

The Green Kitchen: Sustainability of Organic Practices in the Cloud Kitchen Industry

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DOI: <https://doi.org/10.68050/JAMS.2026.479>

Received: 14 Sept 2026; Accepted: 15 Sept 2026; Published: 18 September 2026

ABSTRACT

Food is the basic human need, and it is for this that generations have worked so hard to create civilizations. In the context of the food industry, which evolves with every generation also needs a change. As such with growing awareness of environmental sustainability and health consciousness food choices which has compelled the food industry to adopt the changes. One such initiative is the mushrooming of Cloud kitchens. The explosive growth of cloud kitchen has revolutionized the food service sector by highlighting digital platforms, convenience, and delivery-based business models. The present study aims to examine the sustainability of organic practices for the survival of cloud kitchen business. As food tech business is evolving, the Cloud Kitchen model purely based on take-away concept is scrutinised regarding the environmental footprint. A random sample of 200 respondents is selected for analysing the sustainability practices of cloud kitchen. Both the sources of data collection i.e. primary and secondary sources were used to analyse the data. Descriptive and inferential statistical techniques i.e. correlation, regression, chi-square and ANOVA were used to test the stated hypotheses based on the objectives of the study. The findings of the study explored the transparency of sustainability practices to be followed as a source of cloud kitchen survival. The study concludes that the actionable insights in alignment with the business model and growing demand taken on right time fosters the business for a long time and maintains the consistency.

Key Words: Cloud Kitchen, Health consciousness, Sustainability, Survival and Environment, Waste Management.

INTRODUCTION

Consumer behaviour is related to individual, group and organisations concepts related to the buying and using of goods and services and their experiences related to satisfaction. It is that concept that combines elements of psychology, sociology, economics, and marketing to understand the perception of people's purchasing decisions. The theories of Consumer behaviour, such as the Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM), have long explained the axioms related to purchase intentions across various sectors. These theories have integrated constructs like trust, food safety perception, social influence, and technological ease of use into these models. The theories have enriched the knowledge of researchers as to how consumers form attitudes and intentions in a purely digital, contactless food service environment. Unfortunately, cloud kitchens operate in a highly competitive and rapidly shifting market landscape. The loyalty and repeat purchase are driving forces to sustain cloud kitchens in the ages to come. In light of the prevailing scenario, the present study holds an important place in making an effort towards addressing the role played by demographic factors in addressing the customers' purchase intentions.

Need for the Study

The rapid integration of digital technology into everyday life has fundamentally reshaped consumer behaviours and market dynamics across sectors, and the foodservice industry is no exception. Among the most innovative and disruptive trends is the proliferation of cloud kitchens, delivery-only food outlets that operate without

dine-in facilities and rely entirely on online ordering and delivery platforms. This emerging model holds immense potential for transforming the food consumption landscape, particularly in burgeoning urban markets. However, the success of cloud kitchens hinges critically on understanding of how consumers perceive these services. The demographic perspectives are what drives the consumer towards purchase intention.

Significance of the Study

The current study's exploration significantly aligns cloud kitchen operations with broader areas of sustainability and social responsibility. Efforts are being made throughout the study to fill the gaps in identifying the factors responsible for customer attraction and retaining them. Cloud kitchen is an innovative practice of the food service industry, catering to eco-friendly and health-centric menus. By explaining consumer patterns and preferences, this research helps policymakers in understanding how the digital foodservice sector, i.e. cloud kitchen platform, ensures quality standards, consumer protection, and fair competition. Moreover, it is that platform which serves tech-savvy younger populations linked with urban areas. The study is an opportunity and can illuminate inclusivity challenges and opportunities for expanding access to safe, affordable, and varied food choices among diverse socio-economic groups. The study's significance covers multiple dimensions, from strengthening theoretical frameworks to empowering businesses with consumer insights to fostering innovative ideas aligned with consumer needs. It is to inform the concerned representatives about the facts by enriching their subtle knowledge on essential components of the emerging cloud kitchen industry and consumer behaviour. The current study proves to be significant in setting a benchmark by elaborating on the major and minor issues of the transformative shift in how consumers approach dining.

REVIEW OF LITERATURE

1. The study by Suresh et al. (2024) observed how COVID-19 changed cloud or ghost kitchens and affected how people in India eat food outside their homes. It studies how food packaging and delivery affect people's ideas about themselves, health, and success. Using a cultural theory by Stuart Hall, the research explores how ghost kitchens have grown and changed the ways food is produced, consumed, and linked to identity in India. It also discusses the social effects and future possibilities of digital food services in the Indian cultural setting.
2. Bose and Chaudhary (2023) highlighted the transformation of the food service industry through the rise of cloud kitchens and virtual restaurants that utilise digital platforms for preparation and delivery. Simultaneously, increasing consumer awareness of health and sustainability has drawn focus to millets, nutrient-dense and climate-resilient grains well-suited to sustainable agriculture. Positioned as an eco-friendly option, millets align with growing consumer demand for nutritious and sustainable dietary choices, suggesting their integration into food services could effectively cater to modern dining preferences.
3. Hakim et al. (2023) investigated the prevalence and characteristics of dark kitchens—delivery-only food establishments—in three Brazilian cities: Limeira, Campinas, and São Paulo. An analysis of 22,520 restaurants revealed that 27.1% operated as dark kitchens, typically situated farther from city centres and offering lower-priced meals with limited customer reviews. The study classifies six distinct dark kitchen models and offers implications for management practices and urban planning to accommodate this expanding sector.
4. Sulaiman et al. (2023) investigated the advantages of online food delivery, particularly its role in providing convenient meal access for busy consumers. Addressing a gap in existing research, the study reviews 255 publications from 2000 to 2022 using keyword analysis to identify leading authors, influential journals, and emerging trends. The findings contribute to strengthening business strategies and advancing knowledge of the sector, offering insights valuable to academics, industry practitioners, and policymakers for shaping the future of food delivery in a rapidly evolving digital landscape.
5. Srong et al. (2022) examined the rapid expansion of Cambodia's food industry, valued at \$52 million in 2020 and projected to grow at 14.5% annually between 2022 and 2027. The pandemic accelerated consumer demand for healthier food, prompting restaurants to offer customised meal plans and beverages. Rising adoption of food delivery applications further stimulates the organic and healthy food market. In this context,



the study presents a business plan for DailyBite, a Phnom Penh-based cloud kitchen dedicated to providing healthy Khmer meals, with an initial investment of seventy thousand dollars.

6. Rawat et al. (2022) examined the transformative role of artificial intelligence in the food processing sector, with emphasis on ready-to-eat meals and tiffin services. The study proposed an AI-driven platform enabling consumers to select meal providers, customise portions, and subscribe to home-cooked deliveries. This model not only enhances consumer flexibility but also supports homemakers in establishing small-scale enterprises, thereby promoting financial independence from home.

7. Ghosh and Saha (2022) examined the transformative impact of cloud kitchens on the food industry, augmented by technical developments, lifestyle changes, and the epidemic. Operating exclusively through delivery and supported by food aggregators, cloud kitchens address growing online demand while reducing infrastructure and overhead costs. With projections estimating the sector's value at \$365 billion by 2030, the study questions their potential threat to traditional restaurants and analyses the strategies cloud kitchens employ to capture market share, with particular implications for Kolkata's fine dining industry.

8. Sapkota (2022) examined the factors of customer satisfaction with cloud kitchen delivery in the Kathmandu Valley using a quantitative approach. Independent variables include price, customer service, food quality, technology and innovation, and delivery service, with customer satisfaction as the dependent variable. Data were collected from 275 respondents through structured questionnaires on a 5-point Likert scale and analysed using SPSS software. Results show that all five factors significantly influence satisfaction, reflecting customers' consistent use of cloud kitchen services.

9. Selvan and Andrew (2021) examined the growing popularity of online food delivery services. The study highlighted how delivery apps have reshaped dining habits, particularly among urban youth aged 15–34, where traffic and high population density discourage dining out. It underscores the importance for providers to understand consumer preferences to improve services and expand their customer base, while also offering insights into industry evolution and strategies for future growth.

10. Sharma and Verma (2021) analysed the rise of online food ordering in India, emphasising the influence of changing lifestyles, technological advancement, and widespread smartphone adoption on consumer behaviour. The study highlights intensified competition in the food tech sector with the entry of both startups and established firms, underscoring the need for strategic planning to sustain growth and market share. Using a descriptive and analytical approach with secondary data, the research evaluates leading companies' business models, scalability, funding, revenue, and valuation. The findings guide food tech firms in navigating competition and shaping strategic decisions.

11. Chopra and Saini (2021) studied the branding and marketing strategies, highlighting the rise of digital marketing as traditional channels such as outdoor and print media declined. The chapter emphasises the increasing reliance on in-house platforms, including social media and streaming services, to engage consumers. It outlines the causes, processes, and outcomes of this digital shift, presenting four strategies for firms to adapt and thrive amid the crisis. The authors conclude that digital marketing has become an essential and enduring element of post-pandemic business practices.

12. Upadhye and Sathe (2020) discussed the emergence of cloud kitchens as a delivery-only model in the food sector, commonly referred to as "dark kitchens" due to the absence of dine-in facilities. The study emphasises the strategic significance of location for ensuring efficient delivery coverage and notes that menus are often limited in scope. It highlights the rapid expansion of the model, citing Swiggy's launch of Swiggy Access, which added over 35 restaurants across new pin codes, with plans to onboard 300 additional partners and target cloud kitchens to contribute 20–25% of revenue within two years. The paper underscores the growing influence of virtual kitchens in changing the food delivery business.

13. Chern and Ahmad (2020) examined the potential influence of virtual kitchens on Malaysia's expanding online food delivery sector, noting their capacity to lower supply chain costs and enhance customer service. The study stresses the importance of collaboration among key stakeholders—food aggregators, outlets,



delivery riders, and consumers—as well as the role of timing for effective adoption. While contributing to the limited literature on the sharing economy, the paper suggests that incorporating empirical data or international case studies would strengthen insights into feasibility.

14. Nandini et al. (2019) analysed a service delay incident at Green Kitchen Family Eatery (GKFE), where a group of fatigued diners experienced extended wait times during peak hours without being informed by a new steward. This lack of communication led to customer frustration and a negative review on Google+, highlighting the challenge for the restaurant's founder in managing complaints from tech-savvy customers. The case underscores the critical role of social media in shaping customer perceptions and the need for effective service recovery strategies to enhance customer relationship management and protect the restaurant's reputation.

15. Chaudhuri et al. (2001) examined the dual dimensions of brand loyalty—purchase loyalty and attitudinal loyalty—as mediators linking brand trust, brand sentiment, and brand performance, measured through market share and relative price. Their framework incorporated product-level attributes (functional and emotional value) alongside brand-level factors (uniqueness and visibility). Drawing on data from 107 brands across three surveys involving consumers and brand managers, the study found that brand trust and sentiment significantly influenced both loyalty types. Purchase loyalty was associated with increased market share, whereas attitudinal loyalty supported premium pricing. The authors emphasised the managerial relevance of these insights.

16. Kivela et al. (1999) developed a conceptual model to explain dining satisfaction and its influence on post-dining behavioural intentions, organising consumer satisfaction research within a disconfirmation framework. The article synthesises prior studies and supports the effectiveness of disconfirmation theory in predicting repeat patronage as an outcome of dining satisfaction. Subsequent sections address research design, methodology, and empirical findings.

17. Luqmani et al. (1994) classified online shoppers into five distinct behavioral categories—opportunists, occasional buyers, need-driven shoppers, cautious first-timers, and loyal repeat customers—based on analysis of 10,000 e-commerce transactions. The study details the decision-making, spending, and shopping patterns characterizing each segment and recommends tailored marketing strategies to effectively target and engage these groups. This segmentation enables businesses to optimize their marketing approaches and enhance online sales outcomes.

18. Zeithaml et al. (1988) investigated the challenges service organisations encounter in consistently delivering high-quality service by analysing four key discrepancies within the service quality framework. The study focuses on internal communication and managerial oversight related to frontline employees, examining their effects on role clarity and role conflict. Integrating marketing and organisational theory with qualitative data, the authors offer deeper insights into factors influencing service quality delivery.

19. Tynan and Drayton (1987) emphasised market segmentation as a crucial strategy to identify and define homogeneous groups of buyers for targeted marketing efforts. Segmentation can be based on geographic, demographic, psychological, lifestyle, or behavioural variables, each with distinct advantages and limitations. Kotler (1984) outlines four key criteria for evaluating segments—measurability, accessibility, substantiality, and actionability guiding firms to make marketing strategies that efficiently fulfil the needs of selected segments, thereby restoring customer intimacy seen in traditional business models.

RESEARCH METHODOLOGY

The present study is a mixed approach of research, the descriptive and empirical research is crucial for knowing the consumer awareness and perception related with sustainability practices followed by green kitchen. A well-structured research design selection is crucial for confirming that the study is rigorous, valid and capable of answering the research questions and hypothesis in an efficient manner. Data is collected from both the sources, i.e. Primary as well as Secondary sources, to test the objective of the study. A structured questionnaire was used to collect responses through Google Forms and an online survey. The medium used to collect original data is through email, WhatsApp and other social media platforms. For the present study, the

primary information is taken from 240 respondents of Hyderabad city through a well-structured and tested questionnaire. The population of the study includes users who order food online from a cloud kitchen. In drawing a steady and significant interpretation related to research questions, the primary source of information is supported by secondary data. The data has been collected from several reputable published sources, i.e. national and international journals, reports, magazines, and internet-based sources. The systematic searches in online databases were gathered using Boolean operators such as AND, OR, and NOT for selecting relevant and comprehensive data. The state and central libraries were visited to obtain information related to the study.

Framework of the study

The universe of the study consists of the consumers who order food using online aggregators like Swiggy, Zomato, Blinkit, etc, from cloud kitchens. The research is conducted using a survey method in the cities of Hyderabad and Secunderabad, and an appropriate sample size of 240 respondents is used. The method adopted is purposive sampling.

The universe of the study is as follows:

Table No.1: Universe of the study

Universe of the study	Individuals who are ordering food from a cloud kitchen through online platforms
Sampling Method	Purposive Sampling
Sample size	240
Method of sample size determination	Cochran's Method
Area of Survey	Hyderabad and Secunderabad

Source: prepared by the researcher

Research Objectives

1. To study the association between consumer awareness with sustainability practices adopted by cloud kitchen.
2. To study the association between consumer perception with sustainability practices adopted by cloud kitchen.

Hypotheses

The following hypotheses were framed to test the above mentioned objectives.

H₀₁ There is no significant association between consumer awareness and sustainability practices adopted by cloud kitchens.

H₀₂ There is no significant association between consumer perception and sustainability practices adopted by cloud kitchens.

Data Analysis

The information collected on consumer awareness and perception related with sustainability practices were analysed by using chi-square test of independent variables.

Consumer awareness and sustainability practices of cloud kitchens.

Consumer awareness is classified as low, medium and high. Whereas sustainability practices are classified as

Waste Management, Energy Efficiency, Sustainability Packaging and Organic source. The cross tabulation of the data is classified below.

Table No.2 Consumer Awareness Level × Sustainability Practices

Awareness Level	Waste Management	Energy Efficiency	Sustainable Packaging	Organic Source	Total
Low Awareness	18 (19.83)	16 (18.08)	14 (17.21)	22 (14.88)	70
Medium Awareness	22 (22.67)	20 (20.67)	21 (19.67)	17 (17.00)	80
High Awareness	28 (25.50)	26 (23.25)	24 (22.13)	12 (19.13)	90
Total	68	62	59	51	240

As per the above table, none of the observed and expected frequency is less than 5. The minimum expected frequency is 14.88 and the maximum is 25.50.

Table No.3 Chi-Square Tests (SPSS Output)

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.95	6	0.24
Likelihood Ratio	8.12	6	0.23
N of Valid Cases	240		

The Pearson Chi-square value is 7.95 with 6 degrees of freedom and a significance value of $p = 0.243$, which is greater than 0.05. Since the p-value is greater than 0.05, the null hypothesis is accepted. The analyses show that there is no statistically significant association between consumer awareness level and the sustainability practices adopted by cloud kitchens. It shows that consumer awareness about sustainability practices needs not necessarily influence their intention to prefer the product. Many consumers may prioritize convenience, price, taste and ease of delivery. Awareness is broad concept and it changes with the personalities of individuals. Apart from this the selection of sample is another criteria which has its own limitations.

Consumer perception and sustainability practices of cloud kitchens.

Consumer perception is classified as positive, neutral and negative. Whereas, sustainability practices are classified as Waste Management, Energy Efficiency, Sustainability Packaging and Organic source. The cross tabulation of the data is classified below.

Table No:4 Consumer Awareness Level × Sustainability Practices

Consumer Perception	Waste Management	Energy Efficiency	Sustainable Packaging	Organic Sourcing	Total
Positive	28 (20.18)	22 (18.53)	30 (22.94)	20 (17.35)	100
Neutral	15 (17.15)	18 (15.75)	20 (19.50)	12 (12.60)	65
Negative	10 (15.67)	8 (14.72)	5 (18.56)	7 (12.05)	30
Total	53	48	55	39	195

As per the above table, none of the observed and expected frequency is less than 5. The minimum expected frequency is 12.05 and the maximum is 22.94.

Table No.5 Chi-Square Tests (SPSS Output)

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.64	6	0
Likelihood Ratio	41.22	6	0
N of Valid Cases	195		

The Pearson Chi-square value is 38.64 with 6 degrees of freedom and a significance value of $p = 0.000$, which is less than 0.05. Since the p-value is less than 0.05, the null hypothesis is rejected. The analyses show that there is a statistically significant association between consumer perception and the sustainability practices adopted by cloud kitchens. Consumers pay more attention and are proactive to the things that benefit them and satisfy them to the utmost extent. They positively respond to visible sustainability initiatives, such as eco-friendly packaging or organic sourcing. The sustainability practices can enhance the brand image and as such quality of cloud kitchens. Positive and influential perception results in enhanced loyalty and an intention for repeat purchase. The need of the hour is the sustainability of cloud kitchen depends on the implementation of green practices.

CONCLUSION

The present study is undertaken to examine the association of consumer awareness and perception with sustainability practices adopted by cloud kitchens. It is being seen through data analysis that awareness has not made a significant impact but perception has influence the consumer towards the outlets which maintain sustainable practices. Having an awareness related with sustainability practices does not necessarily influence the consumer's decision-making. People pay attention to factors which ease their life and enhance their experience. In contrast, consumer perception shows a statistically significant association with sustainability practices. Positive perception is visible and actionable, as a result it influence the decision making process. In an era where technology has taken front seat, it is better for the organisations to follow the strategies which is crucial for long-term survival. Awareness alone is insufficient, apart from this visible and actionable content impact the consumer's preference. The green practices strategies followed by cloud kitchen should be well aligned with environmentally and sustainable food practices, after all food core element of human existence.

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