Impact of Cloud Kitchens on Traditional Restaurant Revenue: Evidence from the Delhi NCR Region

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Abstract: *This study investigated the effect of cloud kitchens on the revenue of traditional restaurants in the Delhi NCR region. Using a purposive sampling technique, data were collected from 173 restaurant owners and managers through a survey, with a final sample size of 116. Multiple regression analysis was employed to explore the influence of various factors, including technology adoption, operational costs, customer preferences, and competition intensity. The results revealed that the number of cloud kitchens, their market share, promotional activities, and technology adoption had a significant positive impact on the revenue of traditional restaurants. Conversely, consumer spending patterns and operational costs did not show significant effects. The geographic location of restaurants also emerged as a crucial determinant of revenue. These findings suggested that traditional restaurants needed to adapt to the increasing presence of cloud kitchens by enhancing their marketing strategies, embracing technology, and considering location-specific advantages. The study provided actionable insights for traditional restaurants to navigate the competitive pressures posed by cloud kitchens and improve their revenue performance.*

Keywords: Cloud Kitchens, Traditional Restaurants, Revenue Impact, Delhi NCR, Technology Adoption

1. Introduction to Cloud Kitchens

There has been a huge transformation in recent years, particularly when one talks about Cloud Kitchens. Cloud kitchens also known as virtual kitchens are in function without traditional restaurants. When one talks about India, it's widely known for its rich heritage and focal point for food innovation. Hence, Online food delivery is said to be the widest area in the food industry—expanding from a market worth USD 60 billion in 2018 to USD 365 billion by 2030, according to a UBS forecast. Growth in markets, knowledge among consumers, improvement in technology and the shift from offline to online mode are the reasons responsible for its immense growth. The reason why cloud kitchens are getting popular, is that many business houses don't want to spend much on the physical location which ultimately leads to less of the investment while starting a new venture as the spaces are at premium, the cloud kitchen seems perfect. In 2021, the global cold kitchen market size was valued at 61.62 billion dollars, furthermore it is expected to grow at 12.4% by 2028.

History of Cloud Kitchens

Cloud Kitchens is a ghost kitchen company started by Diego Berdakin and EarthLink founder Sky Dayton in 2015. In 2018, Travis Kalanick purchased a controlling stake in City Storage Systems LLC, founded by Diego Berdakin and Sky Dayton, for $150 million, which operates as the parent company of CloudKitchens and is operated by Berdakin and Barak Diskin This parent company arrangement allows CloudKitchens to operate as a shell company and to keep a level of secrecy or stealth to the startup. In India, Cloud kitchens are not a new concept: pizza delivery restaurants have been around for decades, and, specifically, pizza prepared for take-out came to be in the 1950s. Initially In 2003, Rebel Foods, backed by Sequoia, started its first business, Faasos, which sells Kebabs. Today, Rebel Foods

has over 9 brands and recently raised $125 million and is valued at $525 million.

Early beginnings in (2013-2016) there was emergence of food delivery platforms and first movers. Early in 2013 with the rise of Swiggy and Zomato, cloud kitchens took shape in India along with REBEL Foods who early adopted this model. With the passage of time, in (2017-2019) the cloud kitchens entered in their growth phase where new entrants say BOX 8, Fresh Menu started creating their place in Market without charging more cost. This scenario adds more new Investors who showed interest in this sector. Moreover advanced technology also plays a pivotal role with the help of which more customer base was created easily with the help of AI driven Insights, Data Analytics etc.

Cloud kitchen, called Ghost Kitchen, got a major breakthrough and vast expansion in 2020 due to the impact of COVID-19 Pandemic, which led to shutting down of many restaurants. Innovation like broader menu offerings, utilization of resources, emergence of many brands cloud kitchen allows expansion in this sector.

Significance of Studying Cloud Kitchen

Study of cloud kitchens is quite significant as it clearly shows their impact on economy, behavior of consumer and also the food industry. Let's highlight few points that highlight its importance:

1) Impact on economy in terms of generating employment, attracts more investment as of now, getting maximum returns hence driving the economic growth.
2) It leads to increased demand for quality food delivery options, variety of menus and also adapting the way customers create their demands and preferences.
3) Growing technologies further adds to derive more customer data from online orders and getting better insights about customer preferences and tastes. Moreover

this further leads to driving more innovations in the food industry.

4) COVID -19 is the major breakthrough factor leading to the growth of Cloud kitchens as it was the more convenient option both for businesses and consumers.

5) It also challenges the traditional restaurants in terms of variety of food, dining space and better availability of food at distant places. They can quickly adapt to changing consumer preferences, experimenting with new menu items and dietary trends.

2. Literature Review

Maurya, Subramaniam and Dixit, 2021 The cloud kitchen market is projected to reach an appraised of 2 billion in India by 2024, and high domestic and international investment into large companies functions on cloud kitchen models deliberate this fast growth. Covid -19 as a pandemic has forced offline business to adapt, and concepts such as cloud kitchens to rise.

Dr. Vidhu K Mathur 2021 Cloud kitchen is more productive than traditional dine-in delivery only operation and it is also feasible for cloud kitchens to run multiple brands at one location which is impossible for a restaurant.

Nitesh chouhan 2019 increasing in use of social media has provided an occasion for the growth of cloud kitchens and rise in the number of customers. Social media platforms are used by most of the cloud kitchens ventures. Cloud kitchens fascinate customers for its innovative products, for the taste and quality of food, fast food items provided by some cloud kitchens and easy accessibility at the doorway.

Bhattacharya, 2020 Cloud kitchens offer lower overhead costs, increased efficiency, elasticity and reduced labor costs. The future is for home delivery food and divest cloud kitchen ventures advertised through social media marketing which is less costly compared to big hoarding and billboards.

Sofi and Srivastav, 2020 Food delivery Apps (FDAs) have not existed in Indian markets for very long, but have taken hold in the Indian food industry better than most other new businesses in the past decade. With the advancement of e-commerce and related technologies, companies such as zomato, Swiggy have taken advantage of the growing youth population and demands of the same in India, by abolishing logistical costs and worries and expanding to an online-only system.

Rise of Cloud Kitchen in India in Previous Half Decade
Cloud Kitchen is climbing the ladder of expansion due to increasing demand of consumers regarding online food delivery. Consumers particularly in developed and developing countries are consuming more meals that leads to the growth of market. As the demand of ready to eat food among the present generation due to various constraints pushes the market value. Multiple research firms have projected that by 2026, the **cloud** kitchen market in India will be worth $1.9 billion. Because the market recorded a business number of $800 million in 2022, this demonstrates that the market is surging. The consistent growth of online meal ordering is the reason for this increase.


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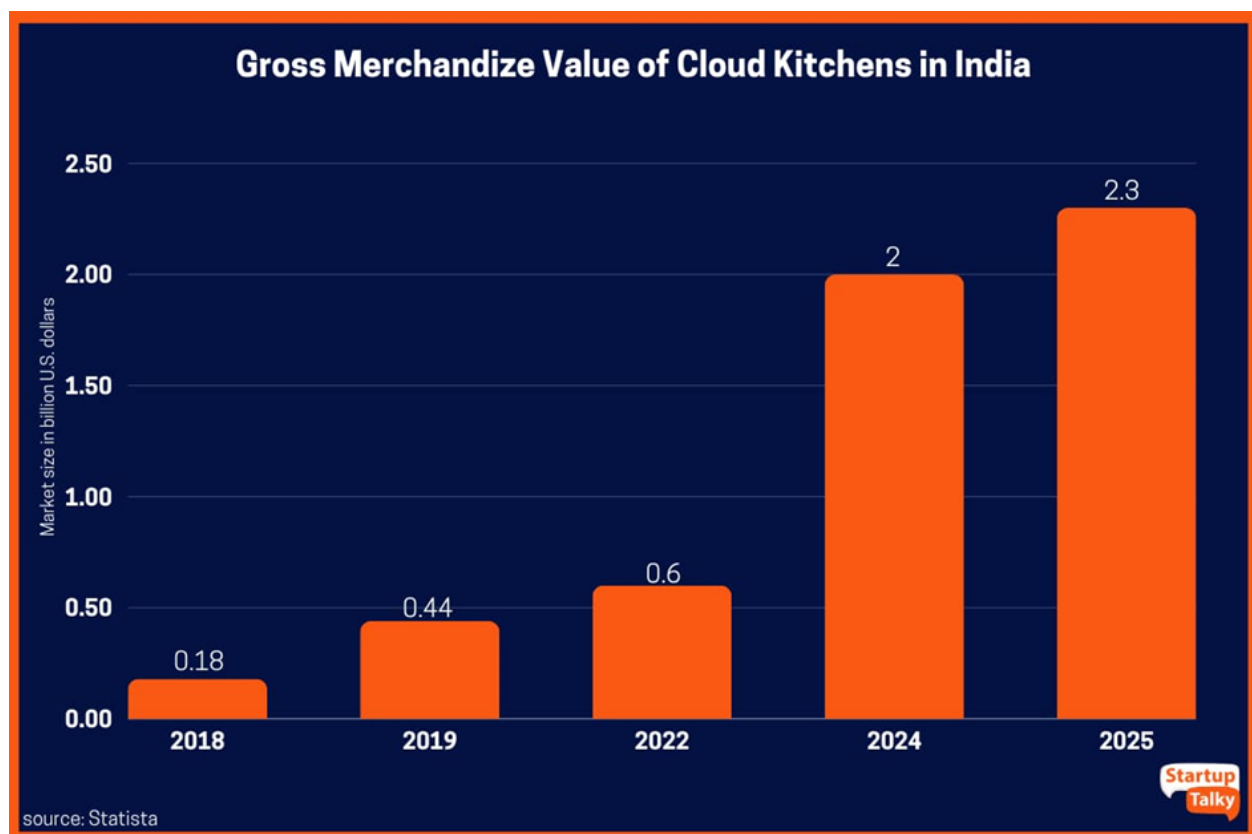
Challenges Faced by Cloud Kitchen in India

In india cloud kitchen faced many challenges which directly or indirectly impact on the growth of cloud kitchen, Now we deeply discuss about the challenges which is faced by cloud kitchen in points:

- **Late delivery:** The staff is not able to keep up to the expectations of on time delivery during a busy schedule or peak seasons. This often results in the late delivery of food, thereby resulting in uncertain outcome.
- **Intense competition:** The increasing popularity of cloud kitchen has led ta a highly competitive market. With more players entering the industry, standing out and attracting customers can be challenging.
- **Food safety & Quality control:** Ensuring consistent food quality & safety across multiple kitchens and delivery partners. Maintaining quality standard crucial for customers satisfaction and retention.
- **Profitability:** Achieving profitability in a competitive market with thin margins can be a significant challenges for cloud kitchens. Managing cost, optimizing pricing strategies and achieving economies are crucial long-term sustainability.
- **Customer satisfaction:** Meeting high customer expectations for food quality, delivery speed and customer service. Meeting this expectation is crucial for cloud kitchen to build customer loyalty drive repeat business and maintain a competitive edge in the market.

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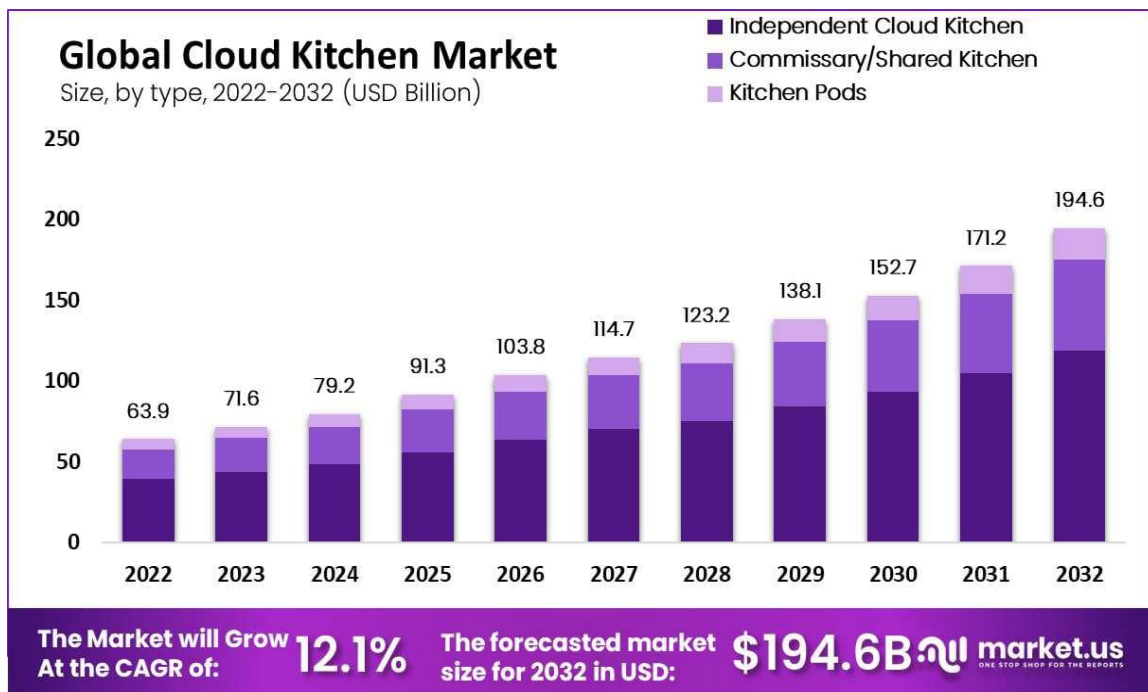
Objective of the Study

The primary objective of this study was to assess the impact of the cloud kitchen segment on the revenue generated by traditional restaurants, examining aspects such as technology adoption, operational costs, customer preferences, competition intensity, and the influence of geographic location on traditional restaurant revenue.

3. Research Methodology

The research was conducted offline, focusing on restaurant owners and managers of traditional restaurants in the Delhi NCR region. Data collection was executed through purposive sampling technique, selecting participants on a first-come, first-served basis, prioritizing those willing to engage in the survey. A survey questionnaire, in English, was designed to gather information on respondent's demographic profiles and their perceptions of factors related to cloud kitchens that influenced the revenue share of their restaurant business. A total of 173 questionnaires were distributed in person, with consent obtained from each participant. Upon receipt of the completed questionnaires, a thorough review was performed to identify any missing values, inconsistencies, or errors. It was determined that 57 of the 173 questionnaires contained such issues and were therefore excluded from the analysis to ensure the accuracy and reliability of the results. Consequently, the final sample size for analysis was 116. Following data organization, the information was input into IBM SPSS software version 26 for analysis. The analysis involved frequency and percentage calculations, as well as multiple regression analysis, to examine relationships and patterns within the data.

4. Analysis and Results

First of all, the reliability of the data was checked using Chronbach's alpha test values. The overall Chronbach's alpha test value of the scale was found to be .791 and the Chronbach's alpha test values for individual items on the scale ranged from 0.705 to 0.790, which were significantly higher than the standard 0.7 (Table 1). To determine the impact of cloud kitchens on the revenue generated by the traditional restaurants in Delhi NCR region, a null Hypothesis (H_0) "The presence of cloud kitchens has no significant impact on the revenue generated by the traditional restaurant

industry" was formulated and tested using multiple regression analysis.

Table 1: Cronbach's Alpha Test Statistics

Factors Affecting the Revenue Share of Traditional Restaurant in Delhi NCR region	Cronbach's Alpha (α)
Number of Cloud Kitchens	0.774
Market Share of Cloud Kitchens	0.79
Consumer Spending Patterns of Cloud Kitchens	0.719
Promotional Activities by Cloud Kitchens	0.712
Technology Adoption in Traditional Restaurants	0.707
Operational Costs for Traditional Restaurants	0.741
Customer Preference for Cloud Kitchens over Traditional Restaurants	0.713
Economic Factors Favorable to Cloud Kitchens	0.744
Competition Intensity from Cloud Kitchens	0.705
Impact of Geographic Location on Traditional Restaurant Revenue	0.755

The regression analysis conducted to assess the individual impact of various factors on the revenue share of traditional restaurants in the Delhi NCR region revealed several significant findings (Table 2). The model summary indicates that the constant term was 0.408 with a standard error of 0.191, which was statistically significant with a p-value of 0.035. Among the factors analysed, the *"number of cloud kitchens"* had a positive and significant impact on revenue share, with a beta coefficient of 0.265, a standard error of 0.015, a t-value of 5.552, and a p-value of 0.000. Similarly, the *"market share of cloud kitchens"* also significantly influenced the revenue share, showing a beta coefficient of 0.258, a standard error of 0.021, a t-value of 5.732, and a p-value of 0.000. "Consumer spending patterns" of cloud kitchens did not have a significant impact on revenue share, as indicated by a beta coefficient of 0.062, a standard error of

0.036, a t-value of 1.027, and a p-value of 0.307, which is not statistically significant. In contrast, "promotional activities by cloud kitchens" had a positive and significant effect, with a beta coefficient of 0.157, a standard error of 0.041, a t-value of 2.598, and a p-value of 0.011.

"Technology adoption in traditional restaurants" positively impacted revenue share, as evidenced by a beta coefficient of 0.161, a standard error of 0.037, a t-value of 2.831, and a p-value of 0.006. "Operational costs for traditional restaurants", however, did not significantly affect the revenue share, with a beta coefficient of 0.070, a standard error of 0.032, a t-value of 1.344, and a p-value of 0.182. "Customer preference for cloud kitchens over traditional restaurants" was also a significant factor, showing a beta coefficient of 0.128, a standard error of 0.035, a t-value of 2.402, and a p-value of 0.018. "Economic factors favourable to cloud kitchens" had a substantial impact, with a beta coefficient of 0.186, a standard error of 0.026, a t-value of 3.856, and a p-value of 0.000. Finally, the "intensity of competition from cloud kitchens" was found to significantly influence revenue share, with a beta coefficient of 0.170, a standard error of 0.026, a t-value of 3.230, and a p-value of 0.002. The impact of "geographic location on the revenue of traditional restaurants" was notably significant, with a beta coefficient of 0.296, a standard error of 0.022, a t-value of 6.362, and a p-value of 0.000.

It was evident from the interpretation of the regression analysis that the results of the analysis provided clear evidence against the null hypothesis. The regression analysis provided substantial evidence that the presence of cloud kitchens significantly influenced the revenue generated by traditional restaurants, leading to the rejection of the null hypothesis.

Table 2: Model summary of individual impact of factors affecting revenue share of traditional restaurant in Delhi NCR region

Model	B	Std. Error	Beta (β)	t	p
(Constant)	0.408	0.191		2.136	0.035
Number of Cloud Kitchens	0.084	0.015	0.265	5.552	0
Market Share of Cloud Kitchens	0.118	0.021	0.258	5.732	0
Consumer Spending Patterns on Cloud Kitchens	0.037	0.036	0.062	1.027	.307*
Promotional Activities by Cloud Kitchens	0.107	0.041	0.157	2.598	0.011
Technology Adoption in Traditional Restaurants	0.103	0.037	0.161	2.831	0.006
Operational Costs for Traditional Restaurants	0.042	0.032	0.07	1.344	.182*
Customer Preference for Cloud Kitchens over Traditional Restaurants	0.083	0.035	0.128	2.402	0.018
Economic Factors Favorable to Cloud Kitchens	0.1	0.026	0.186	3.856	0
Competition Intensity from Cloud Kitchens	0.085	0.026	0.17	3.23	0.002
Impact of Geographic Location on Traditional Restaurant Revenue	0.14	0.022	0.296	6.362	0

5. Conclusion

The regression analysis conducted to assess the impact of various factors on the revenue share of traditional restaurants in the Delhi NCR region provided valuable insights into the evolving dynamics of the restaurant industry. The results decisively rejected the null hypothesis, demonstrating that cloud kitchens have a significant effect on traditional restaurant revenues. The analysis revealed that both the "number of cloud kitchens" and the "market share of cloud kitchens" exerted a substantial and positive influence on revenue share, underscoring the increasing prominence of cloud kitchens within the competitive landscape. This finding highlights the need for traditional restaurants to acknowledge

and adapt to the growing presence of cloud kitchens as a critical factor in their business strategies. Conversely, "consumer spending patterns" related to cloud kitchens did not significantly impact revenue share, suggesting that shifts in consumer preferences may not directly translate into immediate revenue changes for traditional restaurants. Promotional activities by cloud kitchens emerged as a significant factor affecting revenue share, emphasizing the importance of marketing and promotions in shaping consumer behaviour and, consequently, the financial outcomes of traditional restaurants. This suggests that traditional restaurants may benefit from enhancing their promotional strategies to better compete with cloud kitchens. Furthermore, the positive effect of technology adoption on

revenue share indicates that investing in technological advancements can improve operational efficiency and customer engagement, leading to enhanced financial performance for traditional establishments. On the other hand, operational costs did not have a significant impact on revenue share, suggesting that while managing costs remains crucial, it may not directly influence revenue in the current context. The significant effect of "customer preference for cloud kitchens over traditional restaurants" reflects a shift in consumer choices that traditional restaurants need to address to remain competitive. Economic factors favouring cloud kitchens were found to play a substantial role in shaping revenue outcomes, indicating that broader economic conditions and market trends are essential considerations for traditional restaurants. The analysis also highlighted the significant impact of competition from cloud kitchens on revenue share, illustrating the intense competitive pressure traditional restaurants face. Additionally, the importance of geographic location in determining revenue potential underscores that traditional restaurants must consider their location when formulating strategies for success.

In light of these findings, traditional restaurants are encouraged to strategically address the growing influence of cloud kitchens by enhancing their marketing efforts, adopting technological innovations, and responding to shifting consumer preferences. Furthermore, they should consider their geographic location and competitive environment when developing their business strategies. By proactively adapting to these factors, traditional restaurants can better position themselves to thrive in a competitive market increasingly shaped by the rise of cloud kitchens.

6. Suggestions and Discussion

Based on these findings, it is recommended that traditional restaurants strategically adapt to the rising prominence of cloud kitchens. Investing in targeted marketing and promotional activities could help in countering the competitive pressures and attracting more customers. Additionally, embracing technological advancements should be a priority, as it can enhance operational efficiency and customer satisfaction. Traditional restaurants should also consider adjusting their business models to better compete with cloud kitchens, possibly by incorporating elements that cloud kitchens excel in, such as streamlined operations and delivery efficiency. Furthermore, traditional restaurants should explore ways to leverage geographic location advantages to maximize revenue potential. This could involve optimizing location-specific strategies to draw in local customers or expand into underserved areas. It is also important for traditional restaurants to stay attuned to economic factors and consumer trends, ensuring they remain adaptable in a rapidly evolving market.

Overall, the study underscores the need for traditional restaurants to be proactive and innovative in addressing the challenges and opportunities presented by the growing influence of cloud kitchens. By strategically aligning their operations and marketing efforts with the changing dynamics of the industry, traditional restaurants can enhance their competitive edge and improve their revenue outcomes.

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