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# Generative Artificial Intelligence (GenAI) in Procurement and Supply Chain Management: Applications, Opportunities, and Challenges

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## **Abstract:**

**Purpose** – Artificial intelligence (AI) agents and agentic systems have the potential to transform the tourism and hospitality (T&H) industry by automating existing processes and improving operational efficiency. This viewpoint paper aims to explore and analyze the potential opportunities and challenges, and establish a comprehensive research agenda for developing AI agents and agentic systems within the T&H industry.

**Design/methodology/approach** – This article comprehensively analyzes current literature, user sentiment analysis, and market trends assessment on AI agents and agentic systems. It identifies critical areas where these technologies can transform the T&H industries, providing valuable insights into this emerging field and its potential for driving innovation and efficiency.

**Findings** – Sentiment analysis reveals that 65% of social media users positively view OpenAI's new AI agent, praising its automation capabilities. Meanwhile, 22% raise concerns about technical flaws, accessibility, and ethics, while 13% remain neutral. AI agents offer opportunities to enhance efficiency, personalize services, and support sustainability in T&H. However, challenges persist in development and implementation, with concerns from businesses, customers, and regulators. This article highlights both the opportunities and challenges AI agents present in T&H industries.

**Research limitations/implications** – This paper provides valuable insights for stakeholders in the T&H industry, considering the adoption of AI agents. We present an overview of the potential challenges involved in adopting this emerging technology and discuss key organizational barriers.

**Originality/value** – This study examines the application of AI agents and agentic systems in T&H, highlighting opportunities and challenges may face during their adoption. The paper contributes original insights into how these systems can reshape industry practices, providing a foundation for future research and practical applications.

**Keywords:** AI Agents, Agentic AI, Agentic System; Autonomous Agent; Cognitive Agent; Intelligent Agent; Hospitality, OpenAI Operator; Smart Agent; Tourism; Virtual Assistant

**Article Type:** Viewpoint

## 1. Introduction

Artificial intelligence (AI) agents and agentic systems represent a significant leap in AI development with estimates indicating an increase from \$5.1 billion in 2024 to a remarkable \$47.1 billion by 2030 (Dennis *et al.*, 2023; Markets and Markets, 2025). The unique attribute of AI agents is the goal-orientated nature of the technology, enabling the rapid development of autonomous business functions that can operate and communicate within an overall agentic system architecture. These systems can improve business outcomes by adapting and learning, reasoning, and functioning in a dynamic environment without human intervention (Russell and Norvig, 2016; Acharya *et al.*, 2025). AI agent technology capability aligns with the broader industry trend where leading technology companies like OpenAI (Operator), Microsoft (Copilot), and Google (Gemini) are investing in AI-based automation systems to balance personalized service with operational efficiency (Dwivedi *et al.*, 2024; Owens and Leonard, 2025).

This study adopts a service-dominant logic perspective, viewing customers and firms as co-creators of value in hospitality (Vargo & Lusch, 2008) and linking attentional states to experiential well-being in high-contact services (Brown *et al.*, 2007), positioning agentic AI as a natural progression in value co-creation. Nonetheless, longstanding concerns about technology's impact on society highlight risks such as algorithmic opacity, job loss, and reduced human connection, which may undermine trust and service authenticity (Ivanov & Webster, 2020). Existing literature has begun exploring AI in tourism and hospitality through three pathways. First, methodological studies show how big-data analytics address operational challenges and improve forecasting accuracy (Doborjeh *et al.*, 2022). Second, theory-driven research integrates AI with service-dominant logic, mindfulness theory, and related paradigms (Law *et al.*, 2024; Wang & Uysal, 2024). Third, management and marketing studies examine how AI tools reshape customer engagement, business operations, and strategic decision-making (Kim *et al.*, 2025; Saleh, 2025). While these streams reveal AI's role in analytics, service delivery, and marketing, they expose two gaps: (i) very little is known about how multiple AI agents can be orchestrated within an interoperable, end-to-end agentic system, and (ii) existing frameworks rarely deal with the challenges when autonomous decision making crosses organizational boundaries. Our paper addresses these gaps by exploring agentic system topologies, highlighting opportunities and challenges, and proposing a research agenda bridging theory and practice for tourism and hospitality professionals.

Additionally, despite the growing interest in AI agents across various industries (Dennis *et al.*, 2023; Elgendi *et al.*, 2025; Hughes *et al.*, 2025a; 2025b), to the best of our knowledge, research on their application within the T&H sector remains in its early stages, particularly concerning the interoperability of agentic systems. Unlike the above-mentioned studies, this viewpoint paper explores and discusses the fundamental concepts of AI agents and agentic systems, offering

insights into how these technologies can be integrated into the T&H industry. We explore the key opportunities for leveraging AI agents, such as enhancing service automation, improving workforce performance, and optimizing decision-making processes. Additionally, AI agents hold the potential to foster greater resilience, efficiency, and sustainability within the sector. However, they also carry inherent risks, including incorrect recommendations, booking failures, or misinterpreting customer inputs that can seriously undermine customer satisfaction and operational stability. Recognizing these vulnerabilities is critical for designing robust error-mitigation strategies and maintaining trust in AI-driven solutions. Therefore, we also critically examine the challenges associated with deploying these systems, addressing integration, operation, trust, and cultural sensitivity issues. This integrative analysis not only fills a critical gap in the existing literature but also redefines strategic directions for the adoption of AI technologies in T&H.

## 2. AI agents and agentic systems

AI agents refer to autonomous entities that can operate with a higher level of independence and adaptability by perceiving their environment, processing information, and taking actions to achieve specific goals (Hughes *et al.*, 2025a; 2025b). Whereas agentic systems are frameworks that enable one or more AI agents to collaborate through direct communication to solve complex tasks without human intervention (Elgendi *et al.*, 2025; Hughes *et al.*, 2025a). The architecture of AI agents plays a crucial role in developing robust and efficient AI solutions (Acharya *et al.*, 2025). However, currently, there are no standardized architectures for AI agents. As an emerging technology, agent-based architectures are highly varied and often tailored to meet the specific needs of different domains and application requirements. Despite these variations, most AI agents share a set of fundamental core components. These typically include five main modules namely a perception module, a knowledge representation module, a reasoning and decision-making module, a learning and adaptation module, and an action execution module (see Figure 1) (Russell and Norvig, 2016; Ben Saad, 2024).

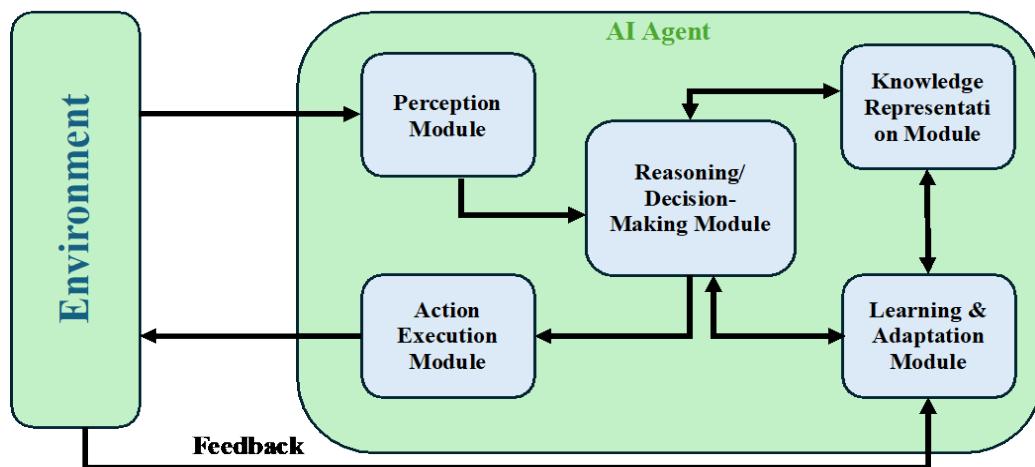


Figure 1: AI agent system components

(Source: drawn by authors based on inputs from Shehory *et al.*, 2014; Russell and Norvig, 2016)

The functionality of these modules is as follows. Firstly, the perception module gathers and interprets environmental data from digital or physical sources, converting it into a structured format for further processing (Elgendi *et al.*, 2025). The knowledge representation module is the agent's cognitive foundation, encoding domain-specific information in a structured, machine-readable format and facilitating efficient storage, organization, and knowledge retrieval (Acharya *et al.*, 2025). The reasoning and decision-making module is the core processing unit, utilizing logical inference, probabilistic reasoning, or machine learning-based approaches to analyze data and determine optimal actions. Furthermore, to enhance adaptability, the learning and adaptation module enables the agent to refine its strategies over time through various learning algorithms. This continuous learning process improves decision-making and response mechanisms in dynamic environments. Finally, the action execution module translates decisions into concrete actions through robotic actuators in physical systems or application programming interface calls and system commands in digital environments.

The concept of AI agents is not new, with researchers such as Russell and Norvig (2016) discussing the ability of intelligent agents to interact with their surroundings, perceive their environment, and utilize reasoning and purposeful actions to optimize their performance. The earlier study by Russell and Norvig (2016) categorized AI agents into five different types based on their capabilities and decision-making approaches, each suited for specific applications (see Table 1), which are simple reflex, model-based reflex, goal-based, utility-based and learning agents (Russell and Norvig, 2016).

Table 1: Comparative Overview of AI Agent Types

| Agent Type         | Description   | Complexity | Advantages  | Limitations  |
|--------------------|---|------------|---|--|
| Simple Reflex      | Follows predefined rules and responds to current conditions without memory. | Low        | <ul style="list-style-type: none"> <li>• Simple and provides real-time response.</li> <li>• Highly reliable with accurate sensors.</li> </ul>                         | <ul style="list-style-type: none"> <li>• Prone to errors and lacks memory</li> <li>• Cannot adapt to new situations.</li> </ul>                                |
| Model-Based Reflex | Tracks hidden world aspects, updates decisions accordingly.                 | Medium     | <ul style="list-style-type: none"> <li>• Quick decision-making.</li> <li>• Adaptability.</li> <li>• Strategic choices.</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Computationally expensive.</li> <li>• Higher development costs.</li> <li>• Limited Learning.</li> </ul>               |
| Goal-Based         | Acts to achieve goals using search algorithms.                              | High       | <ul style="list-style-type: none"> <li>• Efficient, adaptable and easy to evaluate performance.</li> <li>• Applicable in robotics.</li> </ul>                         | <ul style="list-style-type: none"> <li>• Limited to predefined goals.</li> <li>• Goal Complexity.</li> <li>• Resource intensive.</li> </ul>                    |
| Utility-Based      | Chooses actions to maximize utility for the best outcome.                   | High       | <ul style="list-style-type: none"> <li>• Handles complex decision-making.</li> <li>• Provides objective analysis.</li> <li>• Flexibility and adaptability.</li> </ul> | <ul style="list-style-type: none"> <li>• Computationally costly with scalability challenges.</li> <li>• Lacks ethics and risk utility misalignment.</li> </ul> |
| Learning           | Learns from experience to improve performance.                              | Very high  | <ul style="list-style-type: none"> <li>• Adaptability.</li> <li>• Autonomy.</li> <li>• Enhanced decision-making.</li> </ul>   | <ul style="list-style-type: none"> <li>• Data Dependency.</li> <li>• Computational complexity.</li> <li>• Ethical and bias considerations.</li> </ul>          |

Source: AI Agent Types adapted from Russell *et al.* (2016).

Large language models (LLMs) have demonstrated remarkable capabilities in generating text, and solving complex queries. However, they remain constrained by their lack of memory, real-world interaction, and ability to take action (Gursoy and Cai, 2025). Agentic systems could be a critical step in evolving these systems where LLMs' natural language processing and learning capabilities are integrated with AI agents, autonomously processing unstructured data, adapting to evolving contexts, and executing tasks without human intervention (Elgendi *et al.*, 2025). These agentic systems comprise four key design patterns: reflection, planning, tool usage, and multi-agent collaboration (Singh *et al.*, 2024). Reflection is a critical component of agentic reasoning, enabling

the iterative analysis and refinement of outputs. In contrast, using tools is a mechanism to augment and integrate the capabilities of a range of LLMs (Gao *et al.*, 2024). Planning involves the strategic formulation of action sequences to achieve predefined goals (Huang *et al.*, 2024), while multi-agent collaboration orchestrates the coordinated efforts of multiple AI agents working together towards shared goals (Hong *et al.*, 2023).

Figure 2 depicts a model and proposed architecture of an agentic system for travel planning, where the user initially inputs goal-orientated details such as destination, travel dates, preferences, and budget. The planning module breaks down the process into subtasks, including flight bookings, hotel reservations, and activity scheduling (Singh *et al.*, 2024). Multi-agent collaboration facilitates coordination among these components, utilizing tools like flight booking systems, hotel reservation platforms, Google Calendar, and Stripe for payment processing (Gao *et al.*, 2024). Subsequently, the critic agent conducts a reflection phase, evaluating any conflicts and aligning the outcomes with the user's preferences and budget before delivering the final output back to the user (Hong *et al.*, 2023).

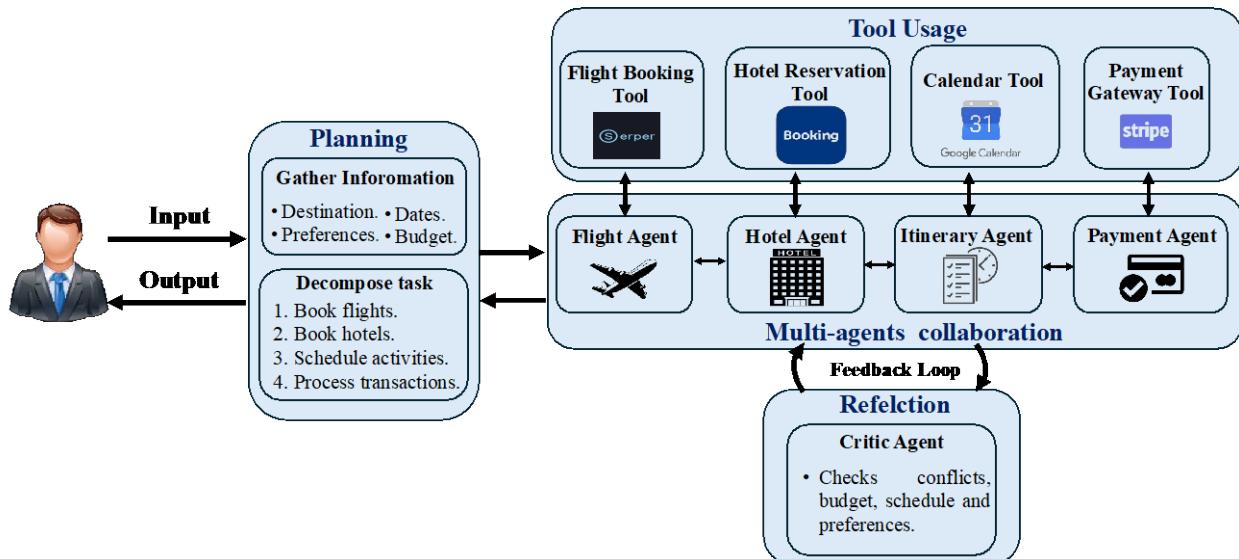


Figure 2: Agentic travel planning model and system architecture

(Source: adapted from Singh *et al.*, 2024)

### 3. Public perception and opinion on social media regarding the launch of OpenAI's Operator: A sentiment analysis

The launch of OpenAI's new AI agent, Operator, has generated considerable attention across various social media platforms. In order to better understand some of the key conversations and perspectives surrounding this new technology, Twitter (X), Facebook, Reddit, and LinkedIn are utilized as the main social media platforms to collect data focusing exclusively on posts mentioning OpenAI's Operator over only three weeks after launching it. The selection of these platforms as data sources was guided by their established relevance in technology adoption literature and their proven utility in social sentiment research (Thapa, 2022; Chakraborty *et al.*, 2024).

Specifically, platform-specific APIs are first employed to extract posts based on predetermined keywords and hashtags (i.e., OpenAI's Operator), ensuring only content directly relevant to the conversation. Then, a preprocessing step is applied to the data, and the duplicates and irrelevant entries are removed, resulting in refined data of 210 entries. While we acknowledge that this dataset may appear limited for traditional large-scale sentiment analysis, the dataset was purposively curated from a three-week window following the recent launch of OpenAI's *Operator*. Subsequently, this data was analyzed using a sentiment analysis framework built with Python to classify each post. The findings provide valuable insights into the potential adoption of AI agent technologies by highlighting the enthusiasm and the concerns users express. By categorizing opinions (refer to Figure 3), the study reveals diverse viewpoints that underscore key trends and challenges, which could significantly influence the broader integration of agentic AI in the industry.

It is observed from the analysis that the significant majority of the social media posts on OpenAI's Operator are positive, with 65% highlighting its potential to transform automation through autonomous task performance. Platforms like LinkedIn and Reddit frame Operator as a step toward more advanced AI, with some suggesting its relevance to the future of artificial general intelligence. Many praised its adaptability, error recovery, and seamless integration, calling it a "paradigm shift" for productivity. However, 22% of posts expressed skepticism, pointing to technical flaws, slow performance, CAPTCHA disruptions, and data inaccuracies. Criticism also focused on the \$200/month subscription fee, perceived as exclusionary due to regional restrictions and limited global access. Concerns about job displacement, particularly roles like virtual assistants, and ethical worries about AI safety and privacy were also raised. The remaining 13% of posts were neutral, focusing on technical specifics, such as Operator's architecture and partnerships with companies. These neutral discussions balanced enthusiasm and caution, emphasizing the Operator's role as a transformative but imperfect step in AI development that requires careful oversight as adoption grows.

Figure 4 displays a word cloud that reflects the varied opinions on OpenAI's Operator. It features positive terms such as "Automation," "Adaptability," and "Revolutionize." It also includes critiques related terms like "Job Displacement," "Regional Restrictions," and "Inaccuracies," as well as neutral references to "Comparative Analysis," and "Claude."

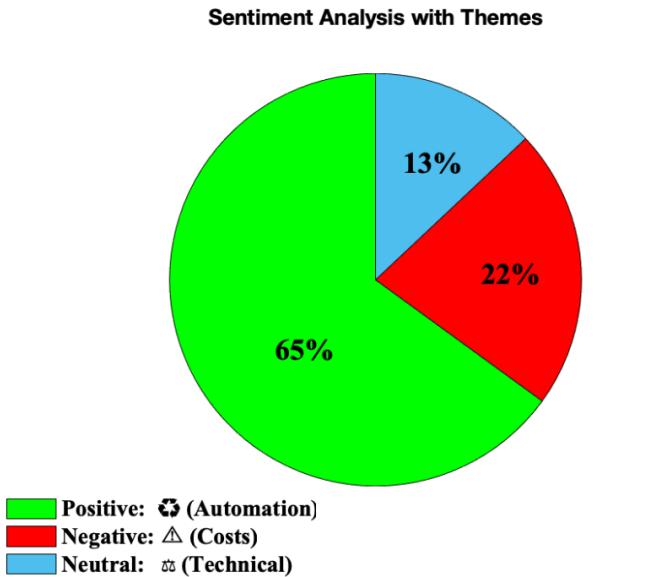


Figure 3: Social media sentiment analysis on the launch of OpenAI's.

(Source: Created by the authors)

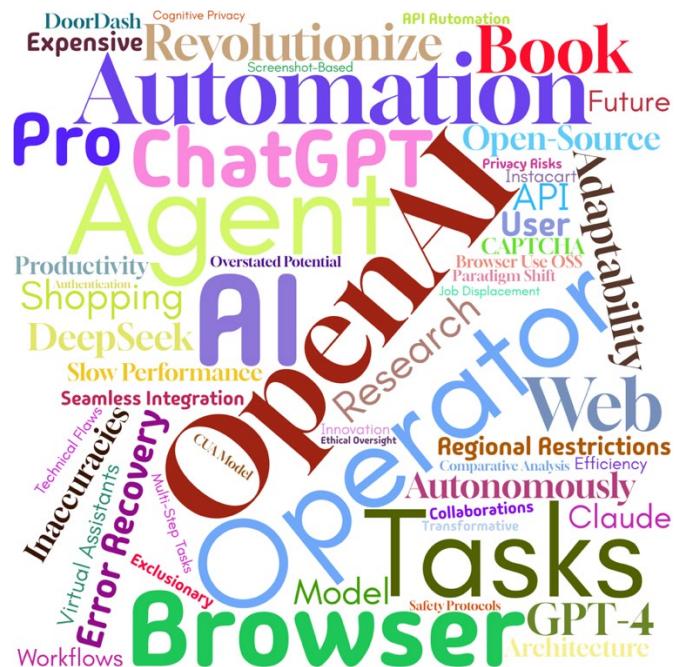


Figure 4: Word cloud showing social media perceptions on Operator.

(Source: Created by the authors)

The sentiment analysis serves as a vital empirical basis for our following discussion, and exposing the broad public impression of the Operator. To further ensure analytical robustness, the sentiment trends were directly mapped to the structure of the research agenda in Section 6. Importantly, the agenda is not based on sentiment analysis alone; it reflects insights from manual content validation and is grounded in a thorough review of current literature in AI, T&H (e.g., Acharya *et al.*, 2025;

Kim *et al.*, 2025), ensuring each research direction is shaped by both public discourse and academic evidence.

#### 4. AI agents and agentic systems: opportunities for T&H

Based on the sentiment analysis presented in the previous section, we identify four areas of potential for T&M businesses: (1) supply-and-demand optimization (for example, changing room rates based on positive automation sentiment), (2) operational efficiency and workforce synergy (scheduling led by agents that address concerns about workforce displacement), (3) compliance and sustainability (agents as real-time monitors of energy use and data governance), and (4) behavioral factors (AI-driven engagement nudges and predictive-pricing prompts highlighted in neutral technical posts). Table 2 summarises the domain-specific benefits before each is discussed in detail.

Table 2: AI agents and agentic systems: opportunities for T&H

| T&H Area                                     | Opportunities  |
|--|--|
| Supply and Demand Optimization               | <ul style="list-style-type: none"> <li>Optimize pricing and inventory.</li> <li>Forecast demand for travel services.</li> <li>Enhance personalized travel experiences.</li> <li>Improve customer interaction via AI.</li> </ul>          |
| Operational Efficiency and Workforce Synergy | <ul style="list-style-type: none"> <li>Automate scheduling and maintenance.</li> <li>Personalize guest experiences with AI.</li> <li>Enhance workforce efficiency and skills.</li> <li>Support revenue management strategies.</li> </ul> |
| Compliance and Sustainability                | <ul style="list-style-type: none"> <li>Monitor compliance in real-time.</li> <li>Ensure adherence to regulations.</li> <li>Optimize energy and resource use.</li> <li>Promote sustainable tourism practices.</li> </ul>                  |
| Behavioral Factors                           | <ul style="list-style-type: none"> <li>Use AI for customer engagement.</li> <li>Apply behavioral nudges for sales.</li> <li>Enhance predictive analytics in travel.</li> <li>Improve pricing strategies dynamically.</li> </ul>          |

Source: Created by the authors.

##### 4.1. AI agents in supply and demand optimization

This opportunity domain focuses on revenue-management tasks that leverage the largest positive cluster, which welcomed Operator's autonomous booking and pricing capabilities. Hotels, restaurants, travel agencies, and entertainment venues stand to gain by integrating AI agents and agentic systems into daily operations (Buhalis and Leung, 2018; Dwivedi *et al.*, 2024). Based on impartial technical observations, these systems analyse vast datasets covering regional preferences, seasonal patterns, weather, and customer behaviour (Dennis *et al.*, 2023). Hotel managers can digitally test service models and market scenarios before deployment. Agentic systems create a sandbox where menu engineering, pricing tactics, and supply-chain logistics are refined for profitability and satisfaction. Once connected to customer-relationship platforms, these agents support execution (Cai *et al.*, 2022). They monitor inventory in real time, schedule replenishment, flag anomalies, advise staffing, and generate actionable insights for managers. Hotel chains also automate reservations, adjust room rates to demand, and curate distinctive

experiential bundles, ensuring revenue resilience during shocks such as late cancellations or sudden festivals.

On the demand side, AI agents craft deeply personalized plans for travel and lodging. Conversational interfaces on websites, apps, and social media engage prospective tourists through natural dialogue (Filieri *et al.*, 2021). Beyond static lists, agents supply complete itineraries, flexible price windows, and augmented-reality previews aligned with user goals. They merge event calendars, travel blogs, and crowdsourced reviews to build live trip guides (Adam *et al.*, 2021; Gaur *et al.*, 2021). Recommendations blend user-generated content, expert insight, and seasonal highlights to give richer context than conventional search. As dynamic marketing tools, agents promote holiday packages, suggest off-peak dates, and issue targeted discounts by analysing browsing history, social engagement, and past behaviour (Huang and Rust, 2021; Kshetri *et al.*, 2024). In doing so, they simultaneously enhance customer satisfaction and maximise supplier profitability.

#### *4.2. AI agents for operational efficiency and workforce synergy*

In everyday operations, agentic systems in the T&H sector can mimic human decision-making processes and, in some cases, even surpass human capabilities (Dennis *et al.*, 2023). These systems adapt service procedures, anticipate maintenance issues before they occur, and continuously learn from operational data. Additionally, the agentic system can track guest preferences, including dietary preferences, room temperature, and recreational activities, to deliver a personalized guest experience (Puntoni *et al.*, 2021). These systems may guarantee a smooth experience for guests from check-in to check-out by processing inputs from sensor networks and Internet of Things (IoT) devices (a network of interconnected devices that communicate data). AI agents can handle intricate scheduling and resource allocation tasks without human intervention.

The effect AI agents and agentic systems have on the workforce is among the most significant in the T&H sectors. Although the possibility of AI replacing human labor is the subject of much debate (Dennis *et al.*, 2023), many experts believe these technologies are more likely to improve work quality and open up novel possibilities (Zhao *et al.*, 2025). This perspective is supported by sentiment analysis's findings, highlighting areas where AI complements rather than replaces human talents. AI agents can do data-intensive and repetitive jobs, allowing human workers to concentrate on more innovative and customer-focused work (Zhang *et al.*, 2025).

Additionally, incorporating AI agents into operational processes will promote the development of high-quality positions in the industry. To prepare the next generation of hospitality workers for a technologically advanced workplace, educational institutions and training facilities are starting to provide specialized courses that combine hospitality management with digital literacy and AI operations (Zhang *et al.*, 2024). Automating repetitive processes encourages staff to develop innovative ways to improve service delivery. Teams may find service gaps using AI-driven analytics insights, which inspire creative solutions and new business models. Consequently, businesses increase operational effectiveness and create an atmosphere that allows advanced technology and human talent to flourish.

Moving towards a digital-first strategy within the T&H sector does not require eliminating established processes. Instead, the best results from AI agents and agentic systems would come from their smooth integration with current technology (Acharya *et al.*, 2025). For instance, contemporary AI-powered booking platforms and older reservation systems can coexist, with AI agents serving as middlemen to improve customer engagement and data flow. These interfaces maintain the integrity of current workflows while facilitating a seamless shift from traditional to digital procedures. Businesses that have invested in digital transformation may include AI agents in their current technology platforms by using cloud-based services and platforms (Akter *et al.*, 2022).

#### *4.3. Ethical AI agents: compliance and sustainability*

AI agents may provide regulators with real-time dashboards highlighting compliance concerns and indicating possible dangers by automatically combining data from several sources, including booking systems, guest evaluations, and safety audit reports. In addition to expediting the inspection procedure, this proactive monitoring capacity improves industry-wide responsibility (Dwivedi *et al.*, 2024). For instance, an AI agent may provide an alert with comprehensive data analysis and recommendations for corrective actions if a hotel exceeds the required safety procedures or visitors report persistent problems. Additionally, AI agents may help understand new rules and ensure hospitality organizations stay current with changing sustainability, fire safety, and hygiene compliance regulations (Wong *et al.*, 2023). AI agents can handle many languages, which is helpful in areas where various linguistic groupings are spoken (Wang *et al.*, 2023). This feature supports international T&H operations by bridging communication barriers and promoting a consistent knowledge of standards across national boundaries.

Modern T&H organizations strongly emphasize sustainability (De Martino *et al.*, 2025), and AI agents may play a critical role in encouraging environmentally beneficial behavior. To help hotels, restaurants, and resorts reduce their environmental impact, these systems can track energy use, water use, and trash production in real-time. AI agents may suggest energy-saving measures by evaluating operational data (He *et al.*, 2022). For example, they can optimize kitchen operations to minimize food waste or modify heating, ventilation, and air conditioning (HVAC) settings according to occupancy trends. Additionally, AI agents may provide recurring reports that outline the hotel's progress toward green certification objectives, point out areas needing development, and recommend sustainable best practices. In addition to helping the environment, this proactive strategy is a powerful marketing tool for environmentally concerned tourists, increasing reservations and strengthening brand loyalty.

#### *4.4. AI Agents and behavioral factors*

AI agents can enhance the 'nudge' effect, a concept from behavioral economics that refers to subtle cues or interventions that influence people's decisions and behaviors without restricting their choices (Espinosa *et al.*, 2022). Informed by earlier empirical observations, these AI agents create interactive experiences where customers are gradually encouraged to explore additional services and exclusive deals (Han *et al.*, 2023). The agent may monitor guests' activities and promptly notify them of special discounts and flash sales or recommend scheduling extra services like guided tours or spa treatments. These AI systems' instantaneous, context-aware reactions have

significantly boosted cross-selling and up-selling prospects (Zhang *et al.*, 2025). Additionally, these agents may find latent preferences and customize future encounters to further improve customer engagement by analyzing vast amounts of conversational data.

Hybrid human-AI interfaces are an example of innovation that is becoming more widespread (Stylos *et al.*, 2025). These systems combine AI's speed and accuracy with human agents' empathy and inventiveness. These hybrid approaches are helpful in high-stakes situations when prompt decision-making and effective communication are critical, such as crisis management during pandemics or natural catastrophes. Organizations can swiftly adjust to shifting conditions and preserve service continuity even in difficult situations because of AI agents' real-time processing and analysis of enormous volumes of data (Han *et al.*, 2023). In addition, agentic systems serve as the basis for predictive analytics in the travel and hotel industry (Mariani and Wirtz, 2023). These systems may predict trends, spot new customer preferences, and use historical data and real-time inputs to improve pricing tactics. Businesses may increase profitability and customer satisfaction by effectively using this information to better plan marketing campaigns, allocate resources, and modify operational strategies.

## 5. Challenges of using agentic systems in the T&H domain

Integrating agentic AI in the T&H industry promises improved operational efficiency, customized consumer experiences, and quick decision-making. However, several complex adoption and deployment challenges need to be carefully considered.

### 5.1. Integration challenges

Many businesses in the hospitality industry still use outdated architectures (Buhalis and Leung, 2018) that are incompatible with sharing data in real-time with autonomous agents. This mismatch may compromise the systems' value proposition, making using past guests' data for tailored suggestions more difficult. In addition, as agentic systems often need access to public and private databases (Acharya *et al.*, 2025), including sensitive customer data such as payment information, dietary restrictions, and mobility preferences, the ethical implications of data usage continue to be controversial. Further, SMEs often lack the funding necessary for technology integration, whereas multinational chains may be able to cover the expenditures.

### 5.2. Trust in AI agentic systems

According to Chakraborty *et al.* (2024), familiarity, transparency, and consistency are essential to building customer trust in technology. However, the decision-making processes of agentic systems often function as "black boxes." For example, a hotel guest who receives a room upgrade via an autonomous system would wonder whether the choice was made by opaque algorithms that put profit ahead of equity. Guests may value human judgment above algorithmic accuracy in high-stakes situations like medical emergencies or emergency evacuations, which increases this

skepticism. Acceptance is further complicated by the cognitive-affective duality of trust, which requires users to feel emotionally reassured by the system's behaviors and intellectually believe in its competence (Morosan and Dursun-Cengizci, 2024).

### *5.3. Employee resistance*

Employee resistance is challenging, as employees can believe that their job security or autonomy is in danger due to agentic systems (Law *et al.*, 2024). Changing to a hybrid model (models that integrate machine-driven analysis with human judgment), where staff concentrate on complicated, unintuitive interactions while agents perform everyday tasks (such as check-ins and reservation revisions), calls for significant operational and cultural changes and significant training (Stylos *et al.*, 2025). To prioritize creativity and problem-solving over procedural tasks, re-skilling programs must restructure roles and enhance technical literacy. However, unions have previously voiced concerns about workload inequalities and dehumanization (Ivanov and Webster, 2020).

### *5.4. Algorithmic bias and fairness*

Another challenge with AI agents and agentic systems is their neutrality, as algorithmic biases and training data naturally influence their outputs (Stahl *et al.*, 2022). For instance, under the pretense of personalization, the agentic system of a restaurant aggregator may covertly give preference to businesses that pay high listing fees, affecting search results. Such actions violate fair competition regulations and undermine customer confidence. Moreover, current AI models often lack deep contextual understanding (Acharya *et al.*, 2025). They may generate errors due to inherent biases in their training data, which can significantly impair their reliability and effectiveness in culturally diverse and dynamic T&H environments. Algorithmic fairness necessitates ongoing observation and external oversight.

### *5.5. System Operationalization and cybersecurity*

Regular upgrades are necessary for agentic systems to adjust to evolving cybersecurity risks, consumer trends, and regulatory changes. However, many hotel operators depend on outside suppliers for maintenance since they lack the internal knowledge to handle these changes. According to Ahmad *et al.* (2021), the 2018 Marriott data breach revealed 500 million guest records due to antiquated systems, demonstrating the hazards created by this reliance. The proprietary nature of many systems makes customization more difficult, but developers like OpenAI must prioritize modular designs that enable gradual improvements without interfering with operations. Financial obstacles prevent smaller businesses from obtaining innovative solutions, which might increase the divide between regional firms and industry giants.

### *5.6. Legal and liability issues*

Determining culpability is complicated when an agentic system makes an error, such as overbooking a flight or giving a tourist the wrong directions. The European Union's 2021 plan for AI regulation deemed specific applications in the T&H industry as "high-risk," requiring strict transparency and human control (Zvaigzne *et al.*, 2025). However, global enforcement is still uneven, which exposes companies to legal action. The increasing use in the T&H sector of Robot,

Artificial Intelligence, and Service Automation (RAISA) technologies to automate routine tasks and personalize services (Skubis *et al.*, 2024) presents new complexities within the context of the agentic systems in terms of public liability and accountability.

### *5.7. Cultural sensitivity*

Cultural customs, such as greeting practices and eating preferences, are essential to hospitality (Li and Lee, 2025). In Middle Eastern or Asian cultures, where hierarchical communication methods and collectivist beliefs are prevalent (Ting-Toomey and Dorjee, 2018), an agentic system created for Western establishments may misread preferences. For instance, a booking agent that prioritizes individual preferences over group needs in countries like China or India may disenfranchise family-oriented travelers. To overcome these obstacles, developers should work with cultural specialists, include datasets particular to a specific location, and refine AI agents using transfer learning and reinforcement learning methods influenced by culturally relevant reward signals (Acharya *et al.*, 2025).

### *5.8. Ethical implications*

The use of AI agents in T&H raises critical ethical issues. Inadequate data security measures may result in significant breaches of customer confidentiality, while biases inherent in training data might provide unfair or discriminating results. In addition, increased dependence on AI agents may reduce human jobs, resulting in job losses and decreased personalized service. Addressing these challenges requires robust technological safeguards, well-defined ethical frameworks, and regulatory oversight that balances innovation with the preservation of fundamental rights and social welfare (Ahmad *et al.*, 2021).

### *5.9. Regulatory and compliance challenges*

For the integration of AI agents in the T&H industry to be effective, strong regulatory frameworks are essential. Businesses must establish effective data governance practices to ensure compliance with data protection regulations such as the General Data Protection Regulation (GDPR) (de Almeida *et al.*, 2021). At the same time, emerging transparency standards for AI demand explainable algorithms that clarify and make decision-making processes more understandable (Zvaigzne *et al.*, 2025). Furthermore, explicit contractual agreements and proactive risk management are necessary to ensure responsibility among developers, operators, and consumers due to uncertain culpability in AI-driven service failures (Stahl *et al.*, 2022).

## **6. Research agenda**

The broad application of AI in T&H field has been the subject of numerous studies (e.g., Majid *et al.*, 2023; Tuo *et al.*, 2024), but few have examined the unique characteristics and autonomous decision-making abilities of AI agents, the subclass that propels operational and strategic changes in T&H. Targeted research is critical to analyze the potential impact on the T&H sector for adopting AI agents and agentic systems. Further research will inform key stakeholders and policymakers on deploying AI agent technology within a strategic, ethical, and sustainable framework (see Appendix A).

### *6.1. Operations*

Prior studies on AI have mainly concentrated on increasing efficiency (e.g., Tuo *et al.*, 2024) rather than highlighting the subtle advantages of entirely autonomous AI that integrates automated logistics with human elements. AI agents could enhance operational efficiency by anticipating demand, optimizing energy use, and managing inventories predictively (He *et al.*, 2022). However, excessive automation poses the risk of depersonalizing services, for example, when impersonal chatbots replace concierge personnel. Research should investigate hybrid models where AI manages logistics while staff concentrates on guest interaction and improving levels of AI agent-led interaction. Thus, future research avenues should study AI agents' following aspects:

- RQ1: How could AI agents enhance the real-time distribution of resources during high tourism demand?
- RQ2: How might predictive inventory using AI agents help reduce food waste?
- RQ3: How can AI agents in housekeeping achieve a balance between automation and employee autonomy?
- RQ4: How do the challenges of AI agent-led robotic interactions compare to human interactions in the T&H industry, and what are the implications for customer satisfaction, service quality, and operational efficiency?

### *6.2. Marketing*

AI agents can provide real-time promotions and predictive suggestions by evaluating behavioral data and enabling hyper-personalized marketing based on user goal setting. For example, using browser history, AI-powered chatbots might suggest upselling options to tourists, including spa packages or meal upgrades (Puntoni *et al.*, 2021; Zhang *et al.*, 2024). Over-reliance on algorithmic nudges, however, runs the risk of offending customers with invasive targeting or cultural insensitivity. Thus, researchers working at the intersection of marketing, hospitality, and tourism may examine the following different aspects of AI agents:

- RQ1: How can AI agents customize marketing without breaking cultural norms?
- RQ2: In the T&H sector, how can AI agents track, evaluate, and react to customer feedback to enhance e-brand reputation?
- RQ3: How can AI agents detect and eliminate fake reviews to protect the legitimacy of review platforms in the T&H industry?
- RQ4: How can AI agents optimize visual material (e.g., photos and videos) for T&H marketing campaigns?
- RQ5: How can AI agents improve customer segmentation models to provide more focused advertising campaigns for the T&H sector?

### *6.3. Customer experience*

Earlier research has focused mainly on AI-driven customer service systems, such as Adam *et al.* (2021), who explored chatbots for enhanced customer service and user compliance, and Reis (2024), who examined AI-powered human-robot interactions in customer service. However, our

focus on AI agents highlights a knowledge gap regarding how these self-governing systems can be developed to integrate human-like sensitivity and adaptive decision-making, essential for striking a balance between automation and emotional intelligence. AI agents could transform customer interactions by providing personalized trips, multilingual chatbots, and real-time crisis management (Wang *et al.*, 2023). Thus, researchers may examine the following different aspects of AI agents:

- RQ1: How may AI agents simulate cultural sensitivity in encounters with tourists?
- RQ2: What measures guarantee AI transparency during service outages (e.g., overbooking)?
- RQ3: In high-touch services, how can AI agents strike a balance between automation and human intervention?
- RQ4: Which KPIs best reflect an AI agent's influence on enduring customer loyalty?
- RQ5: How might AI agents improve perceived customer value by reforming customer value propositions?

#### *6.4. Strategic management*

Although broad AI applications have been shown to support strategic planning (e.g., Buhalis and Leung, 2018; Filieri *et al.*, 2021; Akter *et al.*, 2022; Dwivedi *et al.*, 2024), few studies differentiate the proactive, autonomous capabilities of AI agents that enable real-time market analysis and multi-stakeholder planning; our work attempts to fill this gap. AI agents provide practical insights for strategic decision-making, such as sentiment research for identifying developing markets or competitive scenario simulation (Dennis *et al.*, 2023). Agentic systems can be designed to predict the impact of geopolitical events on tourist arrivals, allowing for proactive risk mitigation. However, organizations often struggle to align AI-driven breakthroughs with their long-term objectives. Thus, researchers may study AI agents' following aspects:

- RQ1: How can AI agents use specific analysis to find unexplored markets?
- RQ2: What tactics match long-term organizational objectives with AI agents' innovations?
- RQ3: How can AI agents increase emergency preparedness in tourism destinations?
- RQ4: Which frameworks incorporate AI agents' insights into decision-making involving several stakeholders?

#### *6.5. Human resources*

Prior studies have mainly concentrated on the broad impacts of AI on human resource management (e.g., Zhao *et al.*, 2025), yet our viewpoint article suggests that to maximize human-AI cooperation, it is essential to implement specialized training and leadership techniques tailored to the distinct autonomous roles of AI agents, as indicated by emerging trends in human-AI interaction (Raees *et al.*, 2024). Research should concentrate on creating training curricula that prepare staff to manage AI systems, building trust via open processes, and calculating AI's return on investment (ROI) in lowering burnout. Therefore, researchers in this field may investigate the following various workforce aspects with regard to AI agents:

- RQ1: How can leaders promote trust in service delivery between employees and AI agents?
- RQ2: What is the impact of using AI agents in talent acquisition?
- RQ3: What indicators evaluate the ROI of AI agents in lowering employee burnout?
- RQ4: How can AI agents recraft employment responsibilities in the T&H to achieve a balance between machine efficiency and human creativity?

### *6.6. Information systems*

For operational efficiency, AI agents should be seamlessly integrated with legacy information technology infrastructure (Akter *et al.*, 2022). Agentic systems require robust application programming interface (API) frameworks to integrate with existing enterprise resource planning (ERP) and customer relationship management (CRM) platforms. While much research has focused on integrating AI, less attention has been paid to how blockchain and distributed ledger technology, a secure, decentralized database system that records transactions across multiple computers, may enhance the independent character of AI agents, setting them apart from standard AI systems by ensuring data openness and reducing biases (Knani *et al.*, 2022; Sousa *et al.*, 2022). Thus, researchers may study AI agents' following aspects:

- RQ1: What is the process for integrating agentic systems with legacy systems?
- RQ2: Which architectures provide reliable interoperability between AI agents and CRM/ERP?
- RQ3: In what ways might blockchain reduce biases in data used to train AI agents?
- RQ4: In multilingual chatbots, which real-time metrics best reflect the effectiveness of AI agents?
- RQ5: How can AI agents achieve a compromise between guest privacy concerns and the usefulness of IoT data?

### *6.7. Sustainability*

Although several studies demonstrate how generic AI technology can advance sustainability in the T&H sector (Buhalis and Leung, 2018; Akter *et al.*, 2022; Balakrishnan *et al.*, 2025), our emphasis on AI agents reveals a critical gap in understanding how their data-driven, autonomous decision-making capabilities can further support sustainability initiatives and align with international environmental objectives. By monitoring carbon footprints, encouraging eco-friendly behavior, and optimizing energy consumption, AI agents help promote sustainability (De Martino *et al.*, 2025). Research is needed to measure the overall environmental footprint of AI agent development. Thus, researchers may study AI agents' following aspects:

- RQ1: How could AI agents encourage travelers to practice environmentally beneficial behavior?
- RQ2: How can AI agents contribute to the real-time tracking of carbon footprints?
- RQ3: What regulations guarantee AI agents conform to international sustainability criteria?
- RQ4: How can AI agents help T&H businesses meet sustainability certifications while reducing operational costs?

- RQ5: How can AI agents automate tasks like modifying HVAC settings according to occupancy trends to reduce energy use in hospitality buildings (such as hotels and resorts)?

### *6.8. Finance*

In the T&H industry, cost management and pricing strategies are essential components of providing value (Hayes *et al.*, 2021). Even though AI-driven pricing is widely studied (Hayes *et al.*, 2021; Vinod, 2022), our study fills a crucial gap that traditional AI research has overlooked: the ability of AI agents to independently adjust and refine dynamic pricing strategies, which can significantly increase revenue and customer satisfaction (Barua and Kaiser, 2024; Bludorn, 2024). AI agents can completely transform cost optimization and financial planning through sophisticated predictive analytics and real-time data processing skills (Vinod, 2022). Therefore, researchers in this field may investigate the following various aspects of AI agents:

- RQ1: How can AI agents improve the accuracy of dynamic pricing in tourism markets subject to fluctuations?
- RQ2: How can SMEs use AI agents to forecast costs without making a significant upfront investment?
- RQ3: How can T&H businesses lower labor expenses while maintaining operational effectiveness with AI agents?
- RQ4: In the hospitality industry, how can AI agents enhance menu engineering practices to optimize ingredient purchasing, pricing, and profitability?

## **7. Discussion and conclusions**

### *7.1. Conclusions*

This viewpoint article analyzes the potential impact of AI agents and agentic systems in the T&H industry, identifying the numerous opportunities and significant challenges while establishing a comprehensive research agenda. AI agents and agentic systems, such as OpenAI's Operator, present a paradigm shift in the T&H industry, offering innovative solutions that automate complex tasks, enhance operational efficiency, and drive hyper-personalized customer experiences. These technologies possess the capacity to enhance automation whilst improving job satisfaction and service quality. However, their adoption raises significant concerns regarding scalability, ethics, transparency, and trust that must be addressed through continued research and regulatory oversight. As the industry adapts to this evolving technological landscape, a balanced approach that integrates AI capabilities with human expertise will be essential to maximize benefits while mitigating potential risks. Given these considerations, an important question arises: *As AI agents become more autonomous and capable of making complex decisions, how should the T&H industry redefine human roles to ensure that technological efficiency complements rather than replaces human-centric service experiences?* Additionally, with AI agents increasingly shaping consumer choices, from personalized recommendations to dynamic pricing strategies, *what safeguards should be in place to prevent algorithmic biases from distorting market competition and eroding consumer trust?*

## *7.2. Theoretical implications*

Employing service-dominant logic, the study perceives agentic AI as an actor that integrates resources and produces hospitality value in real time, rather than as a passive tool (Vargo & Lusch, 2008). Agents build on mindfulness theory by integrating continuous environmental sensing with adaptive decision-making loops. This can transform moment-to-moment attention into personalized visitor experiences that enhance well-being (Brown *et al.*, 2007). Their independence also raises fundamental sociotechnical issues, such as job loss, lack of transparency, and loss of authenticity, which have been discussed in robotics research before (Ivanov & Webster, 2020). The study consequently recommends that researchers combine AI operations analytics with theories of service and information systems. This would connect studies that focus on methods and show how algorithms are used in tourism (Doborjeh *et al.*, 2022). This study also strengthens dynamic-capability arguments by presenting multi-agent orchestration and ongoing model updates as key routines that change the way human and machine resources are combined. This aligns with previous requests for cutting-edge AI research in hospitality (Law *et al.*, 2024). Collectively, these insights reframe the concept of experiencing quality as a combined cognitive and computational concept, laying the theoretical framework for evaluating adaptive autonomy and collaborative learning as endemic elements of hospitality ecosystems.

## *7.3. Practical implications*

For professionals, agentic AI moves decision-making from planned human evaluations to constant algorithmic micro-adjustments. Embedding learning agents in revenue platforms enables fine-grained rate optimization and inventory control, mirroring revenue-management best practices (Vinod, 2022) and supplementing standard cost disciplines (Hayes *et al.*, 2021). Front-of-house chatbots and voice assistants turn detailed preference data into highly personalized itineraries and real-time upsell cues. This feature is even more beneficial when combined with touchless robots, particularly in situations where cleanliness is crucial (Gaur *et al.*, 2021). To maximize these benefits, managers must learn how to effectively manage algorithms, control data, and integrate human and AI capabilities. Industry surveys are already indicating that new job titles, such as "prompt engineer," and cross-functional upskilling are becoming increasingly common (Kim *et al.*, 2025). Security breaches remain a strategic concern, as evidenced by high-profile breaches associated with outdated systems (Ahmad *et al.*, 2021). To protect privacy, energy, and safety, boards should include compliance dashboards that show these indications in their governance procedures (de Almeida *et al.*, 2021). Clear communication that makes agents seem like helpers rather than replacements reduces employee resistance by meeting their cognitive-affective trust demands (Chakraborty *et al.*, 2024). Cloud-hosted, pay-as-you-go architectures make advanced analytics accessible to everyone, enabling SMEs to join an increasingly agentic industry that is projected to grow roughly tenfold by 2030 (Markets and Markets, 2025). Lastly, executives should utilize agent telemetry in conjunction with balanced scorecards that track guest sentiment, carbon intensity, and the number of unethical incidents. This ensures that the success of the algorithms aligns with the company's responsibility objectives.

## *7.4. Limitations and future research*

Because this article is presented as a viewpoint rather than an empirical investigation, its arguments are based on conceptual synthesis and illustrative examples. In the future, research should extend

beyond merely explaining phenomena and employ multi-method empirical designs, such as longitudinal case studies, cross-sectional surveys, and quasi-experiments, to measure the operational, experiential, and ethical effects of agentic AI on businesses of all sizes and in diverse cultures (Morosan & Dursun-Cengizci, 2024). Collecting this kind of information can help clarify theoretical boundary conditions, assist in evidence-based management playbooks, and aid regulators who must find a balance between innovation and public trust.

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## Appendix A: A comprehensive future research agenda for AI agents in tourism and hospitality

(Source: Created by the authors)

| Research area                  | Explanation  | Research questions  | Data sources   | Conceptual models/frameworks   |
|--------------------------------|--|---|--|--|
| <b>1. Operations</b>           | Explores how AI agents can automate tasks and optimize resource allocation while balancing human-driven service components.        | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How could AI agents enhance the real-time distribution of resources during high tourism demand?</li> <li>- <b>RQ2:</b> How might predictive inventory using AI agents help reduce food waste?</li> <li>- <b>RQ3:</b> How can AI agents in housekeeping balance automation and employee autonomy?</li> <li>- <b>RQ4:</b> What are the implications of AI agent-led robotic interactions vs. human interactions for customer satisfaction and efficiency?</li> </ul>   | <ul style="list-style-type: none"> <li>- Real-time occupancy data (e.g., hotels)</li> <li>- IoT sensor data for energy/resource usage</li> <li>- Inventory records (food and supplies)</li> <li>- Scheduling and labor-cost data</li> </ul>  | <ul style="list-style-type: none"> <li>- <b>Socio-technical systems theory</b> (for human-AI collaboration)</li> <li>- <b>Operations management models</b> (e.g., queuing theory + AI decision-making)</li> <li>- <b>Hybrid service model frameworks</b> (merging agent-led logistics with human-centric service)</li> </ul> |
| <b>2. Marketing</b>            | Examines how AI agents provide hyper-personalized marketing and manage risks such as cultural insensitivity or over-reliance.      | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can AI agents customize marketing without violating cultural norms?</li> <li>- <b>RQ2:</b> How can AI agents track and respond to customer feedback to enhance e-brand reputation?</li> <li>- <b>RQ3:</b> How can AI agents detect/eliminate fake reviews in the T&amp;H industry?</li> <li>- <b>RQ4:</b> How can AI agents identify suitable brand ambassadors?</li> <li>- <b>RQ5:</b> How can AI agents optimize visual content for campaigns?</li> <li>- <b>RQ6:</b> How can AI agents improve segmentation for targeted ads?</li> </ul>  | <ul style="list-style-type: none"> <li>- CRM data (customer demographics, behaviors)</li> <li>- Social media engagement metrics</li> <li>- Review platform data (authenticity vs. fake)</li> <li>- Influencer campaigns (engagement, click-through rates)</li> </ul>                             | <ul style="list-style-type: none"> <li>- <b>Customer journey frameworks</b> (AI as a key marketing touchpoint)</li> <li>- <b>Service-dominant logic</b> (co-creation in marketing)</li> <li>- <b>Ethical AI guidelines</b> (ensuring privacy, avoiding invasive personalization)</li> </ul>                                  |
| <b>3. Customer Experience</b>  | Investigates how AI agents can personalize interactions and support service recovery while retaining empathy and cultural nuance.  | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How may AI agents simulate cultural sensitivity in guest interactions?</li> <li>- <b>RQ2:</b> What measures ensure AI transparency during service outages?</li> <li>- <b>RQ3:</b> How do you balance automation and human intervention in high-touch services?</li> <li>- <b>RQ4:</b> Which KPIs measure AI's impact on long-term loyalty?</li> <li>- <b>RQ5:</b> How can AI agents proactively address customer service issues?</li> <li>- <b>RQ6:</b> How can AI agents detect dissatisfaction and adjust replies for recovery?</li> <li>- <b>RQ7:</b> How might AI agents enhance perceived customer value propositions?</li> </ul> | <ul style="list-style-type: none"> <li>- Customer satisfaction surveys, loyalty metrics</li> <li>- Chatbot/AI logs (including multilingual interactions)</li> <li>- Complaint/incident reports</li> <li>- Cultural dimensions data (e.g., high-context vs. low-context communication)</li> </ul> | <ul style="list-style-type: none"> <li>- <b>Emotionally intelligent AI frameworks</b> (combining sentiment and empathy)</li> <li>- <b>Service quality models</b> (contrasting AI-led vs. human-led service)</li> <li>- <b>Technology acceptance models</b> (adapting them for AI-driven hospitality services)</li> </ul>     |
| <b>4. Strategic Management</b> | Focuses on how AI agents deliver proactive market insights (e.g., sentiment analysis, scenario simulation) for long-term planning. | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can AI agents use data analysis to discover unexplored tourism markets?</li> <li>- <b>RQ2:</b> Which tactics align AI-driven innovations with an organization's strategic objectives?</li> <li>- <b>RQ3:</b> How can AI agents improve emergency preparedness at tourism destinations?</li> <li>- <b>RQ4:</b> Which frameworks embed AI agents' insights into multi-stakeholder decision-making?</li> </ul>  | <ul style="list-style-type: none"> <li>- Market trend data (macro/micro economic indicators)</li> <li>- Social media sentiment analyses</li> <li>- Risk assessment data (geopolitical, environmental)</li> </ul>   | <ul style="list-style-type: none"> <li>- <b>Scenario-planning models</b> (AI-driven "what-if" analysis)</li> <li>- <b>Stakeholder theory</b> (factoring AI agent insights for broader collaboration)</li> <li>- <b>Resource-based view</b> (assessing strategic value from AI agent capabilities)</li> </ul>                 |

|                               |   |   |  |   |
|-------------------------------|---|---|--|---|
|                               |   |   | - Multi-stakeholder meeting transcripts, policy documents  |   |
| <b>5. Human Resources</b>     | Investigate how AI agents reshape roles, recruitment, and training while fostering trust and minimizing cultural or job-related tensions.                 | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can leaders encourage employee trust in AI-driven service delivery?</li> <li>- <b>RQ2:</b> What is the impact of AI agents on talent acquisition?</li> <li>- <b>RQ3:</b> Which metrics measure AI agents' ROI in reducing burnout?</li> <li>- <b>RQ4:</b> How can AI agents deliver personalized training and skill development?</li> <li>- <b>RQ5:</b> How can AI agents recraft roles to balance automation with human creativity?</li> <li>- <b>RQ6:</b> How can AI agents efficiently schedule employees while maintaining service quality?</li> </ul> | <ul style="list-style-type: none"> <li>- HR information system data (retention, satisfaction)</li> <li>- Employee surveys, performance reviews</li> <li>- Training/e-learning platform usage data</li> <li>- Talent acquisition metrics (time-to-fill, success rates)</li> </ul> | <ul style="list-style-type: none"> <li>- <b>Human-AI collaboration frameworks</b> (trust, autonomy, role redefinition)</li> <li>- <b>Job demands-resources model</b> (to evaluate burnout and wellbeing)</li> <li>- <b>Leadership theories</b> (e.g., transformational vs. adaptive in AI-augmented workplaces)</li> </ul>  |
| <b>6. Information Systems</b> | Reviews how AI agents integrate with legacy IT (ERP, CRM) and employ distributed ledger technologies (blockchain) to ensure transparency.                 | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can agentic systems integrate seamlessly with legacy IT environments?</li> <li>- <b>RQ2:</b> Which architectures enable reliable ERP/CRM interoperability with AI agents?</li> <li>- <b>RQ3:</b> How might blockchain mitigate biases in AI training data?</li> <li>- <b>RQ4:</b> What real-time metrics best reflect multilingual chatbot performance?</li> <li>- <b>RQ5:</b> How can AI agents reconcile guest privacy with IoT data usage?</li> </ul>   | <ul style="list-style-type: none"> <li>- Legacy reservation system logs</li> <li>- API transaction records</li> <li>- Blockchain logs for data provenance</li> <li>- Real-time IoT sensor feeds</li> </ul>   | <ul style="list-style-type: none"> <li>- <b>Interoperability frameworks</b> (API-based integration)</li> <li>- <b>Blockchain-based transparency models</b> (bias detection and data lineage)</li> <li>- <b>Diffusion of innovation models</b> (enterprise-level AI adoption)</li> </ul>                                     |
| <b>7. Sustainability</b>      | Examines how AI agents foster eco-friendly practices, monitor carbon footprints, and align with environmental goals despite their own data center impact. | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can AI agents encourage travelers to adopt sustainable behaviors?</li> <li>- <b>RQ2:</b> How can AI agents support real-time carbon tracking?</li> <li>- <b>RQ3:</b> Which regulations ensure AI agent compliance with global sustainability standards?</li> <li>- <b>RQ4:</b> How can AI agents help T&amp;H businesses meet certifications while reducing costs?</li> <li>- <b>RQ5:</b> How can AI agents automate HVAC and lighting to reduce energy?</li> <li>- <b>RQ6:</b> How can AI agents help manage natural resources in ecotourism?</li> </ul>  | <ul style="list-style-type: none"> <li>- Energy consumption and water usage logs</li> <li>- Sustainability standard criteria (LEED, ISO)</li> <li>- IoT data from climate control systems</li> <li>- Ecotourism resource inventories</li> </ul>                                  | <ul style="list-style-type: none"> <li>- <b>Green IT frameworks</b> (AI agent carbon footprints, data center optimization)</li> <li>- <b>Environmental sustainability models</b> (AI-driven resource optimization)</li> <li>- <b>Behavioral nudging frameworks</b> (incentivizing eco-friendly traveler actions)</li> </ul> |
| <b>8. Finance</b>             | Analyzes how AI agents refine dynamic pricing, cost forecasting, and resource planning while addressing transparency and fair profit-sharing.             | <ul style="list-style-type: none"> <li>- <b>RQ1:</b> How can AI agents enhance dynamic pricing accuracy in fluctuating tourism markets?</li> <li>- <b>RQ2:</b> How can SMEs leverage AI agents for cost forecasts with minimal investment?</li> <li>- <b>RQ3:</b> How can T&amp;H businesses reduce labor costs without sacrificing efficiency through AI?</li> <li>- <b>RQ4:</b> How can AI agent analytics optimize marketing spending?</li> <li>- <b>RQ5:</b> How can AI agents improve menu engineering (purchasing, pricing, profitability)?</li> </ul>  | <ul style="list-style-type: none"> <li>- Dynamic pricing feeds (revenue management systems)</li> <li>- Financial statements (costs, revenues, labor expenses)</li> <li>- Ingredient sourcing and menu profitability data</li> <li>- SME operational data</li> </ul>              | <ul style="list-style-type: none"> <li>- <b>Dynamic pricing and revenue management models</b> (with AI decision-making)</li> <li>- <b>Predictive analytics frameworks</b> (cost forecasting)</li> <li>- <b>Ethical AI frameworks</b> (fair pricing, avoiding monopoly, transparent revenue sharing)</li> </ul>              |