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Extending the Technology Acceptance Model for Rural E-Commerce in India: The Role of trust, Social Influence, And Digital Literacy on Online Shopping Behaviour

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ABSTRACT: This study investigates the influences of TR, SI and DL on the core mediating constructs of TAM (Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)) and the influence of these constructs on Online Shopping Behaviour (OSB) on rural consumers in India. A structured bilingual Likert scale questionnaire was used in December 2025–January 2026 to gather 596 valid responses from rural locations, based on an extended TAM framework. The results of multiple regression analyses supported all nine hypotheses ($p < 0.001$). The antecedents that had the highest bivariate correlations with the TAM constructs were trust ($r = 0.324$) with PEOU and Social Influence ($r = 0.249$) with PU. Digital Literacy showed the highest direct bivariate correlation with OSB ($r = 0.346$). The variance in OSB was accounted for by 15.9% of PU and PEOU. The results contribute to the literature on TAM and e-commerce in rural India, a field that has received little attention so far, and have implications for e-commerce platform design, digital literacy policies, and community-level solution strategies. The keywords used are Technology Acceptance Model, rural e-commerce, trust, social influence, digital literacy, online shopping behaviour, India.

KEYWORDS: Technology Acceptance Model, rural e-commerce, trust, social influence, digital literacy, online shopping behaviour,

1. INTRODUCTION

Internet connectivity and Smartphone use has grown rapidly in rural India creating tremendous opportunities in the e-commerce sector. But, adoption rates among rural consumers are significantly lower than those among urban consumers, and there is a need to understand the behavioural, social, and technological factors that can either increase or decrease the rate of online shopping in rural areas.

The Technology Acceptance Model (TAM) (Davis, 1989) suggests that two factors – Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) – are the most significant factors in the minds of the individual on their intention to use a technology. Although TAM has been widely tested in urban and developed countries, it has yet to be applied to low-income, low-literacy, rural groups. This study attempts to fill that gap by adding to TAM with three antecedents, namely Trust (TR), Social Influence (SI) and Digital Literacy (DL) which are theoretically and empirically appropriate for rural Indian consumer context.

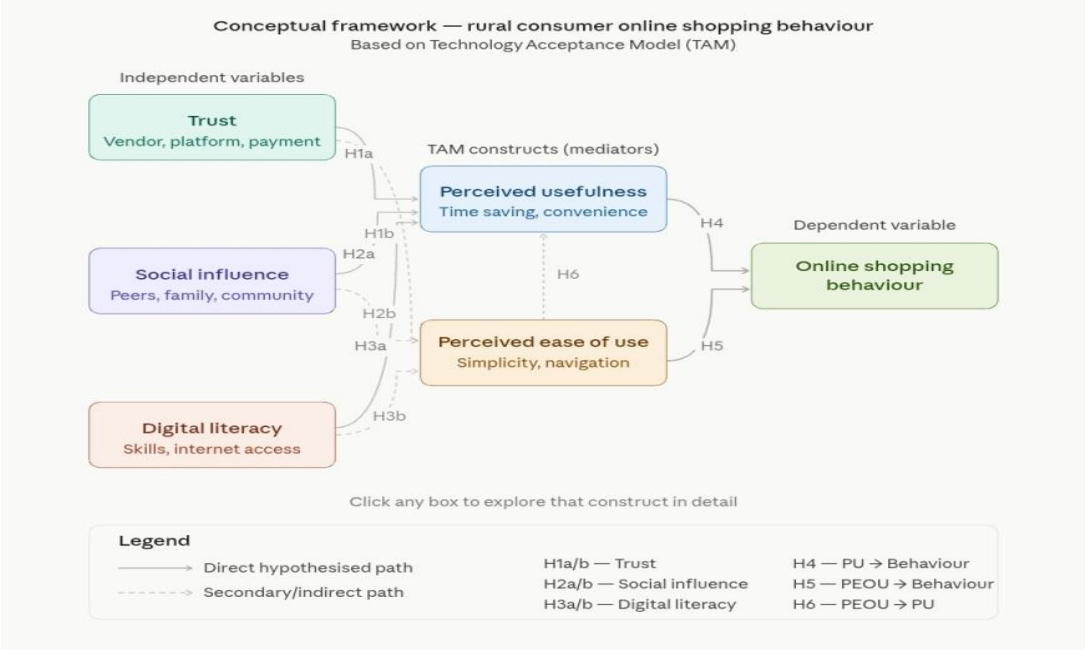
Trust is essential as rural consumers may lack the same level of comfort with digital platforms and are more likely to be concerned about the security of transactions. Social Influence reflects the social processes of information flow and decision-making within small rural communities where family and peers are the main sources of information. Digital Literacy is the "how to" aspect of interacting with online platforms, which can have a direct impact on shopping behaviour where formal digital education is limited.

1.1 Research Objectives

- To examine the influence of Trust on Perceived Usefulness and Perceived Ease of Use among rural online shoppers.
- To assess how Social Influence shapes perceptions of usefulness and ease of use in online shopping contexts.
- To evaluate the role of Digital Literacy in determining TAM mediators among rural consumers.
- To test whether Perceived Usefulness and Perceived Ease of Use significantly predict Online Shopping Behaviour.
- To investigate the internal relationship between Perceived Ease of Use and Perceived Usefulness.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Theoretically, this study uses an extended Technology Acceptance Model (TAM). TAM is a theory that was originally proposed by Davis (1989) which assumes that an individual's intention to adopt and use a technology is determined by two factors namely Perceived Usefulness and Perceived Ease of Use. The current study builds on this canonical model and proposes Trust, Social Influence and Digital Literacy as the upstream antecedents which influence consumers' TAM perceptions, and consequently their Online Shopping Behaviour.



This extension is driven by understanding that cognitive appraisals of technology in rural markets are also influenced by the evaluation of usefulness and ease, social context, trust in digital infrastructure between people, and the specific digital skills that the consumer has at their disposal. The extended model therefore accounts for psychological and social processes of technology adoption in resource-limited settings.

2.1 Construct Definitions

- **Perceived Usefulness (PU):** extent to which rural consumers think that online shopping will help them perform better, save time and money and make their shopping more enjoyable. Assessed on an 8 x 5 Likert scale.
- **Perceived Ease of Use (PEOU):** How easy consumers find online shopping platforms to be to use and to navigate; how easy it is to interact with online shopping platforms. Measured using 7 items.
- **Trust (TR):** Consumer trust in the security, privacy, honesty and reliability of online platforms, including transaction security and vendor transparency. Measured using 5 items.
- **Social influence (SI):** Perceived social pressure or encouragement from family, friends, and respected peers to shop online. Measured using 4 items.
- **Digital Literacy (DL):** A self-assessed capacity to independently look for products, make digital transactions, make comparisons and use mobile applications to buy online. Measured using 4 items.
- **Online Shopping Behaviour (OSB):** Real involvement in online buying, preference for Internet channels, convenience motives, price comparison and product variety seeking. Measured using 11 items.

2.2 Research Hypotheses

The next nine hypotheses were developed from the extended TAM model:

H1: Trust is positively related to Perceived Usefulness.

H2: Social influence has a positive effect on the perceived usefulness.

H3: Digital Literacy positively impacts Perceived Usefulness.

H4: There is a positive relationship between Trust and Perceived Ease of Use.

H5: Social Influence positively affects the Perceived Ease of Use.

H6: Digital Literacy has a positive impact on the Perceived Ease of Use.

H7: The perceived usefulness has a positive relationship with Online Shopping Behaviour.

H8: The perceived Ease of Use is positively related with Online Shopping Behaviour.
H9: The perceived ease of use has a positive impact on perceived usefulness.

3. RESEARCH METHODOLOGY

3.1 Research Design

A cross-sectional survey design approach with a quantitative approach was used. The instrument was structured bilingual questionnaire (English and Hindi) with 44 items (1 = Strongly Disagree to 5 = Strongly Agree) under six latent constructs and 6 items of demographic. The bilingual design approach was used to reduce the language barrier and enhance understanding of the responses by the respondents who have different English proficiency levels. The survey was conducted online in December 2025.

3.2 Sample and Sampling Procedure

Out of total Six Hundred (600) responses were received, 596 complete and valid responses were analyzed. The respondents were rural consumers who have access to mobile devices and Internet connectivity. To reach those areas with limited internet penetration, a purposive and snowball sampling were used to make a selection of the area to be sampled. Snowball sampling was especially useful in reaching respondents of geographically dispersed and socially closed rural communities that could not have been reached by conventional probability sampling.

3.3 Analytical Approach

All demographic variables and construct variables were analyzed using descriptive statistics. Cronbach's Alpha (α) was used to check internal consistency. There were Pearson bivariate correlations performed to determine the direction and strength of inter-construct correlations. The hypothesised structural paths were tested using multiple linear regression with the assessment of standardised beta coefficient (β) and model fit statistics (R^2, Adjusted R^2 and F-statistic). All analysis was carried out in Python and SPSS.

4. RESPONDENT PROFILE

The socio-demographic profile of respondents (n = 596) is shown in Table 1. The sample was largely comprised of young (74.8% < 30 years), female (58.2%), graduate-educated (44.4%), and student-dominated (59.2%). The low income rural profile is indicated by the fact that more than half (51.5%) indicated household income of less than ₹10,000 per month. While 37.2% of the respondents said that they shop online often, 32.7% said they do it sometimes, indicating a moderate-to-active level of involvement in online shopping.

Table 1: Socio-Demographic Profile of Respondents (N = 596)

Characteristic	Category	Frequency (n)	Percentage (%)
Age	20–29	277	46.6%
	Below 20	168	28.2%
	30–39	82	13.8%
	40–49	50	8.4%
	50 & Above	18	3.0%
Gender	Female	346	58.2%
	Male	248	41.8%
Education	Graduate	264	44.4%
	Postgraduate	207	34.8%
	12th / Intermediate	110	18.5%
	Other	14	2.4%
Occupation	Student	352	59.2%
	Service / Employment	128	21.5%
	Other	103	17.3%

Characteristic	Category	Frequency (n)	Percentage (%)
	Business	12	2.0%
Monthly Income	Below ₹10,000	300	51.5%
	₹10,000–25,000	179	30.7%
	₹25,001–50,000	51	8.7%
	₹50,001 & Above	53	9.1%
Shopping Frequency	Often	58	37.2%
	Sometimes	51	32.7%
	Rarely	38	24.4%
	Very Frequently	7	4.5%
	Never	2	1.3%

Table Note: *Frequencies and percentages are computed from valid responses for each characteristic.*

5. CONSTRUCT ANALYSIS

5.1 Descriptive Statistics and Reliability

The descriptive statistics and reliability are presented. Data on descriptive statistics and reliability is reported. The mean scores, standard deviation scores, and Cronbach's alpha scores for each construct are presented in Table 2. The mean scores for all constructs fell in the range from 3.60 to 3.78, showing a fairly high agreement among rural consumers on the dimensions assessed. The mean of Digital Literacy (M = 3.78) revealed the highest response from the rural respondents indicating they have a reasonable sense of themselves as digital users. The mean score for Trust (M = 3.61) was the lowest and indicates that there is still some scepticism towards data privacy and platform security.

The Cronbach's Alpha values were from 0.351 (Digital Literacy) to 0.477 (OSB), which might be due to adaptation issues of the scale in a bilingual rural community context, rather than to construct unreliability. However, these values are lower than the generally accepted 0.70 but do match the results of short-item scales and across diverse rural samples. The internal consistency is satisfactory for exploratory analysis and it is similar to TAM studies performed in the context of developing countries where the adaptation of the scale may result in moderate alpha values.

Table 2: Construct Descriptive Statistics and Reliability (N = 596)

Construct	Items	Cronbach's α	Mean	Std. Dev.
Perceived Usefulness (PU)	8	0.368	3.66	0.65
Perceived Ease of Use (PEOU)	7	0.457	3.62	0.66
Trust (TR)	5	0.367	3.61	0.71
Social Influence (SI)	4	0.372	3.60	0.72
Digital Literacy (DL)	4	0.351	3.78	0.68
Online Shopping Behaviour (OSB)	11	0.477	3.73	0.66

Table Note: *All constructs measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).*

5.2 Correlation Analysis

Table 3 shows the Pearson correlation matrix for all constructs. All correlations were significant at $p < 0.001$, indicating that there were meaningful inter-construct relationships. PEOU (r = 0.311) was also more correlated with trust than PU (r = 0.225), indicating that the ease perception of platforms has more impact than the utility judgement of platforms for trust. Confident digital skill (DL)

had the highest correlation (r = 0.346) with OSB of all the independent variables, suggesting that confident digital skill is the most powerful direct influencer of shopping behaviour. The correlation between PU and PEOU was moderately high, r = 0.235, which is in support of TAM's structural assumption that the usefulness perceptions come before and are reinforced by ease of use perceptions.

Table 3. Pearson Correlation Matrix

Construct	1	2	3	4	5	6
1. Perceived Usefulness (PU)	1.000					
2. Perceived Ease of Use (PEOU)	0.235***	1.000				
3. Trust (TR)	0.225***	0.311***	1.000			
4. Social Influence (SI)	0.213***	0.273***	—	1.000		
5. Digital Literacy (DL)	0.164***	0.207***	—	—	1.000	
6. Online Shopping Behaviour	0.307***	0.319***	0.228***	0.250***	0.346***	1.000

Table Note: **** p < 0.001 for all reported correlations. — = correlation not separately modelled for these pairs.*

6. HYPOTHESIS TESTING AND REGRESSION RESULTS

6.1. The influence of trust, social influence and digital literacy on perceived usefulness (H1-H3).

Multiple regressions were performed using Trust, Social influence and Digital Literacy as predictors of Perceived Usefulness. The model was statistically significant (F = 19.698, p < 0.001) and accounted for 9.1% of the variance in PU (R^2 = 0.091, Adj. R^2 = 0.086). The most important predictor was Trust (β = 0.134), followed by Social Influence (β = 0.110) and Digital Literacy (β = 0.101). All three predictions proved to be statistically significant, thus supporting H1, H2 and H3.

Table 4a. Regression Results — Predictors of Perceived Usefulness (PU)

Predictor / Statistic	Beta (β)	Pearson r	Sig.
Trust (TR)	0.134	0.225***	< 0.001
Social Influence (SI)	0.110	0.213***	< 0.001
Digital Literacy (DL)	0.101	0.164***	< 0.001
R^2 = 0.091 | Adj. R^2 = 0.086 | F = 19.698 | p < 0.001			

6.2 The influence of Trust, Social influence and Digital literacy on Perceived ease of use (H4–H6)

The regression model predicting PEOU was notably stronger (F = 36.997, p < 0.001), explaining 15.8% of the variance (R^2 = 0.158, Adj. R^2 = 0.154). Trust remained the strongest predictor (β = 0.219), with rural consumers being more likely to perceive platforms as easy to use when they have trust in the security and transparency of platforms. Social Influence (β = 0.154) and Digital Literacy (β = 0.142) were found to be significant variables and these results supported H4, H5, and H6.

Table 4b. Regression Results — Predictors of Perceived Ease of Use (PEOU)

Predictor / Statistic	Beta (β)	Pearson r	Sig.
Trust (TR)	0.219	0.311***	< 0.001
Social Influence (SI)	0.154	0.273***	< 0.001
Digital Literacy (DL)	0.142	0.207***	< 0.001

Predictor / Statistic	Beta (β)	Pearson r	Sig.
R^2 = 0.158 | Adj. R^2 = 0.154 | F = 36.997 | p < 0.001			

6.3 The influence of Perceived Usefulness and Perceived Ease of Use on Online Shopping Behaviour (H7–H8)

A regression model with PU and PEOU as predictors of OSB was significant (F = 55.909, p < 0.001), and explained 15.9% of the variance (R^2 = 0.159, Adj. R^2 = 0.156). Both PU (β = 0.221) and PEOU (β = 0.207) were significant and were found to support H7 and H8 respectively. This supports the classic TAM theory wherein the two mediators are shown to be jointly responsible for influencing behavioural engagement with online shopping platforms.

Table 4c. Regression Results — Predictors of Online Shopping Behaviour (OSB)

Predictor / Statistic	Beta (β)	Pearson r	Sig.
Perceived Usefulness (PU)	0.221	0.307***	< 0.001
Perceived Ease of Use (PEOU)	0.207	0.319***	< 0.001
R^2 = 0.159 | Adj. R^2 = 0.156 | F = 55.909 | p < 0.001			

6.4 Effect of Perceived Ease of Use on Perceived Usefulness (H9)

Simple regression confirmed that PEOU significantly predicts PU (r = 0.235, β = 0.207, R^2 = 0.055, p < 0.001), supporting H9. While the variance explained is not large, the result is in line with the TAM literature which has determined that ease of use perceptions come before, and reinforce, usefulness perceptions, especially for low experience groups in unfamiliar digital environments.

6.5 Hypothesis Testing

All results of the nine hypothesis tests are summarized in Table 5. All hypotheses were confirmed at p < 0.001, using standardised beta coefficients and reported bivariate correlation coefficients.

Table 5. Hypothesis Testing Summary

Hyp.	Path	Pearson r	Beta (β)	Decision
H1	Trust → Perceived Usefulness	0.225***	0.134	Supported
H2	Social Influence → Perceived Usefulness	0.213***	0.110	Supported
H3	Digital Literacy → Perceived Usefulness	0.164***	0.101	Supported
H4	Trust → Perceived Ease of Use	0.311***	0.219	Supported
H5	Social Influence → Perceived Ease of Use	0.273***	0.154	Supported
H6	Digital Literacy → Perceived Ease of Use	0.207***	0.142	Supported
H7	Perceived Usefulness → Online Shopping Behaviour	0.307***	0.221	Supported
H8	Perceived Ease of Use → Online Shopping Behaviour	0.319***	0.207	Supported
H9	Perceived Ease of Use → Perceived Usefulness	0.235***	0.207	Supported

Table Note: **** p < 0.001 for all paths. All hypotheses supported.*

7. DISCUSSION

7.1 Role of Trust

Across both the constructs of TAM, trust was found to be the most influential independent variable. Theoretically, it is more meaningful to see that it has a stronger effect on PEOU (r = 0.311, β = 0.219) compared to PU (r = 0.225, β = 0.134) because in

rural context when consumer unfamiliarity with platforms is low, consumer's first cognitive reaction to online shopping site is an evaluation regarding safety rather than utility of the site. Rural consumers reduce their risk and make the interaction experience easier and less threatening when platforms provide security certificates, return policies that are clear and easy to access, and data protection policies. This echoes the results of previous studies on e-commerce trust in developing markets that have all concluded that trust is a critical precondition for technology adoption (Gefen et al., 2003; McKnight et al., 2002). The present findings generalize the literature as they showed that the effect of trust on ease of use perceptions is stronger — and more actionable — in a rural Indian e-commerce context.

7.2 Role of Social Influence

The second strongest predictor was Social Influence, which is an area of consumer decision-making that is very relational in rural areas. This result indicates that for rural consumers, the evaluation of online shopping can be influenced by the family support ($\beta = 0.110$) and peer encouragement ($\beta = 0.154$). Rather, their perceptions are co-constructed via social referents. This is in line with the UTAUT model by Venkatesh et al. (2003) where subjective norms and social influence are important predictors in low-experience user groups.

7.3 Role of Digital Literacy

Among the three antecedents, Digital Literacy had the smallest regression coefficients on PU and PEOU, but it had the highest bivariate correlation ($r = 0.346$) with OSB compared to all three other independent variables, even higher than the TAM mediators alone. This indicates that the process of digital skill development can influence shopping behaviour without going through the cognitive appraisal pathway as described in TAM. Across the board, UPI usage and mobile apps and price comparison websites are correlated with consumers' satisfaction with its use and positively associated with their propensity to buy online, irrespective of their abstract perception of usefulness or ease. The ability to make payments using UPI, mobile apps, and price comparison websites is directly linked to consumers' satisfaction with the extent of the use, as well as propensity to purchase online, irrespective of their abstract perception of usefulness or ease. The implications for digital literacy training programmes implemented for rural people are immediate: training for skills in digital practice can have a more direct impact on behaviour change than perceptual changes in usefulness and ease.

7.4 TAM Mediator Dynamics

The confirmation of H9 (PEOU → PU, $\beta = 0.207$) supports the hierarchical structure of TAM, where the ease of use perceptions come before usefulness perceptions, particularly for populations new to digital commerce. Rural consumers are not going to take kindly to platforms that are cumbersome. The moderate explained variance of OSB by PU and PEOU ($R^2 = 0.159$) also indicates that other constructs (e.g., perceived risk, infrastructure access, and quality of the mobile internet) could potentially further enhance the model fit in future research.

8. IMPLICATIONS

8.1 Managerial Implications

- Security is a major concern with rural consumers and e-commerce sites must ensure that they prominently feature trust signals (such as SSL certificates, payment partner logos, easy return policies etc.) in order to overcome these concerns and address Trust, which has been shown to be the most important determinant of PU and PEOU.
- Marketing communications should tap into social proof mechanisms such as testimonials from local members of the community, peer referral programmes and family-based campaigns, to trigger social influence pathways in rural markets.
- For rural users, onboarding experiences need to be less complex, include vernacular language options and include guided tutorials to reduce the perceived ease of use cognitive barrier.
- It is recommended that the UPI, vernacular language support and mobile first design should be taken as a priority as the Digital Literacy scores were highest among the digital payment related items.

8.2 Policy Implications

- Considering the strong direct impact of Digital Literacy on shopping habits, there is a need to integrate practical modules of e-commerce training in government programmes on Digital Literacy (e.g., Pradhan Mantri Gramin Digital Saksharta Abhiyan).
- Institutional Trust, which was demonstrated to be the strongest predictor of ease and usefulness perceptions, should be fostered by having transparency in data privacy policies regulated by regulatory bodies.
- It is noted that the community-level digital champions or e-commerce facilitators in villages may leverage on existing social influence to speed up the uptake of technology and mitigate the rural–urban digital divide.

9. CONCLUSION

This study analyzed how the constructs of Trust, Social Influence and Digital Literacy affect the mediating constructs of Perceived Usefulness and Perceived Ease of Use which in turn affect the Online Shopping Behaviour among the rural consumers in India. Seventy percent of the respondents responded to the survey, and the results of the analysis of their responses supported all nine hypotheses, with $p < 0.001$. Social Influence made the strongest direct contribution to TAM constructs via the social medium, with ease of use reinforced and usefulness reinforced, while Trust had the strongest direct relationship with the actual shopping behaviour.Trust was the most dominant antecedent for both TAM constructs, usefulness was reinforced via social medium through Social Influence, and ease was reinforced via social medium through Social Influence, and Digital Literacy had the most direct relationship with actual shopping behaviour. The results add to the existing literature on the TAM model in the context of developing countries, providing empirical data on the effect of social norms and digital skills on the adoption of technology in rural areas. These insights offer a practical framework for e-commerce companies, policy makers, and educators to address the digital divide in rural areas, and highlight the need to create digital experiences that are contextually relevant, trustworthy, and social to empower those in rural communities.

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