

# Factors Influencing Unified Payments Interface Adoption Among Hawkers in Mangaluru: An Extended Technology Acceptance Model Approach

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**Abstract** - This study explores the adoption of the Unified Payments Interface (UPI) among hawkers in Mangaluru, India, using the extended Technology Acceptance Model (TAM). The research aims to identify key factors influencing hawkers' decisions to adopt UPI, contributing to discussions on financial inclusion and the digital economy. A quantitative research design was employed, with 180 hawkers selected through convenience sampling. Data were collected using a structured questionnaire adapted from previous studies to suit the context of hawkers. The study examined constructs such as perceived usefulness (PU), perceived ease of use (PEOU), attitudes toward UPI (ATU), facilitating conditions (FC), and behavioral intention to use UPI (BIU). Structural equation modeling (SEM) with AMOS software was utilized to test the relationships among these constructs and to assess the mediating role of ATU. The findings indicate that PU significantly influences hawkers' intentions to adopt UPI by enhancing operational efficiency and customer satisfaction. ATU mediates the relationship between PU and behavioral intention, emphasizing the importance of positive attitudes toward UPI. PEOU is particularly crucial for hawkers with limited digital literacy, while FC, such as reliable internet access and technical support, is essential for overcoming adoption barriers. This study provides valuable insights into UPI adoption among hawkers and offers recommendations to enhance digital payment adoption in the informal sector.

**Keywords:** Unified Payments Interface (UPI), Technology Acceptance Model (TAM), Digital Payment Adoption, Structural Equation Modeling (SEM), Informal Sector

## I. INTRODUCTION

The rapid adoption of digital payment platforms, particularly the Unified Payments Interface (UPI), across urban India signifies a remarkable leap in technological advancements, addressing evolving consumer and business needs in the digital age. UPI, developed by the National Payments Corporation of India, facilitates seamless transactions between bank accounts using mobile devices, offering enhanced convenience and efficiency (Gupta *et al.*, 2023; Mahesh & S., 2022).

The Technology Acceptance Model (TAM) provides a useful framework for understanding the factors influencing hawkers' intentions to adopt UPI, emphasizing perceived usefulness (PU) and perceived ease of use (PEOU) (Suyanto,

2023; Setiawan & Setyawati, 2020). PU reflects hawkers' belief that UPI will enhance their business operations, whereas PEOU pertains to their perception of the platform's ease of use and user-friendliness (Saha & Kiran, 2022; Handayati & Trisnawati, 2023; Setiawan & Setyawati, 2020; Suyanto, 2023).

Research indicates that PU is a strong predictor of behavioral intention to use mobile payment systems, with the relationship between PU and behavioral intention mediated by users' attitudes toward technology (Saha & Kiran, 2022; Handayati & Trisnawati, 2023; Kirmani *et al.*, 2022). Similarly, PEOU significantly affects hawkers' attitudes toward UPI, as ease of use leads to more favorable attitudes and a higher likelihood of adoption (Setiawan & Setyawati, 2020; Suyanto, 2023; Laksamana *et al.*, 2022; Sembiring *et al.*, 2022). Furthermore, facilitating conditions, such as access to reliable internet, mobile devices, and technical support, play a crucial role in enhancing hawkers' ability to use UPI effectively. Adoption intention rises when hawkers perceive that they have the necessary resources (Karnadi & Kurniawan, 2021; Al-Sabaawi *et al.*, 2021; Laksamana *et al.*, 2022).

The integration of globalization and technology (Qadri & Bhat, 2018), along with insights into customer responsiveness to banking technology (Vidyapriya & Mohanasundari, 2015), underscores the growing relevance of UPI for hawkers. Moreover, the importance of service quality in IT adoption (Jain & Wali, 2018) and knowledge management integration (Chandrasekaran *et al.*, 2014) further enhances the understanding of digital technology's role in business operations.

In conclusion, hawkers' behavioral intention to use UPI is shaped by a range of factors, including PU, PEOU, attitudes toward technology, and facilitating conditions. Understanding these influences is essential for creating targeted interventions that can foster UPI adoption, thereby improving hawkers' business efficiency and advancing financial inclusion and the digital economy in urban India. Future studies should focus on empirically validating these relationships and investigating additional factors that could influence UPI adoption among street vendors.

## II. REVIEW OF LITERATURE

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## III. RESEARCH HYPOTHESES

*H<sub>1</sub>*: Perceived usefulness will positively influence behavioral intention to use.

*H<sub>2</sub>*: Perceived usefulness positively influences behavioral intention to use, mediated by attitudes toward use.

*H<sub>3</sub>*: Attitude toward using will mediate the relationship between perceived ease of use and behavioral intention to use.

*H<sub>4</sub>*: Facilitating conditions will positively influence behavioral intention to use.

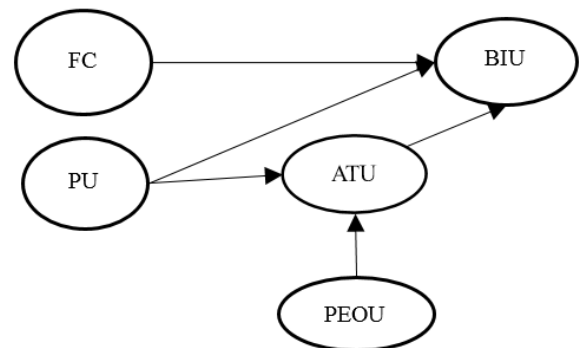


Fig. 1 Proposed Research Framework

## IV. RESEARCH METHODOLOGY

This study employs a quantitative research design to examine the factors influencing hawkers in Mangaluru to adopt the Unified Payments Interface (UPI), grounded in the extended Technology Acceptance Model (TAM). The key constructs of TAM, including perceived usefulness (PU) and perceived ease of use (PEOU), are explored as primary determinants of technology adoption. The study also investigates the mediating role of attitudes toward UPI usage and the influence of facilitating conditions on the behavioral intention to use UPI.

The sample consisted of 180 hawkers, selected through convenience sampling using informal networks to ensure accessibility to this mobile and often underserved group. A structured questionnaire was used to measure the constructs of the extended TAM, including PU, PEOU, attitudes toward UPI, facilitating conditions, and behavioral intention to use UPI. The items in the questionnaire were adapted from previous studies and simplified to ensure that they were easily understood by the hawkers. A 5-point Likert scale, ranging from strongly disagree to strongly agree, was used. Data collection was carried out through face-to-face interactions to improve response rates and data accuracy.

The gathered data were analyzed using structural equation modeling (SEM) with AMOS software to test the hypothesized model, evaluate the direct and indirect effects, and determine the significance of the mediating variables. Reliability and validity checks were performed to ensure the robustness of the measurement model, and the overall fit of the model was assessed using established indices.

Ethical considerations were a priority throughout the research process. Participants were informed of the study objectives, and their voluntary consent was obtained. Confidentiality and anonymity were strictly maintained, with responses securely stored and used solely for research purposes. Participants were free to withdraw from the study at any point without any consequences.

**IV. RESULTS OF THE STUDY**

*A. Demographic Profile*

The demographic profile of Mangaluru hawkers is crucial for understanding the characteristics and trends of the informal retail sector, a key part of the local economy. Analyzing factors such as gender, age, and experience provides valuable insights into this community.

Street vending, a common form of self-employment, offers flexible income opportunities, particularly for individuals with limited access to formal employment. Understanding hawkers’ demographics helps identify labor market trends, challenges, and the potential for adopting technologies such as digital payments.

This demographic analysis is essential for developing targeted policies aimed at improving hawkers’ livelihoods and integrating them into the broader economy (Kumar *et al.*, 2018; Rahi & Ghani, 2019).

TABLE I GENDER \* AGE CROSSTABULATION

Gender	Age				Total
	26-35 years	36-45 years	46-55 years	55 years and above	
Male	6	22	72	35	135
Female	1	6	25	13	45
Total	7	28	97	48	180

TABLE II GENDER \* YEAR OF EXPERIENCE AS STREET VENDOR CROSSTABULATION

Gender	Year of Experience as a Street Vendor				Total
	Less than 5 years	5-10 years	11-20 years	20 years and above	
Male	31	65	9	30	135
Female	9	27	2	7	45
Total	40	92	11	37	180

*B. Descriptives*

The data in Table I include descriptive statistics for various constructs, such as facilitating conditions (FC), perceived usefulness (PU), perceived ease of use (PEOU), attitude toward usage (ATU), behavioral intention to use (BIU), and actual usage behavior (AUB). Additionally, the table provides insights into the normality of the data.

TABLE III DESCRIPTIVE STATISTICS

Values	Mean	Std. Deviation	Skewness	Kurtosis
FC1	3.43	1.187	-.752	-.510
FC2	3.59	1.180	-.960	.004
FC3	3.52	1.244	-1.007	-.122
PU1	3.49	1.184	-.882	-.269
PU2	3.51	1.212	-.873	-.309
PU3	3.54	1.230	-.883	-.336
PEOU1	3.40	1.156	-.894	-.395
PEOU2	3.64	1.132	-1.066	.283
PEOU3	3.64	1.132	-.933	-.142
ATU1	3.49	1.184	-.915	-.253
ATU2	3.46	1.309	-.847	-.589
ATU3	3.49	1.262	-.882	-.471
BIU1	3.47	1.189	-.801	-.551
BIU2	3.61	1.151	-1.007	.096
BIU3	3.53	1.275	-.775	-.669
AUB1	3.45	1.154	-.747	-.566
AUB2	3.61	1.126	-.978	-.003
AUB3	3.57	1.228	-.836	-.434
Valid N (listwise) 180				

The analysis of mean values, skewness, and kurtosis provided insights into the distribution of the responses. Mean values (3.40 to 3.64) indicate a generally positive perception of variables such as facilitating conditions, perceived usefulness, perceived ease of use, attitude toward usage, and behavioral intention to use. The standard deviations (1.126-1.309) showed moderate variability.

Negative skewness values (-1.007 to -0.747) suggest a leftward skew, indicating that most respondents rated the constructs positively, within acceptable limits for normality (Önal, 2022; Özkan & Er, 2020). Kurtosis values (-1.066 to 0.004) were negative, indicating flatter distributions but remained within the range of -2 to +2, supporting normality assumptions for parametric analysis (Weliange *et al.*, 2014). Thus, the data can be considered approximately normal for statistical analyses despite minor deviations (Abbas *et al.*, 2022).

*C. Reliability Analysis Using Cronbach Alpha Values*

The reliability statistics revealed a Cronbach’s alpha value of 0.945 for a scale comprising 18 items. This value is considered excellent, signifying a high degree of reliability and internal consistency among the items. It suggests that the scale is well-constructed, with minimal measurement error and redundancy, making it suitable for assessing the construct of interest. With 18 items contributing to this high reliability score, the scale demonstrated robust dependability, ensuring consistent results (Tavakol & Dennick, 2021).

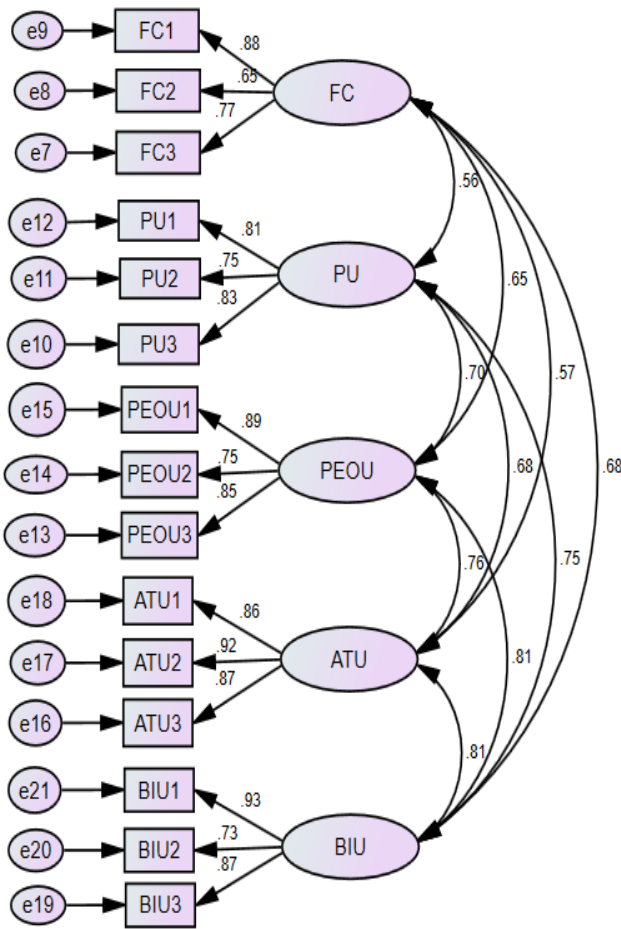


Fig. 2 Confirmatory Factor Analysis model

D. Goodness of Fit Indices and Factor Loadings

The model fit indices and factor loadings collectively demonstrated the robustness of the measurement model. The Chi-Square (CMIN) value was 130.077 with 80 degrees of freedom ( $p = 0.000$ ). Despite the significant p-value, the normed chi-square (CMIN/DF) value of 1.626 was acceptable (less than 3), indicating a good fit. The Comparative Fit Index (CFI) was 0.974, and the Tucker-Lewis Index (TLI) was 0.965, both exceeding the recommended value of 0.95, signifying an excellent fit. The Root Mean Square Error of Approximation (RMSEA) was 0.059, with a 90% confidence interval of 0.040-0.077, and a PCLOSE value of 0.201, indicating low error. These indices confirmed the alignment of the model with the observed data.

Factor loadings reflected strong relationships between the latent constructs and indicators. Facilitating Conditions (FC) loadings ranged from 0.650 to 0.885, with FC1 being the strongest (0.885) and FC2 acceptable (0.650). The Perceived Usefulness (PU) loadings ranged from 0.746 to 0.829, with PU3 being the strongest. The Perceived Ease of Use (PEOU) loadings ranged from 0.750 to 0.890, with PEOU1 being the most representative (0.890). Attitudes toward Using (ATU) loadings ranged from 0.860 to 0.922, with ATU2 as the strongest (0.922). Behavioral Intention to Use (BIU) loadings ranged from 0.732 to 0.932, with BIU1 as the strongest (0.932).

Overall, the fit indices and factor loadings confirmed the model's robustness and suitability for further analysis, with all indicators exceeding the acceptable threshold of 0.60.

TABLE IV VALIDITY ANALYSIS

Values	CR	AVE	MSV	MaxR(H)	FC	PU	PEOU	ATU	BIU
FC	0.817	0.601	0.458	0.853	0.775				
PU	0.838	0.634	0.563	0.843	0.559***	0.796			
PEOU	0.870	0.691	0.655	0.884	0.645***	0.704***	0.831		
ATU	0.915	0.783	0.661	0.921	0.573***	0.677***	0.762***	0.885	
BIU	0.885	0.722	0.661	0.916	0.677***	0.751***	0.809***	0.813***	0.850

The extended Technology Acceptance Model (TAM) validity analysis revealed high reliability and validity for all constructs: facilitating conditions (FC), perceived usefulness (PU), perceived ease of use (PEOU), attitude toward usage (ATU), and behavioral intention to use (BIU). Composite Reliability (CR) values exceeded 0.7, indicating strong internal consistency (Bai *et al.*, 2020).

Average Variance Extracted (AVE) values were above 0.5, confirming convergent validity (Önal, 2022; Özkan & Er, 2020). The Maximum Shared Variance (MSV) values were lower than the AVE values, validating discriminant validity (Zou *et al.*, 2018). This solid validation supports further analyses, such as structural equation modeling (SEM), to explore the relationships and effects on usage behavior (Önal, 2022).

TABLE V HTMT ANALYSIS

Values	FC	PU	PEOU	ATU	BIU
FC					
PU	0.580				
PEOU	0.654	0.719			
ATU	0.568	0.681	0.756		
BIU	0.680	0.756	0.817	0.801	

The HTMT analysis results in Table III indicate that all pairwise HTMT values are below the 0.85 threshold, confirming the discriminant validity of the constructs. The values, ranging from 0.568 to 0.817, suggest that the constructs - facilitating conditions (FC), perceived usefulness (PU), perceived ease of use (PEOU), attitude toward usage

(ATU), and behavioral intention to use (BIU) - are empirically distinct. These findings demonstrate that each construct measures a unique concept with no significant overlap between them. This ensures that the constructs contribute separately and meaningfully to the model,

providing a robust foundation for evaluating technology acceptance and usage behavior (Hair *et al.*, 2015; Hair *et al.*, 2022). The results strengthen the overall measurement model by ensuring that multicollinearity is not an issue and that each construct plays a unique role in the theoretical framework.

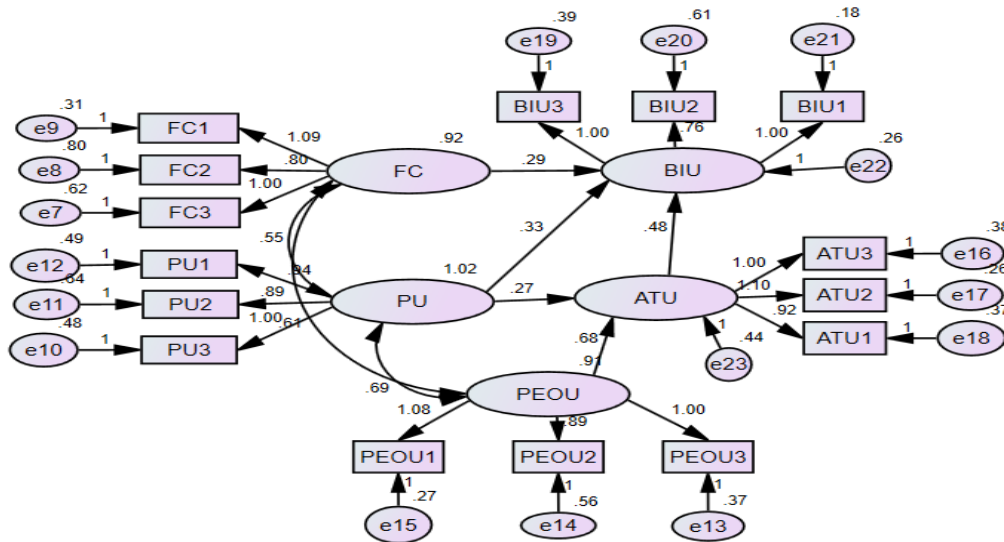


Fig. 3 Path Analysis Model

E. Goodness of Fit Indices of Path Model

The default model in the fit summary indicated a reasonable fit for the data. The chi-square statistic (CMIN = 138.350), with 82 degrees of freedom and a significant p-value of .000, suggests a noticeable difference between the observed and expected covariance matrices, indicating that the model does not perfectly fit the data. However, the CMIN/DF ratio of 1.687 was within the acceptable range (below 3), suggesting a good fit. The RMR value of .054 is low, indicating that the

residuals are small and the model approximates the data well. Additionally, the GFI of .909 was close to 1, signifying a good fit, and the AGFI of .867, although slightly below the ideal threshold of 0.9, still indicated an acceptable model fit. In terms of model parsimony, the PRATIO of .781, PNFI of .727, and PCFI of .758 all suggest an efficient balance between fit and complexity. Overall, the default model demonstrates a reasonably good fit to the data, with indices showing that it captures the relationships well while avoiding excessive complexity.

TABLE VI HYPOTHESES TESTING SUMMARY

Hypothesis	Hypothesized Relation	Path Coefficients (β)	Standard Error (S.E.)	Critical Ratio (C.R.)	Indirect Effect (IE)	Total Effect (TE)	P-Value	Decision on Hypothesis
H1	PU → BIU	0.326	0.088	3.714	NA	0.299	***	Supported
H2	PU → ATU → BIU	0.273 0.482 = 0.131	N/A	N/A	0.131	0.457	***	Supported
H3	PEOU → ATU → BIU	0.684 0.482 = 0.329	N/A	N/A	0.329	0.595	***	Supported
H4	FC → BIU	0.286	0.077	3.726	NA	0.248	***	Supported

The hypothesis testing outcomes indicated substantial correlations between the investigated constructs. Perceived Usefulness (PU) exhibits a direct positive effect on Behavioral Intention to Use (BIU), with a path coefficient of 0.326, a critical ratio of 3.714, and a statistically significant p-value. This suggests that hawkers view UPI as advantageous for their business activities, significantly influencing their adoption intention. Attitude Towards Using (ATU) plays a mediating role, as PU positively affects ATU (0.273), which in turn positively impacts BIU (0.482). This resulted in an indirect effect of 0.131 and a total effect of 0.457, with all paths showing statistical significance.

Likewise, Perceived Ease of Use (PEOU) shows a strong impact on ATU (0.684), which subsequently influences BIU (0.482), yielding an indirect effect of 0.329 and a total effect of 0.595. This confirms that user-friendliness considerably enhances hawkers' attitudes toward UPI and their adoption intentions. Facilitating Conditions (FC) positively affect BIU with a path coefficient of 0.286, a critical ratio of 3.726, and a significant p-value, demonstrating that resource and support availability notably influence the intention to utilize UPI. In summary, all hypotheses were supported, underscoring the significance of PU, PEOU, ATU, and FC in shaping hawkers' behavioral intention to adopt UPI.



## V. DISCUSSION

The research findings corroborate previous studies, shedding light on the adoption of the Unified Payments Interface (UPI) by hawkers through the lens of the extended Technology Acceptance Model (TAM). This investigation underscores the significance of perceived usefulness (PU), perceived ease of use (PEOU), facilitating conditions (FC), and attitude toward using (ATU) in shaping behavioral intention. PU has emerged as a crucial driver of hawkers' inclination to adopt UPI, boosting operational efficiency and customer satisfaction, as corroborated by Gupta *et al.*, (2023) and Bai *et al.*, (2020). ATU acts as an intermediary between PU and behavioral intention, with favorable perceptions amplifying technology acceptance. Handayati and Trisnawati (2023) stress the importance of focused campaigns to cultivate positive attitudes among hawkers. PEOU influences attitudes, particularly among hawkers with limited digital proficiency, as noted by Karnadi and Kurniawan (2021) and Laksamana *et al.*, (2022).

Streamlining UPI's interface and offering practical training could enhance PEOU and willingness to adopt. FC tackles external adoption hurdles, with dependable internet, mobile devices, and technical support being vital, as demonstrated by Al-Sabaawi *et al.*, (2021) and Khuong *et al.*, (2022). Overcoming infrastructural challenges can create an enabling environment for UPI adoption. The interplay among PU, PEOU, ATU, and behavioral intention, as delineated in TAM, is evident, incorporating both internal and external factors for a comprehensive understanding of technology adoption (Hair *et al.*, 2022). This interconnected framework validates TAM's relevance in the context of hawkers, a demographic often neglected in adoption research.

From a practical perspective, these findings suggest several possible strategies. Policymakers and developers should prioritize enhancing UPI's perceived utility and ease of use through simplified user interfaces, targeted training programs, and awareness campaigns. Addressing infrastructural gaps by ensuring affordable internet access and robust technical support is crucial. These measures can facilitate the integration of hawkers into the digital economy, thereby promoting financial inclusion and economic growth.

This study offers valuable insights into the adoption of the Unified Payments Interface (UPI) by hawkers in urban India using the extended Technology Acceptance Model (TAM). It emphasizes perceived usefulness (PU), perceived ease of use (PEOU), facilitating conditions (FC), and attitude toward use (ATU) as key determinants of behavioral intention. PU propels adoption by enhancing efficiency and customer satisfaction, whereas ATU mediates the relationship between PU and behavioral intention, highlighting the role of positive perceptions. PEOU, which is influenced by user-friendly designs and training, facilitates adoption, especially among digitally inexperienced users. FC addresses external barriers, such as internet access, creating an enabling environment for widespread adoption.

## VI. CONCLUSION

An examination of street vendors' acceptance of the Unified Payments Interface (UPI) utilizing the extended Technology Acceptance Model (TAM) offers valuable insights into the elements shaping technology adoption within this group. This study highlights the crucial roles of perceived usefulness (PU), perceived ease of use (PEOU), facilitating conditions (FC), and attitude toward use (ATU) as key factors influencing behavioral intention. By confirming PU as a primary driver of adoption, this study corroborates existing research, reinforcing the idea that street vendors are more inclined to adopt UPI when they view it as advantageous to their business operations and customer interactions. Furthermore, the mediating effect of ATU between PU and behavioral intention underscores the importance of cultivating positive perceptions among vendors. This suggests that initiatives aimed at improving attitudes toward UPI could significantly boost adoption rates. The study also emphasizes the vital role of PEOU, particularly for vendors with limited digital literacy, indicating that a simplified user interface and practical training could enhance their willingness to embrace this technology. The significance of FC in addressing external adoption barriers is another crucial aspect of this study. These findings suggest that reliable internet access, mobile devices, and technical support are essential for facilitating UPI adoption among street vendors. By addressing these infrastructural challenges, stakeholders can create an environment conducive to integrating vendors into the digital economy. In summary, the interplay among PU, PEOU, ATU, and behavioral intention, as articulated in the TAM framework, provides a comprehensive understanding of technology adoption in the context of street vendors, a group often neglected in previous studies. The practical implications derived from this research offer actionable strategies for policymakers and technology developers, emphasizing the need for user-friendly interfaces, targeted training programs, and infrastructure improvements.

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