*Journal of Postgraduate Current Business Research (JPCBR)*
*e-ISSN 2504 - 8449, Volume 10 Issue 2 2025*

# Customer Engagement in the Digital Era: Testing Service Attributes in Malaysian Mobile Commerce

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**Abstract**

Mobile commerce has become a dominant force in shaping consumer–brand interactions, particularly in emerging markets such as Malaysia. This study investigates the influence of personalisation, responsiveness, and ubiquitous connectivity on customer engagement in mobile commerce. Data were collected from 129 Malaysian consumers with mobile shopping experience, and Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to assess both measurement and structural models. The results reveal that responsiveness and ubiquitous connectivity significantly enhance customer engagement, while personalisation shows no significant effect. These findings challenge traditional assumptions regarding the universality of personalisation as an engagement driver and instead highlight the growing importance of accessibility and timely service in digital commerce. The study contributes theoretically by extending digital engagement frameworks and practically by offering insights for businesses to prioritise responsiveness and seamless connectivity in mobile service strategies.

Keywords: mobile commerce, customer engagement, responsiveness, personalisation, ubiquitous connectivity

## 1. Introduction

Mobile commerce (m-commerce) has revolutionised the way consumers interact with businesses, becoming one of the fastest-growing segments of digital commerce globally. According to Statista (2024), mobile commerce accounted for nearly 60% of total e-commerce sales worldwide in 2023 and is projected to surpass USD 6.5 trillion by 2028. This rapid growth is driven by smartphone penetration, improved internet infrastructure, and consumers' demand for convenience and accessibility (Alalwan, 2021; Dwivedi et al., 2021).

Malaysia has followed this global trend closely. Supported by government initiatives such as the National E-Commerce Strategic Roadmap (Malaysia Digital Economy Corporation, 2022), the adoption of mobile commerce has accelerated, particularly during the COVID-19 pandemic, when consumers increasingly relied on digital platforms for shopping and services (Hanafiah et al., 2022). Despite this growth, sustaining meaningful customer engagement remains a challenge, as consumers are faced with numerous options and rising expectations.

Customer engagement has emerged as a strategic imperative in digital commerce, associated with loyalty, advocacy, and long-term profitability (Kumar & Kaushik, 2023). However, the mechanisms through which personalisation, responsiveness, and ubiquitous connectivity influence engagement remain underexplored in emerging markets. Previous studies often highlight personalisation as a critical driver of engagement, but growing evidence suggests mixed outcomes, including personalisation fatigue and privacy concerns (Nguyen & Tran, 2022). In contrast, responsiveness and connectivity appear increasingly important, ensuring that consumers receive timely support and uninterrupted access to services (Lim et al., 2023; Li & Wang, 2024).

Against this backdrop, this study aims to evaluate the relative impact of personalisation, responsiveness, and ubiquitous connectivity on customer engagement in Malaysian mobile commerce. By employing PLS-SEM, the study not only provides empirical validation of these relationships but also offers practical insights for businesses to optimise digital strategies in a competitive and connected environment.

## 2. Literature Review

### 2.1 Customer Engagement

Customer engagement (CE) is widely recognised as a multidimensional construct involving cognitive, emotional, and behavioural participation in consumer–brand interactions (Hollebeek et al., 2022). Engaged customers often provide greater lifetime value through loyalty, advocacy, and co-creation (So et al., 2021). In mobile commerce, engagement is facilitated by interactive technologies such as apps, chatbots, and personalised notifications, where responsiveness, transparency, and seamless experiences play central roles (Algharabat et al., 2022). This study positions CE as the dependent variable influenced by key service attributes—personalisation, responsiveness, and connectivity.

### 2.2 Responsiveness and Customer Engagement

Responsiveness refers to a firm's ability to address customer needs promptly and effectively. In digital services, responsiveness has been shown to strengthen trust, satisfaction, and loyalty (Lim et al., 2023). Recent findings suggest that responsiveness functions as both a service quality dimension and a relational driver, enhancing emotional bonds and encouraging repeat interactions (Rather & Sharma, 2023). In mobile commerce, where consumers expect near-instant support, responsiveness is considered a non-negotiable feature that underpins engagement.

### 2.3 Personalisation and Customer Engagement

Personalisation involves tailoring interactions, offers, and recommendations to suit individual consumer preferences. While earlier studies linked personalisation with satisfaction and loyalty (Hollebeek et al., 2022), recent research highlights risks such as personalisation fatigue and consumer scepticism when strategies are excessive or invasive (Nguyen & Tran, 2022). In Malaysia, where digital trust and affordability remain important, personalisation may have limited influence unless it adds clear value to the consumer experience. Thus, its role in fostering engagement requires contextual validation.

### 2.4 Ubiquitous Connectivity and Customer Engagement

Ubiquitous connectivity describes seamless access to digital services across devices and platforms. Advances in 5G and mobile technologies have made connectivity an infrastructural necessity in digital commerce (Li & Wang, 2024). Research shows that connectivity enhances perceptions of convenience, reliability, and trust, while enabling consumers to engage consistently with brands (Hanafiah et al., 2022). Connectivity also interacts with responsiveness and personalisation, amplifying their effectiveness by ensuring consumers remain continuously connected to platforms (Dwivedi et al., 2021).

## 3. Methodology

### 3.1 Research Design and Population

This study employed a quantitative design guided by the research onion framework (Saunders et al., 2019). A positivist philosophy and deductive approach were adopted to test hypotheses. The population is comprised of Malaysian consumers with prior experience in mobile shopping. Purposive sampling was used to target individuals familiar with mobile commerce platforms.

### 3.2 Sample and Data Collection

A total of 129 valid responses were obtained via an online survey distributed through social media and email. Screening questions ensured relevance to the research context. According to the 10-times rule for PLS-SEM, the sample size exceeded the minimum requirement for the number of paths directed at a construct (Hair et al., 2022).

### 3.3 Measurement Items

All constructs were measured using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Customer engagement was measured using fifteen items adapted from Hollebeek et al. (2022). Responsiveness was captured with five items adapted from Lim et al. (2023), personalisation with six items from Nguyen and Tran (2022), and ubiquitous connectivity with six items from Li and Wang (2024). The items were reviewed by three academic experts to ensure contextual and content validity.

### 3.4 Data Analysis

Data were analysed using SmartPLS 3.0 due to its suitability for small-to-medium samples and complex models. The measurement model was assessed for reliability and validity, with Cronbach's alpha and Composite Reliability (CR) exceeding 0.70, AVE above 0.50, and discriminant validity established via the Fornell–Larcker criterion and HTMT ratio (<0.90). The structural model was assessed using path coefficients (β), explanatory power ($R^2$), effect sizes ($f^2$), predictive relevance ($Q^2$), and bootstrapping with 5,000 subsamples. These procedures align with best practices in PLS-SEM (Hair et al., 2023).

## 4. Findings

### 4.1 Demographic Profile

The demographic results reveal that the sample was nearly gender-balanced, with 51.9% male and 48.1% female respondents. A significant majority (82.2%) were aged between 15 and 24, highlighting the dominance of Generation Z in driving mobile commerce adoption.

Educationally, most respondents (74.4%) held a Bachelor's degree, followed by Diploma/Certificate holders (17.8%) and postgraduates (7.8%). Income distribution showed that over half (52.7%) earned less than RM 999 monthly, reflecting the student or early-career status of many participants. These findings indicate that Malaysian mobile commerce is primarily driven by young, educated, and low-income consumers, suggesting the importance of affordability and convenience in shaping engagement.

### 4.2 Measurement Model Results

Table 1: Measurement Model Results

| Latent Variable | Indicators | Internal Consistency Reliability | | | | | |
|---|---|---|---|---|---|---|---|
| | | Standard Deviation | Mean | Loadings | AVE | Composite Reliability | Cronbach's Alpha |
| Customer Engagement | CE1 | 1.162 | 5.504 | 0.815 | 0.630 | 0.962 | 0.958 |
| | CE10 | 1.182 | 5.465 | 0.857 | | | |
| | CE11 | 1.661 | 5.000 | 0.736 | | | |
| | CE12 | 1.438 | 5.054 | 0.770 | | | |
| | CE13 | 1.619 | 4.915 | 0.755 | | | |
| | CE14 | 1.444 | 5.178 | 0.735 | | | |
| | CE15 | 1.448 | 5.109 | 0.740 | | | |
| | CE2 | 1.175 | 5.465 | 0.778 | | | |
| | CE3 | 1.206 | 5.434 | 0.864 | | | |
| | CE4 | 1.195 | 5.465 | 0.831 | | | |
| | CE5 | 1.238 | 5.357 | 0.771 | | | |
| | CE6 | 1.206 | 5.357 | 0.823 | | | |
| | CE7 | 1.197 | 5.605 | 0.804 | | | |
| | CE8 | 1.151 | 5.605 | 0.796 | | | |
| | CE9 | 1.295 | 5.519 | 0.814 | | | |
| Personalisation | P1 | 1.487 | 5.209 | 0.729 | 0.631 | 0.911 | 0.882 |
| | P2 | 1.209 | 5.388 | 0.800 | | | |
| | P3 | 1.397 | 4.969 | 0.750 | | | |
| | P4 | 1.302 | 5.295 | 0.827 | | | |
| | P5 | 1.283 | 5.326 | 0.802 | | | |
| | P6 | 1.214 | 5.465 | 0.850 | | | |
| Responsiveness | R1 | 1.178 | 5.341 | 0.822 | 0.697 | 0.920 | 0.891 |
| | R2 | 1.086 | 5.488 | 0.798 | | | |
| | R3 | 1.085 | 5.364 | 0.859 | | | |
| | R4 | 1.082 | 5.403 | 0.872 | | | |
| | R5 | 1.101 | 5.380 | 0.821 | | | |
| Ubiquitous Connectivity | UB1 | 1.005 | 5.930 | 0.845 | 0.678 | 0.927 | 0.905 |
| | UB2 | 1.140 | 5.953 | 0.835 | | | |
| | UB3 | 1.089 | 5.977 | 0.827 | | | |
| | UB4 | 1.023 | 6.008 | 0.845 | | | |
| | UB5 | 1.201 | 5.527 | 0.752 | | | |
| | UB6 | 1.110 | 5.736 | 0.834 | | | |

All constructs demonstrated satisfactory reliability and validity. Customer engagement achieved loadings between 0.735 and 0.864, an AVE of 0.630, a CR of 0.962, and a Cronbach's alpha of 0.958. Personalisation loadings ranged from 0.729 to 0.850, with AVE = 0.631, CR = 0.911, and alpha = 0.882. Responsiveness loadings ranged from 0.798 to 0.872, with AVE = 0.697, CR = 0.920, and alpha = 0.891. Ubiquitous connectivity achieved

loadings between 0.752 and 0.845, with AVE = 0.678, CR = 0.927, and alpha = 0.905. These results exceeded the recommended thresholds (Hair et al., 2022), confirming strong convergent validity and internal consistency reliability.

### 4.3 Hypothesis Testing

The path analysis results indicated that personalisation had a positive but insignificant effect on customer engagement ($\beta = 0.155$, $t = 1.737$, $p = 0.083$), leading to rejection of H1. Responsiveness significantly influenced engagement ($\beta = 0.381$, $t = 3.592$, $p < 0.001$), supporting H2. Ubiquitous connectivity also demonstrated a significant positive effect ($\beta = 0.335$, $t = 4.054$, $p < 0.001$), supporting H3. These results confirm that responsiveness and connectivity are the most salient drivers of engagement in Malaysian mobile commerce.

Table 2: Path Analysis

| | Coefficient(β) | Standard Deviation | T-Values | P-Values | Result |
|---|---|---|---|---|---|
| H1.Personalization → Customer Engagement | 0.155 | 0.089 | 1.737 | 0.083 | Not supported |
| H2.Responsiveness → Customer Engagement | 0.381 | 0.106 | 3.592 | 0.000 | Supported |
| H3.Ubiquitous Connectivity → Customer Engagement | 0.335 | 0.083 | 4.054 | 0.000 | Supported |

## 5. Discussion

The findings confirm the importance of responsiveness and ubiquitous connectivity as critical antecedents of customer engagement. At the same time, personalisation failed to produce a significant effect. The lack of support for personalisation challenges conventional wisdom that tailored experiences universally enhance engagement (Nguyen & Tran, 2022). Instead, it points to potential issues such as consumer scepticism, personalisation fatigue, or misalignment between offered recommendations and consumer expectations (Algharabat et al., 2022).

In contrast, responsiveness emerged as the strongest driver of engagement. This aligns with prior research emphasising the central role of prompt, empathetic responses in fostering trust, satisfaction, and long-term loyalty (Lim et al., 2023; Rather & Sharma, 2023). For mobile commerce platforms, responsiveness extends beyond customer service to include proactive communication and real-time issue resolution, which together enhance relational bonds with consumers.

The significant role of ubiquitous connectivity underscores its function as an infrastructural enabler of engagement. Consistent with Li and Wang (2024), connectivity ensures continuous, seamless access to digital services, thereby reinforcing convenience and reliability. For young Malaysian consumers who dominate mobile commerce adoption, connectivity is not merely a value-added feature but a fundamental expectation.

Together, these findings advance digital engagement literature by showing that in emerging markets, responsiveness and connectivity outweigh personalisation in predicting

engagement. This suggests that businesses must carefully prioritise their digital strategies to meet baseline expectations of speed and access before relying heavily on personalisation to differentiate experiences.

## 6. Conclusion

This study explored the influence of personalisation, responsiveness, and ubiquitous connectivity on customer engagement in Malaysian mobile commerce. The results revealed that while personalisation did not significantly influence engagement, responsiveness and connectivity had strong positive effects.

Responsiveness and connectivity are non-negotiable drivers of engagement. Businesses must prioritise timely, empathetic interactions and ensure uninterrupted, cross-device access to mobile services. Although personalisation retains potential, it must be implemented with caution, ensuring that strategies emphasise consumer relevance, transparency, and ethical data use to avoid disengagement.

For academics, this study contributes by challenging the assumed universality of personalisation as an engagement driver and highlighting contextual dynamics in emerging markets. Future research should consider moderating variables such as cultural values, trust in technology, and privacy orientation to explain variation in personalisation outcomes.

In conclusion, mobile commerce firms that successfully integrate responsive service and seamless connectivity into their platforms will be best positioned to build strong consumer relationships, foster loyalty, and achieve sustainable growth in the increasingly competitive digital marketplace.

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