

Bridging the Micro-Business Digital Divide: Drivers of Technology Acceptance in Ayer Keroh, Malacca

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ABSTRACT

Global business environment has changed due to the rapid acceleration of digitalization, which offers Micro, Small and Medium-sized Enterprise (MSMEs) huge changes to improve operational efficiency, drive ongoing innovation and increase market access. However, resource-constrained traditional small businesses located in semi-urban areas frequently encounter substantial hurdles in integrating digital technologies, risking economic marginalization. This empirical study investigates the critical determinants of digital tool adoption among traditional MSMEs (including retail, food and beverage, and handicraft enterprises) operating within the tourism-centric MITC Ayer Keroh commercial zone in Malacca, Malaysia. A quantitative research design was implemented by utilizing an extended Technology Acceptance Model (TAM) incorporating the construct of Trust. Primary data were collected via structured questionnaires from a representative sample of N=159 MSME owners selected through simple random sampling. Descriptive analysis revealed high adoption rates of basic digital payment systems (TNG E-Wallet and DuitNow at 98.7% usage) and social media marketing platforms (TikTok at 92.4% and Instagram at 90.7%), whereas more advanced cloud services, data analytics, and CRM tools exhibited low penetration. Multiple linear regression analysis demonstrated that the extended TAM model explains 74.6% of the variance in digital tool adoption ($R^2 = 0.746$, $F = 151.565$, $p < 0.001$). Perceived Ease of Use exerted the strongest positive influence on digital adoption ($\beta = 0.411$, $t = 4.075$, $p < 0.001$), followed by Trust ($\beta = 0.294$, $t = 3.337$, $p = 0.001$) and Perceived Usefulness ($\beta = 0.208$, $t = 2.898$, $p = 0.004$). The results underscore the necessity of expanding theoretical models of technology acceptance to encompass the emotional and security dimensions of Trust in resource-constrained contexts. Pragmatically, the study recommends targeted policy interventions such as subsidized digital infrastructure, tailored digital literacy training, and localized cybersecurity workshops, in alignment with the Melaka Smart City Blueprint 2035 to bridge the digital divide and ensure long-term small business sustainability.

Keywords: Micro Small and Medium Enterprises (MSMEs), Technology Acceptance Model (TAM), Trust, Digital Adoption, Semi-Urban Commercial Zone, Operational Efficiency.

INTRODUCTION

Accounting for approximately 96.9% of total business establishments in 2020, Micro, Small, and Medium Enterprises (MSMEs) represent the foundational backbone of the national economy in Malaysia representing over 1.1 million distinct enterprises (SME Corp Malaysia, 2020). MSMEs across Malaysia are highly dynamic and operate across multiple sectors, but they are particularly dominant in the services sector, which accounts for 83.9% of the national MSME profile (SME Corp Malaysia, 2020). MSMEs have historically supported about half of the country's employment and provided roughly 38% of the GDP, making a significant contribution to national socioeconomic indices (National Entrepreneur and SME Development Council, 2024). Within local states like Malacca, small traditional businesses play an additional, critical role: acting as key agents of cultural preservation and tourism facilitation in commercial zones such as MITC Ayer Keroh.

The rapid advancement of the digital economy has necessitated the digitalization of business operations. Innovative digital tools, spanning social media marketing platforms, e-commerce channels, and digital payment infrastructure offer immense opportunities for small businesses to survive, thrive, and scale. Digital tools allow resource-constrained enterprises to substitute traditional cash-based transactions, enhance communication, automate data-driven decision-making, and reduce operational bottlenecks (Ammeran et al., 2023). Legitimate applications of technology have been shown to accelerate growth, elevate customer satisfaction, and foster business resilience against economic shocks, such as the COVID-19 pandemic (Ammeran et al., 2023).

Despite these clear advantages, traditional MSMEs in semi-urban locations like MITC Ayer Keroh struggle with technology integration. These businesses often rely on manual, heritage-based processes and exhibit deep-seated psychological resistance to technological change. This creates a prominent 'digital divide' between urban, tech-savvy startups and localized, traditional small businesses. Resolving this tension is crucial, as traditional small businesses are vulnerable to losing market share to modern competitors.

Research Gap and Problem Statement

While previous academic literature on MSME digitalization has extensively explored the patterns of technology adoption in urban centers, a prominent research gap exists concerning how resource-constrained small businesses navigate technology adoption in semi-urban commercial zones that are heavily dependent on tourism and heritage-based transactions. Small traditional retail shops, food vendors, and craft sellers face unique challenges: they run on low profit margins, possess limited technical skills, and lack dedicated IT departments (SME Corp Malaysia, 2020). Consequently, investing in technology represents a high-risk financial commitment with uncertain returns. Furthermore, standard technology acceptance models often overlook localized psychological dynamics, such as the critical role of transaction trust and cybersecurity fears, which heavily influence traditional merchants. This study addresses these gaps by evaluating the current rate of digital adoption, identifying major financial and technical barriers, and analyzing the socio-psychological determinants of digital tool adoption among traditional small businesses in MITC Ayer Keroh, Malacca.

Research Objectives

In order to systematically address the problem, this research formulates four specific Research Objectives (RO):

- RO1: To examine the current level of digital tool adoption among traditional small businesses in MITC Ayer Keroh, Malacca.
- RO2: To identify the key challenges and barriers that hinder these businesses from adopting digital tools.
- RO3: To explore the opportunities and benefits that digital adoption presents for operational efficiency and business sustainability.
- RO4: To analyze the key variables (Perceived Usefulness, Perceived Ease of Use, and Trust) that influence the technological adoption behavior of small business owners

Significance of The Study

This study carries significant academic and practical merit. Theoretically, it expands the Technology Acceptance Model (TAM) by incorporating the construct of 'Trust', adapting technology acceptance frameworks to semi-urban, risk-prone micro-business environments (Gefen et al., 2003). Practically, it provides empirical baselines for regional policymakers, including the Melaka State Government, to design tailored grants, subsidized infrastructure, and localized digital literacy training programs in line with the Melaka Smart City Blueprint 2035 (Melaka State Government, 2021).

LITERATURE REVIEW

Digital Tool Adoption in MSMEs

Digital tool adoption in business operations refers to the integration of digital technologies, software, and platforms to optimize, substitute, or replace traditional manual mechanisms (OECD, 2021). These tools span multiple functional categories, including marketing (e.g., social media and search engine optimization), sales (e-commerce platforms), transactions (digital payment gateways), and management (cloud-based ERP and CRM tools) (OECD, 2021). Extensive research has shown that integrating these tools directly enhances organizational capacity, allowing micro-enterprises to operate with a level of agility that mirrors larger corporations (Department of Statistics Malaysia, 2024).

Underpinning Theory: Technology Acceptance Model (TAM)

The primary theoretical framework utilized in this study is the Technology Acceptance Model (TAM), originally developed by Fred Davis in 1989 (Davis, 1989). Grounded in the Theory of Reasoned Action (TRA), TAM posits that an individual's behavioral intention to accept and utilize a new information system is primarily determined by two constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989; Venkatesh & Davis, 2000). Davis defines PU as the degree to which an individual believes that using specific technology will enhance their job performance, whereas PEOU is defined as the degree to which an individual believes that using a specific technology will be free of physical and mental effort (Davis, 1989). In small business settings, if an entrepreneur perceives a digital tool as highly intuitive (high PEOU) and believes it will directly boost sales or lower transaction costs (high PU), their intention to implement it increases (Davis, 1989).

The Extended Construct: Trust

While the classical TAM framework possesses strong explanatory power, scholars have argued that it must be expanded to encompass contextual realities in risk-prone, financially constrained environments. Traditional small businesses, which are highly vulnerable to financial fraud, transactional disputes, and cybersecurity breaches, require a high level of system reliability and transaction safety (Alshamaila et al., 2013). McKnight et al. (2002) highlight that Trust acts as a crucial psychological bridge that mitigates perceived risk in technology transactions (McKnight et al., 2002). Trust in digital tools reflects a merchant's belief that the technology is secure, the service provider is reliable, and the digital transactions are safe from unauthorized manipulation (Pavlou, 2003). Integrating Trust as a direct predictor alongside PU and PEOU significantly enhances the predictive validity of the technology acceptance model in MSME contexts (Gefen et al., 2003).

Conceptual Framework and Hypotheses

Drawing from the extended TAM framework, this study proposes a conceptual framework where Perceived Usefulness, Perceived Ease of Use, and Trust act as independent variables (IV) influencing the dependent variable (DV) of Technology Adoption. Simultaneously, the framework acknowledges that financial and technical challenges act as moderate barriers, while digital adoption ultimately drives operational efficiency. This is illustrated in the structural model representing these core relationships:

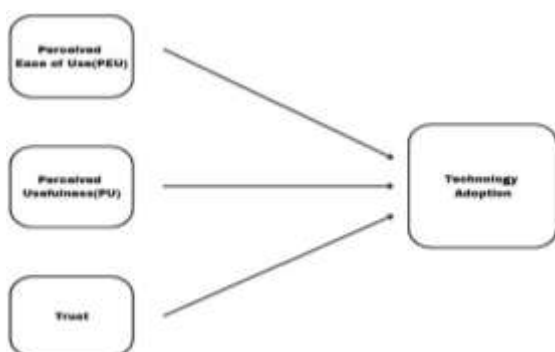


Figure 1 – Extended TAM Conceptual Framework for traditional MSME digital adoption.

Based on this theoretical arrangement, the study formulates three primary hypotheses:

- Hypothesis 1 (H1): Perceived Ease of Use has a positive and significant relationship with Technology Adoption among traditional small businesses in MITC Ayer Keroh.
- Hypothesis 2 (H2): Perceived Usefulness has a positive and significant relationship with Technology Adoption among traditional small businesses in MITC Ayer Keroh.
- Hypothesis 3 (H3): Trust has a positive and significant relationship with Technology Adoption among traditional small businesses in MITC Ayer Keroh.

RESEARCH METHODOLOGY

Research Design and Philosophy

This study employs a descriptive, quantitative, cross-sectional survey design (Creswell & Creswell, 2018). Methodologically, the study is grounded in the positivist research paradigm, which assumes that reality is objective, external, and measurable using empirical, numerical data rather than subjective, speculative interpretations (Bryman, 2016). A deductive approach is utilized to test the formulated hypotheses derived from technology acceptance theory (Saunders et al., 2019). The research variables are measured using a structured questionnaire, allowing statistical relationships to be established with scientific rigor and high replicability (Saunders et al., 2019; Creswell, 2014).

Population and Sampling

The target population comprises the registered micro, small, and medium enterprises (MSMEs) operating within the semi-urban commercial zone of MITC Ayer Keroh, Malacca. According to registry data from the Malacca State Government, a total of 268 MSME companies are registered within this zone, specializing primarily in retail, food and beverage, and handicraft services. To determine an appropriate sample size, the study utilizes the standard sample size table developed by Krejcie and Morgan (1970). For a population of $N=268$, the required representative sample size is determined to be exactly $S=159$ companies (Krejcie & Morgan, 1970). To ensure impartial, representative, and generalizable results, a simple random sampling (SRS) strategy was executed using computerized random number generation, ensuring each registered company had an equal probability of selection (Saunders et al., 2019).

Research Instrument

Primary data were gathered using a structured survey questionnaire designed in English and translated into Bahasa Malaysia to accommodate diverse respondents. The instrument was divided into four main parts: Section A captured demographic characteristics (nominal level); Section B measured current usage across specific digital platform types (nominal); Section C measured the independent constructs (PU, PEOU, Trust) utilizing standardized measurement items adapted from established literature; Section D evaluated perceived operational efficiency and barriers. The interval scale constructs (Sections C and D) utilized a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) (Riduwan, 2012). Content validity was established prior to distribution through rigorous panel review by expert researchers.

RESULTS AND DISCUSSIONS

Pilot Study and Scale Reliability

Prior to full data collection, a pilot study was conducted with $N=30$ participants to establish internal consistency and reliability (Van Teijlingen & Hundley, 2001). Cronbach's Alpha coefficient was utilized as the primary metric, with a value above 0.70 serving as the threshold for acceptable reliability (Ahmad et al., 2024). The pilot SPSS results yielded an overall Cronbach's Alpha of 0.918 across 16 items, indicating

excellent reliability and internal consistency (Ahmad et al., 2024). Reliability analysis for each individual construct was also performed, as summarized in Table 1.

Table 1 - Reliability Statistics for Measurement Scales (N=30)

Construct	Items	Alpha (Pilot)	Alpha (Full)
Perceived Usefulness (PU)	4	0.830	0.830
Perceived Ease of Use (PEOU)	4	0.906	0.906
Trust (T)	4	0.881	0.881
Technology Adoption (TA)	4	0.763	0.763

In the full dataset of N=159, the overall scale Cronbach's Alpha was 0.954 (16 items), indicating exceptional psychometric suitability for advanced statistical testing (Ahmad et al., 2024).

Respondent Demographic Profile

Descriptive statistical analysis was performed on the full sample (N=159) to construct a comprehensive profile of the small businesses and their owners in MITC Ayer Keroh (Alabi & Bukola, 2023). All demographic variables yielded 100% valid responses, confirming a high-quality dataset with zero missing values. The detailed demographic breakdown is presented in Table 2.

Table 2 - Demographic Profile of Respondents (N=159)

Demographic Variable	Frequency (n)	Percentage (%)
Gender		
Female	83	52.2%
Male	76	47.8%
Age		
21–30 Years	41	25.8%
31–40 Years	68	42.8%
41–50 Years	30	18.9%
Above 50 Years	20	12.6%
Ethnicity		
Malay	86	54.1%
Chinese	40	25.2%
Indian	33	20.8%
Business Sector		

Food & Beverage	63	39.6%
Retail Shop	40	25.2%
Accessories Shop	25	15.7%
Leisure & Entertainment	16	10.1%
Arts & Cultural	15	9.4%
Business Size (Employees)		
1–5 Employees (Micro)	132	83.0%
6–15 Employees (Small)	27	17.0%

The demographic data reveals that the typical traditional small business in MITC Ayer Keroh is a micro-enterprise (83.0% employing between 1 and 5 workers) operated by an entrepreneur aged between 31 and 40 (42.8%). The sample captures the multi-ethnic structure of Malaysian business settings (54.1% Malay, 25.2% Chinese, and 20.8% Indian) and is heavily concentrated in the F&B (39.6%) and Retail (25.2%) sectors, which align with tourism activities.

Current Extent of Digital Tool Adoption

Descriptive analysis was performed on Section B to determine the specific types of technologies adopted by traditional merchants. The results show a highly bifurcated adoption landscape. While basic, low-cost tools have reached saturation, advanced operational tools are significantly underutilized. Among digital payments, TNG E-Wallet and DuitNow achieved near-ubiquitous penetration, with 98.7% of respondents (n=154) actively using both, highlighting the success of localized financial transaction networks. In social media, TikTok (92.4%) and Instagram (90.7%) are the dominant platforms, driven by short video and image-based visual content. In e-commerce, Shopee (97.2%) and TikTok Shop (96.2%) represent the core online sales channels.

In sharp contrast, cloud-based software was utilized by only 49 respondents (30.8% of the sample), primarily for storage (OneDrive and iCloud) rather than accounting or collaborative management. Customer Relationship Management (CRM) software was utilized by a mere 25 respondents (15.7%), with Hubspot and Zoho CRM representing the few specialized platforms.

Lastly, data analytics tools were adopted by only 31 respondents (19.5%), underutilizing platforms like Google Analytics (90.3% of users) or Microsoft Power BI (87.1% of users) to drive strategic planning. These findings confirm that traditional merchants are operational, 'functional' adopters rather than strategic, digitally transformed enterprises.

Pearson Correlation Analysis

Bivariate Pearson Correlation (r) analysis was executed to evaluate the strength and direction of the linear relationships among variables (Hair et al., 2018). The resulting correlation matrix is presented in Table 3.

Table 3 - Bivariate Pearson Correlation Matrix (N=159)

Construct	PU	PEOU	Trust	Adoption
Perceived Usefulness (PU)	1	.824***	.760***	.770***
Perceived Ease of Use (PEOU)	.824***	1	.886***	.842***

Trust	.760***	.886***	1	.816***
Technology Adoption (DV)	.770***	.842***	.816***	1

***. Correlation is statistically significant at the 0.001 level (2-tailed).

The correlation coefficients demonstrate extremely strong, positive, and statistically significant relationships among the constructs. In terms of direct technological adoption, Perceived Ease of Use exhibits the strongest bivariate association ($r = 0.842$, $p < 0.001$), closely followed by Trust ($r = 0.816$, $p < 0.001$) and Perceived Usefulness ($r = 0.770$, $p < 0.001$) (Hair et al., 2018). All correlation metrics fall below the critical threshold of 0.90, indicating that while variables are highly interrelated, multicollinearity is present but not severe (Hair et al., 2018).

Multiple Linear Regression Analysis

To analyze the simultaneous predictive validity of the independent variables and formally test the structural hypotheses, multiple linear regression analysis was executed in SPSS (Hair et al., 2018). The model summary yielded a multiple correlation coefficient (R) of 0.864, indicating that the predictors are highly correlated with the dependent variable. The R-Square value was 0.746, demonstrating that Perceived Usefulness, Perceived Ease of Use, and Trust collectively account for 74.6% of the variance in digital tool adoption among traditional small businesses in MITC Ayer Keroh (Adjusted $R^2 = 0.741$, Standard Error = 0.51182). Analysis of Variance (ANOVA) proved that the regression model is highly significant, $F(3, 155) = 151.565$, $p < 0.001$, confirming that the predictor set is statistically robust. The standard regression coefficients are presented in Table 4.

Table 4 - Multiple Linear Regression Coefficient Estimates (N=159)

Predictor	B	Std. Error	Beta	t	Sig.	VIF
(Constant)	0.843	0.161	-	5.239	<.001	-
Perceived Usefulness (PU)	0.186	0.064	0.208	2.898	.004	3.155
Perceived Ease of Use (PEOU)	0.362	0.089	0.411	4.075	<.001	6.188
Trust (T)	0.250	0.075	0.294	3.337	.001	4.716

Multicollinearity was diagnosed utilizing Tolerance and Variance Inflation Factor (VIF) values. All VIF values fall well below the standard threshold of 10.0 (ranging from 3.155 to 6.188), and all Tolerance values exceed 0.10, indicating that collinearity does not compromise the regression estimates (Hair et al., 2018). Collinearity diagnostics indicated that Dimension 4 has a Condition Index of 22.852, with Variance Proportions concentrated in PEOU (0.97) and Trust (0.65), revealing a high level of shared variance that remains within statistically acceptable parameters (Hair et al., 2018).

Hypothesis Testing and Scholarly Discussion

Hypothesis Testing was executed utilizing the standard p-value threshold of $\alpha = 0.05$. The outcomes indicate that all three null hypotheses are rejected, and alternative hypotheses are accepted:

Hypothesis 1 (H1) evaluated whether Perceived Ease of Use positively influences digital adoption. PEOU yielded a highly significant effect ($B = 0.362$, $Beta = 0.411$, $t = 4.075$, $p < 0.001$), indicating strong empirical support (Hair et al., 2018). When traditional small business owners find digital tools user-friendly, intuitive, and simple to set up, their rate of adoption accelerates.

Hypothesis 2 (H2) evaluated whether Perceived Usefulness positively influences adoption. PU yielded a statistically significant positive coefficient ($B = 0.186$, $Beta = 0.208$, $t = 2.898$, $p = 0.004$), supporting the

hypothesis (Hair et al., 2018). Traditional merchants are pragmatic: when they believe that a digital tool can improve cash flow, reduce billing errors, and automate daily transactions, they are more willing to implement it.

Hypothesis 3 (H3) investigated whether Trust significantly affects technology adoption. Trust emerged as a highly significant positive predictor ($B = 0.250$, $\text{Beta} = 0.294$, $t = 3.337$, $p = 0.001$), providing strong support (Hair et al., 2018). For traditional merchants, technology adoption is not merely a functional decision, but a psychological one. Trust in transaction safety, system security, and platform reliability are crucial determinants that overcomes the perceived risks associated with digital business (Gefen et al., 2003).

CONCLUSION & RECOMMENDATIONS

Discussion and Theoretical Contributions

The empirical findings validate the relevance of the Technology Acceptance Model (TAM) for traditional MSMEs in semi-urban environments (Venkatesh et al., 2003). However, the research theoretically demonstrates that technology adoption in resource-constrained contexts is not purely technical, but behaviorally and psychologically driven (Gefen et al., 2003). Adding 'Trust' as a direct predictor alongside PU and PEOU significantly improves the explanatory power of technology acceptance frameworks, highlighting that transaction security, service reliability, and information accuracy are fundamental criteria for small businesses.

Practical and Policy Implications

The study presents crucial empirical implications for policymakers, industry chambers, and government bodies looking to foster inclusive digitalization in Malaysia. Since traditional merchants are primarily concentrated in basic payment and marketing tools, state governments should facilitate a transition toward 'strategic digitalization'. Specific practical recommendations include:

- **Infrastructural Subsidies:** Expand localized digital matching grants, such as the Madani PMKS Digital Matching Grant, to reduce the upfront cost of hardware and software subscriptions for micro-enterprises.
- **Tailored Digital Literacy Training:** Develop hands-on digital skills workshops through agencies like Malaysian Digital Economy Corporation (MDEC) focusing on practical inventory, accounting, and CRM tools designed for non-technical users (MDEC, 2025).
- **Cybersecurity and Trust Seminars:** Establish trust-building cybersecurity frameworks, educating merchants on secure transaction practices to mitigate transaction anxiety.

Limitations and Future Directions

While highly rigorous, this study is subject to key limitations. First, its geographical scope is restricted to MITC Ayer Keroh, Malacca, limiting direct generalization to hyper-urban or extremely rural Malaysian contexts. Second, the cross-sectional design captures respondent perceptions at a single point in time, omitting long-term trends. Future research should utilize longitudinal, mixed-method approaches, combining quantitative surveys with qualitative semi-structured interviews across multiple Malaysian states to construct a more holistic, nationwide view of MSME digital transformation.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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