

The Digital Divide in Agricultural Marketing: Consumer Preferences in Bengaluru's Agri - Supply Chains

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ABSTRACT

This study explores the evolving consumer preferences for agricultural commodities in Bengaluru, focusing on a comparative analysis of online and offline marketing channels. Using conjoint analysis, the research evaluates the relative importance of key attributes such as commodity type, price, frequency of purchase, place of purchase, and platform selection (for online consumers). Data was collected from 160 respondents, (80 each from offline and online buyers), offering valuable insights into their purchasing behaviours. The findings indicate that offline consumers prioritize purchase frequency and price, valuing access to fresh produce in familiar settings like local markets. In contrast, online consumers emphasize the choice of platform and commodity type, showcasing a preference for convenience and quality over cost. Notably, online buyers were more educated and had higher incomes, while offline shoppers represented a more diverse socioeconomic profile. These behavioural distinctions underline the importance of customizing marketing strategies. Offline vendors must focus on freshness, accessibility and pricing, whereas online platforms should invest in improving reliability, delivery and user experience. The study contributes to the growing discourse on urban Agri-marketing, highlighting opportunities for integrating digital tools with traditional retail to better serve India's urban consumers.

Keywords : Conjoint analysis, Consumer preference, Agricultural commodities, Online purchase, Offline purchase

AGRICULTURE plays a vital role in the Indian economy, contributing significantly to the country's GDP and providing livelihoods for millions of people. In recent years, the agricultural commodities market has undergone a transformative shift with the advent of digital platforms. The traditional offline channels, such as local markets and wholesale mandis, are now facing growing competition from online platforms that promise convenience, transparency and a broader market reach. This transition has been particularly pronounced in urban hubs like Bengaluru, where technology adoption and consumer preferences are evolving rapidly.

Economic Survey indicates that the Indian agriculture sector provides livelihood support to about 42.30 per cent of the population and has a share of 18.20 per cent in the country's GDP at current prices. The sector has been buoyant, which is evident from the fact that it has registered an average annual growth rate of 4.18 per cent at constant prices over the last five years and as per provisional estimates for 2023-24, the growth rate of the agriculture sector stood at 1.40 per cent. The total India's food grain production for the 2023-24 crop year reached a record 332.22 million tonnes, surpassing the previous year's 329.6 million tonnes (Business-standard). In 2022-23, India's total fruit production was 112.46 million tonnes, with

bananas (31.5 million tonnes), mangoes (23.6 million tonnes) and citrus fruits (12.5 million tonnes) being major contributors. Vegetable production reached 204.45 million tonnes, led by potatoes (53.4 million tonnes), onions (27.3 million tonnes) and tomatoes (21.7 million tonnes), along with other key vegetables like cauliflower and cabbage.

Understanding consumer preferences is critical for the sustainable development of agricultural supply chains. Buyers of agricultural commodities, whether individual customers, retailers or businesses, base their purchasing decisions on multiple factors, including price, quality, ease of access and reliability. While offline channels have traditionally been favoured for their perceived trust worthiness and the ability to physically inspect goods, online channels offer advantages such as home delivery, price comparisons and access to a wider variety of products. The trade-offs between these attributes make it essential to explore consumer preferences systematically.

This study employs choice-based conjoint analysis to evaluate consumer preferences for purchasing agricultural commodities through online and offline channels in Bengaluru. Conjoint analysis is a robust statistical technique widely used in marketing research to measure the relative importance of different product or service attributes. By presenting respondents with carefully designed hypothetical scenarios, the study seeks to capture the implicit preferences and priorities of customers.

The study aims to provide valuable insights into the factors driving consumer decisions in the agricultural commodity market. These insights can inform policymakers, e-commerce platforms and traditional market stakeholders about how to adapt to changing consumer behaviours. Additionally, the study also aims to bridge the gap between theoretical understanding and practical implications by offering actionable recommendations for improving both online and offline channels to better serve the needs of customers.

Consumer preferences for agricultural commodities in Bengaluru are evolving, with a notable shift towards online channels. The study by (Chitra and Gopinath, 2021) found that during the COVID-19 pandemic, customers increasingly preferred online shopping for agricultural products, valuing benefits such as time savings, detailed product information and 24/7 access.

The metro area population of Bangalore in 2022 was 1,31,93,000, a 3.35 per cent increase from 2021. The metro area population of Bengaluru in 2021 was 1,27,65,000, a 3.55 per cent increase from 2020. (STATISTA, 2023).

In the context of Bengaluru, a city known for its technological advancements and diverse population, this study is particularly relevant. It reflects the dynamic interplay between tradition and modernity, highlighting the challenges and opportunities in integrating digital solutions into the agricultural ecosystem. By identifying the preferences and priorities of customers, this research seeks to contribute to a more consumer-centric approach in the marketing and distribution of agricultural commodities. The present study analyses the factors influencing consumer preferences for Agricultural Commodities: A comparative conjoint study of online and offline channels in Bengaluru.

METHODOLOGY

Study Area

The study was conducted in urban and semi-urban areas of Bengaluru due to the city's unique characteristics and its growing significance as a major hub for both online and offline consumer markets. Bengaluru, being one of the largest metropolitan cities in India, has a diverse population with varying socio-economic backgrounds, making it an ideal location to study consumer preferences for agricultural commodities. Additionally, the city has witnessed rapid growth in e-commerce, particularly in the online purchase of daily necessities like agricultural products, providing a contrasting

setting for comparing online and offline consumer behaviour. This selection allows for an in-depth analysis of how different demographic factors, such as income levels, occupation and education, influence purchasing patterns and preferences for agricultural commodities.

Sampling Framework

The study was based on primary data collected from sample respondents using a pre-tested structured schedule through online survey method. For the study, 80 customers from offline preference and 80 customers from online preferences, were drawn randomly, resulting in a total sample size of 160 customers. The data was collected during the year 2024-25.

Analytical Tool Used

Conjoint Analysis is a powerful and versatile marketing research technique that helps businesses understand how consumer make decisions based on the combination of product attributes. By analysing consumer preferences, it enables marketers to assess the perceived value of different attributes and determine the optimal product configuration. This method is particularly useful for new product development and forecasting, as it helps predict consumer choices in response to changes in product features, pricing or positioning. Hence, for the present study, this tool was used to analyse the consumer's preference for agricultural commodities.

The attributes included in a conjoint analysis experiment correspond to important consumption characteristics or characteristics hypothesized to influence purchase behaviour. The attributes are further divided into levels. The levels are sample classes for each of the selected attributes and should span the realistic range of each attribute (Veerabadrappa *et al.*, 2017). The conjoint experiment employs a full-profile approach, in which the level of each attribute of the consumption to be rated is specified.

Conjoint analysis helps to identify the factors that matter most to different categories of consumer that

are included in the study by estimating the relative importance that each attach to a given factor in making a purchase decision. Since, the demand functions for various attributes of consumer differ, with households being driven by utility and restaurants by profit, it is expected that the relative importance that each class attached to the attributes will differ. However, despite these differences, conjoint analysis can also provide overall relative importance that all the different categories of consumer attach to a given factor in making a purchasing decision (Kwadzo *et al.*, 2013).

The following seven steps were taken for conducting conjoint analysis.

- a) Establishing the attributes
- b) Assigning levels for each attribute
- c) Selecting the conjoint methodology
- d) Deciding which profile to present to the respondents
- e) Establishing preferences for each attribute
- f) Choosing the presentation method
- g) Selecting a method for part-worth estimation

Based on the goodness of fit, the additive conjoint model was used in this study. The model has been formulated as:

$$Y = \sum_{i=1}^n \sum_{j=1}^m V_{ij} X_{ij}$$

where,

Y = consumer' overall evaluation of agricultural commodities.

V_{ij} = Part-worth contribution or utility associated with the j^{th} level ($j, j = 1, 2, \dots, m$) of the i^{th} attribute ($i, i=1, 2, \dots, n$)

X_{ij} = Dummy variable representing the preference for the j^{th} level of the i^{th} attribute

(one, if the j^{th} level of the i^{th} attribute is present, otherwise zero)

n = Number of attributes

m = Number of levels of attribute 'i'

For the present study, a profile describing alternatives was constructed by combining the levels of four attributes. The attributes and their levels (Table 1)

TABLE 1
Attributes and their relative levels
for Offline customers

Attributes	Levels
Commodity	Fruits & vegetables
	Cereals & Pulses
	Dairy & Meat
	Rs. 1000/month
Price	Rs. 1000-3000/month
	More than Rs. 3000/month
	Local Shops
Place of purchase	Super markets
	Directly from farmers
	Daily
Frequency of purchase	Weekly
	Monthly

TABLE 2
Attributes and their relative levels
for online customers

Attributes	Levels
Commodity	Fruits & vegetables
	Cereals & Pulses
	Dairy & Meat
Price	Rs. 1000/month
	Rs. 1000-3000/month
	More than Rs. 3000/month
Online platform	Zepto
	Swiggy instamart
	Big basket
Frequency of purchase	Daily
	Weekly
	Monthly

were identified through discussions with consumer during preliminary survey and also in consultation with subject matter specialists and accordingly, 10 cards were generated separately for offline and online consumer with different combinations and the same were used for collection of information pertaining to consumer preferences in the study area. The consumer was requested to rank each card based on their preferences.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Offline Sample customers in Bengaluru city

The socio-economic profile of offline customers in Bengaluru highlights key trends (Table 3). Majority (56.25%) of the customers were found to be middle-aged (31–50 years) and likely household decision-makers serving as primary target for marketing strategies by sellers. Younger customers (20–30 years) account for 30 per cent, while the elderly (above 50 years) form the smallest group at 13.75 per cent, requiring distinct approaches. Women dominate the customer base, comprising 81.25 per cent, of respondents, emphasizing their pivotal role in household consumption. These insights suggest focusing on middle-aged women, with tailored strategies for younger and elderly segments, to effectively target this market.

TABLE 3
Socio-economic characteristics of offline
customers in Bengaluru city (n₁=80)

Particulars	Number	Per cent
Age (years)		
- 20 to 30	24	30.00
- 31 to 50	45	56.25
- Above 50	11	13.75
Total	80	100.00
Gender		
- Male	15	18.75
- Female	65	81.25
Total	80	100.00

Continued....

TABLE 3 Continued....

Particulars	Number	Per cent
Literacy Level		
- Illiterate	17	21.25
- Primary School	5	6.25
- High School	8	10.00
- PUC	16	20.00
- Degree and above	34	42.50
Total	80	100.00
Occupation		
- Private employee	32	40.00
-Government employee	24	30.00
-Self-employed	5	6.25
-Homemaker	19	23.75
Total	80	100.00
Income Level		
Below Rs.20,000 per month	15	18.75
Rs.20,001 to Rs.40,000 per month	21	26.25
More than Rs.40,000 per month	44	55.00
Total	80	100.00
Frequency of purchase agricultural commodities		
Daily	16	20.00
Weekly	55	68.75
Monthly	9	11.25
Total	80	100.00

The literacy levels indicate that a significant proportion of the customers (42.50%) possess a degree or higher education, followed by those with pre-university qualifications (20%). While 21.25 per cent are illiterate, this is an important minority to address, as accessibility in terms of communication and education about products may influence their purchasing decisions. This diverse educational spread underscores the need for marketing approaches that cater to both educated and less literate segments.

Private employees make up the largest occupational group (40%), followed by government employees

(30%) and homemakers (23.75%). The smaller proportion of self-employed individuals (6.25%) suggests limited entrepreneurial representation among offline customers. This occupational profile points to stable income sources, particularly from salaried employees, driving the purchasing power of the sample.

More than half of the respondents (55.00%) earn above Rs.40,000 per month, indicating a relatively affluent consumer base, while 18.75 per cent earn below Rs.20,000 and 26.25 per cent fall between Rs.20,001 and Rs.40,000, highlighting income diversity. This creates opportunities for market segmentation, with premium products targeting higher earners and cost-effective options for lower-income groups. Additionally, 68.75 per cent of respondents purchase agricultural commodities weekly, reflecting consistent demand, while 20 per cent buy daily, likely prioritizing freshness or limited storage and 11.25 per cent make monthly bulk purchases. Similar finding has observed in the study of (Aravinda *et al.*, 2024). These trends underscore the need for efficient supply chains to ensure timely availability and freshness for frequent buyers and affordability for bulk purchasers.

Socio-Economic Characteristics of Online Customers in Bengaluru City

Table 4 reveals key socio-economic insights into online customers, highlighting distinct trends. A majority (55%) belong to the age group of 31-50 years, while 36.25 per cent are aged between 20-30 years, indicating that online platforms appeal primarily to tech-savvy, working-age individuals and similar results were found in the study of (Sree Lakshmi *et al.*, 2023). Older customers (8.75%) are under represented, likely due to barriers in technology adoption, suggesting opportunities to enhance digital literacy and develop user-friendly interfaces. These findings emphasize the importance of targeting younger and middle-aged demographics while addressing accessibility challenges to expand the reach among older users.

The majority of online customers are female (73.75%), similar to offline trends, though a higher proportion

TABLE 4
Socio-economic characteristics of online customers in Bengaluru city
 (n₁=80)

Particulars	Number	Per cent
Age (years)		
20 to 30	29	36.25
31 to 50	44	55.00
Above 50	7	8.75
Total	80	100.00
Gender		
Male	21	26.25
Female	59	73.75
Total	80	100.00
Literacy Level		
Illiterate	0	0.00
Primary School	5	6.25
High School	17	21.25
PUC	19	23.75
Degree and above	39	48.75
Total	80	100.00
Occupation		
Private employee	38	47.50
Government employee	22	27.50
Self-employed	4	5.00
Homemaker	16	20.00
Total	80	100
Income Level		
Below Rs. 20,000 per month	7	8.75
Rs. 20,001 to Rs. 40,000 per month	25	31.25
More than Rs. 40,000 per month	48	60.00
Total	80	100.00
Frequency of purchase agricultural commodities		
Daily	14	17.50
Weekly	60	75.00
Monthly	6	7.50
Total	80	100.00

of males (26.25%) suggests that the convenience of online platforms appeals to both genders. This highlights the need for marketing strategies that emphasize efficiency and ease of use for diverse audiences. Unlike offline customers, the online customers were found to be educated respondents, reflecting the impact of literacy and technological familiarity for online transactions. Nearly half of the sampled online consumers (48.75%) hold a degree or higher education, with an additional 23.75 per cent completing pre-university courses, indicating that online platforms primarily attract well-educated individuals comfortable with digital interfaces.

Private employees form the largest occupational group among online customers (47.50%), followed by government employees (27.50%). Home makers account for 20 per cent, while self-employed individuals make up the smallest group (5%). The dominance of salaried employees indicates a reliance on stable incomes and possibly greater exposure to digital tools at workplaces. Home makers' participation reflects the growing accessibility of online platforms for managing household needs. Income plays a critical role in online shopping behaviour.

The online sample shows a significant majority (60%) earning above Rs.40,000 per month, higher than the offline segment (55%), while lower-income groups (8.75%) are under represented, likely due to affordability concerns or limited technological access. This income disparity indicates that online platforms primarily attract affluent customers, highlighting the need for affordability and accessibility to broaden the market. Weekly purchases dominate (75%), exceeding offline figures, reflecting a preference for regular, planned purchases facilitated by scheduling and delivery services. The lower proportion of daily buyers (17.50%) suggests delivery time as a potential barrier, which rapid delivery models could effectively address.

Table 5 presents the correlation between consumer preferences for agricultural commodities among offline and online customers in Bengaluru. It includes two types of correlation measurements: Pearson's R

TABLE 5
Correlation among attributes of consumer preference for Agricultural Commodities in Bengaluru city

Correlation	Value	
	Offline customers	Online customers
Pearson's R	0.940 *	0.912 *
Kendall's tau	0.714 *	0.444 *

Note : * significant at five per cent level

and Kendall's tau. For offline customers, Pearson's R is 0.940, indicating a very strong positive correlation between the attributes analysed. Similarly, Kendall's tau for offline customers is 0.714, also reflecting a strong positive relationship, albeit slightly lower than Pearson's R. In contrast, online customers show a Pearson's R of 0.912, signifying a strong positive correlation, though again slightly less than that observed for offline customers. Conversely, their Kendall's tau is 0.444, indicating a moderate positive correlation, significantly lower than that for offline shoppers. Notably, the asterisk (*) beside each value denotes statistical significance at the five

per cent level, suggesting that the correlations are unlikely to have arisen by chance. Overall, the findings suggest that while both groups exhibit strong correlations in consumer preference attributes, offline customers demonstrate slightly higher levels of correlation overall.

Conjoint Analysis of Preference for Offline Customers of Bengaluru City

The conjoint analysis results for offline and online customers in Bengaluru highlight key differences and similarities in their preferences for agricultural commodities. For offline customers, the most significant attribute is frequency, with a relative importance of 53.879 per cent. This suggests that offline customers prioritize the frequency of their purchases, with a preference for monthly buying patterns, likely driven by the convenience of bulk buying and fewer trips to the market. Price follows as the second most important factor at 22.845 per cent, indicating that while cost is important, offline customers are willing to spend more for quality or bulk purchases. Purchase place comes next with a relative importance of 16.379 per cent, where local shops are the preferred shopping destinations due to their convenience and familiarity. Commodity type

TABLE 6
Conjoint analysis of preference for offline customers of Bengaluru city

Attributes	Levels	Utility level	Relative importance
Commodity	Fruits & Vegetables	-.250	6.897
	Cereals & Pulses	.125	
	Dairy & Meat	.125	
Price	Rs. 1000/month	1.104	22.845
	Rs. 1000-3000/month	2.208	
	More than Rs. 3000/month	3.312	
Purchase place	Local Shops	-.792	16.379
	Supermarkets	-1.583	
	Directly from farmers	-2.375	
Frequency	Daily	2.604	53.879
	Weekly	5.208	
	Monthly	7.813	

TABLE 7
Conjoint analysis of preference for online customers of Bengaluru city

Attributes	Levels	Utility level	Relative importance
Commodity	Fruits & Vegetables	-1.167	26.804
	Cereals & Pulses	.917	
	Dairy & Meat	.250	
Price	Rs. 1000/month	.583	16.337
	Rs. 1000-3000/month	1.167	
	More than Rs. 3000/month	1.750	
Purchase place	Zepto	-1.750	43.261
	SwiggyInstamart	-3.500	
	Big basket	-5.250	
Frequency	Daily	.542	13.598
	Weekly	1.083	
	Monthly	1.625	

ranks the least important at 6.897 per cent, suggesting that offline customers prioritize product availability and freshness over specific commodity types, as they can inspect items in person.

Customers who engage in both online and offline shopping exhibit distinct but complementary preferences, reflecting the strengths of each purchasing mode. The high relative importance of purchase place (43.261%) for online customers underscores the value they place on convenience and reliability offered by platforms like Big Basket, Swiggy, Instamart and Zepto. However, when shopping offline, purchase place remains crucial, influenced by factors such as proximity, store reputation and the availability of fresh produce. This suggests that while online platforms excel in convenience, offline stores appeal to those seeking tactile and sensory validation, particularly for perishable goods.

Commodity selection, with a relative importance of 26.804 per cent highlights that online customers are more discerning, especially regarding perishable items like fruits and vegetables. This trend reflects their reliance on stringent supply chain controls for quality assurance. In offline contexts, the ability to

inspect products directly also makes commodity selection a key factor, indicating that customers often use online platforms for packaged or non-perishable goods and turn to offline markets for fresh produce.

Price, with a lower relative importance of 16.337 per cent for online customers, suggests a willingness to pay for convenience and quality. Offline, however, price sensitivity may be higher due to the visibility of competing products and opportunities for negotiation with local vendors. This indicates that customers use both channels strategically, leveraging online deals for savings on bulk items while seeking better prices offline for immediate needs. Finally, the low importance of frequency (13.598%) in online shopping reflects a preference for bulk purchases to minimize delivery costs and effort, whereas offline shopping often accommodates more frequent, smaller purchases due to proximity and flexibility.

Overall, customers blend the advantages of online and offline channels, creating a hybrid shopping approach. Online platforms should continue to prioritize convenience, reliability and quality while addressing gaps like the tactile experience of fresh produce. Meanwhile, offline retailers can maintain

their appeal through experiential shopping and competitive pricing. Retailers offering omni channel solutions-such as click-and-collect services or partnerships between online and offline stores-can effectively meet the diverse needs of this consumer segment.

The similar studies were found that (Veerabhadrapa *et al.*, 2017) found that for urban Bengaluru customers, taste was the most important attribute of ragi (39.33%), followed by colour (23.56%) and price (20.66%). In rural Bengaluru, price (35.60%) was the primary factor, reflecting the middle-income group's influence, with colour as secondary. Urban ragi consumption was lower, likely due to the availability of substitutes and a shift in urban spending patterns. (Miguel *et al.*, 2021) in his study showed that internet proficiency impacted shopping preferences. Online shopping was influenced by quick product information, a wider selection and better prices, while offline shopping was driven by faster delivery, product quality reliability and accuracy.

The preferences of offline and online customers in Bengaluru show clear distinctions, particularly in terms of influential factors. Offline customers prioritize frequency of purchases and price, often opting for local shops for convenience and affordability. These customers typically buy in retail quantities and prefer nearby markets, emphasizing the need for accessible, cost-effective fresh produce. In contrast, online customers value doorstep delivery and product quality, reflecting a preference for the reliability of platforms and the convenience of shopping for perishable goods.

Given these differences, both offline and online businesses in Bengaluru have opportunities to expand by aligning strategies with consumer needs. Offline retailers can attract middle-income customers by promoting bulk purchases, offering loyalty programs, discounts and ensuring consistent supply of fresh products. Online retailers can cater to higher-income consumers by improving delivery services, ensuring product quality and offering a wide variety of commodities, thus enhancing the platform experience.

Bengaluru's diverse demographic, spanning both middle and higher-income groups, presents opportunities for businesses to customize their offerings for both offline and online channels, leading to increased market reach and customer satisfaction. By addressing the distinct needs of these segments, businesses can foster loyalty and drive growth.

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