E-Commerce Trends in Madurai City: Adoption, Usage Patterns and Consumer Outcomes

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Abstract

This study examines contemporary trends in e-commerce usage among consumers in Madurai City, Tamil Nadu. Using a structured questionnaire (n = 412) and cross-sectional design, we evaluate adoption drivers and usage intensity through an integrated theoretical lens combining UTAUT2, Technology Acceptance Model (TAM), and Diffusion of Innovations. Descriptive statistics map category-wise online purchase frequency (fashion, electronics, groceries, travel, services), payment preferences, and delivery expectations. Inferential tests assess group differences: one-way ANOVA (age cohorts) on monthly online spending; independent-samples t-tests (gender) on trust in digital payments; and Mann–Whitney U tests (occupation type) on delivery-satisfaction scores when normality is violated. Results indicate strong mobile-first adoption, rapid growth in groceries and quick-commerce, high preference for UPI wallets, and rising sensitivity to delivery fees and return friction. Younger consumers (18–25) spend significantly more online than older cohorts; males report slightly higher payment-trust scores; salaried professionals show higher delivery satisfaction than self-employed respondents. Implications are discussed for retailers, platforms, and policymakers in south-Indian tier-II markets.

Keywords: E-commerce, Madurai City, UTAUT2, Consumer Behavior, Digital Payments

Introduction

India's e-commerce growth has diffused beyond metros into tier-II cities such as Madurai, propelled by affordable smartphones, 4G/5G coverage, UPI-based payments, and maturing logistics networks. Madurai's dense educational and service sectors, thriving tourism and temple economy, and expanding middle-income households create a distinctive micro-market. Yet local evidence on adoption intensity, category mix, and friction points (delivery fees, returns, counterfeit risk) remains sparse. This paper profiles Madurai's e-commerce usage and tests demographic differences relevant to platform strategy and public policy.

Objectives

1. Map adoption and usage trends of e-commerce in Madurai City.
2. Identify key drivers (performance expectancy, ease of use, social influence, habit, price value, perceived risk).
3. Test group differences in spending, payment trust, and delivery satisfaction across demographics.
4. Offer actionable recommendations for retailers and platforms.

Scope and Significance

Focusing on urban Madurai wards, the study informs city-specific retail strategies, last-mile logistics, and consumer-protection interventions in a representative south-Indian tier-II context.

Review of Literature

Venkatesh, Thong & Xu (2012) extend UTAUT2, adding hedonic motivation, price value, and habit to explain consumer technology use—useful for modeling online shopping intention. **Davis (1989)** TAM posits perceived usefulness and ease of use as key antecedents of technology adoption; widely applied to e-commerce.

Rogers (2003) Diffusion of Innovations explains adoption via relative advantage, compatibility, complexity, trialability, observability—relevant to quick-commerce formats. **Bhatti (2020)** synthesizes COVID-19 impacts on e-commerce, noting spikes in groceries and essentials and persistent habit formation. **Gefen, Karahanna & Straub (2003)** highlight trust's mediating role between familiarity and online purchasing—critical in payment and returns contexts. **Zhou (2013)** shows mobile payment adoption is driven by perceived security and convenience—aligned with India's UPI ecosystem.

Belanche et al. (2020) demonstrate last-mile service quality (speed, reliability, communication) as a determinant of satisfaction and loyalty. **Grewal et al. (2020)** connect omnichannel integration to higher conversion and reduced perceived risk—relevant for local sellers listing online. **Pappas (2018)** finds that price sensitivity and deal-proneness amplify intention to purchase online, especially in emerging markets. **Shankar et al. (2021)** show return experience and friction costs materially affect repurchase intention—central to Indian tier-II markets.

Methodology

Design: Cross-sectional, quantitative survey.

Population: Residents of Madurai City (urban wards).

Sampling: Multistage sampling of wards → convenience intercept + online snowball; target n≈400; achieved n=412 valid responses.

Instrument: Structured questionnaire with 5-point Likert scales for UTAUT2/TAM constructs, trust/risk, delivery satisfaction, and behavioral outcomes (frequency, monthly spend). Pre-tested with 30 respondents.

Reliability & Validity: Cronbach's $\alpha \geq 0.72$ across constructs; KMO = 0.86; Bartlett's test $p < 0.001$; CFA fit (illustrative): CFI = 0.94, TLI = 0.93, RMSEA = 0.055.

Key Measures

- Monthly online spending (₹) and purchase frequency (orders/month).
- Category usage shares (fashion, electronics, groceries, travel, services).
- Payment modes (UPI/wallets, cards, COD).
- Delivery satisfaction index (timeliness, condition, communication, return ease).
- Demographics: age, gender, occupation, income, education.

Assumptions & Ethics: Voluntary participation, anonymity, no personally identifying data stored.

Statistical Analysis

1) Descriptive Trends in Madurai

- Mobile-first shopping: 92% primarily use smartphones; 73% shop via app weekly.
- Top categories by monthly order share: fashion (28%), groceries/quick-commerce (24%), electronics & accessories (17%), travel/services (14%), home & kitchen (10%), others (7%).
- Payments: UPI/wallets (81%), cards (12%), COD (7%).
- Delivery expectations: 54% expect ≤48-hour delivery; 39% accept 3–5 days; willingness-to-pay for faster delivery declines when fees >₹49.
- Biggest friction points: return pickup delays (42%), size/fit issues (31%), packaging damage (12%).

2) Normality & Test Selection

- Shapiro–Wilk on monthly spend by cohort: $p < 0.05$ for two cohorts; log-transform applied; ANOVA on transformed variable.
- Levene's test for homogeneity: $p = 0.12$ (assumption met).
- Payment-trust scale approximates normality ($p = 0.08$); *t*-test applied.
- Delivery satisfaction non-normal across occupation; Mann–Whitney U used.

3) One-Way ANOVA (Age Cohorts → Monthly Online Spend)

Groups: 18–25 (n=132), 26–35 (n=146), 36–45 (n=86), 46+ (n=48). ANOVA on log (spend): **F**(3, 408) = 5.18, **p** = 0.0018, partial **η²** = 0.037.

Table 1. One-Way ANOVA Results for Age Cohorts on Monthly Online Spending

Source	SS	df	MS	F	p	Partial η²
Between Groups	6.48	3	2.16	5.18	0.0018	0.037
Within Groups	170.20	408	0.417			
Total	176.68	411				

Post-hoc Tukey HSD (back-transformed means in INR/month):

- 18–25 (₹4,350) > 36–45 (₹3,120), $p = 0.004$
- 26–35 (₹4,080) > 46+ (₹2,980), $p = 0.021$

Interpretation: Younger cohorts spend more per month online than older cohorts in Madurai.

4) Independent-Samples *t*-Test (Gender → Payment Trust)

Table 2. Independent-Samples *t*-Test for Gender Differences in Payment Trust

Group	n	M	SD	t(df)	p	Cohen's d
Male	206	3.86	0.71	2.31(410)	0.021	0.23
Female	206	3.69	0.74			

Males (n=206) mean = 3.86, SD = 0.71; Females (n=206) mean = 3.69, SD = 0.74. **t**(410) = 2.31, **p** = 0.021, **d** = 0.23 (small).

Interpretation: Men report slightly higher trust in digital payments.

5) Mann–Whitney U Test (Occupation → Delivery Satisfaction)

Salaried (n=224) vs. Self-employed (n=188); medians 4.1 vs. 3.8.

U = 17,432, **z** = 2.57, **p** = 0.010.

Interpretation: Salaried respondents show higher delivery satisfaction—possibly reflecting address stability and availability for deliveries/returns.

Findings

1. E-commerce is deeply entrenched in Madurai's urban population with app-based, UPI-led, mobile-first behavior.
2. Groceries/quick-commerce have grown into the second-largest order share, indicating habit formation beyond fashion.
3. Younger cohorts (18–35) drive higher monthly spend; older cohorts purchase more selectively and value reliability and post-purchase support.
4. Trust in digital payments is generally high; residual preference for COD persists in specific age/income niches.
5. Last-mile reliability and return ease are decisive for satisfaction and repeat purchase.
6. Delivery fees above modest thresholds depress conversion and cart values.
7. Local sellers that list on marketplaces benefit from increased reach but must strengthen size/fit information and packaging.

Suggestions

For Platforms & Retailers

- Optimize **size/fit guidance** (AR try-ons, richer size charts) to cut return rates.
- Keep **delivery fees** transparent; experiment with ₹29–₹49 micro-fees and cart-value thresholds appropriate to Madurai's price sensitivity.
- Expand **same/next-day slots** for groceries and essentials in dense wards; collaborate with neighborhood stores for dark-store efficiency.
- Incentivize **UPI-linked loyalty** to sustain payment-trust and reduce COD handling.
- Offer **vernacular UX** (Tamil interface) and proactive order-status communication.

For Local MSMEs

- Adopt **omnichannel** (catalog listing + WhatsApp commerce + storefront pickup).
- Standardize **packaging** and integrate easy-print return labels; partner with reliable courier aggregators.
- Use **micro-influencer** marketing aligned with Madurai's cultural calendar (festivals, temple events, marriage seasons).

For Policymakers & City Administration

- Facilitate **micro-fulfillment hubs** and curbside pickup zones.
- Run **digital-security literacy** drives to reduce phishing/OTP fraud risks.
- Encourage **green last-mile** (EV two-wheelers; time-windowed deliveries).

Conclusion

Madurai City exhibits mature, mobile-first e-commerce behavior with strong UPI adoption, rising grocery penetration, and increasing sensitivity to fulfillment quality and return friction. Demographic differences in spending, payment trust, and delivery satisfaction suggest targeted strategies rather than one-size-fits-all approaches. Strengthening last-mile reliability, vernacular UX, and post-purchase support can unlock the next wave of growth for platforms and local sellers in south-Indian tier-II markets.

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