note: X reveals the restaurant name.

Conforming to Henseler et al. (2015), cross-loadings were predestined to investigate discriminant validity, the Heterotrait Monotrait (HTMT) ratio of all constructs' correlations, and the Fornell-Larcker criterion (refer to Table 2). The outcomes indicated that the AVE values' square root, shown in bold and off-diagonal, were higher than their correlations with the corresponding rows and columns (Fornell & Larcker, 1981). Therefore, the measurement model showed more promising results and ensured that the discriminant validity was established. Another approach was indicated by Henseler et al. (2015), which was adopted to consider the discriminant validity through the HTMT model. Table 3 demonstrates a sufficient degree of discriminant validity for all factors studied, with all HTMT values having a cut-off less than 0.90.

Table 3. Statistics of the discriminant validity.

Fornell-Larcker criterion								HTMT ratios						
Construct	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1- Aesthetics	**0.893**													
2-Functionality	0.652	**0.899**						0.744						
3- Symbolism	0.673	0.735	**0.903**					0.766	0.833					
4- Financial security	0.679	0.752	0.744	**0.907**				0.769	0.849	0.837				
5- Customer Inspiration	0.64	0.673	0.685	0.709	**0.856**			0.698	0.732	0.741	0.765			
6- Customer Satisfaction	0.594	0.68	0.665	0.746	0.822	**0.931**		0.66	0.754	0.734	0.82	0.874		
7- Customer Loyalty	0.635	0.664	0.718	0.71	0.8	0.856	**0.918**	0.696	0.723	0.781	0.769	0.837	0.812	

4.3. Structural model

Direct effects

Following satisfactory results from testing the general measurement model, PLS-SEM estimates the structural model (Ringle et al., 2015). Hair et al. (2019) suggested that the complete bootstrapping approach was used to evaluate and compute path estimates, their associated t-values, the excellence of model fit, and testing for mediation effects (see Figure 3).

Table 4 shows that aesthetics (β = 0.167, t = 3.368, **p < 0.001**), functionality (β = 0.177, t = 3.558, **p <0.001**), Symbolism (β = 0.211, t = 4.277, **p <0.001**), and financial security (β = 0.304, t = 6.238, **p <0.001**), all had a favorable and noteworthy impact on CI. Hence, this evidence supports H1, H2, H3, and H4. The findings also revealed that CI positively and significantly affected CS (β = 0.824, t = 18.153, **p < 0.001**), as well as CL (β = 0.799, t = 17.543, **p < 0.001**). Thus, this supported H5 and H6.

Hair et al. (2019) supposed that the coefficient of determination (r^2), cross-validated redundancy (q^2), and effect size (f^2) should be evaluated to determine the explanatory and predictive quality of the overall structural model. As such, this model explained 59%, 68%, and 64% of the variance in CI, CS, and CL, respectively. According to Cohen (2013) q^2 values of .02, .15, and .35 account for small, medium, and high impact sizes, respectively. Interestingly, our model possesses strong predictive relevance, as all q^2 values for the three endogenous constructs (CI=0.580, CS=0.670, and CL=640) are greater than 0.35 (Hair et al., 2019). This result demonstrates the model's high fit for out-of-sample and unseen future observations. The study's f^2 values, ranging from .107 to .642, indicate that the endogenous latent constructs have an acceptable impact. Because the data, ranging from 0 to 1, indicates the model's strong explanatory power (Shmueli et al., 2019).

Indirect effects

This research used the method advised by Preacher & Hayes (2008) to evaluate the mediating effects of the whole bootstrapping confidence interval (CI) and track the modeling method, which is recommended for this type of inquiry. In other words, mediation occurs when there's a significant indirect correlation between the predictor and criterion constructs, and zero remains at the top and lower levels of the confidence intervals.

Accordingly, the results presented in Table 4 and Figure 3 evaluated CI's mediating impact. As a result, the indirect effect of S-Servicescape (β = 0.632, **p < 0.001**, CI [0.544; 0.720]) on CS through CI was positively and meaningfully reported. This result specifies that CI mediated the nexus between S-servicecape and CS, thus supporting H7. Also, the indirect impact of S-servicecape (β = 0.616, **p < 0.001**, CI [0.526; 0.706]) on CS through CI was positively and significantly established. Hence, this evidence supports H8.

Control variable

Factors restricted or kept constant during a research study are called control variables. While this variable is not directly pertinent to the study's propositions, it is controlled because it can influence the results of endogenous constructs. It was surprising that both educational level (β = 0.020, t = 0.347, **p = 0.350**) and age (β = 0.016, t = 0.255, **p =0.379**) did not affect customer loyalty, which does not affect the causal connections between dependent and independent variables in our model.

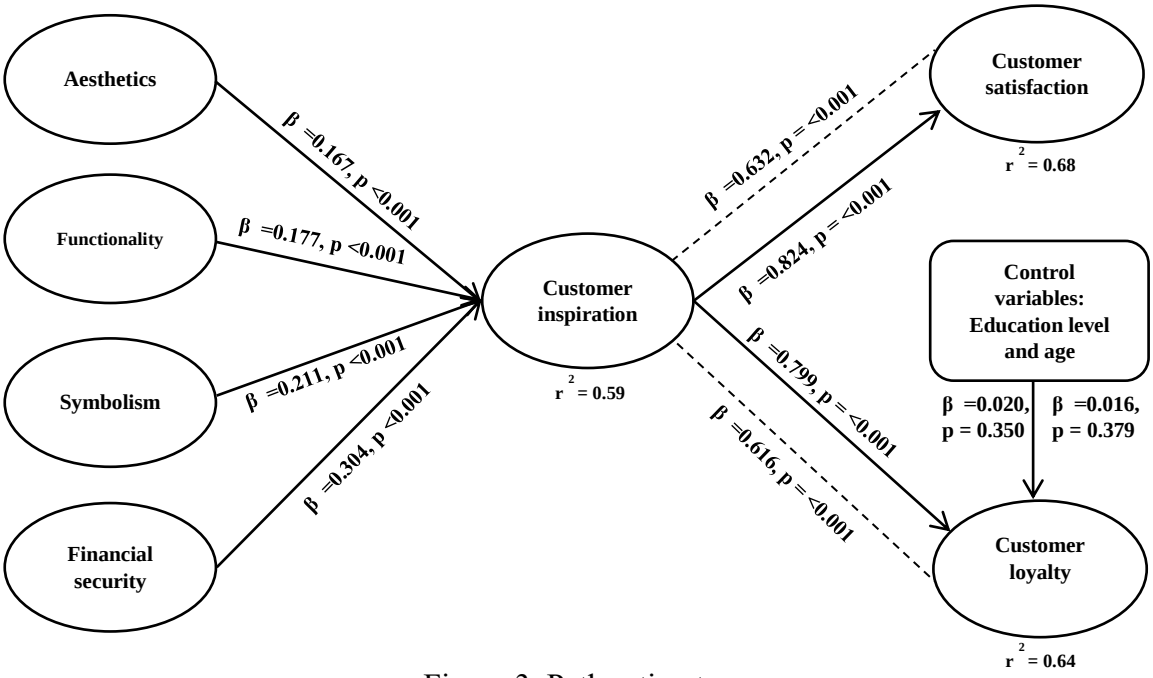

Figure 3. Path estimates.

Table 4. Hypothesis testing.

Contral variables' effects							
H	Path	β	t-value	p-value	f 2		*Decision*
	Education level → Customer Loyalty.	0.020	0.347	0.350	0.002		No effect
	Age → Customer Loyalty.	0.016	0.255	0.379	0.001		No effect
Direct effects							
H	Structural paths	β	t-value	p-value	f 2		*Decision*
H1	Aesthetics → Customer Inspiration.	0.167	3.368	<0.001	0.107		Accepted
H2	Functionality → Customer Inspiration.	0.177	3.558	<0.001	0.119		Accepted
H3	Symbolism → Customer Inspiration.	0.211	4.277	<0.001	0.145		Accepted
H4	Financial security → Customer Inspiration.	0.304	6.238	<0.001	0.218		Accepted
H5	Customer Inspiration → Customer Satisfaction.	0.824	18.153	<0.001	0.680		Accepted
H6	Customer Inspiration → Customer Loyalty.	0.799	17.543	<0.001	0.642		Accepted
Indirect effects							
H	Structural paths	β	t-value	p-value	CI 95%		*Decision*
H7	Smart Servicescape → Customer Inspiration → Customer Satisfaction.	0.632	14.045	<0.001	0.544	0.720	Accepted
H8	Smart Servicescape → Customer Inspiration → Customer Loyalty.	0.616	13.389	<0.001	0.526	0.706	Accepted

5. Discussion and conclusion

This study is grounded on the SSQ theoretical foundation reflected in the S-Servicescape. The integration of S-Servicescape with emerging technology in the service sector is an interesting research area (Rahayu et al., 2024). Accordingly, we integrated this framework, including the four dimensions of S-Servicescape, namely aesthetics, functionality, symbolism, and financial security (Lee, 2018; Tankovic & Benazic, 2018), in the SFFK in Egypt. A random sample of 386 users has been surveyed to obtain their perceptions of the kiosks' experience. The study linked each one of the S-Servicescape's four constructs (Lee, 2018; Tankovic & Benazic, 2018) with the "inspired by" and "inspired to" parts of CI (Böttger et al., 2017; Chen et al., 2024; Tsaur et al., 2024). Furthermore, the study hypothesized a noteworthy mediating role of CI in the connection between aesthetics, functionality, symbolism, and financial security on one hand, and both CS and CL on the other hand. In light of the reported results, we offered a plethora of theoretical and managerial recommendations to scholars and policymakers in the hospitality arena, particularly the fast-food sector.

This study discovered that aesthetics positively impacts the CI. This result is consistent with research (Ardiansyahmiraja et al., 2025). Rahayu et al. (2024) emphasized that it has a favorable impact on user intention. Additionally, Lee (2018) found that it affected the fervent arousal of the customers. On the other hand, Tankovic & Benazic (2018) found that appearance does not significantly enhance emotional reactions or perceived value, a finding echoed by Li et al. (2024). The present study discovered that functionality positively affects the CI. This argument aligns with Rahayu et al. (2024), who found that functionality increases customer intent towards technology services. Likewise, it has been reported that functionality positively affects customer intention, emotional responses (Li et al., 2024), and perceived value (Hermantoro, 2022). According to this study, symbolism has a favorable impact on the CI. By emphasizing a product's meaning, the symbolic dimension helps shape a customer's perception of themselves through design elements (Homburg et al., 2015). Additionally, the positive effect of symbols on consumer emotions was explained by Baek & Ok (2017). Our results demonstrated that the CI is positively impacted by financial security. This result aligns with (Harris & Goode, 2010; Kurniawati & Yaakop, 2021). Also, financial security amplifies consumer intention and trust (Ardiansyahmiraja et al., 2025; Rahayu et al., 2024). However, our result disagrees with the idea that financial security is not an amplifier of customer arousal (Nuralam, 2023).

This study confirms that inspiring customers through a demand-driven approach enabled by technology symbolizes urbanization and the ability to maintain familiarity with technological advancements. That is, CI has directly impacted CS and CL. These findings align with previous studies by Chen et al. (2024); Frasquet & Ieva (2024). At the same time, CI mediates the relationship between S-Servicescape and CL. Similarly, S-Servicescape affects CS through CI but with a lower level than the indirect effect on CL. These outcomes are compatible with prior studies (Chen et al., 2024; Saha & Mukherjee, 2022; Tsaur et al., 2024). Notably, it was emphasized that the CI mediating relationship between S-Servicescape and CS and CL is expected to boost the effects of other SSQ influences on customer outcomes. Accordingly, our results found no control

effect for educational level and age on CL, signifying that the smart kiosk experience is perceived uniformly across these demographics within the studied context. Restaurants must prioritize innovative services to keep updated with the technological era by adopting advanced policies and processes for service delivery. This effort may contribute to higher levels of CS and CL for brands.

5.1. Theoretical implication

The results of this study offer several substantial recommendations for academic research and industry practice. Firstly, this study contributes to bridging a notable gap in the existing literature not merely by reaffirming the importance of technology in the hospitality sector, but by offering a direct assessment of S-Servicescape in fast food restaurants. By concentrating on the specific dimensions of SSQ, particularly S-Servicescape, this study extends the conceptual framework initially proposed by Wong et al. (2022), adapting it to the context of modern innovative service environments. This approach offers a more nuanced grasp of how technology service tools, such as smart kiosks, shape customer outcomes. Unlike previous studies that have concentrated on mobile apps or online food ordering through social media, this study focuses on SFFK, a growing sector in the fast-food business. The study's findings suggest that customers are inspired by smart kiosks for their technological functions, aesthetic appeal, and perceived financial security. These aspects jointly enhance customer knowledge, promoting satisfaction and loyalty.

Secondly, a novel output of this analysis is the introduction of tech-induced restoration, an emerging concept that extends beyond the traditional scope of Attention Restoration Theory (ART). The study proposes that technologically advanced restaurants can inspire customers and thus gain their satisfaction and loyalty. Through immersive smart environments, especially the S-Servicescape, technology stimulates the senses and enhances customer experiences that surpass conventional dining satisfaction expectations. In this context, smart service parts meet functional needs and promote psychological renewal by offering engaging, interactive, and aesthetically pleasing experiences. By immersing customers in service technology, restaurants can produce a sense of joyful mental stimulation and emotional engagement, contributing to more profound psychological benefits. This positions technology as a central element in shaping customer well-being, not just service efficiency. Integrating attention restoration into the service quality framework introduces a new dimension to hospitality research, shifting focus toward psychological sustainability, an area rarely addressed in existing literature, by synthesizing knowledge from SERVQUAL, attention restoration, and info technology. Additionally, we addressed this gap in the Egyptian context, which has a unique and traditional Eastern food identity (Mostafa et al., 2019). This study initiates a new line of academic inquiry and sets the stage for incoming inquiries on the stimulating prospect of innovative service environments.

5.2. Practical implication

The growing service technology entailing cost reductions is expected to revolutionize the hospitality industry, enabling fully automated, brilliant service, such as autonomous robots and kiosks, to serve customers. Nevertheless, personalization is one area of technology application in the foodservice sector that is still understudied. Such actions may improve customer experience

and foster a heightened feeling of community and emotional connection between consumers and diners, as noted previously (Rosenbaum, 2006). An additional impressive remark from the current investigation stems from including inspiration in the SFFK setting. As advanced technologies have evolved and been invested in every part of the food catering industry, restaurants have gained a relatively famous venue for unique tours and selfie-taking. They have also enticed many technology lovers, who pay tribute to the restaurant's novel layout and special customer care methods. Hence, smart kiosks may be placed as microcelebrities (Huang et al., 2021). They frequently gain powerful public attention in digital media. However, restaurants are transforming the dining industry by focusing on technology rather than manual methods. The social changes are transforming the dining experience, shifting from merely focusing on the food to a smart dining experience that precedes it. Hence, the ultimate goal should be to make the dining experience more enjoyable than just the food.

5.3. Limitation and future research

This investigation challenged several restrictions that may guide future studies. First, the data was gathered from restaurants located in Cairo. Therefore, the results might be limited to this group of Eastern populations. Accordingly, the results can be observed inversely in other contexts, particularly since smart dining outlets are prevalent in the developed hospitality markets. Secondly, this research is an empirical extension of S-Servicescape in the academic literature. However, using a quantitative research approach to measure customer returns limits our in-depth, thoughtful examination of the effectiveness of these smart services in hospitality studies. Therefore, we motivate future research to measure other dimensions of SSQ and explore its pertinence in several hospitality environments and fields. We also call for investigating customer ratings and preferences regarding technological services in restaurants and other hospitality venues. Finally, the S-Servicescape measured in the current research needs to be the initial step toward improved evaluation of restaurant services, as Wong et al. (2022) asserted. Going forward, scholars are invited to investigate customer anxieties derived from smart services. This understanding will help provide deeper assessments and action plans across different food sectors.

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