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EVALUATING CUSTOMER SATISFACTION THROUGH SERVICE QUALITY IN FOOD DELIVERY: INSIGHTS BEFORE AND AFTER AI ADOPTION

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ABSTRACT

The study examines the impact of service quality metrics on customer satisfaction before and after the implementation of Artificial Intelligence (AI) in food delivery services. Primary data was collected in the Hyderabad region using a convenient sampling method, and a mixed research approach combining quantitative and exploratory analysis was adopted to achieve the framed objectives. Statistical techniques such as regression and exploratory factor analysis were applied to evaluate the findings. Results indicate that before AI adoption, order accuracy, delivery speed, and quick issue resolution were the most critical drivers of customer satisfaction, reflecting the importance of reliability and responsiveness. Following AI integration, service reliability improved substantially, with faster order processing and enhanced delivery accuracy emerging as dominant factors. However, assurance showed a slight decline, highlighting that customers still seek human-backed support alongside technological efficiency. Despite improvements, challenges persist in the form of operational inefficiencies like technical glitches and GPS inaccuracies, limited personalization in AI recommendations, and trust-related issues concerning data privacy and fraud detection. The study underscores the dual nature of AI in enhancing efficiency while also creating new service quality challenges, offering valuable insights for both academia and industry stakeholders.

INTRODUCTION

The food delivery industry has witnessed remarkable growth over the last decade, driven by changing consumer lifestyles, digital platforms, and increasing demand for convenience. With the rise of mobile applications and on-demand services, food delivery has evolved from a traditional phone-based model to a highly digitized and app-driven ecosystem. Consumers today expect speed, accuracy, and reliability, making service quality a critical determinant of customer satisfaction and business success. To meet these expectations, companies have increasingly turned to advanced technologies such as Artificial Intelligence (AI), which is reshaping the operational and service dimensions of the industry.

AI integration has transformed various aspects of food delivery operations, including order processing, personalized recommendations, real-time delivery tracking, automated customer service, and predictive demand management. Chatbots and virtual assistants are now handling customer queries, while machine learning algorithms optimize delivery routes and reduce waiting times. AI also enables data-driven personalization, offering customized promotions and meal suggestions based on past consumer behavior. Such advancements highlight the growing reliance on AI as a driver of efficiency, accuracy, and personalization, ultimately influencing the overall perception of service quality.

While technological advancements promise efficiency, the essence of food delivery lies in service quality, which encompasses timeliness, reliability, responsiveness, empathy, and assurance. Service quality not only impacts customer satisfaction but also directly influences customer loyalty, brand reputation, and long-term competitiveness. However, the introduction of AI raises important questions: Does AI genuinely enhance service quality, or does it create new challenges such as lack of human interaction, reduced

empathy, and dependence on technology? Addressing this question requires a comparative analysis of customer experiences before and after AI integration in food delivery services.

Although existing studies have examined the adoption of AI in the food and hospitality sectors, there remains limited research that explicitly measures service quality changes before and after AI integration. Most available literature focuses either on technological adoption or customer satisfaction in isolation, without linking them to established service quality frameworks. Furthermore, comparative evaluations across the two phases—traditional delivery methods versus AI-driven models—are scarce. This gap highlights the need for systematic research that evaluates how AI has redefined the service quality dimensions in food delivery.

This study seeks to bridge this gap by evaluating the impact of AI integration on service quality in food delivery services. By examining customer perceptions and service outcomes before and after AI implementation, the study aims to provide a holistic understanding of the technological shift. The findings will not only contribute to academic literature on AI and service quality but also offer practical insights for food delivery companies seeking to enhance customer satisfaction and gain a competitive edge. Ultimately, this research emphasizes the importance of balancing technological efficiency with human-centric service values in an AI-driven food delivery landscape.

NEED OF THE STUDY

The rapid expansion of AI-powered food delivery services in India, driven by platforms, has significantly reshaped customer expectations and operational efficiency. AI has enabled real-time tracking, dynamic pricing, automated chatbots, and predictive analytics, improving order accuracy, delivery speed, and personalized customer experiences. However, there is a growing concern over service quality. Understanding the impact of AI on customer satisfaction is crucial for food delivery companies to refine their service strategies. This study is essential to evaluate the effectiveness of AI in food delivery, address existing challenges, and provide recommendations for optimizing AI-driven service quality. By analyzing customer perceptions, operational bottlenecks, and industry trends, this research will assist food delivery platforms in India in enhancing AI-driven customer experiences while maintaining service efficiency and reliability.

REVIEW OF LITERATURE

Jack Collison (2020), The study investigates the impact of online food delivery services on restaurant sales, analyzing the extent to which these services expand the market or cannibalize traditional brick-and-mortar restaurant revenues. The findings indicate that while 30-50% of online food delivery sales are incremental, the remaining portion replaces dine-in sales, leading to reduced profitability for traditional restaurants. Using a difference-in-differences methodology, the study suggests that convenience and consumer spending habits drive this shift. The conclusion states that while online food delivery services increase overall restaurant revenues, they pose challenges for profitability, urging traditional restaurants to adapt their business models accordingly.

Lau Teck Chai & D. N. C. Yat, (2020), The Study focus on the growth and market potential of online food delivery services in Southeast Asia. The study highlights that while the food market is a trillion-dollar industry, the food delivery segment remains a small fraction but has significant growth potential. Findings suggest that by 2022, the food delivery market was expected to reach USD 956 million in annual revenue, making it one of the fastest-growing sectors in the food industry. The study concludes that online food delivery services are becoming the new normal, presenting immense opportunities for future expansion.

Jose Mathew, **et al (2021)**, The Study focus on fraud detection in online food delivery services using an AI-based weak supervision framework called DeFraudNet. The study addresses challenges in identifying fraudulent claims due to the lack of reverse logistics in food delivery, making manual fraud detection expensive and time-consuming. Findings indicate that leveraging AI with noisy data sources, such as customer interactions and business rules, helps detect fraudulent activities more efficiently. The study concludes that DeFraudNet provides an effective and scalable solution to combat fraud in online food delivery platforms.

Shahira Ariffin et al. (2021),The study focuses on understanding the factors influencing the continuous intention to use online food delivery apps among young adults in Malaysia. The research finds that information quality, performance expectancy, and social influence have a positive relationship with the continuous use of food delivery apps, with social influence being the most significant factor. The study, based on data from 300 respondents analyzed using SPSS, highlights the growing reliance of young consumers on food delivery services due to social and technological factors. The conclusion suggests that food delivery platforms must enhance information quality and user experience while leveraging social influence to sustain long-term consumer engagement.

Satender Pal Singh et al. (2023), The research examines how the COVID-19 pandemic has influenced consumer preferences and willingness to pay (WTP) for online food delivery services in India. The study finds that consumer preference has shifted from price sensitivity to prioritizing food and packaging quality, especially for larger orders, where packaging quality outweighs delivery time concerns. Using conjoint analysis, the study highlights that WTP is highest for food quality, followed by convenience and packaging. The conclusion emphasizes that online food delivery companies must adapt to post-pandemic consumer expectations by improving service quality and hygiene to retain and attract customers in a competitive market.

Adit Nair, et al. (2023), The study investigates the user experience and challenges faced by blind and visually impaired (BVI) individuals while using food delivery applications. Conducting an online survey with 166 participants and semi-structured interviews with 12 BVI individuals, the research identifies two major challenges: usability and accessibility issues in food delivery apps, and broader service design concerns. The findings highlight the need for better app navigation, improved voice support, and enhanced service designs to cater to BVI users effectively. The study concludes that addressing these challenges can improve inclusivity in food delivery services and provides insights for future research to enhance accessibility for BVI individuals.

Can Sayginer (2024), The Study investigates customer satisfaction and loyalty in AI-driven food delivery systems during and post-COVID-19. Using a survey of 294 participants, the study analyzed factors like price, promotions, safety, and hedonic motivation. Findings showed that hedonic motivation and information quality significantly influenced customer satisfaction, with higher impact during the pandemic. The study concludes that AI-based food delivery platforms should enhance consumer engagement by improving service personalization and information accuracy to maintain loyalty in a post-pandemic market.

R. R. Rao (2024), This study examines customer satisfaction and perception towards online food delivery services, particularly focusing on Zomato in Hyderabad. The research highlights that despite challenges faced during the COVID-19 pandemic, the online food delivery market is expected to witness substantial growth, with a projected increase from $115.07 billion in 2020 to $126.91 billion in 2021. Major players like Zomato and Swiggy dominate the Indian market due to their extensive reach. The study concludes that online food delivery services, particularly Zomato, continue to grow and evolve, making them a crucial component of modern e-commerce.

Slavomír Svancar et al. (2024) explore AI-based optimization in cloud kitchens through a planning-based decision-making platform. The system uses a Vehicle Routing Problem with Time Windows (VRPTW) to efficiently allocate food orders to delivery vehicles. The findings indicate that AI-driven route optimization reduces delivery delays, improving customer satisfaction. The study concludes that integrating AI-driven planning models in cloud kitchens enhances operational efficiency, making food delivery more reliable and time-sensitive.

Praveen Payili, (2025), The article examines the integration of artificial intelligence (AI) in food delivery platforms, focusing on its impact on operational efficiency and customer experience. Analyzing key areas such as communication safety, voice ordering systems, and advanced data engineering applications, the study highlights how AI has transformed food delivery operations. The findings indicate that AI-driven hybrid systems significantly enhance order processing, delivery optimization, and customer service while addressing key challenges related to scaling, performance, and security. The study concludes that the successful adoption of AI in food delivery platforms improves overall efficiency and safety, positioning AI as a critical component in the industry's future growth.

RESEARCH GAP

Despite the rapid adoption of Artificial Intelligence (AI) in the food delivery sector, limited research has systematically examined its direct impact on service quality dimensions before and after integration. Existing studies primarily focus on customer satisfaction, delivery efficiency, or technological adoption, but they often overlook comparative evaluations of service quality using established frameworks. Moreover, most literature emphasizes either consumer perception of AI-driven personalization or operational efficiency, without providing an empirical assessment of how AI has transformed traditional service attributes such as reliability, responsiveness, assurance, and empathy. This creates a gap in understanding the extent to which AI integration enhances or challenges service quality in food delivery, thereby warranting a focused investigation into pre- and post-AI service experiences.

OBJECTIVES OF THE STUDY

1. To analyze and assess the impact of service quality metrics on customer satisfaction before and after AI integration in food delivery services.
2. To investigate the potential challenges associated with AI implementation in food delivery services.

HYPOTHESIS OF THE STUDY

H_0: There is no significant impact of service quality metrics on customer satisfaction before and after AI integration in food delivery services.

SCOPE OF THE STUDY

This study focuses on evaluating service quality before and after AI integration in food delivery services, specifically within Hyderabad, India**.** The research examines customer satisfaction levels and service quality metrics across major AI-powered food delivery platforms, that offer delivery services. It will help online food delivery platforms and food chain companies in India better understand customer expectations and improve their AI strategies to deliver superior service experiences.

RESEARCH METHODOLOGY

Research Design: This study adopts a quantitative research approach to evaluate service quality before and after AI integration in food delivery services. The study relies on structured data collection methods to analyze customer satisfaction levels, identify challenges, and assess AI's impact on service quality metrics.

Geographic Scope: The study is conducted in Hyderabad, India, focusing on customers who frequently use AI-driven food delivery services.

Target Population: The target population includes customers of major food delivery platforms, specifically:

- Zomato
- Swiggy
- Uber Eats
- Food chain companies offering delivery services, such as McDonald's, Pizza Hut, Domino's, and others.

Sampling Methodology: A convenience sampling method is used, allowing researchers to gather data from customers who actively use food delivery services and are willing to participate in the study. This approach ensures accessibility to respondents while capturing relevant insights into AI-driven food delivery experiences.

Sample Size: The study includes a sample of 110 respondents, ensuring a sufficient dataset to analyze customer satisfaction and service quality variations before and after AI integration.

Data Collection Method: Primary data is collected using a Likert scale-based questionnaire, which enables respondents to rate their experiences, satisfaction levels, and perceptions regarding AI-driven

service quality. The survey focuses on key service quality metrics, AI implementation challenges, and recommendations for optimization.

STATISTICAL TOOLS

Regression: The study applied the regression method to identify the Impact of Service Quality metrics on the Customer satisfaction before and after AI integration in Food delivery services.

Exploratory Factor Analysis (EFA): Exploratory Factor Analysis (EFA), also known as Factor Analysis, is a statistical method used to identify underlying structures in a set of observed variables. It reduces a large number of variables into a smaller set of core factors that explain the observed correlations.

TABULATION OF DATA ANALYSIS

Objective – I: to analyze and assess the impact of service quality metrics on customer satisfaction before and after AI integration in food delivery services.

The study mainly focused to assess the Impact of service quality metrics on the customers satisfaction before and after AI integration in Food Delivery Services. The study applied the regression method and derived the following result.

Table No -1

service quality metrics impact on customer satisfaction pre-ai integration of food delivery services.

			Estimate	**.E.**	**C.R.**	
Reliability-Before						
Before AI Adoption [Accuracy of order processing.]	---	Reliability	0.907	.05	18.14	***
Before AI Adoption [Speed of order processing.]	---	Reliability	0.836	.076	11	***
Before AI Adoption[Reliability of estimated delivery time.]	---	Reliability	0.83	.077	10.779	***
Before AI Adoption [Consistency of food quality in delivery.]	---	Reliability	0.686	.093	7.376	***
Assurance-Before						
Before AI Adoption [Trust in secure payment options.]	---	Assurance	0.792	.12	6.6	***
Before AI Adoption [Confidence in food safety and hygiene standards.]	---	Assurance	0.76	.083	4	***
Before AI Adoption [Satisfaction with refund and cancellation policies.]	---	Assurance	0.889	.107	8.308	***
Tangibility-Before						
Before AI Adoption [Ease of navigating the	-	Tangibility	0.811	.0	11.	*

app/website.]	---			7	585	*
Before AI Adoption [Effectiveness of AI-powered recommendations.]	---	Tangibility	0.891	.058	15.362	**
Before AI Adoption [Clarity of real-time tracking and delivery updates.]	---	Tangibility	0.962	.049	19.632	**
Empathy-Before						
Before AI Adoption [Personalization of food recommendations.]	---	Empathy	0.917	.041	2.365	**
Before AI Adoption[Understanding of customer preferences.]	---	Empathy	0.577	.095	6.073	**
Before AI Adoption [Availability of special dietary preferences.]	---	Empathy	0.594	.038	15.631	**
Responsiveness Before						
Before AI Adoption [Ease of customer support interaction.]	---	Responsiveness	0.807	.09	8.966	**
Before AI Adoption [Speed of issue resolution]	---	Responsiveness	0.927	.067	13.835	.008
Before AI Adoption [Effectiveness of response in handling complaints.]	---	Responsiveness	0.926	.065	14.246	.007

Source: Primary Data

The regression analysis examines the impact of key service quality metrics on customer satisfaction in food delivery services before AI adoption. Among the predictors, the accuracy of order processing ($\beta = 0.907$, $p < 0.001$) has the highest impact, indicating that precise order fulfillment significantly influences customer satisfaction. This is followed by the speed of order processing ($\beta = 0.836$, $p < 0.001$) and the reliability of estimated delivery time ($\beta = 0.83$, $p < 0.001$)**,** both of which highlight the importance of timely service in shaping customer perceptions. The consistency of food quality in delivery ($\beta = 0.686$, $p < 0.001$)**,** while still significant, has the lowest impact among the four factors, suggesting that although food quality matters, it is relatively less influential compared to logistical reliability.

The regression analysis evaluates the impact of assurance-related service quality metrics on customer satisfaction before AI integration in food delivery services. The standardized beta (β) values indicate the strength of each predictor. "Satisfaction with refund and cancellation policies" ($\beta = 0.889$) has the highest influence on customer satisfaction, highlighting its critical role in shaping consumer trust and experience. "Trust in secure payment options" ($\beta = 0.792$) follows, suggesting that reliable payment systems significantly contribute to customer confidence. Lastly, "Confidence in food safety and hygiene standards" ($\beta = 0.76$) has the lowest but still notable impact, emphasizing that while hygiene is important, customers may prioritize financial security and policy assurances more.

The regression analysis examines the impact of service quality metrics on customer satisfaction in food delivery services before AI integration. The standardized beta (β) values indicate the relative importance of each predictor. "Clarity of real-time tracking and delivery updates" has the highest impact ($\beta = 0.962$, $p < 0.001$), followed by "Effectiveness of AI-powered recommendations" ($\beta = 0.891$, $p < 0.001$) and "Ease of navigating the app/website" ($\beta = 0.811$, $p < 0.001$). The significance levels ($p < 0.001$) confirm that all predictors strongly influence customer satisfaction. These results suggest that before AI adoption, real-time tracking clarity was the most critical factor in enhancing service quality, while navigation ease had the least impact among the three. This analysis provides a baseline for comparing post-AI service quality improvements.

The regression analysis evaluates the impact of empathy-related service quality metrics on customer satisfaction before AI adoption in food delivery services. Among the predictors, "Personalization of food recommendations" has the highest standardized beta ($\beta = 0.917$, $p < 0.001$), indicating a strong positive influence on customer satisfaction. This suggests that tailored meal suggestions played a crucial role in enhancing user experience. "Availability of special dietary preferences" follows with a moderate impact ($\beta = 0.594$, $p < 0.001$), highlighting the importance of catering to specific dietary needs. Lastly, "Understanding of customer preferences" has the lowest, yet still significant, impact ($\beta = 0.577$, $p < 0.001$), reflecting the value of recognizing individual tastes in pre-AI service quality.

The regression analysis examines the influence of responsiveness-related service quality metrics on customer satisfaction before AI adoption in food delivery services. Among the predictors, "Speed of issue resolution" has the highest standardized beta ($\beta = 0.927$, $p < 0.01$), indicating that the quick handling of customer concerns was the most significant factor in shaping satisfaction levels. "Effectiveness of response in handling complaints" closely follows with a nearly identical impact ($\beta = 0.926$, $p < 0.01$), emphasizing the importance of resolving customer grievances efficiently. "Ease of customer support interaction" has a slightly lower, though still notable, effect ($\beta = 0.807$, $p < 0.001$), suggesting that accessible and user-friendly support interactions also played a key role.

table no - 2
service quality metrics on customer satisfaction post-ai integration of food delivery services.

			Estimate	S.E.	C.R.	
Reliability-After						
After AI Adoption [Accuracy of order processing.]	<---	Reliability	0.811	0.073	11.109	0.000
After AI Adoption [Speed of order processing.]	<---	Reliability	0.967	0.039	24.794	0.000
After AI Adoption [Reliability of estimated delivery time.]	<---	Reliability	0.841	0.051	16.491	0.000
After AI Adoption [Consistency of food quality in delivery.]	<---	Reliability	0.818	0.066	12.393	0.000
Assurance-After						
After AI Adoption [Trust in secure payment options.]	<---	Assurance	0.883	0.086	10.267	0.000
After AI Adoption [Confidence in food safety and hygiene standards.]	<---	Assurance	0.767	0.1	4	0.000
After AI Adoption [Satisfaction with refund and	<---	Assurance	0.888	0.082	10.829	0.000

cancellation policies.]						
Tangibility-After						
After AI Adoption [Ease of navigating the app/website.]	<---	Tangibility	0.984	0.019	51.789	0.000
After AI Adoption [Effectiveness of AI-powered recommendations.]	<---	Tangibility	0.922	0.028	32.928	0.000
After AI Adoption [Clarity of real-time tracking and delivery updates.]	<---	Tangibility	0.974	0.017	57.294	0.000
Empathy-After						
After AI Adoption [Personalization of food recommendations.]	<---	Empathy	0.956	0.024	39.833	0.000
After AI Adoption [Understanding of customer preferences.]	<---	Empathy	0.936	0.031	30.193	0.000
After AI Adoption [Availability of special dietary preferences.]	<---	Empathy	0.972	0.016	60.75	0.000
Responsiveness-After						
After AI Adoption [Ease of customer support interaction.]	<---	Responsiveness	0.915	0.915	11.356	0.000
After AI Adoption [Speed of issue resolution]	<---	Responsiveness	0.947	0.947	13.546	0.000
After AI Adoption [Effectiveness of response in handling complaints.]	<---	Responsiveness	0.959	0.959	16.845	0.000

Source: Primary Data

The regression analysis evaluates the relationship between service quality metrics before AI adoption and overall reliability after AI integration in food delivery services. The standardized beta (β) values indicate the strength of each predictor's impact on post-AI reliability. Among the service quality metrics, the speed of order processing ($\beta = 0.967$, $p < 0.001$) has the highest impact, suggesting that AI significantly enhances order speed. This is followed by the reliability of estimated delivery time ($\beta = 0.841$, $p < 0.001$), highlighting AI's role in improving delivery accuracy. The consistency of food quality in delivery ($\beta = 0.818$, $p < 0.001$) and accuracy of order processing ($\beta = 0.811$, $p < 0.001$) also show strong associations with post-AI reliability, indicating that AI contributes to reducing order errors and maintaining quality standards.

The regression analysis evaluates the impact of service quality metrics on customer satisfaction before and after AI integration in food delivery services. The standardized beta (β) values indicate the strength of association between pre-AI service quality factors and post-AI assurance levels. Among the predictors, "Satisfaction with refund and cancellation policies" has the highest impact ($\beta = 0.888$, $p < 0.001$), suggesting that AI-driven enhancements in handling refunds and cancellations significantly improve customer assurance. "Trust in secure payment options" follows closely ($\beta = 0.883$, $p < 0.001$), highlighting the critical role of AI in reinforcing payment security and reliability. "Confidence in food safety and hygiene standards" has the lowest impact ($\beta = 0.767$, $p < 0.001$), though still substantial, implying that while AI contributes to maintaining food safety, its influence on customer assurance is comparatively lower. The

highly significant p-values ($p < 0.001$) across all predictors confirm the robustness of these relationships, underscoring the positive impact of AI integration on customer assurance in food delivery services.

The regression analysis evaluates the impact of AI adoption on service quality metrics related to Tangibility in food delivery services. The standardized beta (β) values indicate the strength of each predictor's influence on Tangibility - After (overall perception of tangibility post-AI adoption). Among the three factors, Ease of navigating the app/website ($\beta = 0.984$, $p < 0.001$) has the highest impact, suggesting that AI-driven improvements in user interface and accessibility significantly enhance customer satisfaction. This is followed by Clarity of real-time tracking and delivery updates ($\beta = 0.974$, $p < 0.001$), highlighting AI's role in providing accurate and timely information. Lastly, Effectiveness of AI-powered recommendations ($\beta = 0.922$, $p < 0.001$), while slightly lower, remains a strong predictor, indicating that AI-generated suggestions contribute positively to user experience.

The regression analysis results indicate the impact of AI-driven service quality enhancements on customer satisfaction in food delivery services, specifically focusing on empathy-related factors. Among the predictors, "Availability of special dietary preferences" has the highest standardized beta coefficient ($\beta = 0.972$, $p < 0.001$), signifying its strongest influence on customer satisfaction after AI adoption. This suggests that AI's ability to cater to specific dietary needs significantly enhances perceived service quality. Following this, "Personalization of food recommendations" ($\beta = 0.956$, $p < 0.001$) plays a crucial role, highlighting AI's effectiveness in tailoring suggestions based on individual tastes. Lastly, "Understanding of customer preferences" ($\beta = 0.936$, $p < 0.001$) also positively contributes but has the lowest impact among the three. The consistently high beta values across all factors suggest that AI integration has significantly improved the empathetic aspects of service quality, ultimately enhancing customer satisfaction in food delivery.

The regression analysis results indicate the impact of responsiveness-related service quality metrics on customer satisfaction after AI integration in food delivery services. The standardized beta (β) values suggest that the effectiveness of response in handling complaints ($\beta = 0.959$) has the highest impact on customer satisfaction, followed by the speed of issue resolution ($\beta = 0.947$) and ease of customer support interaction ($\beta = 0.915$). These findings highlight that while all three factors significantly contribute to improved service quality post-AI adoption, ensuring effective complaint resolution is the most critical driver of customer satisfaction.

table no - 3
service quality metrics on customer satisfaction before-ai integration of food delivery services

			Estimate	S.E.	C.R.	P
Reliability - Before	<---	**Customer Satisfaction**	0.216	0.141	12.531	0.000
Assurance - Before	<---	**Customer Satisfaction**	0.331	0.244	13.356	0.000
Tangibility - Before	<---	**Customer Satisfaction**	0.307	0.17	15.805	0.000
Empathy - Before	<---	**Customer Satisfaction**	0.347	0.211	12.644	0.000
Responsiveness Before	<---	**Customer Satisfaction**	0.334	0.214	16.561	0.000
Service quality metrics on Customer Satisfaction After-AI integration of Food Delivery Services.						
			Estimate	**S.E.**	**C.R.**	**P**
Reliability - After	<---	**Customer Satisfaction**	0.278	0.181	14.535	0.000
Assurance - After	<---	**Customer Satisfaction**	0.311	0.207	13.502	0.000
Tangibility - After	<---	**Customer Satisfaction**	0.349	0.203	13.719	0.000
Empathy - After	<---	**Customer Satisfaction**	0.319	0.179	15.782	0.000

Responsiveness - After	<---	**Customer Satisfaction**	0.348	0.231	13.506	0.000

The regression analysis results for the pre-AI integration phase of food delivery services reveal the relative impact of different service quality metrics on customer satisfaction. Among the predictors, empathy (β = 0.347) exhibits the highest influence, followed by responsiveness (β = 0.334) and assurance (β = 0.331). Tangibility (β = 0.307) and reliability (β = 0.216) also contribute to customer satisfaction but to a lesser extent. The findings indicate that before AI adoption, customers valued personalized service, human interaction, and staff responsiveness the most, underscoring the importance of emotional connection and prompt support in shaping customer experiences.

The regression analysis examining the impact of service quality metrics on customer satisfaction after AI integration in food delivery services reveals varying degrees of influence. Among the predictors, Empathy (β = 0.319) has the highest impact on customer satisfaction, followed closely by Tangibility (β = 0.349) and Responsiveness (β = 0.348), indicating that personalized service, technological advancements, and swift issue resolution significantly enhance customer experience. Assurance (β = 0.311) and Reliability (β = 0.278) also contribute to satisfaction, though to a lesser extent. The consistently positive relationships suggest that AI-driven improvements across these dimensions positively influence customer satisfaction, with a particular emphasis on personalized interactions and service efficiency. The results underscore the critical role of AI in enhancing both tangible and intangible aspects of service quality, ultimately leading to a more seamless and satisfactory customer experience in food delivery services. The study rejects the H0 and accepts the H1.

Objective– 2: To investigate the potential challenges associated with AI implementation in food delivery services.

The study has framed the questions based on the literature keeping in view of the potential challenges associated with the AI implemented in Food Delivery services. The study applied the EFA and derived the following result.

table no -4 sample adequacy test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
Bartlett's Test of Sphericity	Approx. Chi-Square	66.817
	Df	21
	Sig.	.000

The Kaiser-Meyer-Olkin (KMO) value of 0.883 indicates a moderate level of sampling adequacy, suggesting that factor analysis is appropriate for the data. Bartlett's Test of Sphericity is significant (χ^2 = 66.817, df = 21, p < 0.001), confirming that the correlations among variables are sufficient for factor analysis. Ranking the factor loadings from highest to lowest, only those exceeding 0.50 were considered.

table no -5 component matrix

	Component	
	1	2
Technical issues and glitches disrupt food delivery operations.	.768	
GPS inaccuracies affect delivery routes and real-time tracking.	.712	
Fraud detection systems sometimes reject valid payments.	.690	
AI-based delivery time predictions are often inaccurate."	.579	
AI-generated order recommendations do not always match preferences.	.540	
AI-powered services offer limited customization options.		.689
Data privacy and security concerns impact trust in AI.		.553
a. 2 components extracted.		

The factor analysis extracted two components, highlighting key challenges in AI implementation for food delivery services. Ranking factor loadings above 0.50, the most significant issue is technical issues and glitches (loading = 0.768), emphasizing how system failures disrupt delivery operations. GPS inaccuracies

(0.712) follow, underscoring concerns about inefficient routing and tracking. Fraud detection errors (0.690) point to legitimate transactions being mistakenly blocked, potentially frustrating customers. Inaccurate AI delivery time predictions (0.579) highlight reliability concerns, while AI-generated recommendations not matching preferences (0.540) reflect personalization limitations. Additionally, AI-powered services offering limited customization (0.689) and data privacy concerns (0.553) load onto the second component, suggesting broader concerns about flexibility and trust in AI systems. These findings indicate that improving AI accuracy, reliability, and customization while addressing security concerns is essential for effective AI adoption in food delivery services.

FINDINGS OF THE STUDY

1. It reports that Before AI adoption, order accuracy (β = 0.907) and delivery speed (β = 0.836) were the strongest drivers of customer satisfaction, emphasizing that logistical reliability was prioritized over food quality consistency.
2. It reports that Before AI adoption, Quick issue resolution (β = 0.927) and effective complaint handling (β = 0.926) were the most critical factors in customer satisfaction, highlighting that responsiveness in addressing concerns was a major service expectation pre-AI.
3. It indicates that after AI integration significantly enhances service reliability in food delivery, with the speed of order processing (β = 0.967) having the strongest impact. This suggests that AI-driven optimizations in order handling and delivery accuracy improve overall customer satisfaction.
4. It indicates that Pre-AI, reliability (β = 0.216) had the lowest impact on satisfaction, but post-AI, its influence increases (β = 0.278), indicatingAI has improved service dependability. Similarly, assurance maintains a stable role, but its slight decline (β = 0.331 to β = 0.311) implies that while AI enhances security, customers may still expect human-backed assurance in certain aspects.
5. It indicates that highest-ranked challenge is operational inefficiencies, with technical glitches (0.768) and GPS inaccuracies (0.712) disrupting food delivery. This suggests that AI-driven automation still faces reliability issues, impacting service efficiency.
6. It indicates that AI-based services struggle with personalization, as seen in limited customization (0.689) and inaccurate recommendations (0.540). This indicates that while AI enhances automation, it lacks adaptability to individual customer preferences.
7. It indicates that Data privacy issues (0.553) and faulty fraud detection (0.690) contribute to trust-related challenges in AI adoption. This highlights the need for improved security measures to enhance customer confidence in AI-powered food delivery services.

CONCLUSIONS

The study mainly focused to know the service quality metrics impact on the customers satisfaction before and after implementation of AI in Food Delivery Services. The study considered the primary data and adopted the convenient sampling method and collected the data in Hyderabad region. The study considered the quantitative and exploratory mixed research approach for the examination of framed objectives. The study applied the regression and exploratory factor statistical analysis. The observations reveal that before AI adoption, customer satisfaction in food delivery was primarily driven by order accuracy, delivery speed, and quick issue resolution, highlighting the importance of reliability and responsiveness in addressing concerns. After AI integration, service reliability improved significantly, with faster order processing and enhanced delivery accuracy becoming the strongest factors influencing satisfaction. While reliability gained importance post-AI, assurance showed a slight decline, suggesting that despite technological improvements, customers still value human-backed support. However, challenges remain, including operational inefficiencies such as technical glitches and GPS inaccuracies, as well as limitations in personalization where AI struggles to provide accurate recommendations. Additionally, concerns over data privacy and weak fraud detection indicate trust-related issues that must be addressed to strengthen customer confidence in AI-driven food delivery services.

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