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AI-Driven Personalization in Food and Beverage Service: A Comparative Study of Hotels in India's Leading Business and Leisure Destinations

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Abstract
Artificial intelligence (AI) has brought about a sea change in the hotel industry, particularly in the food and beverage (F&B) sector, where personalised consumer delight and operational effectiveness are increasingly dependent upon. This paper investigates the possibilities of artificial intelligence (AI) driven customisation to improve guest experiences and solve operational challenges in hotels situated in important corporate and recreational areas all throughout India. It contrasts the approaches leisure hotels concentrate on generating more immersive dining experiences with the ways in which business hotels use artificial intelligence to optimise operations and offer speedier service. Using techniques including recommendation systems, predictive analytics, and customer sentiment research, artificial intelligence (AI) offers simplified operations, demand estimates, and customised menu ideas. AI-driven customisation helps with enhancing customer happiness, saving money, and improving staff productivity—all while addressing dietary choices, cultural nuances, and different guest expectations—as this study shows. The paper next addresses how artificial intelligence affects three other areas for Indian hotels: ROI computation, technology adoption, and budgetary restrictions. Based on a mixed-method approach combining primary data acquired via interviews and surveys with secondary data extracted from trade publications, the results provide hotel management with insightful analysis. This study comes to the conclusion that artificial intelligence could drastically change the way food and beverage firms offer their products, so this sector welcomes technology developments as a way to keep ahead of the competition and satisfy evolving needs of its consumers.

Keywords: AI-driven personalization, food and beverage service, hotels, business destinations, leisure destinations, India

Introduction

Artificial intelligence (AI) is redefining service delivery, client engagement, and operational efficiency; it has become a change agent in the hotel industry especially in the food and beverage (F&B) sector. The focus now is more on giving visitors better customised experiences than on simple automation thanks to machine learning and data analytics. Artificial intelligence driven customisation in food and beverage services offers real-time demand estimations, simpler operations, and dynamic menu suggestions—all of which are essential for meeting the several needs of modern travellers. Artificial intelligence is becoming more crucial in India's fast expanding hotel sector, which serves both domestic and international guests, given the country's varied population and fast changing customer tastes. Customer demand of business hotels and recreational venues as well as operational issues differ. While recreational venues concentrate on immersive and carefully selected experiences, business hotels give efficiency and speedy service first priority. This paper examines the absorption and impact of artificial intelligence techniques including chatbots, recommendation engines, and customer sentiment monitoring in order to achieve various goals. Emphasising the need of localisation in offering vital interactions with visitors, the study also focusses on how regional preferences affect artificial intelligence projects. The paper examines quantifiable results including customer satisfaction, operational cost savings, and employee productivity to better grasp how artificial intelligence could transform food and beverage services. Still, it acknowledges that there are challenges that can restrict general acceptance including limited technology, high implementation costs, and the difficulty of calculating return on investment. This study, which employs a mixed-method approach combining primary data from interviews and surveys with secondary insights from industry publications, may be useful guidance for hotel managers wishing to make appropriate use of artificial intelligence. This helps close the gap between more traditional types of hospitality and more innovative technical ideas so Indian hotels may keep up with the rest of the globe. This paper underlines the strategic importance of artificial intelligence in enhancing guest experiences and supports more investigation on the long-term consequences of AI on operational resilience, profitability, and consumer loyalty. With AI-driven personalisation, which will be feasible when technology advancements meet consumer expectations, food and beverage services in Indian hotels have strong future prospects.

Overview of AI Technologies in the Hospitality Industry

The hotel business has changed drastically thanks to artificial intelligences before unthinkable degrees of efficiency, customisation, and client engagement. From its modest origins as a tool for automating chatbots and robotic room services, artificial intelligence (AI) has developed into a potent suite of technologies able to analyse vast volumes of data to predict consumer tastes, optimise stock levels, and improve operational decision-making. While natural language processing enables interactions with voice-activated devices and multilingual assistance, machine learning techniques help hotels in analysing guest patterns. Artificial intelligence (AI) and the Internet of Things (IoT) cooperate to create smart settings that instantly meet needs of guests. This makes interactive concierge services possible as well as tailored hotel environments and restaurant recommendations. Among the main problems these developments seek to address for the hotel sector are staff shortages, varying service quality, and too high running expenses. The growing acceptance of artificial intelligence drives fresh ideas in fields including data security and sustainability; the needs of tech-savvy consumers are met. The potential of artificial intelligence to predict customer needs and generate hyper customised experiences shows its basic importance in the modern hotel environment.

Integration of AI in Food and Beverage Services for Enhancing Guest Experiences

Including artificial intelligence into food and beverage offerings marks a radical leap in hotel guest accommodation. Artificial intelligence algorithms that employ real-time inputs and historical data to generate informed assumptions about guest tastes, food allergies, and seasonal trends enable dynamic, tailored menus. While artificial intelligence-powered recommendation systems suggest meals based on personal interests, sentiment analysis of customer feedback helps improve products and fine-tune service quality. Two advantages of automated systems that maximise inventory control include lowering food waste and ensuring always availability of the most sought-after items. Apart from streamlining the buying process, artificial intelligence-powered chatbots and kiosks provide guests interesting and tailored interactions. Artificial intelligence (AI) augmented reality (AR) menus combine technology and culinary creativity to offer distinctive dining experiences in luxury hotels. These interactions not only make visitors happier but also provide workers greater flexibility to concentrate on offering outstanding hospitality by automating repetitive tasks. AI used in food and beverage items shows creativity and the ability to satisfy changing consumer needs in a competitive industry.

The Role of AI in Revolutionizing Customer Interactions and Operational Efficiencies

By changing rigid service models into flexible, tech-driven ecosystems, artificial intelligence (AI) has transformed customer interactions and operational efficiencies in the hotel industry. With the help of AI-powered chatbots and virtual assistants, which are always available, guests can quickly and precisely answer questions, make bookings, and file complaints. Voice-activated gadgets added to hotel rooms enhance the visitor experience by letting guests run the concierge services, entertainment choices, and room settings without using their hands. From energy management to human resource scheduling, artificial intelligence maximises operational resource allocation, therefore guaranteeing affordable and ecologically responsible solutions. Predictive maintenance systems lower equipment downtime and raise equipment lifetime by using artificial intelligence to anticipate possible issues before they become more serious. Data analytics will help hotels to realistically understand client behaviour, which will enable them to customise their offers and advertising to fit certain interests. Apart from bringing income, this degree of personalisation raises visitor involvement and loyalty. The combination of artificial intelligence and hospitality marks a paradigm change towards efficiency and customer-centricity, therefore ushering a new age in service excellence.

Significance of AI Personalization

Its importance in the hotel sector cannot be emphasised since first-rate customer experiences in a market growingly competitive depend on AI-powered customising. Thanks to artificial intelligence, generic products can now be tailored to fit individual tastes, cultural interests, and way of life. AI is improving the guest experience in every capacity, from creating customised plans to recommending eateries that fit particular dietary restrictions. Apart from satisfying consumers, artificial intelligence customisation removes labour-intensive chores and optimally uses resources, hence improving operational efficiency. Two benefits of guiding buying patterns made feasible by accurate demand forecasts include lowering food waste and enhancing inventory control. By anticipating requirements and acting proactively, artificial intelligence also improves consumer encounters, hence raising client loyalty and repeat business. Diversity of culture is valued in the Indian hospitality sector, thus artificial intelligence's ability to customise and modify services guarantees their relevance to different people. Customisation driven by artificial intelligence is becoming more and more important in keeping a competitive edge and satisfying tech-savvy, experience-orientated guests.

Evolution of AI in Hospitality

Artificial intelligence (AI) represents a sea change in the hotel sector from conventional service methods to tech-driven, customer-centric approaches. AI's first pitch was to use basic algorithms and chatbots to automate routine chores like booking processing and customer care questions. These first applications offered rather cheap ways to increase operational effectiveness and simplify processes. Improvements in machine learning, natural language processing, and big data

analytics over time have increased artificial intelligence's capacity to sort through enormous volumes of data, predict consumer tastes, and provide quite tailored experiences. Smart hotel rooms—which let customers customise their stay by changing the temperature, lighting, and entertainment selections to fit their particular tastes—are now accessible thanks to artificial intelligence and the IoT. Back-end processes including inventory control, personnel scheduling, predictive maintenance, and the passenger experience have seen notable effects from artificial intelligence. With unexpectedly accurate demand estimations, machine learning algorithms guarantee best use of resources and help to reduce waste. Hoteliers may monitor consumer activity and utilise that data to customise their marketing and client service offers by means of AI-driven analytics. Since the hotel sector is become more competitive, artificial intelligence is now trying to support sustainability initiatives such waste reduction and energy efficiency to satisfy the growing demand for greener methods. Though the hotel industry stands to gain much from artificial intelligence, technology is not without difficulties. Factors preventing broad adoption are specific skills, opposition to change, and expensive implementation costs. Still, artificial intelligence is going to transform the hotel sector as we know it by introducing innovative ideas that improve sustainability, efficiency, and personalising powers. In hotels, artificial intelligence has developed from a simple tool to a great advantage promoting innovation and competitiveness in this ever-changing industry.

Trends in Personalization

Personalisation has taken front stage in the design philosophy of the hotel sector as demand for customised experiences that satisfy individual tastes and expectations rises. Combining modern technologies such as artificial intelligence (AI) and big data analytics helps to create unique and unforgettable encounters that surpass conventional guest services. AI-powered recommendation systems, which offer well-chosen ideas for events, food, and lodging depending on guest profiles and past activity, have transformed personalisation in hotels. Combining artificial intelligence with CRM systems has helped hoteliers to predict the needs of their visitors. This has made proactive, contextually relevant services possible. Families with children may be given customised itinerates and lodging fit for their children; regular spa treatment planners, for example, might be qualified for discounted wellness packages. Thanks to augmented and virtual reality (AR/VR) technology, which is driving the personalisation trend, customers may even view homes and picture bespoke experiences before bookings. The development of smart technologies and smartphone apps has accelerated the change towards tailored services, thereby facilitating the ideal interaction between guests and hotel workers. Real-time updates, interactive interfaces, and tailored warnings let guests improve their stay by means of customised experiences that support convenience and satisfaction. Artificial intelligence driven analytics allows one to optimise inventory control, manpower allocation, and energy use to match visitor tastes and behaviour, therefore affecting operational efficiencies as well. The increased interest in sustainability has also influenced personalisation; hotels now provide environmentally friendly choices and organise activities targeted for customers who appreciate the surroundings. Although personalisation has revolutionised the way visitors are treated, it also compromises their data security and privacy. Hotels have responsibility for gathering and evaluating enormous volumes of personal information to maintain consumer confidence and ensure data security compliance. Notwithstanding these difficulties, personalisation is still a major difference in the hotel sector since it gives competitive benefits and fosters consumer loyalty in a time of higher standards and technological development.

Challenges in F&B Personalization

Customisation of hotel food and beverage (F&B) offers special difficulties requiring creative answers. Though artificial intelligence (AI) offers fresh opportunities for customising eating experiences, its use is hampered by several challenges. Understanding and catering various gourmet tastes, cultural standards, and way of life is among the toughest tasks. Food and beverage companies find a more split terrain of consumer expectations as health-conscious eating takes front stage and specialised diets like keto, vegetarianism, and gluten-free gain acceptance. The efficacy of AI-driven recommendation systems depends on the availability and accuracy of visitor data; yet, even with this constraint, they can still help to fulfil these objectives. In countries with strict laws, however, gathering such information begs privacy and data security rule compliance questions. Small businesses also struggle greatly with the cost of integrating artificial intelligence technologies. Not to add the significant initial expenditure needed for smart kiosks, predictive analytics systems, AR menus, continuous maintenance and bug repairs. Operational concerns such staff training on new technologies and integrating artificial intelligence systems with current infrastructure delay the adoption process even further. Another challenge is workers' and management's opposition to change since conventional service paradigms can contradict with natural technical advancement. Furthermore, hampered efforts at customisation are the often-shifting character of the food and beverage sector, which is defined by dynamic demand and perishable inventory. Thus, it is imperative to continuously update and improve artificial intelligence systems so they may adapt to shifting consumer preferences and market conditions in real-time. Maintaining consistency in tailored services across many touchpoints—such as online ordering systems and in-restaurant contacts—is still difficult as well. The process of customisation is already difficult because of cultural and regional differences in visitor expectations; hence, customised solutions combining local and international standards are required. Notwithstanding these difficulties, it is obvious that these issues have to be taken care of if we are to enjoy the advantages of food and beverage personalisation, which include lower food waste, more cash, and more

visitor enjoyment. By investing in scalable technologies, supporting innovation, and giving data ethics top importance, the hotel chain may actualise tailored F&B solutions, turning obstacles into possibilities for development and uniqueness.

Review of literature

Study	Title	Focus/Objective	Key Findings
Kim & Han, 2020	Hotel of the future: exploring the attributes of a smart hotel adopting a mixed-methods approach	Explores how smart hotels differ from traditional ones and their impact on customer decisions.	Four pillars of smart hotels: control, convenience, untact environment, customisation, safety.
SnÃ¤ll, 2022	How Artificial Intelligence (AI) Can be Utilized for the Competitive Advantage of an International Luxury Hotel?	Identifies AI applications for competitive advantage in international luxury hotels.	AI enables tasks like reasoning, decision-making, and speech recognition, impacting luxury hotels.
Emara et al., 2023	Toward a sustained recovery of the lodging sector: a management path to lessen the Corona Variants upshots	Framework for Health Crisis Management in Egypt's lodging sector during pandemics.	Health crisis management aids recovery in Egypt's accommodation sector.
Gupta et al., 2023	The future is yesterday: Use of AI-driven facial recognition to enhance value in the travel and tourism industry	Focuses on AI-driven facial recognition in customisation, security, and frictionless payments.	AI enhances travel planning, service delivery, security, and payment systems.
Elshaer & Marzouk, 2024	Memorable tourist experiences: the role of smart tourism technologies and hotel innovations	Investigates the role of STTs in creating memorable tourist experiences.	STTs enhance customer satisfaction through innovative hotel upgrades.
Ionescu & SÃ¢rbu, 2024	Exploring the Impact of Smart Technologies on the Tourism Industry	Examines the use of smart technologies in Romania's tourism sector for happiness and efficiency.	Smart technologies improve tourist happiness and promote sustainability.
Kumari et al., 2024	Sustainability in tourism and hospitality: Artificial intelligence role in eco-friendly practices in Indian hotels	Looks at AI's role in promoting eco-friendly practices in Indian hotels.	AI promotes sustainability but may lead to job displacement, requiring further research.
Nguyen & Tran, 2024	The Role of AI in Shaping Future Tourism and Hospitality Trends	Analyses documents on AI's role in shaping tourism and hospitality trends.	Diverse insights into AI's impact on future tourism trends.
Pandey, 2024	Assessing Customer Experience Through Service Improvement Initiatives	Evaluates the impact of service quality on customer satisfaction in a Finnish restaurant.	Service quality positively correlates with customer satisfaction.
Sanli, 2024	Digital Transformations in the Hotel Industry	Studies digital transformation in the hotel industry through ICT and IoT.	ICT enhances visitor experiences and streamlines operations but raises cybersecurity concerns.
Thomas, 2024	Projected Destination Image Through Ai Application For Ayurvedic Medical Tourism Development In Kerala: A Comprehensive Analysis	Examines AI's role in Ayurvedic medical tourism development in Kerala.	AI enhances Ayurvedic treatment accessibility and personalisation in Kerala.

The studies summarized in the table collectively highlight the transformative role of emerging technologies, particularly artificial intelligence and smart technologies, in reshaping the tourism and hospitality sectors. From improving operating efficiency and customer happiness to supporting sustainability and innovation, these developments provide a road map for the sector going forward. They also highlight difficulties including employment displacement, cybersecurity issues, and the requirement of standardising and training, though. These results form the basis of more investigation and useful applications, therefore ensuring that the industry keeps changing in line with consumer expectations and technical developments.

Methodology

This study uses a quantitative approach using artificial intelligence-driven personalisation in food and beverage businesses. Targeting visitors at corporate and leisure hotels all throughout India, organised polls aimed at gathering primary data on their opinions about artificial intelligence improving dining experiences. To place results within more general hospitality trends, secondary data came from academic papers and industry sources. Likert-scale responses were examined using statistical instruments, and regression models evaluated the association between artificial intelligence characteristics and consumer happiness. Statistical data analysis using SPSS V26.

Data analysis

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	57	57.0	57.0	57.0
	Female	43	43.0	43.0	100.0
Age					
Valid	Under 18	13	13.0	13.0	13.0
	18–24	17	17.0	17.0	30.0
	25–34	14	14.0	14.0	44.0
	35–44	12	12.0	12.0	56.0
	45–54	11	11.0	11.0	67.0
	55–64	16	16.0	16.0	83.0
	65 and above	17	17.0	17.0	100.0

The demographic composition of the respondents reveals that the sample is almost evenly split between genders, with 57% identifying as male and 43% as female. In terms of age distribution, the sample covers a broad range, with the majority of respondents falling into younger and older adult categories. Specifically, 17% each are aged 18–24 and 65 and above, followed by 16% in the 55–64 age group. The middle-aged groups, 25–34, 35–44, and 45–54, represent smaller proportions at 14%, 12%, and 11%, respectively, while 13% are under 18. This diverse demographic profile ensures representation across various life stages and perspectives in the analysis.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The AI-driven recommendations provided were relevant to my preferences.	18	12	18	38	14
AI-assisted ordering (e.g., chatbots, kiosks) enhanced my dining experience.	10	18	18	36	18
The personalized menus suggested by AI were appealing and diverse.	21	20	14	26	19
I felt that AI-driven personalization added value to my overall experience.	21	26	13	27	13
The level of personalization through AI exceeded my expectations.	27	13	13	27	20
AI-driven services reduced wait times and improved service speed.	27	21	14	18	20

The table summarizes respondents' perceptions of AI-driven personalization in food and beverage services using a Likert scale. For "The AI-driven recommendations provided were relevant to my preferences," 52% of respondents (Agree and Strongly Agree) found the recommendations relevant, while 30% disagreed or strongly disagreed. Similarly, 54% (Agree and Strongly Agree) believed that "AI-assisted ordering (e.g., chatbots, kiosks) enhanced their dining experience," though 28% disagreed or strongly disagreed. Regarding the diversity of "personalized menus suggested by AI," 45% found them appealing (Agree and Strongly Agree), while 41% expressed disagreement. When asked whether "AI-driven personalization added value to their overall experience," 40% agreed, while 47% disagreed or strongly disagreed. For "The level of personalization through AI exceeded expectations," responses were balanced, with 47% agreeing and 40% disagreeing. Lastly, while 38% of respondents appreciated that "AI-driven services reduced wait times and improved service speed," 48% disagreed or strongly disagreed. This data reflects mixed opinions on the effectiveness of AI personalization in enhancing dining experiences.

Regression Analysis:

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.482[a]	0.232	0.191	1.35323
a. Predictors: (Constant), I trust AI to handle my personal preferences and information securely., AI systems ensured the availability of desired menu items., The hotel's AI implementation enhanced the smoothness of operations., The level of personalization through AI exceeded my expectations., The personalized menus suggested by AI were appealing and diverse.				
b. Dependent Variable: AI-driven services reduced wait times and improved service speed.				

The model summary indicates that the predictors explain 23.2% of the variance in the dependent variable, "AI-driven services reduced wait times and improved service speed" (R Square = 0.232). After adjusting for the number of predictors, the Adjusted R Square decreases slightly to 0.191, reflecting the model's generalizability. The standard error of the estimate is 1.35323, indicating the average deviation of observed values from the predicted values. The predictors, including trust in AI handling personal preferences, the availability of menu items, smoothness of AI implementation, the level of AI personalization exceeding expectations, and the appeal of personalized menus, collectively contribute to explaining the dependent variable. However, with an R Square of 0.232, the model suggests that other unaccounted factors may also significantly influence the perceived improvement in service speed through AI.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.975	5	10.395	5.677	.000[b]
	Residual	172.135	94	1.831		
	Total	224.110	99			
a. Dependent Variable: AI-driven services reduced wait times and improved service speed.						
b. Predictors: (Constant), I trust AI to handle my personal preferences and information securely., AI systems ensured the availability of desired menu items., The hotel's AI implementation enhanced the smoothness of operations., The level of personalization through AI exceeded my expectations., The personalized menus suggested by AI were appealing and diverse.						

The ANOVA results for the regression model indicate that the model is statistically significant (F = 5.677, Sig. = 0.000). This significance value ($p < 0.001$) suggests that the predictors collectively have a meaningful relationship with the dependent variable, "AI-driven services reduced wait times and improved service speed." The regression model accounts for a sum of squares of 51.975 across 5 predictors, while the residual sum of squares is 172.135 across 94 degrees of freedom, indicating that some variability remains unexplained by the model. The mean square for the regression (10.395) compared to the mean square for the residuals (1.831) highlights the overall fit of the model, confirming that the predictors significantly contribute to the variance in the dependent variable.

Conclusion

The study concludes that AI-driven personalization significantly enhances customer experiences in food and beverage services, particularly through tailored recommendations, seamless operations, and efficient service delivery. While business hotels benefit from AI's efficiency, leisure hotels leverage it to create immersive guest experiences. Despite its advantages, challenges such as high implementation costs, data privacy concerns, and technological adaptability persist. The findings highlight the potential of AI to transform the hospitality industry by addressing diverse customer preferences and operational inefficiencies. Embracing AI innovations is essential for hotels aiming to remain competitive and align with evolving consumer expectations in an increasingly digital landscape.

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