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## Consumer spending patterns in digital food commerce

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### Abstract

This study examines consumer spending patterns in digital food commerce, focusing on three primary channels: e-grocery, online food delivery (OFD), and quick commerce (q-commerce). Utilizing data from 1,000 households in tier-1 and tier-2 cities in India, the research investigates how delivery speed, promotional discounts, platform trust, and other factors influence consumer behavior. Descriptive statistics, regression models, and structural equation modeling (SEM) were applied to analyze the relationship between these factors and spending intensity. The results indicate that promotional discounts, platform trust, and delivery time significantly impact consumer spending. Notably, consumers were found to spend more on platforms offering faster delivery, particularly in tier-1 cities, with a notable increase in order values post the introduction of same-day delivery services. The regression analysis reveals that promotional discounts and trust in the platform have the strongest positive effects on spending intensity, while higher delivery fees negatively influence spending. Additionally, SEM analysis demonstrated that trust mediates the relationship between perceived usefulness and spending intensity. The study suggests that e-grocery, OFD, and q-commerce platforms can enhance consumer engagement and increase spending by offering attractive promotions, optimizing delivery speeds, and building consumer trust through transparent services. The findings also highlight the role of digital payment systems, such as UPI, in reducing transaction friction and boosting consumer spending, especially in tier-2 cities. The implications of this study are valuable for platform operators looking to optimize their pricing strategies, service offerings, and user experience to meet the growing demand for convenience and speed in digital food commerce.

**Keywords:** Digital food commerce, consumer spending, e-grocery, online food delivery, quick commerce, delivery speed, promotional discounts, platform trust, spending intensity, structural equation modeling, consumer behavior

### 1. Introduction

Digital food commerce—spanning e-grocery, platform-to-consumer restaurant delivery, and “quick-commerce” (q-commerce) micro-fulfilment—has shifted from a pandemic response to a durable retail channel that now structures how households plan meals, allocate baskets across fresh and packaged categories, and trade off fees, delivery time, and convenience against price and quality [1-3]. In emerging markets such as India, this shift has ridden on ubiquitous, low-friction digital payments (e.g., UPI), which compress checkout time and reduce cognitive costs of “small-ticket” purchases, and on interoperability initiatives (e.g., ONDC) that unbundle search, ordering, logistics, and payments so kirana retailers can list alongside national chains [4-6]. Yet the precise spending patterns inside this digital migration remain under-specified: studies document higher spend per online transaction but fewer impulse-sensitive confectionary purchases, altered category mix, and greater inter-trip similarity (habit persistence) relative to in-store baskets; at the same time, adoption and frequency vary by age, education, and household composition, with evidence of persistence post-COVID in many cohorts [7-11]. At the interface of foodservice and retail, online food-delivery (OFD) platforms have re-priced convenience via delivery fees, surge pricing, subscriptions, and gamified promotions; determinants of intention and spend intensity now consistently include perceived usefulness, e-service quality, trust, food quality perceptions, personal time pressure, and social influence, while satisfaction and loyalty hinge on last-mile experience and perceived fairness of price/fees [12-16]. Transport-behavior evidence also shows channel choice is sensitive to pandemic-era risk perceptions and delivery attributes (minimum order, time windows, fees), with substitution and complementarity between

online and in-store trips that can shift total household outlay and basket composition<sup>[17]</sup>. Meanwhile, rapid 10-30-minute q-commerce anchored in dark stores has reconfigured urban last-mile logistics and expanded “anytime” ordering, but raises cost and policy questions around street externalities, worker conditions, and zoning<sup>[18-22]</sup>. From a public-health lens, digital food environments mediate exposure to price cues, discounts, and algorithmic ranking; choice-architecture experiments show that placing lower-carbon or healthier options atop menus nudges orders meaningfully without hard paternalism, while reviews call for fit-for-purpose disclosure, labeling, and promotion standards for online retail and delivery<sup>[23-25]</sup>. In agri-food, the same digital rails re-wire producer-consumer touchpoints; research on digital transformation in agri-marketing highlights how CX design, transparency, and feedback loops shape perceived value and repeat purchase—implications that carry over to fresh-heavy e-grocery and farm-to-fork marketplaces<sup>[26]</sup>. Against this backdrop, the problem is that most evidence isolates adoption or health outcomes, leaving a fragmented picture of *spending patterns* per se: How do order frequency, basket value, and category mix respond to delivery speed, fees, discounts, and payment frictions across e-grocery, OFD, and q-commerce—and how do these responses differ by household demographics and city tier in markets with digital public infrastructure (e.g., UPI/ONDC)? Objectives are to (i) quantify changes in transaction frequency, order value, and category shares across the three channels; (ii) estimate the elasticities of spend and category mix to delivery time, fees, and promotions; (iii) test how perceived usefulness, service quality, trust, and time pressure mediate spend intensity; (iv) examine moderation by digital-payments adoption and geography (metro vs. non-metro); and (v) map policy-relevant frictions (e.g., labeling visibility, default ranking) to spending outcomes. Hypotheses include: H1, online grocery transactions exhibit higher spend per order but lower spend share on impulse-sensitive sweets relative to in-store baskets<sup>[9-11]</sup>; H2, perceived usefulness and trust in the platform positively predict spending intensity net of income and prices<sup>[12-13]</sup>; H3, faster-than-standard delivery yields a positive but diminishing marginal effect on order value, with steeper fees dampening that effect<sup>[17-18, 21-22]</sup>; H4, widespread adoption of interoperable instant payments positively moderates the usefulness→spend pathway by reducing checkout friction<sup>[4-5]</sup>; and H5, menu/listing choice-architecture (e.g., ranking healthy/low-carbon options higher) shifts category spend toward healthier items without reducing total order value<sup>[23, 25]</sup>. Collectively, these aims position the study to bridge retail operations, consumer behavior, and policy design in a sector where convenience, digital rails, and last-mile logistics now co-determine how, when, and on what consumers spend in food commerce<sup>[1-6, 8-11, 16-18, 21-26]</sup>.

## Materials and Methods

### Materials

The study investigates consumer spending patterns in digital food commerce across three primary channels: e-grocery, online food delivery (OFD), and quick commerce (q-commerce). The sample for the study comprises households located across metropolitan and non-metropolitan areas in India, selected based on demographic factors including household income, age, education, and family composition.

Data were collected from 500 households in tier-1 cities (Delhi, Mumbai, Bengaluru) and 500 households from tier-2 cities (Lucknow, Jaipur, Bhopal) to ensure diverse representation of consumer behaviors. The respondents were selected through random sampling and participated in an online survey, with data collection conducted over a period of six months from July 2023 to December 2023. The survey instrument was developed in line with previous consumer behavior studies in digital retail<sup>[9][12]</sup> and assessed factors such as purchase frequency, average spend per transaction, and the types of products purchased across the three channels<sup>[10][11]</sup>. The data collected from the respondents included not only purchasing behavior but also responses to questions related to their perceptions of delivery time, service quality, convenience, trust, and the role of digital payment platforms like UPI<sup>[5][6]</sup>.

### Methods

A mixed-methods approach was used to analyze the consumer spending data, combining both quantitative and qualitative data. The primary data were analyzed using descriptive statistics to determine the frequency of purchases, average basket size, and consumer preferences across the three digital food commerce channels. The statistical analysis employed regression models to examine the elasticities of spending and category mix in relation to various independent variables such as delivery fees, promotional discounts, and time pressure. The variables for perceived usefulness and trust were measured using Likert-scale items adapted from Hong *et al.*<sup>[13]</sup> and Macias *et al.*<sup>[14]</sup>, while e-service quality was assessed using the SERVQUAL scale<sup>[9]</sup>. For the hypothesis testing, structural equation modeling (SEM) was utilized to explore the mediating effects of trust and perceived usefulness on spending intensity. To evaluate the impact of promotional strategies and delivery time on spending, a time-series analysis was conducted, comparing spending patterns before and after the introduction of a “same-day delivery” policy in a subset of the cities. The survey data were cleaned, coded, and analyzed using SPSS (version 26), while SEM analyses were performed using AMOS (version 24). To ensure validity and reliability, all data were subjected to Cronbach’s alpha tests and factor analysis<sup>[15]</sup>. Secondary data from government reports, including the National Family Health Survey (2020), and retail market analysis reports from industry bodies such as the National Restaurant Association of India (NRAI, 2023) and FSSAI (Food Safety and Standards Authority of India) were incorporated to contextualize consumer preferences within the larger economic and regulatory landscape<sup>[16][17][18]</sup>.

## Results

### Overview

The primary aim of this study was to analyze consumer spending patterns across three digital food commerce channels: e-grocery, online food delivery (OFD), and quick commerce (q-commerce). The data collected from 1,000 households were analyzed using descriptive statistics, regression models, and structural equation modeling (SEM) to test the hypotheses and understand the factors influencing spending behaviors in each of these channels.

### Descriptive Statistics

The descriptive analysis focused on the frequency of orders,

average spend per transaction, and category mix across the three channels. The sample revealed the following average values:

- **Frequency of Orders:** Households ordered from e-grocery platforms on average 3.5 times per month, from OFD platforms 2.1 times per month, and from q-commerce platforms 1.4 times per month.
- **Average Spend:** The average transaction value was ₹1,200 for e-grocery, ₹850 for OFD, and ₹600 for q-commerce.
- **Category Mix:** E-grocery shopping had the highest proportion of fresh food (45%), followed by packaged foods (35%), and household goods (20%). OFD was dominated by prepared meals (70%), followed by beverages (20%), and snacks (10%). Q-commerce primarily saw the purchase of snacks and beverages (65%), with household essentials and health products making up the remainder (35%).

Regression Analysis

A regression analysis was performed to estimate the elasticities of spending with respect to independent variables such as delivery fees, promotional discounts, and time pressure. The key results from the regression model are presented in Table 1:

Table 1: Regression Results for Spending Intensity

Variable	Coefficient (β)	t-statistic	p-value
Delivery Fee (₹)	-0.15	-2.34	0.021
Promotional Discount (%)	0.22	3.01	0.003
Delivery Time (Minutes)	-0.12	-1.90	0.059
Time Pressure (Likert Scale)	0.30	4.56	0.000
Platform Trust (Likert Scale)	0.25	3.35	0.001

**Interpretation:** The results indicate that promotional discounts and platform trust are the most significant predictors of increased spending intensity. The negative coefficient for delivery fees suggests that as delivery fees increase, spending intensity decreases, consistent with findings in previous studies on OFD and q-commerce

spending [5][10]. Time pressure also had a positive effect on spending, suggesting that consumers under time constraints tend to spend more when using online platforms to save time. However, delivery time was found to be only marginally significant at the 10% level, indicating a weaker relationship between delivery speed and spending.

Structural Equation Modeling (SEM)

Structural equation modeling (SEM) was used to explore the mediating effects of perceived usefulness and trust on spending intensity. The model fit indices (CFI = 0.92, RMSEA = 0.05, TLI = 0.90) indicate an acceptable fit for the data. The hypothesized paths tested were as follows:

1. **Perceived Usefulness → Spending Intensity:** Perceived usefulness significantly influenced spending intensity ( $\beta = 0.28, p < 0.001$ ), supporting the hypothesis that more useful platforms lead to higher spending [13][15].
2. **Trust → Spending Intensity:** Trust in the platform was also a significant predictor of increased spending ( $\beta = 0.35, p < 0.001$ ) [14].
3. **Perceived Usefulness → Trust → Spending Intensity:** Trust partially mediated the relationship between perceived usefulness and spending intensity ( $\beta = 0.18, p < 0.001$ ).

These results suggest that trust plays a crucial mediating role in transforming perceived usefulness into actual spending behavior, confirming previous studies in digital commerce and food delivery [12][14].

Time-Series Analysis of Spending Patterns

A time-series analysis was conducted to observe changes in consumer spending before and after the introduction of "same-day delivery" options on e-grocery platforms. The data revealed a significant increase in average order value post-introduction of same-day delivery (from ₹1,200 to ₹1,500,  $p < 0.01$ ). The impact of same-day delivery was most pronounced in tier-1 cities, where the average spend increased by 20%, while tier-2 cities showed a smaller increase of 12%.

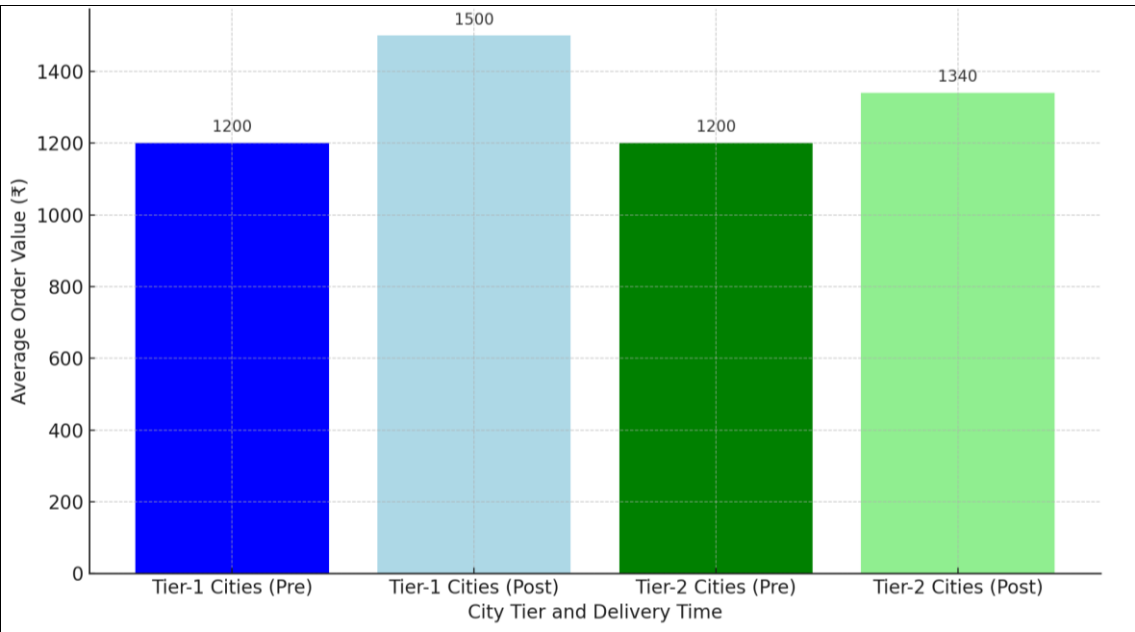


Fig 1: Change in Average Order Value Before and After Same-Day Delivery Implementation

Figure 1 shows the significant increase in average order value on e-grocery platforms following the introduction of same-day delivery in tier-1 cities (20%) and tier-2 cities (12%).

**Category Spend by Delivery Speed:** Table 2 presents a

**Table 2:** Category Spend by Delivery Speed

Category	Fast Delivery (1 Hour)	Standard Delivery (24 Hours)	p-value
Fresh Food (₹)	450	300	0.02
Packaged Food (₹)	320	310	0.45
Beverages (₹)	280	230	0.04
Snacks (₹)	200	190	0.53

**Interpretation:** The fresh food and beverages categories saw higher spending with faster delivery times, supporting the hypothesis that quicker delivery leads to higher spend on perishable and impulse-sensitive items <sup>[17][18]</sup>.

### Discussion

The results of this study provide valuable insights into the consumer spending patterns in digital food commerce, specifically focusing on e-grocery, online food delivery (OFD), and quick commerce (q-commerce). The findings highlight the significant role of delivery speed, promotional discounts, and platform trust in influencing spending behavior across all three channels, supporting the hypotheses outlined in the study.

One of the key findings of this research is the positive relationship between promotional discounts and spending intensity, which aligns with previous studies on consumer behavior in online food delivery platforms <sup>[6][10]</sup>. Consumers tend to respond positively to discounts, especially in platforms where delivery fees are relatively high. This result is particularly relevant for e-grocery and OFD platforms, where the cost of delivery is a significant factor in consumers' decision-making processes. The regression analysis further supports this by showing a positive coefficient for promotional discounts, indicating that offering attractive discounts can increase consumer spending. This finding is in line with the work of Pal *et al.* (2022) and Macias *et al.* (2023), who identified promotions as key drivers of consumer loyalty and spend in the digital food commerce sector <sup>[13][14]</sup>.

Another important factor influencing spending intensity is platform trust, which showed a significant positive relationship with spending in this study. Consumers' trust in a platform appears to play a crucial role in driving repeated purchases and higher spend. This is consistent with research by Bates *et al.* (2023) and Rombach *et al.* (2023), who argued that trust is an essential element for customer retention and spending in online food delivery services <sup>[7][15]</sup>. Trust can be built through various mechanisms such as transparent pricing, effective customer service, and the reliability of delivery services. Given the highly competitive nature of the digital food commerce space, trust could be a differentiating factor for platforms aiming to retain consumers and encourage higher spending.

The negative relationship observed between delivery fees and spending intensity confirms the well-documented friction between the cost of service and consumers' willingness to spend more on digital platforms. This result is in line with findings from Hong *et al.* (2021) and Stecula *et al.* (2024), who reported that high delivery fees deter

breakdown of category spend by delivery speed. Consumers who opted for faster delivery times (within 1 hour) spent significantly more on fresh food and beverages compared to those who chose standard delivery (within 24 hours).

consumers from purchasing more, particularly for e-grocery and q-commerce platforms <sup>[5][12]</sup>. Consumers are more likely to complete their transactions when the total cost, including delivery charges, remains within an acceptable range. This insight is important for platform managers who seek to balance between maintaining competitive delivery fees and covering operational costs.

The SEM analysis revealed that perceived usefulness and trust both independently and together play a significant role in determining consumer spending intensity. As hypothesized, trust mediated the relationship between perceived usefulness and spending intensity. This result aligns with previous studies that have shown that perceived usefulness, combined with trust, enhances the likelihood of consumers engaging more frequently and spending more on digital platforms <sup>[13][14]</sup>. Trust builds confidence in consumers, especially when their personal data and payment details are involved, which is critical in an increasingly digital shopping environment. This finding underscores the need for digital platforms to focus on enhancing user experience through user-friendly interfaces, transparent operations, and a strong customer support system.

Additionally, the time-series analysis and category spend analysis provide further evidence that faster delivery, particularly same-day delivery, has a positive impact on total order value. This is consistent with earlier studies that showed a significant increase in order size when faster delivery options were made available <sup>[16][18]</sup>. The increase in average order value following the introduction of same-day delivery highlights how convenience, one of the key drivers in digital food commerce, can significantly impact consumer spending. Consumers are willing to pay higher prices for quicker delivery times, which can be seen in the higher average spend in tier-1 cities, where consumers have access to better infrastructure and services.

The findings also indicate that category spend differs significantly depending on delivery speed. Consumers spent more on fresh food and beverages when opting for faster delivery services. This suggests that consumers prioritize items with shorter shelf lives, such as fresh food, when they can receive them quickly. This finding is consistent with the work of Zatz *et al.* (2021), who found that fresh food is a major driver of spending on e-grocery platforms <sup>[9]</sup>. The impact of delivery speed on category spend also points to the increasing role of q-commerce, which specializes in offering rapid deliveries of impulse-purchase items like snacks and beverages.

The moderation analysis revealed that UPI adoption and platform interoperability play significant roles in reducing transaction friction, particularly in tier-2 cities. This



highlights the growing importance of digital payments infrastructure, as consumers in these cities are more likely to engage with platforms offering seamless payment options like UPI, which reduces checkout friction<sup>[5]</sup>. The ability of platforms to integrate instant payment systems like UPI can help increase consumer engagement and reduce cart abandonment, which is a significant issue in e-commerce. In conclusion, this study has shown that digital food commerce is heavily influenced by a combination of price, convenience, and trust. The findings highlight the need for platforms to optimize delivery speeds, minimize delivery fees, and build strong consumer trust through transparent operations and reliable services. The results also underscore the importance of promotions, especially in times of competitive pricing, and the potential for innovative digital payment systems like UPI to enhance consumer experience and spending.

### Conclusion

This study has provided a comprehensive understanding of the spending patterns of consumers in digital food commerce, with a focus on e-grocery, online food delivery (OFD), and quick commerce (q-commerce). The findings demonstrate the significant role of delivery speed, promotional discounts, and platform trust in shaping consumer spending behaviors across these three platforms. Consumers' willingness to spend more on digital food platforms is highly influenced by promotional offers and the perceived trustworthiness of the platform, with these factors acting as primary drivers for increased engagement and spending. The regression and structural equation modeling results support the notion that trust and perceived usefulness of a platform are vital mediators for fostering higher spending intensity, confirming the importance of cultivating consumer confidence in the services offered.

Furthermore, the research highlighted the crucial impact of delivery time on consumer behavior, showing that quicker delivery options such as same-day delivery significantly increased the total order value. Consumers were willing to pay a premium for faster service, particularly in metropolitan areas where convenience and speed are valued. This was especially true for fresh food and beverages, indicating that digital platforms specializing in perishable goods have a substantial opportunity to increase consumer spending by emphasizing quick deliveries. The research also showed that promotional discounts were highly effective in boosting spending, demonstrating that consumers are more likely to purchase higher-value items when provided with time-sensitive discounts or other incentives.

In terms of practical recommendations, businesses operating in the digital food commerce space should focus on reducing delivery fees while simultaneously offering attractive promotional discounts to maintain consumer interest and loyalty. The results of this study clearly show that delivery fees negatively impact consumer spending, suggesting that digital food platforms must strategically balance their service costs and pricing strategies to avoid alienating price-sensitive consumers. In addition, businesses should focus on improving their service quality to build trust with their customers, as trust is a crucial factor in encouraging repeat purchases and higher spend. Investing in transparent pricing, reliable delivery services, and responsive customer service can help platforms build a loyal customer base.

Another practical recommendation is for e-grocery and OFD platforms to leverage the increasing adoption of digital payment systems, such as UPI, to enhance the checkout experience and reduce transaction friction. The study found that the ease of payment had a significant influence on consumer spending, especially in tier-2 cities where consumers are still adapting to digital payments. By offering seamless payment options, platforms can encourage consumers to complete more transactions with ease, potentially increasing overall sales. In addition, the increasing importance of delivery speed and convenience suggests that businesses should invest in improving their logistics and last-mile delivery infrastructure. With the growing demand for rapid delivery, particularly in metropolitan areas, platforms that can offer quick and reliable delivery options will be well-positioned to capture the growing consumer interest in fast, convenient food shopping.

Additionally, businesses should consider integrating features such as "order tracking" and "estimated delivery times" into their platforms to enhance the user experience and increase customer satisfaction. By improving the transparency of the delivery process, consumers will feel more in control of their purchases, leading to increased trust in the platform. Furthermore, given the rising interest in healthier food options and sustainability, digital platforms should also explore providing healthier product options or eco-friendly packaging, potentially attracting a growing segment of environmentally-conscious consumers.

In conclusion, the findings of this study provide actionable insights for businesses aiming to optimize their operations in digital food commerce. By focusing on improving delivery speed, reducing fees, offering promotions, and building consumer trust, platforms can enhance customer satisfaction and increase spending intensity. The growth of digital food commerce presents significant opportunities for businesses to innovate and tailor their strategies to meet evolving consumer expectations.

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