Research Article

AI-Driven service quality and sustainable consumer behavior: A social psychology perspective in quick service restaurants

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ABSTRACT

AI is transforming the business operations of quick service restaurants (QSRs) through enhanced delivery of services and customer engagement. This research seeks to investigate the determinants of AI-driven service quality, e.g., perceived value as a mediator, and their influence on customer satisfaction based on the SERVQUAL model. The participants in this research were 459 respondents from the millennial generation. Simple random sampling was used in data collection through a structured questionnaire. Tangibility, reliability, and responsiveness are the primary determinants that play a significant role in customer satisfaction, with perceived value being the mediator. Perceived value mediates the relationship between AI-based service quality and customer satisfaction. QSR players can utilize these findings to simplify their service models, pricing strategies, and brand communications to maximize customer satisfaction and loyalty. Empathy and assurance as additional dimensions of service quality can be explored in future research.

Keywords: AI service quality; service quality; perceived value; customer satisfaction; Millennials; quick service restaurants

1. Introduction

Artificial intelligence (AI) has transformed the customer experience in quick service restaurants (QSRs) in recent years. In addition to enhancing efficiency and personalization, AI technologies can promote sustainable consumer behaviors[1]. From a social psychology perspective, AI-driven service quality can influence customer satisfaction by mediating perceived value. Moreover, by incorporating environmental cues and using AI to nudge eco-friendly decisions, QSRs can notably shape pro-environmental behavior[2]. This interdisciplinary approach bridges service innovation with environmental and social psychology, contributing to a deeper understanding of sustainable consumer engagement in AI-enhanced dining environments.

The food service market in Malaysia, especially in the QSR sector, is rapidly growing and is forecasted to reach USD 13.11 billion in 2024 and USD 23.95 billion by 2029[3]. This growth is driven mainly by the evolving consumer lifestyles and rising demand for convenience, especially among youngsters in urban centers like Klang Valley. A study found that 84% of young students in Malaysia regularly consume fast food due to its affordability and time-saving factor[4]. QSR brands such as KFC, McDonald's, Domino's, and Subway are the leading ones in the market[5].

The intensified competition of QSR business in Klang Valley, a densely populated urban region encompassing Kuala Lumpur and its surrounding areas, has posed pressure to QSR operators in fulfilling the evolving consumer expectations, especially from the millennials, who make up 45% of Klang Valley's population, and contribute to the largest portion of the customer group[6]. Therefore, it is important to investigate millennials' expectations of fast-food consumption, particularly with the increasing role of AI in shaping service quality and customer experience[7].

AI-driven service quality is the key to shaping customer satisfaction and affecting perceived value in the QSR sector[8]. Customer satisfaction plays an essential role in business operations, as it will impact the business's survival[9]. The customers' assessment often impacts the perceived value of their patronized experience towards a product or service from AI aspects[10]. Perceived value may operate as a mediator between customer satisfaction and factors related to service quality[11].

In the QSR sector, service quality elements strongly influence customer satisfaction and loyalty, including tangibility, reliability, and responsiveness[12]. Poor service quality in any of these service quality elements can cause customer dissatisfaction, negative word-of-mouth, and, eventually, loss of patronage[13,14].

Tangibility refers to the physical environment of the restaurant and food quality. An uncomfortable dining environment or inconsistent food quality can negatively impact dining intention and pose food safety or health risks[15,16].

Reliability is the ability to deliver promised services accurately. Customers are dissatisfied when QSR operators fail to meet their expectations or lack the skills to address issues [13,17]. Responsiveness refers to how promptly QSR staff respond to customer needs. Delays or inattentive service can reduce customer satisfaction[18]. Perceived value is related to how customers weigh service benefits against costs. It is a key mediator between service quality and satisfaction[8].

When tangibility, reliability, and responsiveness levels increase, customers tend to perceive better value, strengthening brand perception and increasing brand loyalty[19,20]. However, current literature rarely explores how perceived value connects these service quality elements with customer satisfaction[21,22].

2. Literature review

2.1. Framework

This study follows the SERVQUAL model, which was developed by [23]. Where a set of dimensions of service quality affects customers' overall impressions. As AI-powered services are becoming widespread, this study extends the traditional SERVQUAL model by including aspects of tangibility, reliability, and responsiveness, which are gaining relevance. Of interest is that this study incorporates AI attributes, such as automated systems, self-service kiosks, and chatbots, in contrast to the original SERVQUAL model, which focused on human interaction with service firms. Secondly, we suggest that perceived value is a mediator of the relationship between AI service quality dimensions and customer satisfaction, offering a more

explanatory account of how AI influences consumer attitudes. Figure 1 shows how AI-driven elements of service quality relate to perceived value and how that, in turn, shapes customer satisfaction.
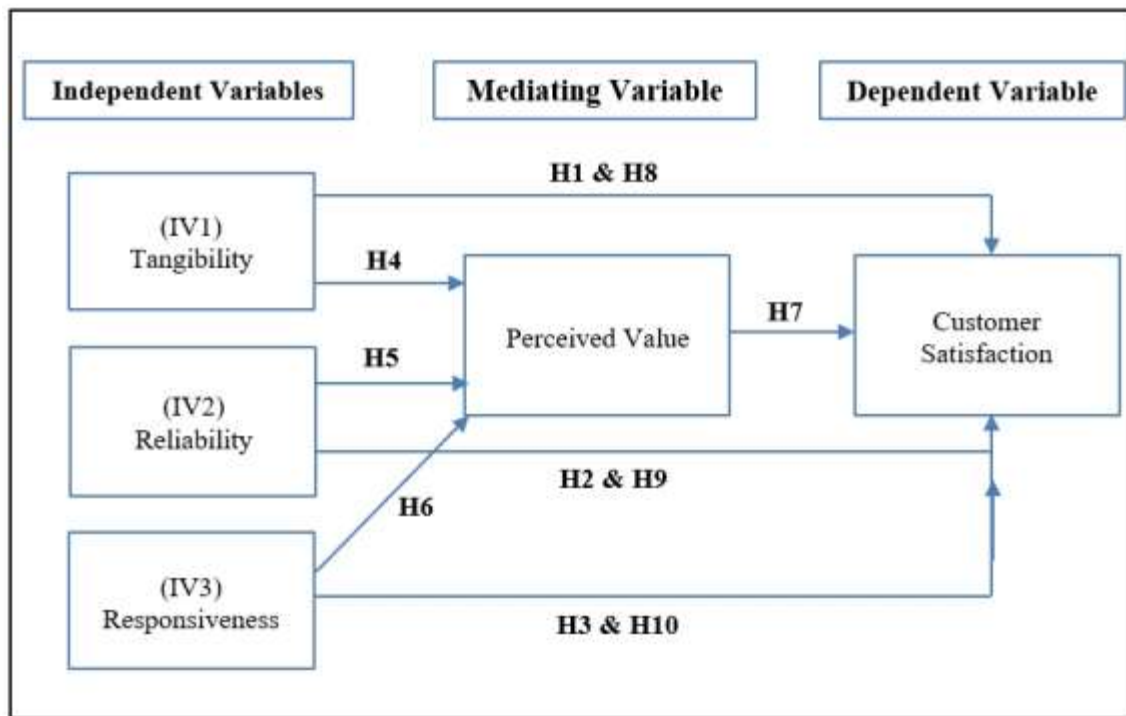

Figure 1. Conceptual framework

2.2. Service quality

Service quality is defined as the level of service that meets customer needs and expectations [24]. proposed five key dimensions in evaluating service quality: tangibility, reliability, responsiveness, assurance, and empathy. AI adoption can improve service quality and enhance customer satisfaction and well-being in the restaurant industry[25]. Tangibility refers to the physical and digital presentation of food and the environment. Reliability relates to the consistent, accountable, and accurate performance of services. Responsiveness is the system's promptness and effectiveness in reacting to the needs[26]. In AI-powered QSRs, these dimensions can be managed with different digital tools.

AI-driven technologies, for instance, chatbots, self-service kiosks, AR menus, and facial-recognition payments, have shifted tangible elements into new ways, offering customers a blend of digital and physical experiences by creating the 'phygital' environment[27,28]. Reliability is also defined as doing things right the first time and consistently delivering accurate service that meets customers' expectations[29].

In the QSR sector, reliability can be enhanced with AI tools such as automated ordering systems and predictive analytics, which help to reduce inventory ordering errors and prevent out-of-stock situations with more accurate forecasting demand[30]. Furthermore, AI-powered kitchen management systems can optimize the food preparation processes to ensure meals are cooked correctly and on time, complying with food safety and quality requirements[31]. Chatbots and self-service kiosks in QSRs enhance reliability by minimizing human errors in order taking and providing instant troubleshooting where necessary[32]. Service robots can simulate or mimic human-like behaviors, fostering customer interaction[33]. AI-driven responsiveness speeds up service delivery, increases customer satisfaction with more interactive experiences (Parvez et al., 2025), and drives QSR brand advocacy among young diners[34].

2.3. Customer satisfaction

Customer satisfaction refers to a customer's fulfillment response after patronizing a product or service, reflecting whether expectations are met, exceeded, or disappointed [35]. Customer satisfaction can be impacted by incorporating tangible elements such as physical facilities, staff appearance, restaurant design layout, and other visible service tools [36]. In the QSR, with AI adoption, smart kiosks, automated kitchen machines, aesthetic store appearance, and digital menus can elevate the dining experience, boosting service quality perceptions and ultimately increasing customer satisfaction by making the dining experience [37].

Customer satisfaction is influenced by reliable service; when QSRs consistently fulfill or exceed customer expectations, customers perceive more value and are more likely to make repeated patronage [38]. AI-driven reliability facilities, for instance, online ordering programs, automated kitchen systems, and service robots, are implemented to ensure accurate and timely order delivery [39].

2.4.Perceived value

Perceived value refers to a customer's assessment of the benefits of a product or service they receive versus the sacrifices they make, including the value paid, time, or effort spent [8]. Various studies show that higher perceived value can directly enhance customer satisfaction and loyalty [40]. In QSRs, different factors, such as pricing strategies, food and service quality, and customer convenience, can influence perceived value[41].

AI-driven services, including personalized recommendations, quicker order processing, and real-time order tracking, can increase customer perceived value by delivering a next-level customer experience while maintaining or reducing customer spending [36]. When AI tools meet or exceed customer expectations in service delivery, customers feel they have gained more for their money spent, which eventually enhances customer satisfaction [11]. Furthermore, QSR with AI-powered service quality can foster trust and increase repeated patronage.

Although the research on the service quality and customer satisfaction of QSR is extensive, there are still several gaps in the existing literature, especially in the context of AI-driven dimensions and perceptions from millennials [42,43]. First, most studies focus on traditional service quality factors like food quality, pricing, and atmosphere, excluding AI-driven dimensions such as tangibility, reliability, responsiveness, assurance, and empathy [16]. Furthermore, the mediating role of perceived value between AI-driven service quality and customer satisfaction is underexplored [44]. In addition, based on the existing literature, the demographic coverage is limited to only a few studies targeting millennials and AI value perceptions in Klang Valley [21].

This study aims to fill these gaps by investigating how AI-enhanced service quality impacts customer satisfaction via perceived value, focusing on millennials' expectations in the Klang Valley.

2.5. Research questions

RQ1: To what extent do the three dimensions of AI-driven service quality (tangibility, reliability, and responsiveness) impact perceived value and customer satisfaction?

RQ2: Does perceived value significantly influence customer satisfaction?

RQ3: Does perceived value mediate the relationship between AI-driven service quality dimensions and customer satisfaction?

3. Methodology

3.1. Research design

The quantitative method was used in this study. According to [40], the quantitative method emphasizes numerical and data measurements and applies statistical analysis to understand research problems.

3.2. Population and sampling

The study's primary emphasis is on the Klang Valley's millennial population. According to[45], millennials were born between 1981 and 1996 (aged between 28 and 43 years). According to Hansaram et al [6], about 45% of the population in Klang Valley is millennials, which equals 3.9 million people. Millennials are the largest and most influential consumer group in the Klang Valley. When it comes to sampling, the best approach for this study is simple random sampling (SRS) [46]. Through SRS, each unit within the population stands an equal chance of being selected, thereby minimizing selection bias. This characteristic is essential to guarantee that the chosen sample closely resembles the population in all respects [47].

As referred to by Krejcie & Morgan [48], 384 suits one million or more populations in determining sample size. As a contingency approach, the dropout rate is estimated at 10%, and the sample size increased by 10% [49]. The final sample for this study was 459.

3.3. Survey instrument

The questionnaire was used to collect data. In this study, the notion of adoption and adaptation was retrieved from previous studies [8,40,50–54]. The questionnaire consisted of Section A – The Participants' Demographic Overview, Section B – AI-driven Service Quality (Tangibility, Reliability, Responsiveness), Section C – Customer Satisfaction, and Section D – Perceived Value.

3.4. Data collection

The questionnaire was distributed to the respondents via Google Forms. Later, the datasheet was downloaded from Google, and it took about 4 weeks to complete the whole data collection process. Several factors were taken into consideration before choosing the collection period, including major holidays and promotional activities that might influence consumer behavior.

3.5. Data analysis

Demographic data on the respondents were analyzed using descriptive statistics. The internal consistency of the constructs' elements was used to evaluate each construct's validity before multiple regression [55]. The variables' inter-correlation was discovered by correlation analysis. The statistician utilizes correlation analysis to quantify the relationship's degree and direction between two or more variables. It assists in establishing how changes in one factor may be linked to changes in the other factor [56].

3.6. Research ethics

We followed established ethical norms for human involvement, including getting informed consent from all participants, ensuring their anonymity and confidentiality, and upholding their right to withdraw at any given time. The data were stored securely, ensuring privacy and protecting against unauthorized access. The research was carried out with a commitment to ethical principles, maintaining integrity, and ensuring transparency.

4. Results

4.1. Descriptive statistics

A total of 459 completed questionnaires were well-received. The demographic profile of those who participated in the survey is shown in **Table 1** below.

Table 1. Demographic profile of the respondents: n=459

Variables		n=459	Percentage (%)
Gender	Female	241	52.5
	Male	218	47.5
Race	Malay	122	26.6
	Chinese	250	54.5
	Indian	50	10.9
	Others	37	8.9
Age Group	29-32 years	175	38.1
	33-37 years	126	27.5
	38-44 years	158	10.9
Frequency of Visiting QSR	More than four times per month	51	11.1
	Four times per month	99	21.6
	Thrice per month	110	24
	Twice per month	119	25.9
	Once per month	80	17.4
Income Level per Month	below RM2,000	34	7.4
	RM2,001 - RM3,000	108	23.5
	RM3,001 - RM4,000	118	25.7
	RM4,001 - RM5,000	131	28.5
	RM5,001 and above	68	14.8
The Most Preferred QSR	Burger King	77	16.8
	KFC	78	17
	McDonald's	121	26.4
	Subway	74	16.1
	Texas Chicken	68	14.8
	Others	41	8.9

4.2. Analysis of AI-driven service quality

241 respondents concur that customers find ordering and understanding the AI-based digital menus in quick service restaurants easy. Furthermore, the findings also reveal that 231 respondents agree that quick-service restaurants utilize self-service ordering kiosks with digital displays with attractive visual interfaces. Furthermore, 207 respondents strongly agree that the AI-integrated payment system enables a quick and error-free transaction process.

4.3. Analysis of customer satisfaction

249 respondents concur that the level of service provided by self-service kiosks or food delivery platforms meets their expectations. This is followed by 241 respondents agreeing that the ambiance with AI-based self-ordering kiosks or service robots improves their dining enjoyment.

4.4. Perceived value

236 respondents concur that fast-service restaurants using AI technology offer superior value. Besides, 235 respondents agree that it is a pleasurable experience using services from robots, such as self-service kiosks and chatbots for order placement. **Table 2** below illustrates the coefficient of AI-driven service quality components (tangibility, reliability, and responsiveness), perceived value, and customer satisfaction for actual data collection.

Table 2. Coefficient of AI AI-driven service quality components, perceived value, and customer satisfaction for actual data collection

Variables	Case Processing Summary	n	%	Cronbach's Alpha	No. of Statements
Independent Variables					
Tangibility	Valid	459	100.0		
	Excluded	0	.0	0.876	7
	Total	459	100.0		
Reliability	Valid	459	100.0		
	Excluded	0	.0	0.883	7
	Total	459	100.0		
Responsiveness	Valid	459	100.0		
	Excluded	0	.0	0.874	7
	Total	459	100.0		
Mediating Variable					
Perceived value	Valid	459	100.0		
	Excluded	0	.0	0.895	7
	Total	459	100.0		
Dependent Variable					
Customer Satisfaction	Valid	459	100.0		
	Excluded	0	.0	0.874	7
	Total	459	100.0		

4.5. Hypothesis testing (correlation analysis)

H1: There is a significant relationship between AI-driven tangibility in service quality and customer satisfaction.

The Pearson correlation between AI-driven tangibility and customer satisfaction is r =.852 at the significant level (0.01). Given that the significance level is less than 0.05, AI-driven tangibility and consumer happiness are considerably correlated. Consequently, the initial alternative hypothesis is approved.

H2: There is a significant relationship between AI-driven reliability in service quality and customer satisfaction.

The Pearson correlation between AI-driven reliability and customer satisfaction is r =.888 at the significant level (0.01). Customer satisfaction and AI-driven reliability are highly correlated, as indicated by the significance level being less than 0.05. The second alternative hypothesis is thus accepted.

H3: There is a significant relationship between AI-driven responsiveness in service quality and customer satisfaction.

At the significant level (0.01), the Pearson correlation between AI-driven responsiveness and customer satisfaction is r =.873. AI-driven responsiveness and customer satisfaction are highly correlated, as indicated by the significance level being less than 0.05. As a result, the third alternative theory is approved.

H4: There is a significant relationship between AI-driven tangibility in service quality and perceived value.

The Pearson correlation between perceived value and AI-driven tangibility is r =.884 at the significant level (0.01). AI-driven tangibility and perceived value are correlated, as evidenced by the significance level being less than 0.05. Therefore, the fourth alternative hypothesis is approved.

H5: There is a significant relationship between AI-driven reliability in service quality and perceived value.

The Pearson correlation between perceived value and AI-driven reliability is r =.914 at the significant level (0.01). Given that the significance level is smaller than 0.05, perceived value and AI-driven reliability are markedly correlated. As a result, the fifth alternative hypothesis is approved.

H6: There is a significant relationship between AI-driven responsiveness in service quality and perceived value.

The Pearson correlation between perceived value and AI-driven responsiveness is r =.884 at the significant level (0.01). Given that the significance level is smaller than 0.05, perceived value and AI-driven response are significantly correlated. The sixth alternative hypothesis is thus approved.

H7: There is a significant relationship between perceived value and customer satisfaction.

The Pearson correlation between perceived value and customer satisfaction is r =.899 at the significant level (0.01). Since the significance criterion is smaller than 0.05, perceived value and customer satisfaction are fully correlated. The seventh alternative hypothesis is thus validated.

H8: There is a mediating effect of perceived value on the significant relationship between AI-driven tangibility in service quality and customer satisfaction.

The Pearson correlation between AI-driven tangibility, perceived value, and customer happiness is r =.899 at the significant level (0.01). Since the significant threshold is less than 0.05, perceived value affects the relationship between tangibility and customer happiness. The eighth alternative hypothesis is thus validated.

H9: There is a mediating effect of perceived value on the significant relationship between AI-driven reliability in service quality and customer satisfaction.

The Pearson correlation between AI-driven reliability, perceived value, and customer happiness is r =.899 at the significant level (0.01). Because the significant threshold is less than 0.05, perceived value noticeably affects the relationship between reliability and customer happiness. As a result, the ninth alternative theory is validated.

H10: There is a mediating effect of perceived value on the significant relationship between AI-driven responsiveness in service quality and customer satisfaction.

The Pearson correlation between AI-driven responsiveness, perceived value, and customer happiness is r =.899 at the significant level (0.01). Since the significant threshold is less than 0.05, perceived value entirely affects the relationship between responsiveness and customer happiness. As a result, the tenth alternative hypothesis is approved.

4.6. Mediation analysis – Regression analysis

The study used Hayes' PROCESS macro to determine the direct and indirect effects.

Before accounting for mediation (Table 3), all three IVs (tangibility, reliability, and responsiveness) showed a significant positive impact (tangibility, $\beta = 0.186$, t = 4.125, p = 0.001) (reliability, $\beta = 0.420$, t = 7.342, p = 0.001) (responsiveness, $\beta = 0.317$, t = 6.600, p = 0.001) on customer satisfaction, indicating a direct effect.

Table 3. Regression Analysis of AI-driven service quality (tangibility, reliability, and responsiveness) and customer satisfaction

		Direct Effect of IV on DV			
Predictor (IV)	**Dependent Variable (DV)**	**Coefficient β (Beta)**	**t-value**	**p-value**	**Significance**
Tangibility	Customer Satisfaction	0.186	4.125	0.001	Significant
Reliability	Customer Satisfaction	0.420	7.342	0.001	Significant
Responsiveness	Customer Satisfaction	0.317	6.600	0.001	Significant

The idea that perceived value might influence the IV-DV link is supported by the fact that all IVs outstandingly predict perceived value (**Table 4**).

Table 4. Regression analysis of AI-driven service quality and perceived value

		Effect of IV on MV			
Predictor (IV)	**Mediator Variable (MV)**	**Coefficient β (Beta)**	**t-value**	**p-value**	**Significance**
Tangibility	Perceived Value	0.210	3.980	0.001	Significant
Reliability	Perceived Value	0.385	6.789	0.001	Significant
Responsiveness	Perceived Value	0.295	5.950	0.001	Significant

IVs and MV were included as predictors of DV in a regression model in **Table 5**. There is evidence of partial mediation since perceived value (MV) stays significant even though the IVs' coefficients go smaller (in comparison to **Table 3**). The fact that IVs (tangibility, reliability, and responsiveness) still crucially affect customer satisfaction (DV) if perceived value (MV) is included, although with smaller coefficients, indicates that perceived value mediates the relationship to some extent. This indicates that tangibility, reliability, and responsiveness have both a direct and an indirect effect on consumer satisfaction through perceived value.

Table 5. Regression analysis of AI-driven service quality, customer satisfaction, and perceived value

Indirect Effect of IV on DV through MV

Predictor	Dependent Variable (DV)	Coefficient β (Beta)	t-value	p-value	Significance
Perceived Value (MV)	Customer Satisfaction	0.350	5.900	0.001	Significant
Tangibility	Customer Satisfaction	0.120	2.850	0.005	Significant
Reliability	Customer Satisfaction	0.290	5.400	0.001	Significant
Responsiveness	Customer Satisfaction	0.215	4.750	0.001	Significant

5. Discussion

This study investigated how organizations using service quality dimensions based on AI affect customer satisfaction with QSRs, with perceived value as the mediating variable. The findings fully support all hypothesized effects and provide a sound empirical basis for the postulated model. The result also reveals that all three dimensions of the service quality constructed based on AI were positively related and statistically significant with perceived value and customer satisfaction. In the Klang Valley region, using such AI tools that consist of self-service kiosks, robotic assistants, and digital signage profoundly impacted the perceived value of the service among Millennial consumers, with a correlation value of $r = 0.884$ and customer satisfaction with the value of $r = 0.852$. Such capabilities show that applying modern and visually appealing AI elements can create an impression of innovation and utility, appealing to Generation Y users who are native to the digital world. The key area of AI technology where a highly positive correlation between reliability and perceived value ($r = 0.914$) or satisfaction ($r = 0.888$) was identified was in terms of order processing or digital payments. This shows the need to pay attention to trust and dependability when creating an AI system that redefines customer experience.

The second antecedent was 'responsiveness'; it was found to have a very high correlation with 'perceived value' ($r = 0.884$) and 'perceived satisfaction' ($r = 0.873$), proving once again that customers want timely and personalized services. In addition, this study confirms that perceived value mediates the relationship between service quality through AI and customer satisfaction (Pearson's $r = 0.899$). This mediating role supports this hypothesis that, in addition to being a function of quality service, Millennials' satisfaction is greatly influenced when they perceive the service as valuable. Therefore, the impact of AI is two-fold: it improves satisfaction at the value perception level and on its own.

The study's conclusion concords with and strengthens the evidence base of prior literature on AI and service quality. In his past work [57], he mainly identified reliability and responsiveness as the significant service quality dimensions. It also ensures that these dimensions remain relevant and have similar significance when delivered through an AI interface. As can also be observed with [58], the presence of physically present AI elements contributes to an up-to-date and pleasing service atmosphere, leading to customer satisfaction. The estimates of the mediating role of perceived value support Parasuraman et al [57] proposition that perceived value is an essential determinant of satisfaction and loyalty.

Furthermore, other researchers [27,59] have claimed that perceived value is a key area where AI can positively impact the digital customer experience. This study provides empirical data from a survey of the Millennial cohort in a Southeast Asian context. It furthers previous research by demonstrating the cross-context nature of AI's positive effect on perceived value and customer satisfaction, as well as the role of the

tech-savvy Millennial generation. While some literature suggests that depersonalization in service delivery is poorly received, this research shows that Millennials respond positively when interactions are personalized via AI and visually stimulating. This argument refutes the misconception that implementing AI will remove human-like qualities, especially warmth, from tasks; instead, it argues that efficiency and innovation can compensate for this factor for the defined population.

It also offers several implications for QSR operators interested in utilizing AI for business [60] optimization. The first set of recommendations for QSRs would be to embrace tangible forms of AI. Digital kiosks, robot servers, and AI menus should be preferred to create a visible, interactive, and modern customer interface. These give the appearance of futuristic décor and give products unique and distinct features that appeal to Millennial consumers. Second, system reliability is one of the ultimate goals of different organizations. AI systems need to be inconspicuous and free from technical faults. Efficient payment processing, a reliable order tracking system, and efficiency will directly lead to increased perceived value [61] and trust from the customer. Third, responsiveness should be increased by integrating AI capabilities.

Automated responses, voluntary service notifications, and pop-up suggestions based on AI can create a real impact on customer relations. For instance, using chatbots to handle customer inquiries or applying AI to follow up on orders helps establish a perception of concern. Fourth, it is asserted that the concept of value perception should determine AI implementations. It should not be fancy, just new, but it should have more valuable features, such as efficiency, ease, and customization. Results should always be checked and improved to ensure customers maintain a high perception of the value of the service provided by the operator.

Overall, it is worthwhile for QSR operators to focus on the Millennial segment. As such, QSR experiences supported by technological tools are relevant and will be convenient for the millennial tech-savvy generation. Providing AI services to this population that suit their technological literacy means they become more loyal to the service and are likely to recommend it to others.

This study targeted participants from the Millennial generation living in Klang Valley, Malaysia. Although this group represents a large urban population segment, the results cannot be generalized to rural settings or other countries with different AI usage levels. The limitation of only focusing on the Millennials makes the findings not generalizable to other age groups, such as Gen Z or Baby Boomers, who could potentially respond differently to AI in service industries. Moreover, this study has a cross-sectional research design, thus using data collected at a single point. Much of it remains mute on factors that could be inherent in new customers resulting from consumers' reliance on AI or changes in trends that may take effect in the long-term usage of technology. In addition, self-administered questionnaires have shortcomings because they appear to introduce response bias. Since respondents may be biased toward social desirability or did not recall the experience accurately and in detail, they may overemphasize certain positive aspects while indicating low satisfaction.

This study opens several avenues for future research. It is recommended that future studies incorporate other generations, for instance, Gen Y, Gen Z, Gen X, or Baby Boomers, to cultivate information on how different sorts of cohorts perceive and respond to QSR services made possible by the incorporation of AI. Other aspects of service quality, such as empathy and assurance from the SERVQUAL model, could be included to understand their applicability and deployment in AI services. For example, can AI reflect the ability to understand feelings and how this might affect customer satisfaction? Such studies would also provide insights into how perception changes over time and with frequent exposure to the AI tool, ultimately allowing researchers to determine the long-term impact on loyalty and the intention to continue using the AI. Furthermore, cross-country comparisons might enrich the assessment of sociocultural factors' contribution to

the examined relations. Lastly, as many QSRs are implementing AI and human elements, future research could also investigate the optimal balance between technology and human elements, particularly regarding their impact on perceived value and affective connection.

6. Managerial implications

AI-based technologies can be utilized by Quick Service Restaurants (QSRs) operators to improve service quality. The operators need to provide technology-aware customers with a seamless user experience by implementing user-friendly AI tools such as self-service kiosks and digital signage. For customers to trust and feel satisfied, AI systems must ensure efficiency and seamlessness in processing orders and payments. The manager should also strive to make the customer feel they are receiving more than they paid for with good and personalized services. Nevertheless, AI needs to be balanced with human contact for emotional relationships and overall customer satisfaction.

7. Conclusion

A rapidly digitizing industry requires AI to complement and extend existing models of service quality. In this study, AI mechanisms have been added to the SERVQUAL model, expanding its use. Although each AI-driven service dimension-tangibility, reliability, and responsiveness-remains essential in shaping customer impressions, the study also identifies challenges and limitations of AI adoption in servicing, especially maintaining a human-like interface.

A practical guidebook for QSR operators to use AI effectively in boosting customer satisfaction and service effectiveness is provided in this study. However, operators must ensure AI technologies are reliable, prompt, and customer-focused. To capture customers' attention, AI solutions need to prioritize delivering utilitarian value such as speed, customization, and efficiency, and depend less on raw novelty. Embedding AI in service settings has enormous potential. Still, future research must examine its long-term impacts on customer loyalty and the balance between human contact and technology.

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Conflict of interest

The authors declare no conflict of interest.

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