

Dimensions of Consumer Expectations and Sustainable Food Service Practices in Cloud Kitchens

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Abstract

The food service industry has undergone a remarkable transformation influenced by changing consumer lifestyles, rapid technological advancements, and innovative business models. Most notably, the emergence of cloud kitchens, which operate without dine-in spaces and focus solely on delivery and takeout. This study examines the dimensions of consumer expectations in cloud kitchen food delivery models by adopting a qualitative research design and conducting in-depth semi-structured interviews with 19 cloud kitchen consumers from Chennai, India. The data were thematically analysis using NVivo15 to identify nuanced perceptions and experiences. Thematic analysis using an inductive approach showed that sustainability emerged as the most frequently mentioned theme, with implications for promoting healthier choices and responsible consumption in cloud kitchen services. Subsequent to thematic analysis, the emergent themes were organized into six categories of consumer expectations and further synthesized into three broader dimensions - fundamentality of expectations, precision of expectations, and feasibility of expectations each operating along a continuum. Grounded in Expectation Confirmation Theory, this study contributes to the service quality literature by developing a comprehensive framework that systematizes consumer expectations and offers strategic insights for cloud kitchen operators. Although this study is conducted in urban India, the findings hold broader relevance for emerging markets experiencing similar digital transformations.

1 Introduction

Technology doesn't just enhance industries; it redefines them. The food and beverages (F&B) industry is not just evolving but experiencing a fundamental change where technology is no longer a tool but the foundation of transformation. Recent global disruptions have primarily reshaped the food service industry, driving the restaurant industry to rapidly adapt to digitally driven operational models. Among these shifts, the rapid transition of consumers to online platforms has been distinctly notable, resulting in the substantial growth of online food delivery services (OFDS) as a dominant mode of consumption and cloud kitchens have evolved as a scalable business model for the food service sector.

Cloud kitchens offer only the 'kitchen' component of a restaurant's operations without dining space and any direct interaction with the customers. There is no need for a host, waitstaff, or cashiers; This contactless model delivers the food to its customers through delivery aggregators, third-party delivery services, and sometimes through specific pickup points (Nedumaran & Ritha, 2023). In 2024, the Indian cloud kitchen market was estimated to be valued at USD 1,097.5 million. South India currently leads the market, holding a significant market share of over 35% in 2024. Swiggy, a leading food delivery platform in India, recorded a 19% year-over-year growth in its average monthly transacting users, reaching 17.1 million by the second fiscal quarter, which ended on September 30, 2024 ("India Cloud Kitchen Market Size, Growth & Forecast 2033," n.d.). Advancements in restaurants' digital capabilities and adoption of OFDS by the consumers contributed to the growth in cloud kitchens. The adoption of cloud kitchens continues to grow as many consumers increasingly prefer the convenience and speed of food delivery, leading to the rapid growth of cloud kitchens. Food patterns among youth are evolving, with

Indian consumers increasingly seeking convenience, transparency, and authenticity through cloud kitchen platforms. (Mathur & Mathur, 2023).

Extant literature has examined cloud kitchens from different perspectives including consumer attitude towards ordering from cloud kitchen Pookulangara et al. (2023), as well as critical discussions within the cloud kitchen labour dynamics (Giousmpasoglou et al., 2024). Studies have also explored the long-term potential of cloud kitchen business model Nigro et al. (2023), alongside investigation into the development of initial trust in cloud kitchens (Jiang et al., 2024). Additional studies have focussed on behavioural intentions such as purchase intention Mathur and Mathur (2023), Leung et al. (2024), and Hakim et al. (2022), repeat patronage (Verma et al., 2025), and the broader shift from traditional dine in restaurants to cloud kitchens (Kulshreshtha & Sharma, 2022).

In addition, a substantial body of work has highlighted the transformative role of digitalisation through mobile applications (Gani et al., 2021; Al Amin et al., 2021; Tandon et al., 2021). Building on these valuable contributions, there remains significant scope to further advance the literature by developing a deeper understanding of consumer expectations within the cloud kitchen context. Examining how such expectations are formed and managed is particularly important, as it can enable cloud kitchen operators to design more responsive strategies, enhance service delivery, and ultimately foster higher levels of customer satisfaction.

Importantly, as the data collection progressed, an unanticipated yet consistent pattern began to emerge. Participants repeatedly and spontaneously referred to sustainability focused concerns such as eco-friendly packaging, waste reduction, and responsible consumption practices. This emergent insight prompted a conceptual shift in the study, leading to the incorporation of a sustainability-oriented perspective within the expectation framework.

By integrating expectation theory with sustainability discourse, this study contributes to the growing body of literature that seeks to reconcile consumer behaviour with sustainable development goals, particularly SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production). Online food delivery services, including cloud kitchens, significantly influence dietary choices and health outcomes by increasing access to energy-dense and nutrient-poor meals, highlighting important implications for public health (Gupta et al., 2024). This suggests the following three research questions:

1. What are the key expectations of consumers from cloud kitchen services?
2. How is sustainability perceived and expected by consumers in the context of cloud kitchen services?
3. How can cloud kitchen operators align their strategies to meet and manage consumer expectations effectively?

The study delves into the literature to examine how the pandemic has accelerated the growth of cloud kitchens and also the implication of sustainable practices in cloud kitchens. The primary objective of the

study is to identify the consumer service quality expectations while suggesting management strategies to address these expectations and to identify and prioritise sustainability-oriented consumer expectations that emerged inductively during the analysis.

2 Literature Review

2.1 The Rise of Cloud Kitchens in India

The concept of cloud kitchens draws inspiration from various food service models across the world, including Chinese takeout restaurants and American pizza delivery chains. These kitchens operate on a delivery-only model, resembling warehouses with multiple restaurant brands under one roof, all optimized for efficient food preparation and delivery. In India, the cloud kitchen model was first introduced by Rebel Foods in 2003, marking the beginning of a new era in the food service industry (Chhabra & Rana, 2021).

Cloud kitchens, also known as dark or ghost kitchens, serves as delivery-only food outlets that receive orders exclusively through online platforms. They focus on efficient food production and delivery while eliminating dine-in spaces, often offering limited yet specialized menus at competitive prices (Upadhye & Sathe, 2020). Unlike traditional dining restaurants, cloud kitchens operate without physical storefronts or direct customer interaction. Instead, they provide commercial kitchen spaces either shared or private for food businesses, allowing brands to operate cost-effectively without the need for prime real estate (Hakim et al., 2022).

The typology of cloud kitchens categorizes their operational models based on structure, ownership, and service approach. A detailed typology is presented in the Table 1.

Table 1
Typology of cloud kitchen business models.

Business Model Type	Functional Description
Brand-Owned Cloud Kitchen	Single-brand, single-location kitchen engaged exclusively on delivery, with no dine-in or takeaway services.
Dine-in with Separate In-Location Delivery Line	A dine-in restaurant manages a parallel kitchen unit enhanced for delivery and takeout, using a modified version of its main menu.
Dine-In Brand from Shared Kitchen Location(s)	A dine-in brand expands delivery operations through off-site shared kitchen facilities, independent of its physical restaurant premises.
Hub & Spoke (Single brand, Multi-Brand and Shared Kitchen)	Single brand cloud kitchen has a central kitchen prepares the food in bulk and supplies it to smaller outlets for final preparation and delivery.
	Multi-Brand Cloud Kitchen is delivery-only facility providing operational space for multiple virtual brands, offering wide range of cuisines under one operational roof.
	Shared Kitchen is a licensed commercial kitchen space shared by multiple food businesses, providing common equipment and infrastructure.
Franchise Model	Licensed operators manage cloud kitchens using an recognised brand's identity, systems, and operational framework.
Shell Kitchen - Outsourced Food Prep/Delivery/Support	A minimal cloud kitchen that relies on externally sourced, semi-prepared food and handles only finishing process or reheating for delivery.
Source: Adapted from Patel (2024), Merckaert (2024)	

These cloud kitchens reduce the operating costs by optimizing the restaurant model to focus solely on off-premises food sales. Rather than offering a dining space, their operations rely on deliveries handled by restaurants itself or through aggregators. The growth of cloud kitchens, accelerated by the covid-19, is expected to stay even beyond the pandemic (Simplot, 2020).

2.2 Impact of the COVID-19 Pandemic on Cloud Kitchens

Cloud kitchens have gained popularity in the F&B business, especially after the COVID-19 pandemic. The COVID-19 pandemic continued and the global economy declined, restaurants faced a new reality. During this period of financial strain, the adoption of the cloud kitchen model grew rapidly, allowing some restaurants to sustain their operations and remain economically viable (Vaughan, 2022).

Pookulangara et al. (2022a) examined Generation Z's food choice behaviour and found that the pandemic has clearly shifted consumer behaviour, with many opting for ordering from cloud kitchens over dining out. The changing consumer habits and the pandemic have accelerated the rise of cloud

kitchens, leading to lasting shifts in restaurant business models. Restaurants have had to adapt to new regulations, occupancy limits, and safety guidelines, often implementing innovative technologies to enhance customer experiences. Rebel Foods capitalized on this shift by expanding its cloud kitchen network to meet the increased demand for food delivery during the pandemic. This trend is expected to persist as consumer preferences have shifted towards ordering in rather than dining out Rebel Foods (2022). The COVID-19 pandemic had a serious impact on almost of the industries but created adversities in dine-in sector. Consumer behaviour was altered by the pandemic and “conscious consumers” assessed thermal scanning, sanitisation, and hygiene for cloud kitchens in a way that was comparable to that of typical restaurant selection criteria (Mathur & Mathur, 2023). Cloud kitchens must balance pre-COVID consumer preferences such as discounts, convenience, and variety with post-COVID priorities such as cost-saving, safety, and hygiene. This can be achieved through digital features like live kitchen streams to build consumer trust (John, 2021). As a result, cloud kitchens emerged not just as a survival mechanism during the pandemic, but as a long-term growth prospective in the post-COVID food industry.

2.3 Customer expectations

The literature on service management expectations is extensive, with various scholars offering insights into different types of customer expectations. Hsieh and Yuan (2021) define customer expectations as what a customer hopes to receive from a service provider, setting the foundation for understanding how these expectations shape service experiences. Managing consumer expectations is a crucial aspect for service managers, aligning with intuitive reasoning that well-managed expectations lead to better customer satisfaction (Hamer et al., 1999).

Several researchers have categorized customer expectations in different ways. One of the earliest and most foundational models in customer expectation literature was developed by Kano et al. (1984) that classifies customer expectations into five categories: must-be (basic expectations), one-dimensional (performance-related expectations), attractive (unexpected but delightful features), indifferent (features that do not impact satisfaction), and reverse (features that some customers may dislike). The five-dimensional service quality framework proposed by Parasuraman et al. (1991) conceptualizes service quality across reliability, tangibles, responsiveness, assurance, and empathy, all of which significantly influence customer satisfaction. Parasuraman et al. (1991a) conceptualize the zone of tolerance as the range between consumers’ desired and adequate expectations. At the upper end of this zone are desired expectations what customers ideally want while adequate expectations represent the minimum level of service, they are willing to accept. Boulding et al. (1993) differentiates 'will' expectations as what customers anticipate based on past experiences and 'should' expectations as what they believe they deserve. Zeithaml et al. (1993) proposed a conceptual framework outlining how customer expectations are shaped by multiple factors, including personal needs, past experiences, explicit and implicit service promises, and word-of-mouth communication. This model identifies three primary types of service expectations: desired service (the ideal level customers hope for), adequate service (the minimum they will tolerate), and predicted service (what they realistically expect to receive). (Ojasalo, 2001) further

categorizes customer expectations into explicit, implicit, precise, fuzzy, realistic, and unrealistic. Explicit expectations are clearly stated, making it easy for customers to evaluate service performance.

2.4 SDGs and Cloud Kitchens

Consumer interest in health-related issues, particularly concerning ghost kitchens, underscores the importance of SDG 3 (Good Health and Well-being) in promoting safe and healthy food practices within cloud kitchen operations (Cai et al., 2022; Horta et al., 2021; Keeble et al., 2021). As a part of the food industry's response to the rising demand for off-premise dining and delivery by third-party online providers, cloud kitchens have stepped in to meet demand (Rivera, 2019). Generation Z's technology-integrated lifestyle and growing orientation toward green consumption, shaped by heightened awareness of environmental degradation, underscore the need for a distinct generational perspective beyond age-based justifications (Kulshreshtha & Sharma, 2022). The hidden nature of ghost kitchens allows minimal hygiene oversight, as customers cannot easily verify food safety or inspection compliance. Despite regulations being similar to traditional restaurants, the delivery-focused model reduces public scrutiny, raising concerns about effective enforcement (Fu et al., 2024). Although ghost kitchens are subject to the same food safety regulations as traditional restaurants, their lack of dine-in spaces and focus on delivery limit public visibility, creating challenges in monitoring hygiene practices. This raises concerns for SDG 3 (Good Health and Well-being) in ensuring safe food consumption, and for SDG 12 (Responsible Consumption and Production) in promoting sustainable and accountable food operations (Keeble et al., 2021).

3 Materials and methods

3.1 Type of research

This study employs qualitative research methods as it is suitable for understanding people's thoughts and emotions based on their own narratives and it focuses on subjective experiences rather than numerical data (Bellenger, 1979). Qualitative study is useful for new topics where the researchers collect open-ended data to develop emerging themes (Creswell, 1994). Given the exploratory nature of this study, qualitative methods allow for a more detailed understanding of emerging themes. As a novel business model in the food service industry, cloud kitchens have attracted growing academic interest; therefore, adopting a qualitative approach is appropriate to gain in-depth insights into this evolving domain. Data was collected through semi structured interview where the participants were asked open ended questions followed by probe questions. In qualitative research, while interview protocols generally adhere to a predetermined sequence, researchers may employ spontaneous probes to elicit deeper insights into participants' perspectives (Wiltfang & Berg, 1990). These open-ended questions encourage discussion and subjective expressions.

3.2 Population and sample

A total of 19 cloud kitchen consumers participated in semi-structured interviews for this study. The demographic profile of the respondents is presented in Table 2. Convenience sampling was used to select participants with relevant experience in cloud kitchens, ensuring meaningful and context-specific insights, with the sample comprising information-rich participants aligned with the information power model (Malterud et al., 2016). Sampling process included participants who were readily accessible and met key inclusion criteria: (1) aged 25–34 years as they are highly aware and frequent users of cloud kitchen services (Keelery, 2024) and (2) frequent users of cloud kitchens. The mobile market is dominated by young consumers, a cohort characterized by high smartphone usage and digital engagement. This behavioural tendency supports the relevance of cloud kitchen models, which rely on technology-mediated food ordering, thereby justifying the focus on the age group within this study (Suhartanto et al., 2024). Prior to data collection, written informed consent was obtained from all participants, ensuring their voluntary participation. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and the guidelines and regulations of the Institutional Ethical Committee for Studies on Human Subjects (IECH), Vellore Institute of Technology (VIT), Chennai, India. Several potential participants were excluded due to limited awareness, with some having unknowingly ordered from cloud kitchens without recognising the difference between an actual cloud kitchen and a traditional restaurant listed on the OFDS applications. Data saturation was reached after 19 participants, as no new perspectives and themes emerged in the later stages of data collection. Participants' interactions were recorded through interviews, and all recordings were later transcribed to verify data accuracy and completeness. This method enables to understand the non-verbal cues such as tone, voice, and body language (Opdenakker, 2006). Participants were informed about the study's purpose, their voluntary participation, and the right to withdraw at any time. No financial allowances were offered. Probing techniques and spontaneous follow-ups encouraged detailed, reflective responses.

Table 2
Participants' characterisation.

S. No	Age	Gender	Occupation	Usage of cloud kitchens in a month
1	29	Female	Employee	1–3 Times
2	28	Male	Employee	4–6 Times
3	26	Female	Employee	1–3 Times
4	26	Male	Employee	1–3 Times
5	25	Male	Self Employed	7 or more times
6	33	Female	Employee	4–6 Times
7	34	Female	Employee	1–3 Times
8	25	Male	Student	7 or more times
9	25	Female	Student	1–3 Times
10	27	Male	Employee	4–6 Times
11	25	Female	Student	7 or more times
12	28	Male	Employee	1–3 Times
13	26	Male	Self Employed	1–3 Times
14	29	Male	Employee	1–3 Times
15	30	Male	Employee	4–6 Times
16	31	Male	Employee	1–3 Times
17	29	Male	Self Employed	7 or more times
18	26	Female	Student	4–6 Times
19	30	Female	Student	4–6 Times

3.3 Data Analysis

Thematic analysis was applied to analyse the data and achieve the study's objectives. The data was approached inductively making sure that the themes emerged directly from the data rather than being based on a pre-existing coding framework. A thorough and iterative coding process was conducted using NVivo 15 software that facilitated thematic coding by transforming raw data into meaningful themes. Initial codes were then examined and grouped into clusters of related ideas and concepts. As the analysis is iterative, transcripts were analysed throughout the coding process to ensure accuracy and consistency. The study followed Braun & Clarke (2006) six-step approach (i) familiarizing with transcribed data, (ii) generating latent codes, (iii) identifying themes, (iv) reviewing themes, (v) defining the themes (vi)generating the report. The analysis reveals a refined classification of consumer

expectations, providing valuable insights for cloud kitchen operators. Inter-coder reliability was assessed using Cohen's kappa ($\kappa = 0.82$) through independent coding by multiple researchers, with discrepancies resolved through discussion and consensus, thereby strengthening the credibility and analytical validity of the findings. The dominant expectations as shown in Fig. 1 were identified based on the frequency, consistency, and emphasis of themes across participants' responses. Among the five emergent themes, **responsiveness, adaptability, convenience, quality, and sustainability** - sustainability emerged as the most prominent theme within the inductive analysis.

Thematic analysis identified five parent themes, each encompassing multiple child nodes, resulting in 21 distinct types of consumer expectations (presented in Table 3) in cloud kitchen services. A theme may be considered important based on its frequency, its relevance to the study's participants and its distinctiveness within the data (Swanson & Holton, 2005).

With regard to the continuum concept, the themes identified during analysis were systematically mapped into six expectation categories framed by Ojasalo (2001) namely explicit, implicit, clear, vague, precise, and fuzzy forming a continuum-based framework. Expectations that were more directly and clearly articulated by participants were categorized as explicit, while those that were less directly expressed or inferred were categorized as implicit. Similarly, expectations varied along continua of clarity (clear and vague) and precision (precise and fuzzy), reflecting differences in how strongly and distinctly they were expressed. This approach demonstrates that expectations do not exist as fixed categories but rather along overlapping and gradational dimensions. The resulting types and dimensions of expectations are summarized in Table 4. The identified child nodes were systematically grouped into six established categories of expectations, which were further consolidated into three overarching expectation dimensions developed by the authors. This structured classification is intended to enhance clarity and provide practical utility for stakeholders and cloud kitchen operators, enabling them to effectively prioritize, manage, and control consumer expectations to deliver improved service outcomes.

Within this structured classification, **sustainability** distinctly emerged as the most emphasized theme, exhibiting the highest frequency and consistency across participant responses, thereby indicating that consumer expectations are increasingly shaped by environmentally responsible practices, positioning sustainability not merely as an isolated expectation category but as a dominant and influential factor across multiple expectation types and dimensions.

Table 3
Consumer Expectation Types Derived from Thematic Analysis (Parent Themes and Child Nodes).

Themes	Sub-themes (Child Codes)
Responsiveness	Direct communication channels
	Responsive complaint resolution
	Real-time order tracking
	Labour dignity
	Compliance with hygiene and safety regulations
Adaptability	Menu innovation
	Tailored orders
	Adapting to market demands
	Competitive advantage
	Scalability of cloud kitchens
Convenience	Affordable pricing
	Speed of delivery
	Secure and durable packaging
	Temperature maintenance
	Loyalty programs and discounts
Quality	Consistent taste and flavour
	Freshly prepared meals
	Ingredient quality
Sustainability	Eco-friendly packaging
	Presentation
	Waste reduction

4 Implication of SDGs

Table 4 maps the identified consumer expectation themes to selected Sustainable Development Goals SDGs. The study extends its analytical scope toward sustainability by mapping the identified themes onto SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production). This classification has been undertaken to systematically interpret how consumer expectations and operational practices in the cloud kitchen ecosystem relate to broader sustainability objectives. Themes

associated with food safety, nutrition, hygiene, and worker well-being have been grouped under SDG 3, while those reflecting resource efficiency, waste minimization, packaging sustainability, and responsible production processes have been aligned with SDG 12. Such thematic grouping provides a stronger conceptual foundation for demonstrating that routine consumption and service practices are not merely functional attributes but also carry significant health, environmental, and social sustainability implications.

Table 4
Implication of SDGs. SDG 3: Good Health and Well-being

Expectation Theme	Relevance to SDG Framework
Freshly prepared meals	Ensures food safety and promotes healthier consumption, directly supporting customer well-being and public health.
Ingredient quality	High-quality ingredients contribute to better nutrition, improved health outcomes, and reduced food-related health risks.
Consistent taste and flavour	Reflects standardized preparation processes that indirectly support food safety, quality assurance, and consumer trust.
Temperature maintenance	Proper temperature control prevents bacterial growth, food contamination, and potential health hazards, directly aligning with food safety and well-being goals.
Compliance with hygiene and safety regulations	Ensures adherence to health standards, minimizes contamination risks, and protects both consumers and food handlers, strongly supporting SDG 3 objectives.
Labour dignity	Safe, fair, and healthy working conditions for employees contribute to physical and mental well-being, extending SDG 3 beyond consumers to workers as well.

SDG 12: Responsible Consumption and Production

Expectation Theme	Relevance to SDG Framework
Eco-friendly packaging	Reduces environmental impact through sustainable, recyclable, or biodegradable packaging materials, directly supporting responsible production and consumption.
Secure and durable packaging	Minimizes spillage, leakage, and spoilage during delivery, reducing food waste and material wastage.
Waste reduction	Supports efficient use of resources by minimizing food waste, packaging waste, and operational inefficiencies in production systems.
Adapting to market demands	Enables efficient resource allocation, avoids overproduction, and supports sustainable consumption patterns.
Scalability of cloud kitchens	Promotes optimized production systems, centralized resource use, and reduced operational inefficiencies.

5 Results

The themes presented in this section have been identified directly from the participant responses through thematic analysis. Figure 2 depicts the grouping of Sub-themes with established expectation types and representative respondent snippets are mapped alongside each theme to demonstrate their empirical grounding in the collected data.

5.1 Fundamentality of expectations

The first dimension pertains to the fundamental nature of expectations, encompassing both implicit expectations (those assumed as basic by customers) and explicit expectations (those consciously anticipated but not necessarily presumed).

Consistent taste and flavour are considered as implicit because it is the basic quality that consumers naturally assume. (P10) highlighted that *"I just expect it to taste the same every time I order."* (P6) added by saying *"I don't want one order to be amazing and the next one disappointing."*

Freshly prepared meals is a standard unspoken assumption in cloud kitchens. (P1) stated, *"When I order food from cloud kitchens, I expect the food to be freshly prepared only after I place my order. This ensures that the meal is customized according to my preferences and is not pre-prepared or reheated."*

Ingredient quality is a fundamental expectation of food service. (P8) emphasized, *"Ensure to use fresh, high-quality ingredients, like tender and juicy chicken, to ensure the best taste in every order and also no frozen meat"*

Speed of delivery is naturally expected for service efficiency. (P7): *"I also think cloud kitchens are generally good with delivery speed, especially since they operate with the sole focus of delivering food."* (P10): *"One of the major advantages of cloud kitchens is their ability to deliver food quickly, even during peak hours or late at night."* And *"In city life, everything is so fast paced now, so I usually order food when I'm busy with work. I just expect it to be quick and easy fast delivery and tracking really matter to me."* (P6)

Compliance with hygiene and safety regulations is an essential ethical standard. (P11) stated *"I expect the kitchen to follow proper hygiene standards."* And (P10) added *"Food safety isn't something I should have to worry about when ordering."*

Explicit expectations are clearly specified standards that customers expect to be fulfilled. Consumers explicitly express **Affordable pricing** and **Loyalty programs and discounts**. They are clearly stated by the consumers. (P19) mentioned *"If the food is too expensive, I'd rather order from somewhere else."* While (P1) said *"I usually look for discounts or offers before placing an order."* and (P12) *"Regular customers should get some rewards or loyalty points."*

5.2 Precision of Expectations

In terms of precise expectations, which involves precise (i.e. detailed) and fuzzy (i.e. vague) expectations, participants expected cloud kitchens **Secure and durable packaging**. (P8) explained, *"Packaging is especially important because it helps ensure the food stays at the right temperature and doesn't spill or get soggy during transit."* Similarly, (P12) added, *"I expect food to stay fresh and intact during transport."*

Temperature maintenance is a Specific measurable service requirement. (P3) highlighted this concern: *"Unlike a dine-in experience where food is often served right away, cloud kitchens need to ensure that the food remains up to par and delivered hot even after being transported."*

Eco-friendly packaging is a concrete sustainability expectation. (P7) pointed out, *"When we order hot food, and it's packed in plastic containers, it's not very healthy or sustainable. Using biodegradable or recyclable materials for packaging could really set cloud kitchens apart from traditional restaurants and other competitors."* (P16) reinforced this by saying, *"Using more sustainable packaging options, even if it increases costs slightly, would be a big step in the right direction"*

Real-time order tracking is an exact technological service expectation. (P8) noted, *"real-time delivery updates like being able to see where my order is live.. it just feels more reassuring"*

In terms of fuzzy expectations, participants mentioned **Presentation** which is a Subjective and perception-based expectation. This is a fuzzy expectation because the idea of *"appealing"* varies from one consumer to another and lacks a fixed standard. (P7) said *"I like it when the food looks appealing when I open the package."*

Waste reduction is considered fuzzy because it is often interpreted differently by different consumers and can mean packaging, leftovers, or sustainability. (P1) said *"I prefer when there isn't too much unnecessary packaging."* While (P12) mentioned *"I prefer portion sizes that don't leave too much food wasted."*

5.3 Feasibility of Expectations

Regarding realistic expectations, many interviewees appreciated **Responsive complaint resolution** as it reflects customers' inherent expectation that service providers will address issues promptly and effectively as a fundamental standard of service delivery. (P7) suggested, *"Cloud kitchens could develop more responsive customer service channels... If cloud kitchens were able to provide more direct, personalized customer service to address my issues, it would enhance the overall experience."*

Direct communication channels is a practically implementable expectation. (P3) emphasized the importance of a personal touch in customer interactions, stating, *"A more personalized approach to resolving issues—perhaps through more human interaction or quicker follow-ups."* A lack of this personal touch can create detachment and dissatisfaction, as expressed by (P13): *"I feel that cloud kitchens lack the personal touch, which makes it harder to address my order related problems."*

Tailored orders is a Feasible customization service. (P10) expressed, *“There’s always room for more variety, particularly in terms of dietary preferences for me like vegan and also gluten-free options.”* (P14) further highlighted seasonal adaptations: *“Cloud kitchens can stay fresh with seasonal dishes, like pumpkin spice latte in fall, mango lassi in summer, or gajar ka halwa in winter.”* Customization extends beyond ingredients to meal structure. (P6) provided an example: *“If I go for Oven Story cloud kitchen, I can customize four different flavours on my pizza”*. (P12) expressed *“I stay away from home for work, so when cloud kitchens have things like puran poli and chana during puja festival this year, it just feels nice and homely”*

Menu innovation is a Reasonably expected business adaptation. (P17) said *“I don’t want the same dishes every time – I like it when they keep adding something new to the menu.”*

Adapting to market demands is realistic, as customers reasonably expect services to align with evolving consumer preferences. (P9) expected *“when everyone started switching for healthy options or high protein, they should add a few items like that”* and (P11) said *“When there’s a festival season, they should bring special combos or something related.”*

Labour dignity is an ethical and manageable workplace expectation. (P13) said *“When staff are treated well, it usually reflects in the service too.”*

Unrealistic expectations are highly impossible to be satisfied by the service provider like the **scalability of cloud kitchens** because customers often presume that cloud kitchens can effortlessly expand their operational capacity, geographic reach, and additional time slots, disregarding the inherent operational, logistical, and resource constraints of a delivery-only business model. (P2) expected *“Honestly, I expect cloud kitchens to be till midnight, like regular restaurants only. Anytime hunger hits early morning or even late night something should be available, no?”* and (P16) added *“Back in my hometown I used to order from this cloud kitchen all the time full family loved it. Now I’ve moved for work, not getting that same taste here. If they’re doing so well, they should open more branches in every city”*.

Competitive advantage reflects an expectation that is hard to sustain because market conditions constantly change. (P18) highlighted *“They should always offer something better than competitors.”*

6 Management strategies to improve service quality

The second objective of this study was to examine how cloud kitchen operators can align their strategies to meet consumer expectations effectively while contributing to long-term sustainability. The present study proposes a set of management strategies to address the diverse categories of customer expectations identified within cloud kitchen operations. With regard to **implicit expectations**, the findings suggest that providers must ensure the consistent delivery of fundamental service attributes such as taste consistency, freshness, ingredient quality, delivery speed, and hygiene compliance, as failure to meet these basic conditions is likely to generate immediate dissatisfaction. In relation to **explicit expectations**, strategic actions such as value-based pricing, loyalty programs, and customer retention

initiatives are recommended to respond to clearly articulated customer demands. **Precise expectations** require the implementation of measurable and technology-driven strategies, including thermal packaging, secure and eco-friendly packaging solutions, and real-time order tracking systems to enhance service reliability and transparency. Furthermore, **fuzzy expectations** necessitate continuous improvement efforts aimed at enhancing subjective aspects such as food presentation and waste reduction, thereby strengthening customer satisfaction and perceived service value. Concerning **realistic expectations**, the study recommends the adoption of adaptive and customer-centric strategies, including responsive complaint resolution mechanisms, direct communication channels, order customization, menu innovation, and ethical workforce management practices, all of which are operationally feasible and aligned with customer requirements. Finally, in response to **unrealistic expectations**, such as scalability and sustained competitive advantage, cloud kitchen providers are advised to engage in careful strategic monitoring, phased expansion planning, and long-term differentiation initiatives, while managing customer perceptions regarding outcomes that may be difficult to guarantee consistently.

7 A framework for improving service quality in cloud kitchens

Figure 3 presents a framework for managing consumer expectations in cloud kitchen services by linking different expectation categories with relevant management strategies to enhance service quality. It highlights three key dimensions of expectations and outlines strategic actions that service providers can implement to meet customer needs and improve overall service performance.

8 Discussion

The results of the present study support earlier research findings, as systematically demonstrated through the comparative summary provided in Table 5.

Table 5
Key contributions of the present study.

Theme	Authors	Key findings	Present study contributions
Responsiveness	Saghiri & Mirzabeiki (2021); Giousmpasoglou et al. (2024); Peng, Erkok & Omachonu (2024); Khan, Farooque & Ahmad (2025)	Responsiveness depends on direct communication, rapid complaint resolution, real-time order tracking, and unified order management systems that synchronise menus, pricing, inventory, and loyalty programmes across apps, kiosks, aggregators, and in-store channels. Peak-load testing and integrated customer support enhance reliability and service continuity.	Direct communication channels are a practically implementable expectation, with participants emphasizing the importance of personal interaction to resolve issues efficiently. Real-time order tracking is a technological service expectation that reassures customers about delivery progress (P8). Responsive complaint resolution reflects the inherent expectation of prompt and effective service handling. Labour dignity is highlighted as an ethical and manageable workplace expectation, positively influencing service quality. Compliance with hygiene and safety regulations is an essential ethical standard that underpins customer trust. This study links operational and ethical dimensions to tangible customer expectations, providing actionable insights for omnichannel service improvement.
Adaptability	Pookulangara et al. (2023); Kulshreshtha & Sharma (2022); Harini et al. (2025)	Customers expect menu innovation and customization. Cloud kitchens succeed by continuously analyzing the market, adopting innovative strategies (e.g., tamper-evident packaging, dedicated deliveries, contactless service), and staying flexible to meet changing demands. Flexibility helps optimize resource allocation, reduce overcapacity risk, and maximize profits. Competitive advantage arises from unique menus, data-driven insights, and quality service.	The study highlights the potential for cloud kitchens to strategically leverage adaptability as a core competitive advantage. By prioritizing operational flexibility, continuous innovation, and data-driven decision-making, operators can anticipate market trends, enhance customer satisfaction, expand successfully into new markets, and sustain long-term growth.

Theme	Authors	Key findings	Present study contributions
Convenience	Darekar et al. (2020); Hakim et al. (2022); Rout et al. (2022); Ahmed Khan et al. (2022)	Customers prioritize affordable pricing, fast delivery, secure and durable packaging, temperature maintenance, and loyalty programs. Operational efficiencies make cloud kitchen meals more affordable than traditional restaurants. Quick delivery is a key driver in densely populated areas. Packaging influences perceived food quality, and customers are willing to pay more for enhanced, sustainable, food-safe solutions. Loyalty programs and discounts act as strong ordering incentives but may vary in perceived value.	The study demonstrates that cloud kitchens can strengthen competitive positioning by systematically addressing convenience-related expectations. Operators can leverage affordability, speed, secure and temperature-controlled packaging, and loyalty initiatives to enhance customer satisfaction, build retention, and align with sustainability goals (SDG 3 & 12). Ensuring consistent convenience not only meets current consumer demands but also enables scalability and differentiation in highly competitive urban markets.
Quality	Fridayani et al. (2021); Ha & Jang (2010); Liu et al. (2017); Chang et al. (2014)	Customers highly value fresh, high-quality, and hygienic meals. Food attributes such as taste, nutrition, variety, presentation, and portion size strongly influence satisfaction and repurchase intention. Consistent quality affects trust and willingness to order from online or delivery-based services.	The study shows that consistent taste, freshness, and ingredient quality are critical drivers of customer satisfaction and loyalty in cloud kitchens. Participant insights reinforce that these expectations are assumed as basic standards. This highlights the potential for cloud kitchens to leverage rigorous ingredient sourcing, standardized preparation protocols, and real-time quality checks to maintain brand trust and enhance customer retention.
Sustainability	Harini et al. (2025); Leonidou (2018); Telaumbanua et al. (2023); Sultana, Nikhat, & Ahmed (2025); Fu et al. (2024); Shankar et al. (2022)	Sustainable practices such as eco-friendly packaging, waste reduction, and optimal resource utilization can provide competitive advantage for cloud kitchens. Efficient inventory management, just-in-time production, and environmentally conscious operations help reduce environmental footprints.	The study shows that cloud kitchens can differentiate themselves by adopting eco-friendly packaging, reducing waste, and integrating sustainability into operational design. This highlights the potential for cloud kitchens to align profitability with environmental stewardship, meet regulatory and consumer expectations, and

Theme	Authors	Key findings	Present study contributions
		However, increasing delivery speed and convenience can create tension with environmental goals (e.g., increased packaging and transport emissions). Consumer awareness and preference for sustainability are rising, highlighting the strategic importance of green practices.	gain long-term strategic advantage.

8.1 Theoretical implications

Grounded in Expectation-Confirmation Theory, this study contributes to the service quality literature by developing a comprehensive and empirically grounded framework that systematically categorizes consumer expectations within cloud kitchen contexts. It extends existing theory by reconceptualizing expectations as a multidimensional construct of expectation quality, comprising fundamentality, precision, and feasibility, thereby shifting the focus from expectation levels to expectation structure. Figure 4 illustrates the qualitative extension of expectation–confirmation theory with three new dimensions identified in this study.

This study builds on prior service management and Consumer Behaviour research on customer expectations by identifying three key dimensions - fundamentality (implicit to explicit), precision (vague to specific), and feasibility (unrealistic to realistic). By organizing expectations along these continua, it highlights the theoretical importance of systematically classifying expectations to better understand and enhance service quality.

Extending prior work on service quality in OFODS, the study further uncovers additional expectation categories linked to broader provider attributes, particularly environmental and social sustainability, thereby expanding the scope of expectation research beyond functional service dimensions.

8.2 Managerial implications

The findings provide strategic guidance for cloud kitchen operators by demonstrating that consumer expectations must be managed not only for service performance but also for sustainability alignment. By categorizing expectations into six distinct types, the framework enables cloud kitchen operators to systematically prioritize customer expectations. This facilitates more effective decision-making in addressing key expectations to better meet operational goals and customer needs. By categorizing expectations into fundamentality, precision, and feasibility, managers can prioritize core attributes such as food quality, safety, and timely delivery directly supporting SDG 3 (Good Health and Well-being) while simultaneously embedding responsible packaging, transparency, and portion control practices aligned

with SDG 12 (Responsible Consumption and Production). Expectations related to convenience, scalability, and competitive pricing should be managed carefully to sustain economic performance under SDG 8 (Decent Work and Economic Growth) without exacerbating logistical inefficiencies or carbon intensity associated with SDG 13 (Climate Action). This structured framework enables data-driven resource allocation, operational optimization, and sustainable service design. Ultimately, aligning consumer expectation management with broader sustainability objectives allows cloud kitchen operators to enhance customer loyalty while building resilient, environmentally responsible, and economically viable business models.

8.3 Limitations and Future Scope

The current study has certain limitations offering opportunities for future research. This study was conducted with cloud kitchens consumers in Chennai, India. The findings could be strengthened by replicating the study in other cities to capture diverse consumer preferences. The study is limited by its focus on respondents aged 18–24, which may not capture variations in expectations across broader age groups, thereby restricting generalizability; future research can address this by including more diverse age segments. Additionally, future research could categorize consumers by age, marital status, and family composition, as expectations may differ across these groups. The study is limited by its focus on young urban consumers who frequently use online food delivery services, which may restrict the generalizability of the findings. Future research should include more diverse demographic groups and contexts to enhance the broader applicability of the results. Although this study adopted a qualitative research design, future studies may improve the reliability of the findings through statistical validation. Although convenience sampling has limitations such as selection bias and limited generalizability, it was appropriate for this exploratory qualitative study to gain in-depth insights into consumers experienced with cloud kitchens. This approach ensured access to information-rich participants while supporting the study's objectives of understanding consumer expectations. Moreover, integrating the perspectives of online food delivery aggregators and delivery partners could provide better understanding of the cloud kitchen food delivery model. Finally, exploring the practical relevance of these insights in similar sectors like grocery delivery and quick commerce would offer valuable cross-industry implications.

Conclusion

This study explored the expectations of cloud kitchen consumers and their influence on operational and strategic service practices. Thematic analysis identified five predominant themes, which were further organized into six established types of consumer expectations. These expectation types were then grouped under into three overarching dimensions - Fundamentality, Precision, and Feasibility of expectations providing a structured lens to better understand and prioritize consumer expectations by the cloud kitchens operators. The findings highlight the importance of aligning operational strategies with consumer expectations through efficiency, innovation, and technology integration to enhance satisfaction, loyalty, and service excellence in cloud kitchens and also the study highlight that consumer expectations in cloud kitchens are closely intertwined with broader sustainability objectives, particularly

SDG 3 and SDG12. Aligning operational strategies with these goals enables cloud kitchens to contribute meaningfully to health, economic resilience, responsible consumption, and climate action.

The study also offers a strategic framework to guide cloud kitchen service providers in addressing key consumer expectations and fostering sustainable growth, providing management strategies to align these expectations, which were derived directly from consumer insights collected during the interviews. While conducted in Chennai, India, the insights have broader relevance for emerging economies with similar digital and post-pandemic shifts in the food service industry. Future research could replicate this study across cities or countries to examine contextual influences on consumer expectations and digital adoption. Overall, this study emphasizes that a strategic, consumer-centric approach in managing consumer expectations is vital for the long-term success and sustainability of cloud kitchens.

Declarations

Consent to Publish

Not applicable.

Consent to Participate

Written informed consent was obtained from all participants prior to the commencement of the face-to-face semi-structured interviews. Participants were informed about the purpose of the study, the voluntary nature of their participation, the confidentiality of their responses, and their right to withdraw from the study at any time without any consequences.

Ethics Statement

This study was approved by the Institutional Ethical Committee for Studies on Human Subjects (IECH), Vellore Institute of Technology (VIT), Chennai, India (Reference No. VIT/IECH/CC/2024/48). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and in compliance with the guidelines and regulations of the Institutional Ethical Committee for Studies on Human Subjects (IECH), VIT. Written informed consent was obtained from all participants prior to their participation in the study.

Conflict of Interest

The authors declare that they have no competing interests.

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Author Contribution

S.A.: Conceptualization, Data Collection, Methodology, Formal Analysis, Writing – Original Draft and S.M: Conceptualization, Methodology, Supervision, Formal Analysis, Writing – Review & Editing.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. The corresponding author can be contacted at Sujatha.manohar@vit.ac.in

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Figures

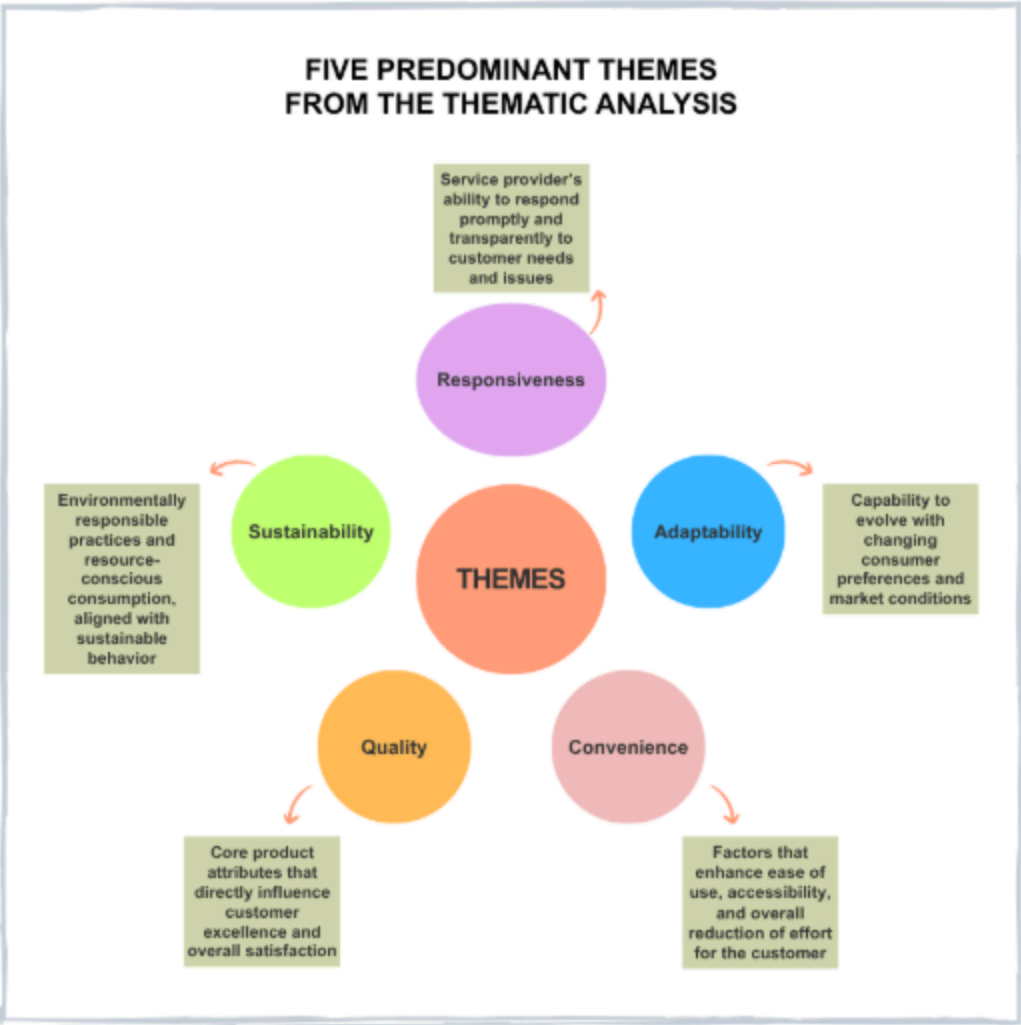


Figure 1

Key themes identified through inductive thematic analysis

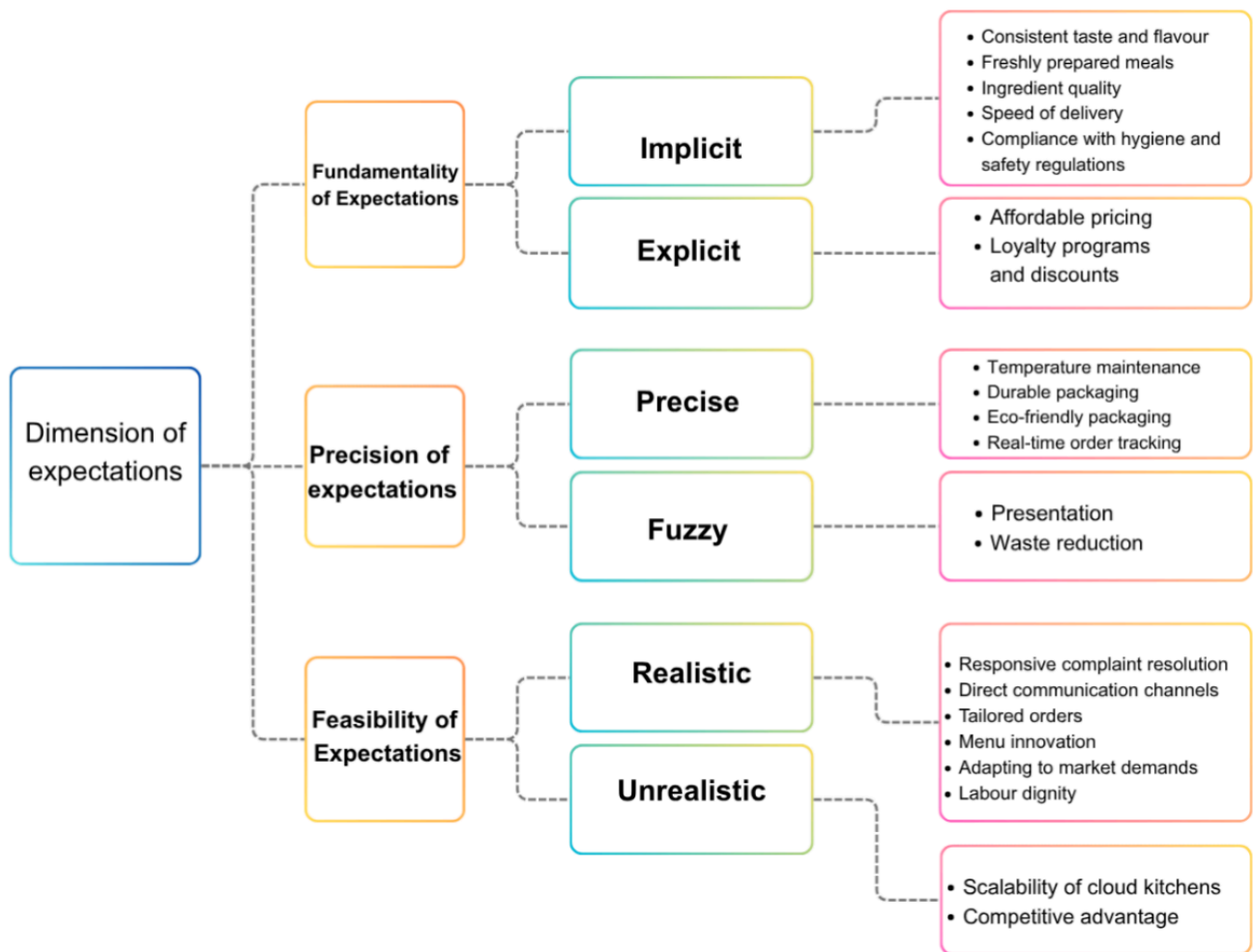


Figure 2

Grouping of sub-themes with established expectation types

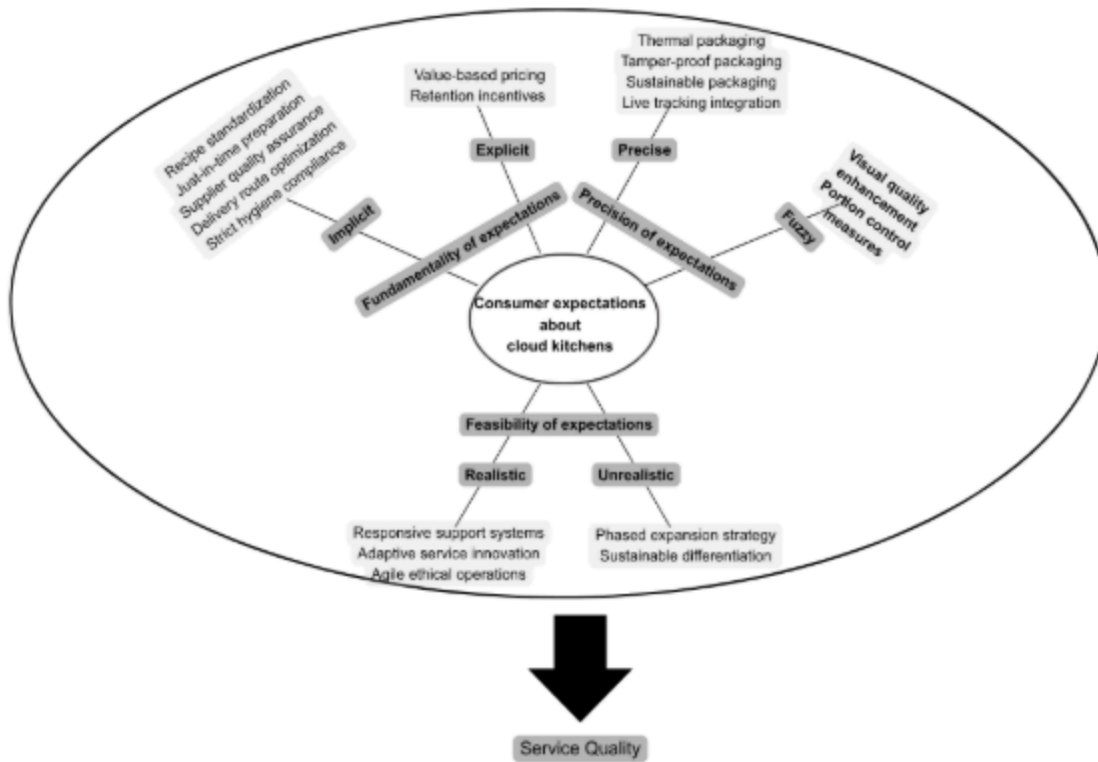


Figure 3

Framework for improving service quality in cloud kitchens

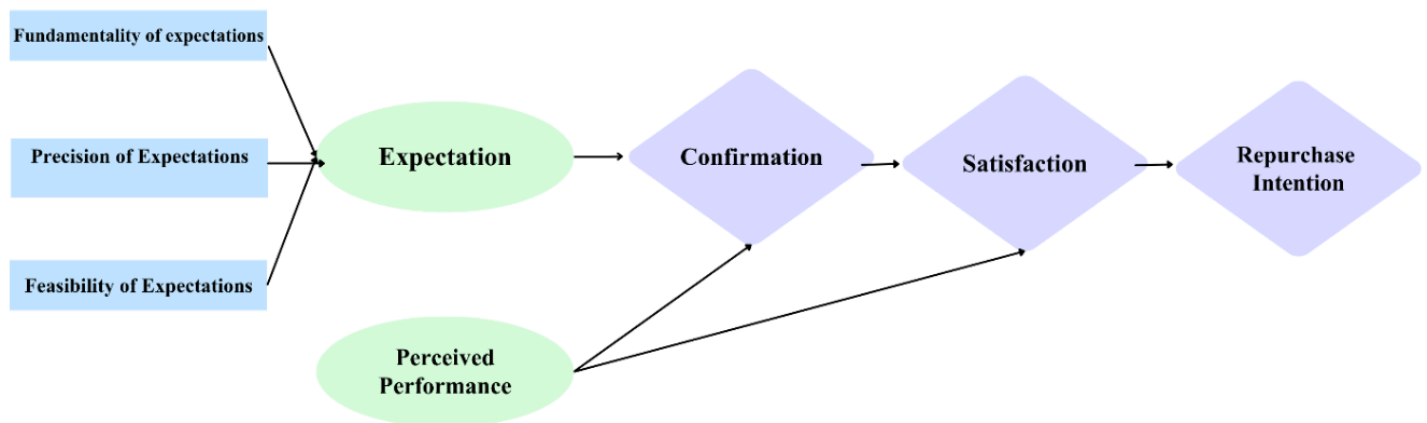


FIGURE 4
A Qualitative Extension of Expectation–Confirmation Theory Through Expectation Quality Dimensions

Figure 4

See image above for figure legend