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Leveraging ChatGPT and Other Generative Artificial Intelligence (AI)-Based Applications in the Hospitality and Tourism Industry: Practices, Challenges, and Research Agenda

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Abstract

Purpose: The hospitality and tourism sector has witnessed phenomenal growth in customer numbers during the post-pandemic times. This growth has been accompanied by the use of technologies in customer interface and backend activities, including the adoption of self-serving technologies (SSTs). This study analyzes the existing practices and challenges, and also establishes a research agenda for the implementation of generative artificial intelligence (such as ChatGPT) and similar tools in the hospitality and tourism industry.

Design/methodology/approach: The study analyzes the existing literature and practices. It draws upon these practices to outline a novel research agenda for scholars and practitioners working in this domain.

Findings: The integration of generative artificial intelligence (generative AI) technologies, such as ChatGPT, will have a transformational impact on the hospitality and tourism industry. The study highlights the potential challenges of implementing such technologies from the perspectives of companies, customers, and regulators.

Implications: The study serves as a reference material for those who are planning to utilize generative AI tools like ChatGPT in their hospitality and tourism businesses. It also highlights potential pitfalls that ChatGPT-enabled systems may encounter during service delivery processes.

Originality: It is a pioneering work that assesses the applications of ChatGPT in the hospitality and tourism industry. The study highlights the potential and challenges in implementing ChatGPT within the hospitality and tourism industry.

Keywords: artificial intelligence, Bard, ChatGPT, generative AI, hospitality, tourism

Introduction

Many organizations are exploring ways to discover and harness the power of ChatGPT and similar tools in their businesses (Adiguzel *et al.*, 2023; Dwivedi *et al.*, 2023a). Microsoft has started using ChatGPT in its Bing search engine with superior results and user experience (Badr, 2023). Companies like Google, Microsoft, Meta, and Open AI have been pioneers in experimenting with its integration into customer-facing activities (Dwivedi *et al.*, 2023a). The use of ChatGPT in the hospitality and tourism industry is in the nascent stage. The hospitality and tourism industry is expected to grow by three percent during 2022-2027 and reach USD 9 trillion by 2027 (Tourism and Hospitality Market Forecast, 2023). Google (Alphabet) launched Bard in March 2023. Companies like Meta, Amazon, and Jasper are heavily investing in generative AI technologies (Dwivedi *et al.*, 2023a). The investments by such companies highlight the immense potential of generative AI technologies like ChatGPT for corporates, including the hospitality and tourism industry.

The hospitality and tourism industry has traditionally been conservative in terms of the adoption of technology, given the nature of this service industry (Buhalis *et al.*, 2023; Leung and Law, 2013; Ozdemir *et al.*, 2023; Pandey and Srivastava, 2013). Companies in the hospitality and tourism industry have been experimenting with the integration of Chatbots in customer service support and delivery (Calvillo, 2023). ChatGPT has direct applications in the hospitality and tourism industry for enhancing customer experience and employee productivity (Mich and Garigliano, 2023). ChatGPT provides accurate query results and can resolve most generic inquiries. This interface, if available as part of their services, would provide tourists with prompt resolutions to their inquiries and, thus, a better visitor experience. Table 1 shows a sample of responses by ChatGPT for different hospitality and tourism-related queries. ChatGPT helps tourists make informed choices regarding the places to be included in their itinerary, as well as decisions regarding routes, modes of transport, and pricing.

Table 1: ChatGPT in Practice (Source: Created by author using ChatGPT)

S. No.	Query by Users	Select responses received from ChatGPT
1.	Which is the best mode of transport to Qutub Minar in Delhi from Connaught Place, Delhi?	“The easiest and fastest way to reach Qutub Minar is by taking the Delhi Metro. You can take the Yellow Line from Rajiv Chowk Metro Station (Connaught Place) and get off at the Qutub Minar Metro Station. It takes approximately 25 minutes and costs around Rs. 30-50.”
2.	Which restaurant in Paris provides the best Italian cuisine?	“Il Carpaccio: Located in the luxurious Le Royal Monceau hotel, Il Carpaccio is one of the best Italian restaurants in Paris. It offers a menu that features traditional Italian dishes and uses fresh and high-quality ingredients.”
3.	How would the weather be in the last week of December in New York?	“The average high temperature during this time of year is around 4°C (40°F), while the average low temperature is around -3°C (26°F). It is also common to experience periods of rain, snow, or sleet, with the possibility of some icy conditions.”
4.	What is the best time of the year to visit Rome?	“Rome is a popular tourist destination and can be visited throughout the year. However, the best time to visit Rome is during the spring (April-May) or the fall (September-November) when the weather is mild and comfortable for sightseeing.”
5.	Which would be the ideal location for a one-thousand-person wedding event in London?	“The Grand Connaught Rooms: The Grand Connaught Rooms is a luxurious venue located in Covent Garden, Central London. It offers a range of event spaces, including a grand ballroom that can accommodate up to 1,000 guests. The venue is known for its stunning architecture and luxurious décor, making it a popular choice for weddings.”

ChatGPT Dimensions in the Hospitality and Tourism Industry

Generative AI technologies like ChatGPT have immense potential to benefit organizations, customers, and regulators operating in the tourism and hospitality sector. The key dimensions concerning this sector are discussed below:

ChatGPT for Supply Side Stakeholders

The tourism and hospitality sector can leverage the potential of ChatGPT from multiple dimensions. Restaurant and catering businesses can utilize ChatGPT to gain insights into popular cuisines worldwide, including detailed recipes. It can also provide inputs for online marketing strategies aimed at attracting customers, especially the youth (Calvillo, 2023). ChatGPT would be beneficial for restaurant owners launching their outlets in new regions as it can provide information about the popular food preferences of the local population. With an appropriate query mentioning the cuisine and location of the proposed restaurant, ChatGPT can quickly help design menus. Additionally, ChatGPT can enhance the learning process of hospitality and tourism students in universities, making it more efficient (Ivanov and Soliman, 2023). Integrating ChatGPT into customer relationship management (CRM) software can assist in promptly resolving standard queries about food services and ingredients. Moreover, open templates are available to create and customize chatbots for firms operating in the hospitality and tourism sector.

ChatGPT for Demand Side Management

ChatGPT is an empowering platform for customers. It informs users about various options in different categories. For example, if a user inquires about "places to visit in Rome," ChatGPT not only provides information about popular tourist sites but also informs about interesting new tourist sites near that location. ChatGPT can give incoming tourists an idea about the availability of cuisines in the region, specialty restaurants in the area along with their locations, the most preferred month to visit a particular location, and the expected price ranges at these

restaurants. It also prompts users to visit the relevant site for reservations. Customers can leverage the power of ChatGPT to learn more about bulk bookings and event-based reservations. It can provide personalized suggestions to tourists and show them images, videos, and virtual tours of proposed places in their itinerary. This enhanced customer engagement and experience contribute to customer acquisition and retention (Chen *et al.*, 2021; Mich and Garigliano, 2023). The ready availability of detailed and precise information on ChatGPT-type platforms provides customers with the confidence to make bookings without postponing their purchases.

ChatGPT and Nudge

The integration of ChatGPT with hospitality CRM services, such as restaurants, catering, resorts, etc., would help resolve customer queries in real-time. The human-like interaction in chats by ChatGPT acts as a nudge, engaging seamlessly with customer queries and providing complete answers. The prompt and elaborate responses nudge customers to explore new service options they may otherwise not have considered. The power of this nudge has been previously utilized in the hospitality sector to reduce energy consumption and maintain cleanliness at hotels by visitors (Chang *et al.*, 2016; Ranson and Guttentag, 2019). The insights generated through text mining of chat data from such integrated platforms would provide cross-selling and up-selling opportunities for hospitality and tourism organizations.

ChatGPT for Regulators

The adoption of ChatGPT would have multiple advantages for regulators. Regulators can extract basic insights about a particular hospitality and tourism organization and related issues in minimal time. The reports generated by ChatGPT are accurate and can serve as a good starting point for any compliance-related investigation. It would aid in explaining basic and new terms used in the domain, including slang, in a clear and real-time manner. Regulators can leverage ChatGPT to cross-check government-mandated safety and security

parameters/protocols according to the region. ChatGPT can also help understand compliance standards, such as maintaining sustainability parameters for certified hotels, ensuring a level playing field in the workplace, and implementing diversity, equity, and inclusion (DEI) protocols.

ChatGPT and Manpower

ChatGPT has the potential to replace repetitive jobs (Dwivedi *et al.*, 2023a; 2023b; 2023c), but it also has the potential to stimulate the creation of quality jobs in the hospitality and tourism industry (Mondal *et al.*, 2023). As businesses in the hospitality and tourism industry are likely to grow due to the use of generative AIs like ChatGPT, there will be an increased demand for manpower. ChatGPT will provide valuable input for enhancing creativity and innovation in office jobs. Integrating ChatGPT into the organization's IT system would attract more customers and generate additional revenue through cross-selling, up-selling, informed decision-making by users, reducing information asymmetry, and improving travel planning for tourists. The user experience would be superior due to its efficient and interactive nature. Therefore, leveraging ChatGPT is likely to benefit the hospitality and tourism industry by enhancing the quality of jobs in the field.

Challenges

Undoubtedly, generative AIs like ChatGPT will have a transformational impact on the hospitality and tourism industry. They would enhance employee productivity, provide superior customer experience, suggest robust go-to-market (GTM) strategies, and offer social media plans for new restaurant or catering businesses. However, one of the key challenges would be the development of the IT architecture for integrating ChatGPT into existing enterprise resource planning (ERP) systems. This integration would enable ChatGPT to provide customized messages based on the target user. However, it would also raise ethical concerns as

it would utilize both public and private databases. The private database would contain personal details of tourists, including demographic data, consumption preferences, location, etc. Therefore, there is a need for the development of international protocols for managing ChatGPT in businesses. Customizing ChatGPT would also require the consent of OpenAI, its parent company, as it uses existing global datasets.

ChatGPT plugins have already been utilized by organizations like Expedia, Kayak, and QuadLabs in the hospitality and tourism industry (Table 2). These plugins provide prompt and detailed information regarding relevant queries about hospitality and tourism services. However, building trust in search queries on ChatGPT-integrated platforms would be a challenge. Prospective customers are accustomed to traditional search engine ranking page (SERP) results from platforms like Google, Yahoo, and Bing. Nonetheless, trust is a vital component in decision-making, especially for high-involvement services such as foreign trips, international hotel bookings, and bulk bookings for sightseeing. ChatGPT may find it challenging to gain the trust of its users, as trust has various dimensions, such as cognitive or affective (Erdem and Ozen, 2003).

The hospitality and tourism industry is part of the service sector, where people, processes, and physical evidence are critical for success. Customers who are used to being served by employees may be hesitant to interact with chatbots. The adoption of ChatGPT-based interactive services by customers in the hospitality and tourism industry may take longer than expected. Shifting from in-person interaction to generative AI-based chatbots for availing services would be a challenging behavior change to expedite.

The neutrality of ChatGPT in providing query results is dependent on the database. Content creators in the hospitality and tourism industry may attempt to influence query results by gaining a better understanding and speculating about the backend algorithm of ChatGPT.

Table 2: Use Cases in Hospitality and Tourism industry (Source: Created by author)

S. No.	Organization	Implementation	More details
1.	Expedia	The US-based online travel company was a pioneer to add ChatGPT on its mobile app for giving superior interactive experience to its users. Expedia has a ChatGPT plugin on its website. It provides options for visitors to explore their trip ideas on ChatGPT.	https://www.forbes.com/sites/geoffwhitmore/2023/04/12/expedia-app-integrates-chatgpt/ https://www.expediagroup.com/investors/news-and-events/financial-releases/news/news-details/2023/Chatgpt-Wrote-This-Press-Release--No-It-Didnt-But-It-Can-Now-Assist-With-Travel-Planning-In-The-Expedia-App/default.aspx
2.	Del Taco restaurant chain	The American fast food restaurant chain Del Taco uses AI bots in the drive-thru for order-taking and directing them to point-of-sale (POS).	https://chainstorage.com/del-taco-automates-drive-thru-voice-ordering https://hospitalitytech.com/how-will-ai-chatgpt-change-restaurant-industry
3.	Kayak	Kayak launched ChatGPT plugin on its travel website. It provides users with efficient search results for travel and hotel bookings.	https://www.travelweekly.com/Travel-News/Travel-Technology/Kayak-launches-a-ChatGPT-plug-in
4.	QuadLabs Technologies	The online travel technology provider has developed QuadGPT based on ChatGPT. It is an AI-powered itinerary planner in a seamless manner.	https://www.quadlabs.com/blog/index.php/quadlabs-introduces-quadgpt-an-ai-powered-itinerary-builder/
5.	Magpie	It integrates its content with ChatGPT parent company OpenAI. Personalized content regarding the product/services of travel companies is optimally curated by Magpie. It uses product optimization tool based on ChatGPT for ensuring superior search results.	https://about.magpie.travel/blog/industry-resources/chatgpt-for-the-travel-industry/

OpenAI needs to take care of the quality and quantity of data in resolving search queries and continuously upgrade its systems to stay ahead in the game and address such challenges.

There is also a threat to the relevance of ChatGPT if sector-specific generative AI tools like QuadGPT (a travel service by QuadLabs Technologies) and Magpie (a product optimization tool for travel companies) (Table 2) become popular among users. Users in the travel and tourism industry would be more interested in travel-specific generative AI platforms like QuadGPT, which provide them with specific services tailored to the travel and tourism sector, rather than a platform catering to all services. There is a growing preference among customers for platforms that offer specialized services instead of general ones (Dwivedi *et al.*, 2023b; Ramasundaram *et al.*, 2023). Therefore, OpenAI may consider developing sector-specific variants of ChatGPT in the near future to counter the popularity of specialized generative AI platforms.

Research Agenda

The advent of Web 3.0 and fifth-generation (5G) broadband services will facilitate the use of ChatGPT-based services in the hospitality and tourism industry. It is an exciting time for this industry as it has the potential to provide new business opportunities, as well as enhance the quality of customer interaction and services. Scholars and practitioners working in this domain may explore the following research questions (RQs), enumerated by function:

Finance

Costing is a key parameter in the pricing of products and services (Pandey and Kumar, 2018; Pellinen, 2003). ChatGPT is currently free; however, OpenAI has announced that it is planning to charge for this service. Recently, OpenAI launched a pilot subscription plan called "ChatGPT Plus" with a price of USD 20 per month (OpenAI, 2023). The beta version of ChatGPT is intended to capture B2C and B2B customer adoption feedback and market reaction to the paid

prices of the service. The adoption of ChatGPT as a plugin, widget, or any other variant by organizations will depend on the final price determined by OpenAI. There may be reluctance to integrate ChatGPT into financial IT packages due to monetary and compliance issues, which could impact the opportunity to leverage and harness the full power of generative AIs like ChatGPT and Bard.

Thus, there are multiple financial dimensions regarding ChatGPT that may be explored by researchers working in this domain:

RQ1: What would be the impact on the adoption of ChatGPT services in the hospitality and tourism industry if it becomes a fully paid service?

RQ2: If ChatGPT becomes a chargeable service for B2B customers, should organizations using it as part of their service offerings *fully or partially pass* on the cost to the customer, or not charge users additionally for ChatGPT-based services?

RQ3: What would be the value creation and communication strategy for ChatGPT-based service offerings by hospitality and tourism companies?

RQ4: What are the product/service formats with different pricing options that OpenAI can provide to diverse categories of B2B customers in the hospitality and tourism industry?

RQ5: What are the key drivers and barriers to using ChatGPT to aid portfolio investment decisions for retail and institutional investors planning to invest in hospitality and tourism companies?

Human Resources

ChatGPT had a direct impact on mechanical and repetitive jobs in the service industry (Dwivedi *et al.*, 2023a; 2023b; 2023c). Hospitality and tourism industry experts predict that ChatGPT would enhance job quality and stimulate creativity and innovation in the workplace (Carvalho and Ivanov, 2023). Jobs that require a higher level of empathy and ethical considerations will involve more human involvement than technological assistants like ChatGPT. Leadership's role

in adopting new technologies will be crucial in managing such changes (Okumus, 2020). Employees have mixed reactions regarding job losses due to ChatGPT. Therefore, the following research questions can be explored by scholars and practitioners in the organizational behavior and human resources field:

RQ6: What is the role of leadership in integrating ChatGPT with the HR module in hospitality and tourism companies?

RQ7: Will organizational culture play a role in the adoption of generative AI like ChatGPT in HR practices in hospitality and tourism companies?

RQ8: How will employer branding be impacted by the increased use of ChatGPT in the hospitality and tourism sector?

RQ9: How can ChatGPT aid in enhancing diversity and inclusion in the hospitality and tourism industry?

Information Systems

Remarkable advancements have been made in terms of features and precision in resolving user queries on ChatGPT (Haleem *et al.*, 2022). User feedback helps improve and co-create new service features for the hospitality and tourism industry. ChatGPT has been considered for integration with company knowledge management systems and decision support systems (DSS) in various industries (Hu *et al.*, 2023; Liu *et al.*, 2023). Organizations like Tata Consultancy Services (TCS), one of the largest IT firms in India, and many hospitality clients are developing their own ChatGPT-like AI tools. TCS will use internal code, data, and a project knowledge base of the last five decades to enhance employee productivity, particularly for routine IT jobs and projects (Gautam, 2023). ChatGPT has also proven to be a helpful tool for understanding clinical situations (Liu *et al.*, 2023). However, there is currently no standardization for integrating ChatGPT with existing systems at the global level. The various

information system-related issues that need to be further explored in the hospitality and tourism industry are:

RQ10: What should be the IT architecture for integrating ChatGPT into existing organizational ERP systems in the hospitality and tourism industry?

RQ11: What would be new metrics for capturing lead generation using ChatGPT in the hospitality and tourism industry?

RQ12: How can the human-like response mechanism of ChatGPT be integrated into social companion chatbots used by tourists and patients?

RQ13: What measures can be implemented to counter biases on the ChatGPT platform in the hospitality and tourism industry?

Marketing

New-age tools like the metaverse and AI-enabled chatbots are becoming popular with users (Dwivedi *et al.*, 2022; Dwivedi *et al.*, 2023d; Koohang *et al.*, 2023). ChatGPT can engage customers and respond in real-time (Carvalho and Ivanov, 2023). Responsiveness is an important service dimension in hospitality and tourism (Poria *et al.*, 2014). Live interactions on ChatGPT act as nudges for customers to explore other products and services on online platforms. ChatGPT can help companies transition from offline store services to an omnichannel approach in the hospitality and tourism industry. Omnichannel provides customers with the option to access products and services across different platforms, thus increasing the customer base for organizations (Pandey and Rupnawar, 2022). Scholars and practitioners working in the sales and marketing function can explore the following research questions:

RQ14: How can ChatGPT be used as a nudging tool for cross-selling in the hospitality and tourism industry?

RQ15: What would be the optimal attribution model for measuring ChatGPT-plugin-related lead conversions in the hospitality and tourism industry?

RQ16: What are the critical service dimensions in the hospitality and tourism sector that would aid in service recovery?

RQ17: How can ChatGPT help hospitality and tourism brands achieve top-of-the-mind recall in a hypercompetitive business environment?

RQ18: How does personalization impact customer acquisition and retention in an omnichannel distribution network in the hospitality and tourism sector when using ChatGPT?

Public Policy

The application of ChatGPT for public policy in the hospitality and tourism industry is in its early stages. ChatGPT provides insights into complex and large-volume data (Sifat, 2023). Government policies regarding the hospitality and tourism sector are issued by the relevant departments from time to time. ChatGPT, as a virtual assistant, provides prompt updated information about these policies as required, along with inputs on international regulations regarding similar issues. However, users have mixed reactions regarding OpenAI not disclosing the ChatGPT algorithm. Regulatory bodies have yet to develop clear policies regarding the use of ChatGPT. Future researchers in this domain can explore the following research questions:

RQ19: What should be the international protocols for managing ChatGPT in businesses in the hospitality and tourism industry?

RQ20: How can hospitality and tourism-related results from ChatGPT-plugin be made more trustworthy for users?

RQ21: What are the different checks and balances for minimizing bias in ChatGPT results for queries from hospitality and tourism customers?

Operations

Operations play a critical role in the hospitality and tourism industry, involving well-thought service blueprints and trained manpower deployment (Gursoy *et al.*, 2023). AI-based tools, such as ChatGPT-enabled systems, can assist in customer service, sharing routine information with guests, optimizing route plans for raw materials, categorizing store sales data, providing information about the most and least productive salespersons, and highlighting the highest and lowest service regions (Carvalho and Ivanov, 2023; Dwivedi *et al.*, 2023a; Gaur *et al.*, 2021). ChatGPT-integrated systems can provide relevant inputs for managing operations in the hospitality and tourism sector, where there are multiple modes of transport options available for tourists, employees, and other resources. ChatGPT-integrated system inputs would help in deciding the most suitable mode of transport based on cost and time calculations (Du *et al.*, 2023). Researchers working in operations management can explore the following research questions:

RQ22: How can ChatGPT aid in making tourist inflow and outflow forecasts more accurate?

RQ23: What changes in traditional operations management techniques would make the ChatGPT-enabled service blueprint of a hotel chain more efficient?

RQ24: How can ChatGPT be leveraged to design superior service experiences in hospitality and tourism organizations?

RQ25: How can ChatGPT-enabled systems reduce operational costs in hospitality and tourism organizations?

Strategic Management

Hospitality and tourism businesses need to make long-term strategic decisions based on their strengths and weaknesses (Okumus *et al.*, 2019). ChatGPT, as part of the strategy development process, provides backend inputs such as sector reports, trend analysis, and information about regional compliances. It also provides ideas for new products, service designs, and international

markets in the hospitality and tourism sector. The role of ChatGPT in strategic management will further increase with its newer versions. Researchers working in the domain of strategic management can explore the following research questions:

RQ26: How can ChatGPT-enabled systems aid in strategic management decisions at the corporate, business, and functional levels in hospitality and tourism companies?

RQ27: What are the strategic contributions that generative AI tools like ChatGPT and Bard can make to public health?

RQ28: How can generative AIs like ChatGPT and Bard help hospitality and tourism companies become more competitive?

RQ29: How can generative AIs like ChatGPT and Bard help hospitality and tourism companies become more sustainable in their business processes?

Conclusions

The article aimed to analyze the existing practices and challenges, as well as set up the research agenda for the implementation of ChatGPT and similar artificial intelligence tools in the hospitality and tourism industry. Any change is a painful process, and we are all witnessing it happening in the hospitality and tourism sector. The infusion of technology, such as the use of generative AIs like ChatGPT, will aid in providing the required scale and scope to the organization's activities. ChatGPT will not completely replace personnel in the hospitality and tourism industry but rather augment them and enhance employee productivity. It will also give them the freedom to shift from monotonous work to more meaningful customer-related job responsibilities. This would help enhance the well-being and job enrichment of employees in the hospitality and tourism sector in the long run. The use of generative AI tools like Bard, Jasper, Synthesia, etc., along with ChatGPT, will have a positive transformative impact on the hospitality and tourism industry. Therefore, there is a need to understand, train, and develop appropriate skillsets among employees to leverage generative AI tools like ChatGPT and

thereby utilize the full potential of these new-age technologies in the hospitality and tourism sector.

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