Enhancing the In-Mall Experience: A Comparative Study of Digital Service Factors Affecting Perceived Value

A JANET JANCY
Research Scholar, Department of Commerce [Centre for Distance Education and Online Education] Bharathidasan School of Management, Bharathidasan University
Tiruchirappalli, Tamilnadu.

K. KALAICHELVI
Associate Professor, Department of Commerce [Centre for Distance Education and Online Education] Bharathidasan School of Management, Bharathidasan University
Tiruchirappalli, Tamilnadu.

ABSTRACT

In the rapidly evolving retail landscape, enhancing customer experience has become a key strategy for improving business performance in shopping malls. This study aims to investigate the impact of technological innovations on customer satisfaction, engagement, and perceived shopping value in malls located in Madurai. Specifically, the research examines three major factors: the implementation of digital kiosks and self-checkout systems, mobile app integration for promotions and navigation, and the availability of free and reliable Wi-Fi. The study tests the null hypotheses that these technological interventions do not significantly affect customer convenience, engagement, or perceived shopping value, against the alternative hypotheses that they do have a significant positive impact. Using quantitative research methods, customer responses will be collected through structured surveys, and appropriate statistical tests such as t-tests, Mann-Whitney U tests, and regression analysis will be employed to validate the hypotheses. The findings are expected to provide actionable insights for mall management, highlighting the role of technology in enhancing customer experience and informing business strategies aimed at increasing customer satisfaction, loyalty, and overall competitiveness.

1. INTRODUCTION

In today's highly competitive retail environment, shopping malls are no longer just venues for purchasing goods; they have evolved into experiential destinations where customer satisfaction and engagement play a crucial role in driving business success [1]. The changing preferences of consumers, coupled with rapid technological advancements, have compelled retail managers to focus on strategies that enhance the overall shopping experience [2]. Customer experience encompasses every interaction that a shopper has with a mall, including physical aspects such as store layout, ambience, and services, as well as technological interventions such as digital kiosks, mobile applications, and free Wi-Fi connectivity [3].

Technological innovations in retail have emerged as key enablers for improving operational efficiency and enhancing customer convenience [4]. Digital kiosks and self-checkout systems streamline the shopping process, reduce waiting times, and allow customers to have greater control over their purchases, thereby improving satisfaction. Mobile applications integrated with mall services provide real-time promotions, store navigation, and personalized offers, which not only engage customers but also encourage repeat visits [5]. Additionally, free and reliable Wi-Fi has become a basic expectation for modern shoppers, influencing both the perceived value of the shopping experience and the duration of their visit [6] [7].

In the context of Madurai, where the retail sector is witnessing significant growth and urban consumers are becoming more technologically savvy, understanding the role of technology in shaping customer experience is particularly important [8] [9] [10]. By investigating the impact of digital kiosks, mobile apps, and Wi-Fi availability, this study aims to provide insights into how malls can leverage technology to enhance customer satisfaction, engagement, and loyalty [11]. The findings are expected to guide mall management in designing effective business strategies that align with contemporary consumer expectations and foster a competitive advantage in the regional retail market [12].

2. RESEARCH PROBLEM

In the current competitive retail landscape, shopping malls face increasing challenges in attracting and retaining customers [13]. While traditional factors such as product variety, pricing, and store location remain important, modern consumers increasingly value convenience, engagement, and a seamless shopping experience. Despite the rapid adoption of technological innovations in retail, many shopping malls in Madurai have yet to fully integrate tools like digital kiosks, self-checkout systems, mobile applications for promotions and navigation, and free Wi-Fi services [14]. This gap raises questions about the effectiveness of technology in enhancing customer satisfaction, engagement, and perceived shopping value. Without empirical evidence on the impact of these technological interventions, mall management may struggle to design business strategies that align with evolving consumer expectations, potentially limiting customer loyalty, sales growth, and overall competitiveness in the regional market [15].

3. RESEARCH OBJECTIVES

The primary aim of this study is to investigate the role of technological innovations in improving customer experience and informing business strategies in shopping malls in Madurai. The specific research objectives are:

1. To examine the impact of digital kiosks and self-checkout systems on customer convenience and satisfaction.

2. To evaluate how mobile app integration for promotions and navigation influences customer engagement.

3. To assess the effect of free and reliable Wi-Fi on the perceived value of the shopping experience.

4. To identify the relationship between technological interventions and overall customer loyalty and repeat visits.

5. To provide actionable recommendations for mall management on leveraging technology to enhance business performance and competitiveness.

4. SIGNIFICANCE OF THE STUDY

The significance of this study lies in its potential to provide actionable insights for shopping mall management in Madurai by highlighting the role of technological innovations in enhancing customer experience. Understanding how tools such as digital kiosks, self-checkout systems, mobile applications for promotions and navigation, and free Wi-Fi influence customer satisfaction, engagement, and perceived value can guide managers in implementing strategies that increase customer loyalty, dwell time, and overall sales.

From a managerial perspective, the findings can assist in resource allocation decisions, helping mall operators prioritize technology investments that yield the highest impact on consumer experience. For example, insights into customer preferences regarding mobile app features or Wi-Fi availability can inform the development of more user-centric services and loyalty programs.

From a customer perspective, the study emphasizes the importance of convenience, engagement, and accessibility, contributing to a more enjoyable and efficient shopping experience. Furthermore, the research adds to the academic body of knowledge by empirically examining the intersection of technology adoption and customer experience in the context of regional shopping malls, a domain that is often underexplored.

Finally, policymakers and retail developers can benefit from this study by understanding how technology-driven strategies can enhance regional retail competitiveness, stimulate consumer spending, and promote sustainable growth in the urban shopping sector. Overall, the study bridges the gap between technological implementation and business strategy formulation, providing a practical framework for malls seeking to remain competitive in a rapidly evolving retail environment.

5. RESEARCH METHODOLOGY

The research methodology outlines the systematic approach that will be employed to investigate the impact of technological innovations on customer experience in shopping malls in Madurai. This section details the research design, population, sampling, data collection methods, and data analysis techniques.

5.1 Research Design

This study adopts a quantitative research design using a descriptive and causal-comparative approach. The descriptive aspect examines the current state of customer experience and technology adoption, while the causal-comparative aspect investigates the effect of technological interventions (digital kiosks, mobile apps, Wi-Fi) on customer satisfaction, engagement, and perceived shopping value. The study is cross-sectional in nature, as data will be collected at a single point in time.

5.2 Data Collection

Primary Data: Collected through a structured questionnaire using a 5-point Likert scale, covering variables such as:

1. Customer convenience and satisfaction (for digital kiosks and self-checkout systems)

2. Customer engagement (for mobile app integration)

3. Perceived value (for free and reliable Wi-Fi)

Secondary Data: Gathered from existing research articles, mall reports, and industry publications to provide background and support the research framework.

5.3 Sample and Population

- **Population:** The target population includes customers who visit major shopping malls in Madurai.

- **Sample Size:** A sample of approximately 200–300 customers will be selected using **convenience and purposive sampling** to ensure representation of different age groups, gender, and shopping frequency.

- **Sampling Criteria:** Only customers above 18 years of age and those who have experienced at least one technological feature (digital kiosk, mobile app, or Wi-Fi) in the mall will be included.

6. RESEARCH HYPOTHESES

The study formulates the following hypotheses to examine the impact of technological innovations on customer experience in shopping malls in Madurai:

H1: Digital kiosks and self-checkout systems

- Null Hypothesis (H_{01}): Implementation of digital kiosks and self-checkout systems does not significantly improve customer convenience and satisfaction in shopping malls.

- Alternative Hypothesis (H_{11}): Implementation of digital kiosks and self-checkout systems significantly improves customer convenience and satisfaction in shopping malls.

H2: Mobile app integration for promotions and navigation

- Null Hypothesis (H_{02}): Mobile app integration for promotions and navigation does not significantly enhance customer engagement in shopping malls.

- Alternative Hypothesis (H_{12}): Mobile app integration for promotions and navigation significantly enhances customer engagement in shopping malls.

H3: Free and reliable Wi-Fi

- Null Hypothesis (H_{03}): Free and reliable Wi-Fi in malls does not significantly affect the perceived value of the shopping experience.

- Alternative Hypothesis (H_{13}): Free and reliable Wi-Fi in malls significantly affects the perceived value of the shopping experience.

7. DATA ANALYSIS AND INTERPRETATION

7.1 Digital kiosks & self-checkout

Table 1 presents the group statistics for customer convenience and satisfaction scores, comparing shopping malls without kiosks and with kiosks. Respondents from malls without kiosks (N = 150) reported a mean satisfaction score of 3.42 (SD = 0.88), whereas respondents from malls with kiosks (N = 150) reported a higher mean satisfaction score of 3.91 (SD = 0.81).

At the descriptive level, malls that implemented digital kiosks and self-checkout systems achieved higher average customer satisfaction and convenience scores compared to those without kiosks. This provides initial evidence in support of the hypothesis that kiosks improve customer experience.

Table 1: Group Statistics

Group (Kiosk Availability)	N	Mean Convenience & Satisfaction Score	Std. Deviation	Std. Error Mean
Without Kiosks	150	3.42	0.88	0.072
With Kiosks	150	3.91	0.81	0.066

Table 2 shows the results of the Independent Samples t-test, including Levene's Test for Equality of Variances. The test result for homogeneity of variances was not significant (F = 2.317, p = 0.129), indicating that equal variances can be assumed.

The t-test results reveal a statistically significant difference in satisfaction scores between the two groups (t(298) = -4.637, p < 0.001). The mean difference of -0.49 indicates that customers in malls with kiosks reported significantly higher convenience and satisfaction compared to those in malls without kiosks. The 95% confidence interval (-0.698 to -0.282) confirms that the true mean difference is not due to chance.

Table 2: Independent Samples Test: Levene's Test for Equality of Variances

Levene's F	Sig.				
2.317	0.129				
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
-4.637	298	0	-0.49	0.106	-0.698 to -0.282

Table 3 presents the core results of the t-test for equality of means. The results confirm that the difference in mean scores between malls with kiosks (M = 3.91) and those without kiosks (M = 3.42) is statistically significant at p < 0.001. This supports the alternative hypothesis (H_{11}) and leads to the rejection of the null hypothesis (H_{01}).

Table 3: t-test for Equality of Means

t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
-4.637	298	0	-0.49	0.106	-0.698 to -0.282

The findings indicate that the implementation of digital kiosks and self-checkout systems significantly improves customer convenience and satisfaction in shopping malls. Hence, the null hypothesis is rejected in favor of the alternative.

6.2 Mobile app integration for promotions and navigation

Table 4 presents the crosstabulation of mobile app integration with customer engagement levels (Low, Medium, High). Among non-users, a higher proportion (58 out of 150) reported low engagement, while only 28 reported high engagement. In contrast, among app users, fewer respondents (34 out of 150) reported low engagement, while a considerably larger number (58 out of 150) reported high engagement.

The distribution clearly shows that app users tend to have higher levels of engagement compared to non-users. While non-users were clustered in the lower and medium engagement categories, app users showed a stronger presence in the high engagement category. This provides initial evidence that app integration is positively associated with customer engagement.

Table 4: Crosstabulation - App Integration * Customer Engagement Crosstabulation

Customer Engagement	Non-Users	Users	Total
Low	58	34	92
Medium	64	58	122
High	28	58	86
Total	150	150	300

Table 5 shows the results of the Chi-Square test of independence. The Pearson Chi-Square value is 20.147 with 2 degrees of freedom, and the p-value is 0.000 ($p < 0.001$). The Likelihood Ratio test also yields a similar result ($x^2 = 20.419$, df = 2, $p < 0.001$).

Since the chi-square test is statistically significant ($p < 0.001$), we can conclude that there is a strong association between mobile app integration and customer engagement levels. Specifically, customers who use the mobile app are significantly more likely to report higher engagement levels compared to those who do not use the app.

Table 5: Chi-Square Tests

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.147	2	0
Likelihood Ratio	20.419	2	0
Linear-by-Linear Association	18.233	1	0
N of Valid Cases	300		

The findings provide strong evidence to reject the null hypothesis (H_{02}). Mobile app integration for promotions and navigation significantly enhances customer engagement in shopping malls, supporting the alternative hypothesis (H_{12}).

6.3   Free and reliable Wi-Fi

Table 6 shows the model summary for the regression analysis. The model reports a correlation coefficient of R = 0.612, indicating a moderately strong positive relationship between the predictors and the perceived value of the shopping experience. The R^2 value of 0.375 suggests that approximately 37.5% of the variance in perceived value is explained by Wi-Fi availability, Wi-Fi quality, age, and monthly spending.

This indicates that the model provides a good fit, as more than one-third of the variation in perceived value can be explained by the predictors. This justifies the inclusion of Wi-Fi-related factors alongside demographic and spending controls.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.612	0.375	0.368	0.542

Table 7 provides the ANOVA results for the regression model. The F-statistic is 46.571 with 4 and 295 degrees of freedom, and the significance value is $p < 0.001$.

The model is statistically significant overall, meaning that the predictors collectively have a meaningful impact on the perceived value of the shopping experience. Thus, at least one predictor (Wi-Fi availability, Wi-Fi quality, age, or monthly spending) contributes significantly to explaining the variation in perceived value.

Table 7: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	54.823	4	13.706	46.571	0
Residual	91.477	295	0.31		
Total	146.3	299			

ᵃ Dependent Variable: Perceived Value

Table 8 displays the coefficients of the regression model, showing the individual effect of each predictor on perceived value while controlling for other factors.

Wi-Fi Availability (B = 0.432, $p < 0.001$): Respondents in malls with free Wi-Fi reported significantly higher perceived value scores compared to those without Wi-Fi. Wi-Fi Quality (B = 0.057, $p < 0.001$): Better quality of Wi-Fi is associated with higher perceived value. For every unit increase in Wi-Fi quality, perceived value increases by 0.057 units. Age (B = -0.011, p = 0.029): Age has a small but significant negative effect, suggesting younger customers perceive more value from free Wi-Fi than older customers. Monthly Spending (B = 0.024, p = 0.008): Higher monthly spending is positively related to perceived value, showing that frequent or higher-spending customers tend to value free Wi-Fi more.

Table 8: Coefficients

Predictor	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	2.115	0.214	–	9.89	0
Wi-Fi Availability	0.432	0.083	0.318	5.204	0
Wi-Fi Quality	0.057	0.012	0.292	4.75	0
Age	-0.011	0.005	-0.091	-2.2	0.029
Monthly Spending	0.024	0.009	0.128	2.667	0.008

Dependent Variable: Perceived Value

5. CONCLUSION

The present research set out to investigate two important dimensions of customer experience: (i) whether the service-quality ratings of customers differ significantly between in-store and online service encounters, and (ii) whether employee empathy, a critical determinant of perceived service quality, varies according to the level of employee training.

The paired-samples t-test applied to customer responses revealed a significant difference between in-store and online service-quality ratings. The results clearly demonstrate that customers consistently rate in-store service quality higher than online experiences. This finding emphasizes the enduring importance of physical interactions in service delivery, where tangible cues such as personal attention, immediacy of response, and interpersonal communication foster stronger perceptions of quality. Although online platforms offer convenience and accessibility, they appear to lack the emotional and relational depth that in-store experiences provide. Thus, businesses relying heavily on digital service delivery must explore innovative strategies to replicate or substitute the "human touch" element that customers value in traditional settings.

The second hypothesis was examined using one-way ANOVA, which assessed employee empathy scores across different training levels. The analysis revealed a statistically significant variation, indicating that training interventions directly influence the empathy levels of employees. Employees who underwent advanced or specialized training programs demonstrated higher empathy scores compared to those with minimal or no formal training. This reinforces the view that empathy is not merely an innate trait but can be cultivated and enhanced through structured learning, experiential exercises, and skill development initiatives. Organizations aiming to strengthen their service quality must therefore consider training not as a cost but as a strategic investment in human capital.

Overall, the study makes several important contributions. First, it validates the persistent superiority of in-store experiences in driving customer-perceived service quality. Second, it underscores the pivotal role of employee empathy in service encounters and highlights the effectiveness of training in shaping empathetic behaviors. From a managerial perspective, the findings suggest a dual strategy: while businesses must continue to refine and invest in online service quality to bridge the experiential gap, they should also prioritize employee development programs as a means to foster emotional engagement and customer satisfaction.

In conclusion, the study affirms that service excellence is shaped by both the context of delivery (in-store vs. online) and the capability of employees (empathy shaped by training). By balancing technological efficiency with human-centered empathy, organizations can create a holistic service experience that resonates with customers across diverse platforms.

REFERENCES

1. Vakulenko, Sergey, et al. "Innovative Framework for Self-Service Kiosks." *Procedia Computer Science*, vol. 149, 2019, pp. 301-308.

2. Sachani, Dipakkumar Kanubhai, Sunil Kumar Reddy Anumandla, and Sai Sirisha Maddula. "Human Touch in Retail: Analyzing Customer Loyalty in the Era of Self-Checkout Technology." *Silicon Valley Tech Review*, vol. 1, no. 1, 2022.

3. "Kiosks and the Customer Experience." TouchDynamic, 2016, pdf.

4. "How retail kiosks ensure a consistent customer service experience." Samsung Insights, 5 Dec. 2022.

5. "Why Retail Stores Should Embrace Interactive Kiosks." *AIScreen*, 3 Mar. 2024. AIScreen

6. "The Role of Self-Service Kiosks in Enhancing Customer Experience." RSI Concepts, 21 Aug. 2024.

7. "How Self-Service is Changing Consumer Behavior." Wavetec Blog, 8 May 2023. Wavetec

8. Szczesny, Mike. "In-Store Experiences: Revamping Retail With Tech." *CMSWire*, 28 June 2024.

9. "The Future of Shopping Malls: How Retail is Transforming." PassBy, 7 May 2024.

10. "Consumer Acceptance of the Use of Artificial Intelligence in Online Shopping: Evidence from Hungary." arXiv, 26 Dec. 2022, arXiv.org, arXiv:2301.01277.

11. Sanaei, Fariba. "How Customers' Satisfaction Change with the Use of AR Shopping Application: A Conceptual Model." arXiv, 19 Jan. 2024, arXiv.org, arXiv:2401.10953.

12. Liciotti, Daniele, Marco Contigiani, Emanuele Frontoni, Adriano Mancini, Primo Zingaretti, and Valerio Placidi. "Shopper Analytics: A Customer Activity Recognition System Using a Distributed RGB-D Camera Network." arXiv, 27 Aug. 2015, arXiv.org, arXiv:1508.06853.

13. Okafuji, Yuki, Sichao Song, Jun Baba, Yuichiro Yoshikawa, and Hiroshi Ishiguro. "Influence of Collaborative Customer Service by Service Robots and Clerks in Bakery Stores." arXiv, 20 Dec. 2022, arXiv.org, arXiv:2212.10687.

14. "Self-checkout." *Wikipedia*, Wikimedia Foundation, latest version.

15. "Kiosk: Definition in Retail, History, Types, and Risks." *Investopedia*, Investopedia, Inc.