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Enhancing Hospitality Service Quality with Artificial Intelligence

Chapter Introduction

The resurgence of the hospitality industry and the increasing use of artificial intelligence in service have resulted in new customer expectations and opportunities to enhance the quality of hospitality services. Accordingly, a clear understanding of these new service quality expectations and how best to design and implement these new technologies for the benefit of hospitality managers and consumers is key. This chapter provides theoretical and practical insights into how artificial intelligence service agents such as chatbots and robots in key hospitality sectors can provide excellent service quality and enhance customer relationships and well-being. The latest examples are illustrated to explore the application of AI within the hospitality industry, outlining the diverse prospects and obstacles that these advanced technologies offer to restaurant owners, hotel operators and other experts in the field.

Background

The hospitality industry continues to grow and contribute significantly to the service economy. Driven by factors such as the lifting of COVID-19 restrictions and an increase in leisure lifestyles, the hospitality industry is projected to outperform the technology and retail sectors towards the end of 2023 (Riaz 2023).

Consisting of several key sectors such as tourism, restaurants and hotels, consumers in the hospitality industry have traditionally been served by human service agents to meet their service needs. Some of these familiar human service agents include human tour guides, human waiters, and human housekeeping personnel in hotels. However, increasingly, many of these services are performed by artificial intelligence service agents (AISA), with consumers becoming more engaged (Fang, Han and Chen 2023) and using AISA to get tour recommendations, book tables in restaurants and interact with room service (Chen et al. 2023). For example, Hilton has experimented with Connie, a robot concierge powered by IBM (IBM, 2016) to enhance customer's experience by personalizing tourism recommendations (Trejos, 2016). In a similar vein, generative AI is used in restaurants to develop personalized meal recommendations (Guszkowski, 2023). Hi Arya, a food-tech company from India, has built a robotic tea maker using AI and IoT technologies which enable users to create their own recipes from the mobile app and web interface (Collins et.al, 2021). Mezli, the world's first fully automated restaurant serves customers a complete menu of meals prepared by fully autonomous equipment (Van Hooijdonk 2023; CIB 2023). The movements of recent business practices have shown the significance of applying AISA in the hospitality industry.

AISA are adaptable AI-based agents that are human-like and that can improve their service performance in various service environments autonomously (Noor, Rao Hill, and Troshani 2022b). With advancements in AI and machine learning applications in service, there has been an increased use of AISA by service firms to facilitate mechanical and analytical service tasks, while emotional service tasks are carried out by both AISA and human service agents (Huang

and Rust 2020). Mechanical tasks can come in the form of repetitive actions such as facilitating the guest's room booking, while analytical tasks may involve giving recommendations on the next preferred travel destination based on the traveller's profiles. Emotional tasks may involve AISA in service activities that require more customer interaction and relationship management, such as managing customer feedback based on the overall trip experience or facilitating service recovery. These tasks can be performed by AISA in relatively more private settings where the consumer will engage AISA via their personal devices such as smartphones or smart speakers. In other instances, AISA may be accessed in more public contexts where AISA are being offered to the consumer in a specific service environment, such as autonomous tour buses that pick up commuters at designated stops and ply specific routes. In addition, AISA can be represented virtually or physically and meet a range of utilitarian or hedonic needs of consumers (Noor, Rao Hill, and Troshani 2022a). For instance, chatbots used in travel websites and mobile applications are virtual in representation and mainly offer utilitarian benefits to the consumer. On the other hand, robot tour guides for travellers are physical in representation and can offer both utilitarian and hedonic benefits to consumers with the integration of generative AI such as ChatGPT.

Continued interactions with traditional human service agents and AISA in the hospitality industry can result in consumers forming service perceptions and evaluating the services experienced. These attitudes can be positive or negative in nature (Kang, Koo and Chung 2023), may differ based on the type of service performed by AISA in the hospitality setting (Alma Çallı et al. 2023) and accordingly lead to different degrees of acceptance among consumers (Ladeira, Perin, and Santini 2023). Responses can also be cognitive or affective which can in turn result in behavioural outcomes. For instance, consumers may begin to form judgements on the perceived value of the hospitality service as well as express a level of customer satisfaction, which can then affect repurchasing intentions and overall loyalty (Hu, Kandampully, and Juwaheer 2009). One key concept that can play a vital role in impacting variables such as perceived value, customer satisfaction and customer loyalty, is service quality (Cronin Jr, Brady, and Hult 2000). Accordingly, it is important to understand how AISA has affected service quality perceptions for hospitality managers to better design and implement AISA effectively.

Managing AI Service Quality in Hospitality

Service quality refers to the overall perception of excellence or superiority of the service as perceived by consumers (Zeithaml 1988). In the context of the hospitality industry, service quality evaluations are associated with the attitudes consumers form when experiencing the service of a specific hospitality sector. Accordingly, service managers may be concerned with the overall service quality of their specific service establishment, whereas tourism managers would be concerned with overseeing the service quality standards across key hospitality touchpoints as travellers may form an overall judgement of the trip experience based on experiences across the entire travel journey.

In the past, as hospitality services were performed by humans, consumers would evaluate service performances in the context of human service agents. The seminal SERVQUAL scale was developed to answer the question of how consumers would perceive such human service

performances. This resulted in the five dimensions of SERVQUAL which are reliability (ability to perform the service task correctly), assurance (ability of human service agents to give confidence to consumers), tangibles (physical elements of the service environment including appearance), empathy (care and personalization given to consumers) and responsiveness (fast service when required) (Parasuraman, Zeithaml, and Berry 1988). While SERVQUAL was originally developed based on research conducted in the maintenance, banking, telephone, and finance service industries (Parasuraman, Zeithaml, and Berry 1988), the model has since been used to measure service quality across a wide variety of other service sectors (Ladhari 2009). In the hospitality industry, the five dimensions of SERVQUAL have been successful in explaining consumers' service quality expectations across sectors including restaurants (Lee and Hing 1995) and hotels (Hu, Kandampully, and Juwaheer 2009), with alternative measurement models continuing to support most of the five service quality dimensions (Stevens, Knutson, and Patton 1995).

However, service environments have changed from purely human-to-human service interactions to include other forms of service agents such as self-service technologies, websites and now AISA. Accordingly, the service environment and the nature of the service agent can affect how consumers evaluate the service quality of the hospitality service (Rust and Oliver 1994). This can be observed in the different service quality dimensions emerging in models developed for non-human service agents. For instance, while empathy was a key dimension for services performed by human service agents (Parasuraman, Zeithaml, and Berry 1988), consumers indicate that they value the design of service interfaces when services are performed by self-service technologies (Lin and Hsieh 2011). In the hospitality industry, this can come in the form of the attractiveness of the ticketing kiosk which is operated by non-AI pre-programmed algorithms with a set of fixed rules and instructions based on the user's input. In the case of websites facilitating information and transaction services, consumers would also expect a level of privacy (Parasuraman, Zeithaml, and Malhotra 2005). Thus, while some service quality dimensions such as reliability appear consistently across different service environments, other dimensions are unique due to the nature of the service agent.

Accordingly, in the context of hospitality services performed by AISA, it is important to accurately measure service quality based on the set of dimensions that matter to consumers in such emerging AI-based service environments. With AISA performing services, consumers' overall expectations have changed, and consumers evaluate AISA service quality based on a unique combination of six dimensions. These dimensions are efficiency, security, availability, enjoyment, contact and anthropomorphism (Noor, Rao Hill, and Troshani 2022b):

- *Efficiency* – AISA's degree of reliability and ease of use and speed of AISA. Once again, reliability proves to be an important criterion for consumers in evaluating service quality.
- *Security* – The consumer's perception that AISA are safe to use and there is little risk associated with intrusion of privacy and personal data. This will continue to remain relevant as hospitality services attempt to further differentiate via greater personalization, in which a key trade-off is the customer's personal data.
- *Availability* – AISA is ready for use anytime, anywhere. This will become a greater expectation as services and devices become more integrated.
- *Enjoyment* – the degree to which using and interacting with AISA is enjoyable.

- *Contact* – The ability to access human service agents for assistance via AISA and reflects the valuable role human service agents continue to play in the AISA service environment.
- *Anthropomorphism* – AISA displays human-like attributes such as tangible features and intangible elements including personality. Anthropomorphism represents a new service quality dimension and reflects the emerging and changing service environments consumers experience with AISA.

By optimizing the design of AISA along these six dimensions, hospitality managers have greater certainty on the aspects of AISA that they need to focus on to achieve a high level of service quality. Close consultation with AISA developers as well as receiving feedback from consumers is crucial to ensuring that the design decisions are optimized for AISA service quality. In terms of tracking and benchmarking the performance of AISA, hospitality service managers can measure AISA service quality by using the 26-item AISAQUAL questionnaire which can be administered to consumers who have interacted with services performed by AISA (Noor, Rao Hill, and Troshani 2022b). As several service tasks may still be performed with traditional service agents such as humans and non-AI self-service technologies, appropriate scales such as SERVQUAL (Parasuraman, Zeithaml, and Berry 1988) and SSTQUAL (Lin and Hsieh 2011) can be used in tandem to measure service quality based on the relevant service environments.

As established in this section, service quality in the hospitality industry is key for the firm's economic growth (Park and Jeong 2019). In the luxury hospitality sector as well, a careful understanding of service quality including the importance of customer interactions and the use of technology is vital for the continued success of the hospitality luxury brand (Lu et al. 2015). For hospitality services performed by AISA, the proper management of AISA service quality can increase the level of the perceived value of the service, customer satisfaction and customer loyalty (Noor, Rao Hill, and Troshani 2022b). How restaurants and hotels can implement AI to optimize services will be discussed in the concluding sections of this chapter.

Managing Well-Being and Relationships with AI

Beyond the bottom-line benefits that AISA can offer to the hospitality industry through service quality, it is important to understand how the use of AISA can affect consumers and their sense of well-being. In the literature, notwithstanding the importance of managing existing hospitality employees' well-being with the emergence of AISA (Xu et al. 2023), there continues to be important discussions on the need to understand the effects of service on the consumer's well-being to create more sustainable service ecosystems (Field et al. 2021). In terms of luxury hospitality services, this is in line with the responsibility luxury brands have in taking care of various stakeholders and their subjective well-being (Batat 2022).

Subjective well-being refers to the consumer's overall evaluation of their lives and can come in the form of cognitive or affective evaluations (Diener 1984). Cognitive evaluations include people's judgements of their life satisfaction, while affective evaluations include levels of happiness (Diener et al. 1999). While services performed by human service agents can result in improvements in the consumer's subjective well-being due to human interactions and engagement with human service agents (Su, Swanson, and Chen 2016), it is important to

understand if such social relationships can be replicated with AISA to create similar beneficial outcomes. Indeed, with continued interactions with AISA, consumers may begin to feel that they are forming relationships with AISA, despite the AISA not being able to truly feel for the consumer. One way to explain this phenomenon is by using the conceptualization of parasocial relationships (PSR).

PSR was initially used to refer to the illusory social bond that the audience can form with performers, despite there not being any real reciprocation and attachment between audience members and the personas that are being portrayed (Horton and Wohl 1956). Like PSR effects that can grow between viewers and characters on television upon multiple viewings of a particular television show, PSR can also be developed between consumers and AISA because of several service interactions (Noor, Rao Hill, and Troshani 2022a). This is because AISA can be perceived as social beings due to their human-like attributes. PSR is driven due to the service quality dimensions of anthropomorphism and perceived enjoyment that consumers experience with AISA (Noor, Rao Hill, and Troshani 2022a). With anthropomorphism, AISA appear more human and relatable. With perceived enjoyment, interactions with PSR feel more human and intimate. PSR is further reinforced with AISA since AISA can sustain these interactions due to their AI-based capabilities.

Despite not being real relationships, the development of PSR between AISA and consumers should not be discounted as consumers can form higher levels of subjective well-being due to increasing PSR (Noor, Rao Hill, and Troshani 2022a). Higher levels of PSR and subjective well-being can be activated with better AISA service quality through its dimensions of anthropomorphism and perceived enjoyment. Accordingly, affective responses such as PSR and happiness can be increased when AISA are designed to be more physical in representation and can serve consumers with more hedonic benefits (Noor, Rao Hill, and Troshani 2022a). Overall, these are opportunities for the hospitality industry to promote AISA in their services due to their benefits on PSR and subjective well-being. Consumers too can be part of the process of personalizing AISA for more social experiences. Examples of these initiatives to the key hospitality sectors of restaurants and hotels will be discussed in the subsequent sections of this chapter.

AI-Restaurant Service Quality and Relationship Management in Practice

A Closer Look at AI in the Food Service and Restaurant Industry

As established earlier in the chapter, the rise of AI in the food service and restaurant industry has shown a positive impact on both business outcomes and customer satisfaction. In a labour-intensive industry, AI can be used to automate and delegate tasks in the front end of the business to the back-end processes. Tasks such as reservations, order taking, inventory management and marketing efforts can be done with the help of AI tools hence allowing the staff to focus on providing quality customer service interactions.

More and more businesses are investing in these AI automation tools to improve the whole dining experience with customers preferring contactless payment processing and user-friendly service. In a survey by Forrester conducted in 2019, 69% of companies reported that operating

costs were reduced after implementing AI automation and chatbots. 62% of companies reported increased employee productivity (Linthwaite 2019). According to Arizton (2023), the global self-service kiosk market size was valued at USD26.45 billion in 2022 and is estimated to reach USD43.65 billion by 2028, expanding at a CAGR of 8.71%.

Specific Benefits of AI to Restaurant Services

Restaurants can use AI technology to enhance consumers' dining experience and ease the brand's service journey (Srivastava 2022). Specifically, AI technology improves businesses' operations by:

- *Streamlining operations* – AI can predict waiting times, guest count and reservations based on past data and inform staff of upcoming surges or downtime.
- *Increasing efficiency* – Automated self-service kiosks can send the menu and any special requests directly and accurately to the kitchen to minimize wait times.
- *Utilizing predictive maintenance* – AI-driven predictive maintenance systems can provide real-time equipment data and continuously monitor the performance of the kitchen equipment such as energy consumption, temperature, and pressure. The AI systems will notify when it's time to be sent for servicing or repairs.
- *Automating inventory management* – Using historical sales data, AI systems can help restaurants forecast demand and create a precise inventory list based on patterns and trends from consumers' preferences, seasonal orders, and popular dishes.

In fast food restaurants, AI technology can enhance consumers' dining experience by making restaurant visits more consistent and predictable, improving the speed of service and order accuracy, minimizing human interaction, and letting staff focus on other tasks.

AI Enhancing Customer Experience

The use of AI can be integrated into various points of the business process and customer service journey. AI technology is used for the customer-facing process like AI phone answering when placing reservations, voice ordering to minimize waiting time, self-serve options and kiosks that can personalize customer experience using conversational AI and facial recognition. AI technology essentially can be used to elevate customers' dining experience by simplifying and personalizing customer interactions without compromising on the quality of customer service (Sweeney n.d.).

Restaurants can use AI technology to enhance their inventory, purchasing and delivery processes which can lead to a reduction in food waste and promote sustainability. Smarter staff scheduling can also be implemented to optimize productivity and ensure proper staff allotments during critical periods. Data-based insights and predictions allow the business to utilize resources efficiently based on previous sales data collected by the AI program. Automated marketing and remarketing can help businesses target new consumers and remarket to previous ones more effectively. Industry leaders such as McDonald's, Wendy's, Nestle and Mastercard are making sizable investments in fitting AI systems and AI humanoids into their business processes (Nestlé 2014). The food service and restaurant industry will be seeing plenty of widespread adoption of this new technology (Sweeney n.d.).

Examples of AISA in the Restaurant Industry

Mugaritz

Chef Andoni Luis Aduriz along with François Chartier and the SONY AI Gastronomy Team has collaborated on a molecular gastronomy AI program that utilizes machine learning algorithms to generate innovative combinations of flavours and textures. Chef Aduriz has incorporated pine needles into dishes to add a flavour of smokiness to the dish and used soil as a seasoning (Mugaritz 2023; Chartier n.d.).

CloudChef

Californian start-up, CloudChef, has developed a software program that uses AI to cook a dish precisely with cameras and sensors placed near the cooking hob. Every aspect of the cooking process can be measured and transcribed into the AI program, following a highly detailed recipe. Cooking processes such as cutting, portion control, the thickness of the sauce and the degree of food caramelization can be monitored and managed by the program. Such AI programs allow chefs to monetize their secret recipes and cooking practices to other external sources (Travel and Leisure 2023).

Miso Robotics

Another Californian start-up, Miso Robotics, has developed an AI kitchen assistant, 'Flippy'. 'Flippy' assists with prepping, grilling, frying, and plating. Like CloudChef, 'Flippy' uses sensors and cameras to prepare and monitor the cooking processes. The limited processes of 'Flippy' could help fast food restaurants solve the issue of high employee turnover and low retention rates. Cali Group, the team managing the fast-food chain CaliBurger, announced a partnership with Miso Robotics to bring 'Flippy's' expertise into their Pasadena, California branch by 2019 with goals to expand to 50 locations worldwide (Sennaar 2019).

Pepper

Japanese technology firm Softbank has collaborated with MasterCard to develop an AI-driven humanoid robot named Pepper. Pepper is a robot waiter that is equipped to process customers' orders, upsell recommendations and enables customers to make contactless payment using their MasterCard account on the robot's screen tablet. Pepper was seen working at Pizza Hut in Asia in 2016 (Sennaar 2019; McEleny 2016).

Halla

The Los Angeles-based company, Halla, is a personalized restaurant and dining search engine. Halla claims to make food delivery more convenient by integrating several food delivery applications into one system (Sennaar 2019).

Domino's

In 2017, Domino's announced an enhanced feature of its Facebook Messenger that included the use of a chatbot, named 'Dom', during the Super Bowl. 'Dom' allowed consumers to order pizza by typing the word 'pizza' on the Facebook Messenger application. Subsequently, customers were able to order wings and salads using 'Dom'. In an attempt first of its kind, Domino's has partnered with Flirtey, a drone company, to deliver pizza to a customer in Whangaparaoa, New Zealand. Although the flying drone attempt was a conceptual one, Domino's has plans to use wheeled robots to deliver pizza within a one-mile radius in Germany and the Netherlands (Walker 2019).

Mezli

Mezli is the world's first fully automated restaurant started in San Francisco by a team of engineers from Stanford. Robots will serve customers a complete menu of meals prepared by fully autonomous equipment. The unique selling proposition of Mezli is to sell healthy, affordable, and convenient food without social interaction. This makes the business model cheaper to run compared to traditional restaurants. The engineers partnered with Michelin star Chef Eric Minnich to create more than 60,000 variations of the menu items (Van Hooijdonk 2023; CIB 2023).

McDonald's

McDonald's has opened a new highly automated test restaurant in Texas equipped with conveyor belts, a self-service kiosk, and drive-thru express lanes. The ban on indoor dining and social interactions during the COVID-19 pandemic has led McDonald's to review its customer service journey. Aimed at reducing in-person interaction, McDonald's CEO Chris Kempczinski in November 2020 announced that customers will receive more services through their digital devices. The future of fast food, according to McDonald's, is focused on innovative customer experience, increased order speed and accuracy to make the service more enjoyable for the consumer (Houser 2023).

Donatos Pizza

Appetronix has entered into an exclusive agreement with Donatos Pizza and its affiliate companies Agápe Automation and the Grote Company to launch a fully autonomous pizza vending machine. This innovative partnership will lead to the development of a standalone, fully autonomous restaurant in Columbus, Ohio. The fully autonomous restaurant developed by Appetronix for Donatos will enable a seamless and efficient dining experience for customers from start to finish (PR News Wire 2023).

AI-Hotel Service Quality and Relationship Management in Practice

A Closer Look at AI in the Hotel Industry

AI is becoming increasingly prevalent across various sectors of the economy, including the travel and hospitality industry. AI-powered tools and services can enhance the guest experience while simultaneously optimizing operations, reducing costs, and saving time for hotel operators. While AI cannot entirely replace the human touch in the hospitality sector, it can proficiently handle many tasks that have traditionally been the domain of human staff, at any time of the day. These tasks include a wide range of functions, from handling hotel bookings, streamlining pre-arrival processes, offering personalized recommendations, facilitating check-in and check-out procedures, to analyzing customer feedback. The potential of AI is virtually limitless.

According to research by HubSpot (2023), business professionals report that AI can help them understand their customers better and improve the overall customer experience (Santiago 2023). Ultimately, hotels that integrate AI into their operations can provide superior service to their guests, resulting in heightened customer satisfaction and increased loyalty. According to

data from Statista (2023), the current market capitalization of AI is nearing \$100 billion U.S. dollars and is projected to surge to approximately \$2 trillion by 2030.

Specific Benefits of AI to Hotel Services

With the introduction of AI and digitization in the hospitality industry, AI can improve hotel operations in many ways, making them more efficient and effective:

- *Automating repetitive tasks* – AI can automate online reservations and contactless check-ins, freeing up staff to concentrate on offering personalized guest experiences (Wadhwa 2023). Many administrative tasks can be automated to reduce human error and increase operational efficiency.
- *Enhancing customer service* – Chatbots and virtual assistants can assist guests with booking reservations, addressing inquiries, and providing recommendations (Hollander 2023).
- *Improving housekeeping room assignments and maintenance* – Sensors and cameras can be used to oversee and regulate the temperature, lighting, and security of guest rooms, and improve energy efficiency through smart building systems (Access 2023).
- *Optimizing pricing and revenue management* – Via data analysis and predictive modelling, AI-driven algorithms are used to optimize pricing and availability in real-time (Revfine 2023). It helps hotels maximize revenue by adjusting rates based on demand, seasonality, and other factors. It ensures that rooms are neither underpriced nor overpriced, leading to increased profitability.
- *Analyzing customer feedback* – AI can be used to analyze feedback from various sources, such as social media, review websites, and guest surveys. This helps hotels identify areas for improvement and respond to customer concerns promptly, ultimately improving guest satisfaction.
- *Utilizing predictive maintenance* – AI-driven predictive maintenance can monitor the condition of equipment and infrastructure within a hotel. By analyzing data from sensors, AI can predict when maintenance is needed, reducing downtime and operational disruptions (OTA Insight 2023).
- *Optimizing energy consumption* – In hotels, adjustments can be made to heating, cooling, and lighting based on occupancy and weather conditions (Mackenzie n.d.). This not only reduces operational costs but also contributes to sustainability efforts.
- *Refining overall efficiency* – Hotel operations can be improved by applying AI for forecasting demand, inventory management, and logistics optimization (Hollander 2023).

AI Enhancing Guest Experience

The hospitality industry is all about delivering the utmost customer service. With the rise of AI, hotels now have new tools to help them enhance guest experience in several methods.

Some hotels are experimenting with robots for tasks like room service delivery, luggage handling, and even cleaning. For instance, Hilton Hotels' First Robot Concierge – Meet Connie can provide tourist information to guests who interact with it (Revfine 2021). Henn na Hotel in Japan has nearly every role in the hotel fulfilled by an AI-powered robot (Revfine 2021). Chatbots and virtual assistants powered by AI can interact with guests in real-time, and offer personalized suggestions and support (Taylor 2023). They can handle a wide range of guest

inquiries, such as booking inquiries, room service requests, and even concierge services. AI-powered systems provide 24/7 support and communicate in multiple languages.

AI is also used to gather and analyze guest data to offer highly personalized experiences. This includes customized room preferences and restaurant recommendations drawing from their preferences, demographics, and past interactions (Wadhwa 2023). For example, The Cosmopolitan of Las Vegas has a robot named Rose (Resident Mischief-Maker & Digital Concierge) that guests can text for anything from dinner suggestions to fresh towels (Revfine 2021). With virtual reality and augmented reality, smart room technology provides guests with immersive experiences, including virtual tours, virtual room selection, and access to virtual events. Technology like in-room voice assistants can fill guests in on the weather or today's news, monitor room temperatures, and more (ROH 2023).

AI can also facilitate automated check-ins and check-outs, quickening the process for guests, and leading to a greater first impression and novel experience (Hospitality Net 2022). It also enables guests to settle their bills directly from their mobile devices or voice commands, with the receipt sent to them via email or text message (Revfine 2021). In addition, AI is employed to enhance safety and security by actively monitoring potential threats and footage for unusual activities or unauthorized access. Facial recognition technology can also be used for check-ins and to enhance overall security (Access 2023).

Finally, AI communication tools can communicate effectively with international guests in multiple languages to cater to customers worldwide. This ensures a smoother and more pleasant experience for guests from diverse linguistic backgrounds.

Examples of AISA in the Hotel Industry

ChatGPT, Jasper, and Writesonic are Generative AI tools that can produce written content, generate artwork, paraphrase text, and more (ROH 2023).

Cendyn, MindOS, and Allora.AI assist properties in refining the booking procedure and on-site guest experience.

Easyway supports hotels to streamline their operations and manage guest relationships more efficiently.

Pegasus aids hospitality teams in improved data tracking and comprehension.

Duetto GameChanger employs predictive analytics to enhance booking revenue.

Recommendations for Business Practices: The Key to Success

With the rapid emergence of AI in the hospitality industry, businesses need to be able to implement AISA effectively. Here are 5 key recommendations for any business in the hospitality industry to succeed with AI:

Recommendation 1: Identify Existing Service Fail Points

One potent area of AISA implementation is addressing existing service fail points. Accordingly, service managers need to have a clear understanding of these fail points which customers are encountering with the hospitality service. Such information can come from feedback from customers, frontline service professionals and observations from service managers themselves. Benchmarking the organization's service performances against records or industry standards can also help highlight service shortcomings which may not necessarily be reported by dissatisfied customers.

Recommendation 2: Educate and Support Whole-of-Business

Everyone in the organization needs to have a clear understanding of their role and contribution to delivering excellent service to the customer. Accordingly, the introduction of AISA to the service process should be seen by employees as a way to assist their current roles and ultimately enhance the level of hospitality and service quality to the customer. The buy-in from existing employees, as well as proper training and support to them, is crucial for the organization to adjust effectively to the new ecosystem with AISA.

Recommendation 3: Don't Be Afraid of Collaboration

Businesses can look beyond their industry and expertise to collaborate with technological companies to integrate manual labour and automate certain tasks. To be open to this possibility, proper infrastructure and expertise need to be made available for business owners to learn and adapt to new AI technologies. Data scientists and business developers can work together to develop deeper insights to uncover the day-to-day bottlenecks and seek solutions. The data that these AI technologies collect may allow businesses to cater to and personalize their service interactions better.

Recommendation 4: Seek Out Co-Creation Opportunities

Co-creation can occur with customers participating in the service delivery process in the initial design stages, during the early adoption stages and when gathering feedback after a full implementation phase. Customers would be intrigued and excited to try or interact with AI technologies, especially if the AI display certain appealing characteristics or personality. Customer service interactions and features can be elevated and lead to overall positive experiences. Ultimately, a business' purpose is delivered through value creation. This can be done through harnessing the capabilities of AI and incorporating new and novel ways to entice the customer.

Recommendation 5: Test and Stay Up To Date

AI technologies continue to advance rapidly, and both AI in hospitality research and industry implementation are still in its early stages. Hence, there is much volatility and uncertainty. To navigate these uncharted waters, business managers must be agile and test new AISA initiatives with experts and selected customers to gather feedback. This can include understanding preferences related to anthropomorphic designs on AISA as well as customer preferences of AISA over human service employees in certain service contexts. Organizations can also stay up to date with the latest developments in the emerging AI space by including academics in their boards in order to provide fresh perspectives and the latest insights on AI research.

Conclusion

This chapter has shown the importance of how businesses can leverage on AI technologies to improve productivity, efficiency and customer service interactions. Specifically, in the food service and restaurant industry, the only constant is change. There are still ways that the industry can improve. AI can help democratize the industry to provide more access and variety to a wider audience and empower service staff with in-demand skill sets. AI has revolutionized how restaurants and hotels operate and interact with their guests to provide a more seamless experience while improving their profitability and competitiveness in the market. These hospitality sectors will continue to rely significantly on intelligent machines in the future to deliver their services.

Specifically, for the restaurant industry, more can be done to integrate AI. For instance, chefs can monetize their recipes through AI gastronomy collaborations by selling their recipes to 'dark kitchens' - virtual restaurants that can be ordered through meal delivery platforms (Travel and Leisure 2023). AI programming can be used to track fraudulent and inconsistent transactions, especially in cases of internal employee theft (Srivastava 2022). Finally, employee interactions and performance can be analyzed using AI clustering. The data collected can assist in assessing, scoring, and improving employee performance (Srivastava 2022). The adoption of AI does not have to be a rapid and steep process. Future research can uncover how industry players can pilot back-end functions to be managed by AI while focusing on customer-facing interactions. Troubleshooting and testing are important to ensure the quality of food and service provided. Studies on consumers' level of acceptance of AI technologies can help restaurateurs decide the amount of investment to put into AI. Understanding consumers' emotions and wellbeing when interacting with AI technologies would also give insight to the sophistication the entire industry can strive for.

As for hotels, hotel operators that fail to embrace innovative technologies such as AI and ChatGPT run the risk of falling behind their competitors who leverage these tools to enhance both guest experiences and operational effectiveness. With a growing demand for personalized interactions, hotels that refrain from implementing AI and chatbot technology may miss out on potential guests seeking tailored and efficient communication methods. Moreover, hotels that do not integrate these technologies into their operations may encounter delayed services and inefficient guest interactions, potentially resulting in negative reviews that affect their reputation and eventually losing competitive advantages. Accordingly, the adoption of AI technologies can empower hotels to maintain competitiveness while streamlining their operations, leading to potential revenue growth and increased guest experiences.

References

- Access. 2023. "The Rise of AI in Hospitality: Trends, Opportunities and Challenges." Access, April 25, 2023. <https://www.theaccessgroup.com/en-gb/blog/hos-ai-hospitality/>
- Alma Çallı, Büşra, Levent Çallı, Didar Sarı Çallı, and Fatih Çallı. "The impact of different types of service robots usage in hotels on guests' intention to stay." *Journal of Hospitality and Tourism Technology* 14, no. 1 (2023): 53-68. doi: 10.1108/JHTT-09-2021-0266
- Arizton. 2023. "Self-Service Kiosk Market -Global Outlook and Forecast 2023 – 2028" Arizton. <https://www.arizton.com/market-reports/self-service-kiosk-market>
- Batat, Wided. 2022. "Transformative Luxury Research (TLR): An Agenda to Advance Luxury for Well-Being." *Journal of Macromarketing* 42 (4):609-623. doi: 10.1177/02761467221135547.
- Chartier, F. n.d. "The First Recipe Created With The Help of Artificial Intelligence or How to Multiply Culinary Creativity Tenfold." François Chartier. <https://francoischartier.ca/en/a-i-first-recipe/>
- Chen, Yuangao, Yuqing Hu, Shasha Zhou, and Shuiqing Yang. 2023. "Investigating the determinants of performance of artificial intelligence adoption in hospitality industry during COVID-19." *International Journal of Contemporary Hospitality Management* 35 (8):2868-2889. doi: 10.1108/IJCHM-04-2022-0433.
- Collins C, Dennehy D, Conboy K, Mikalef P. 2021. "Artificial intelligence in information systems research: A systematic literature review and research agenda." *International Journal of Information Management*, vol.60 (C): 102383. doi: 10.1016/j.ijinfomgt.2021.102383
- Cronin Jr, J Joseph, Michael K Brady, and G Tomas M Hult. 2000. "Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments." *Journal of Retailing* 76 (2):193-218. doi: 10.1016/S0022-4359(00)00028-2.
- Culinary Institute of Barcelona (CIB). 2023. "How will AI influence the world of gastronomy, and what opportunities and challenges will it pose for restaurants?". CIB. <https://blog.cib.education/en/how-will-ai-influence-the-world-of-gastronomy-and-what-opportunities-and-challenges-will-it-pose-for-restaurants>
- Diener, Ed. 1984. "Subjective well-being." *Psychological Bulletin* 95 (3):542-575. doi: 10.1037/0033-2909.95.3.542.
- Diener, Ed, Eunkook M. Suh, Richard E. Lucas, and Heidi L. Smith. 1999. "Subjective well-being: Three decades of progress." *Psychological Bulletin* 125 (2):276-302. doi: 10.1037/0033-2909.125.2.276.

- Fang, Shujie, Xiaoyun Han, and Shuping Chen. "The impact of tourist–robot interaction on tourist engagement in the hospitality industry: A mixed-method study." *Cornell Hospitality Quarterly* 64, no. 2 (2023): 246-266. doi: 10.1177/19389655221102383
- Field, Joy M, Darima Fotheringham, Mahesh Subramony, Anders Gustafsson, Amy L Ostrom, Katherine N Lemon, Ming-Hui Huang, and Janet R McColl-Kennedy. 2021. "Service research priorities: designing sustainable service ecosystems." *Journal of Service Research* 24 (4):462-479. doi: 10.1177/10946705211031302.
- Graves, A. n.d. "Artificial Intelligence for Restaurants to Accelerate Marketing." Bloom Intelligence. Accessed September 20, 2023.
<https://bloomintelligence.com/blog/artificial-intelligence-restaurant-industry/#:~:text=Artificial%20intelligence%20for%20restaurants%20is,marketing%20C%20and%20increase%20operational%20efficiency.>
- Guszkowski, J. 2023. "ChatGPT can now recommend restaurants on OpenTable." Restaurant Business, March 24, 2023.
<https://restaurantbusinessonline.com/technology/chatgptcan-now-recommend-restaurants-opentable.>
- Hollander, J. 2023. "AI in Hospitality: The Impact of Artificial Intelligence on the Hotel Industry." Hotel Tech Report, May 10, 2023. <https://hoteltechreport.com/news/ai-in-hospitality>
- Hospitality Net. 2022. "What's the Impact of Artificial Intelligence in the Hotel Industry." Hospitality Net, May 5, 2022. <https://www.hospitalitynet.org/news/4110360.html>
- Horton, Donald, and R. Richard Wohl. 1956. "Mass communication and para-social interaction: Observations on intimacy at a distance." *Psychiatry* 19 (3):215-229. doi: 10.1080/00332747.1956.11023049.
- Houser, K. 2023. "McDonald's opens its first automated restaurant in Texas." Free Think.
<https://www.freethink.com/robots-ai/automated-restaurant>
- Hu, Hsin-Hui, Jay Kandampully, and Thanika Devi Juwaheer. 2009. "Relationships and impacts of service quality, perceived value, customer satisfaction, and image: an empirical study." *The Service Industries Journal* 29 (2):111-125. doi: 10.1080/02642060802292932.
- Huang, Ming-Hui, and Roland T Rust. 2020. "Engaged to a Robot? The Role of AI in Service." *Journal of Service Research* 24 (1):30-41. doi: 10.1177/1094670520902266.
- IBM. 2016. "Hilton and IBM pilot "Connie", the world's first Watson-enabled hotel concierge" . PR Newswire, March 9, 2016. <https://www.prnewswire.com/news-releases/hilton-and-ibmpilot-connie-the-worlds-first-watson-enabled-hotel-concierge300233140.html#:~:text=Meet%20Hilton's%20Connie%3A%20Pilot%20of,by%20IBM%20Watson%20and%20WayBlazer.>

- Kang, Sung-Eun, Chulmo Koo, and Namho Chung. "Creepy vs. cool: Switching from human staff to service robots in the hospitality industry." *International Journal of Hospitality Management* 111 (2023): 103479. doi: 10.1016/j.ijhm.2023.103479
- Ladeira, Wagner, Marcelo Gattermann Perin, and Fernando Santini. "Acceptance of Service Robots: a Meta-Analysis in the Hospitality and Tourism Industry." *Journal of Hospitality Marketing & Management* 32, no. 6 (2023): 694–716. doi: 10.1080/19368623.2023.2202168
- Ladhari, Riadh. 2009. "A review of twenty years of SERVQUAL research." *International Journal of Quality and Service Sciences* 1 (2):172-198. doi: 10.1108/17566690910971445.
- Lee, Yun Lok, and Nerilee Hing. 1995. "Measuring quality in restaurant operations: an application of the SERVQUAL instrument." *International Journal of Hospitality Management* 14 (3-4):293-310. doi: 10.1016/0278-4319(95)00037-2.
- Lin, Jiun-Sheng Chris, and Pei-Ling Hsieh. 2011. "Assessing the self-service technology encounters: development and validation of SSTQUAL scale." *Journal of Retailing* 87 (2):194-206. doi: 10.1016/j.jretai.2011.02.006.
- Linthwaite, R. 2019. "Prioritize Personalization When Choosing Conversational Chatbot Platforms To Reap Rewards." Forrester. https://info.adaptive.support/hubfs/Ada%20Content%20Assets/Ada_Forrester%20Opportunity%20Snapshot.pdf?utm_campaign=Forrester%20Ops%20Report&utm_medium=email&hsmi=102454842&hsenc=p2ANqtz-2O1ki-4o880FqlzVjciXOAtey-Z0EF5gCHXCkPpqBWwIFWoHNpZJ9bwglyVF2tKVv_v86tklIZByKeGyiSfKEV0A&utm_content=102454842&utm_source=hs_automation
- Lu, Carol, Celine Berchoux, Michael W. Marek, and Brendan Chen. 2015. "Service quality and customer satisfaction: qualitative research implications for luxury hotels." *International journal of culture, tourism and hospitality research* 9 (2):168-182. doi: 10.1108/IJCTHR-10-2014-0087.
- McEleny, C. 2016. "Mastercard has helped SoftBank's Pepper the robot get a job at Pizza Hut." *The Drum*. May 25, 2016. <https://www.thedrum.com/news/2016/05/25/mastercard-has-helped-softbank-s-pepper-robot-get-job-pizza-hut>
- Mugaritz. 2023. Andoni Luis Aduriz is the winner of The Icon Award 2023 by the World's Best 50 Restaurants." Mugaritz. <https://www.mugaritz.com/en/andoni-luis-aduriz-is-the-winner-of-the-icon-award-2023-by-the-worlds-50-best-restaurants/co-1684413697/>
- Nestlé. 2014. "Nestlé to use humanoid robot to sell Nescafé in Japan." Nestlé. <https://www.nestle.com/media/news/nestle-humanoid-robot-nescafe-japan>

- Noor, Nurhafihz, Sally Rao Hill, and Indrit Troshani. 2022a. "Artificial intelligence service agents: role of parasocial relationship." *Journal of Computer Information Systems* 62 (5):1009-1023. doi: 10.1080/08874417.2021.1962213.
- Noor, Nurhafihz, Sally Rao Hill, and Indrit Troshani. 2022b. "Developing a service quality scale for artificial intelligence service agents." *European Journal of Marketing* 56 (5):1301-1336. doi: 10.1108/EJM-09-2020-0672.
- Ota Insight. 2023. "Artificial intelligence for the hotel industry and other key trends for 2023." Ota Insight, March 28, 2023. <https://www.otainsight.com/resources/blog/artificial-intelligence-hotel-industry>
- Parasuraman, A., Valarie A. Zeithaml, and Leonard L. Berry. 1988. "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality." *Journal of Retailing* 64 (1):12.
- Parasuraman, A., Valarie A. Zeithaml, and Arvind Malhotra. 2005. "E-S-QUAL: A multiple-item scale for assessing electronic service quality." *Journal of Service Research* 7 (3):213-233. doi: 10.1177/1094670504271156.
- Park, Jinsoo, and EuiBeom Jeong. 2019. "Service quality in tourism: A systematic literature review and keyword network analysis." *Sustainability* 11 (13):3665.
- PR News Wire. 2023. "Appetronix (formerly SJW Robotics) Partners with Iconic Donatos Pizza to Pioneer Fully Autonomous Restaurant Experience." PR News Wire, July 13, 2023. <https://www.prnewswire.com/news-releases/appetronix-formerly-sjw-robotics-partners-with-iconic-donatos-pizza-to-pioneer-fully-autonomous-restaurant-experience-301876809.html>
- Revfine. 2021. "How to use Artificial Intelligence in the Hospitality Industry." Revfine. <https://www.revfine.com/artificial-intelligence-hospitality-industry/#why-artificial-intelligence-becoming-important-hospitality-industry>
- Riaz, Umar. 2023. "Hospitality industry looks strong for 2023 – despite recession fears." EY, accessed 16 August. https://www.ey.com/en_us/real-estate-hospitality-construction/hospitality-industry-looks-strong-for-2023-despite-recession-fears.
- ROH. 2023. "AI in Hotels: A Complete Guide for the Hospitality Industry." ROH, May 16, 2023. <https://roh.co/prop-tech-articles/ai-in-hotels-hospitality-ai>
- Rust, Roland T, and Richard L Oliver. 1994. *Service quality: New directions in theory and practice*: Sage Publications.
- Santiago, E. 2023. "How AI Perceptions Have Changed in the Last Decade [Comparing New & Old Consumer Data]." Hub Spot, July 11, 2023. <https://blog.hubspot.com/marketing/artificial-intelligence-is-here#:~:text=Furthermore%2C%2062%25%20agree%20AI%20tools%20can%20help%20them,can%20help%20them%20improve%20the%20overall%20customer%20experience>.

- Sennaar, K. 2019. "Examples of AI in Restaurants and Food Services". Emerj. <https://emerj.com/ai-sector-overviews/ai-in-restaurants-food-services/>
- Srivastava, S. 2022. "10 Ways AI Is Transforming The Restaurant Industry." *Forbes*, Sep 22, 2022. <https://www.forbes.com/sites/forbestechcouncil/2022/09/22/10-ways-ai-is-transforming-the-restaurant-industry/>
- Statista, 2023. "Artificial Intelligence – Worldwide." Statista. <https://www.statista.com/outlook/tmo/artificial-intelligence/worldwide>
- Stevens, Pete, Bonnie Knutson, and Mark Patton. 1995. "Dineserv: A tool for measuring service quality in restaurants." *Cornell Hotel and Restaurant Administration Quarterly* 36 (2):56-60. doi: 10.1177/001088049503600226.
- Su, Lujun, Scott R. Swanson, and Xiaohong Chen. 2016. "The effects of perceived service quality on repurchase intentions and subjective well-being of Chinese tourists: The mediating role of relationship quality." *Tourism Management* 52:82-95. doi: 10.1016/j.tourman.2015.06.012.
- Sweeney, B. n.d. "AI in restaurants: 9 ways Artificial Intelligence is shaping the food industry". PopMenu. <https://get.popmenu.com/post/ai-in-restaurants>
- Travel and Leisure. 2023. "How AI Could Bring the Dishes of the World's Great Chefs to your Doorstep." *Travel and Leisure*, Feb 24, 2023. <https://www.travelandleisureasia.com/global/dining/food/ai-could-bring-the-dishes-of-the-worlds-great-chefs-to-your-doorstep/>
- Trejos, N. 2016. "Introducing Connie, Hilton's new robot concierge." USA Today, March 9, 2016. <https://www.usatoday.com/story/travel/roadwarriorvoices/2016/03/09/introducing-connie-hiltons-new-robot-concierge/81525924/>.
- Van Hooijdonk, R. 2023. "Fully autonomous restaurants with AI-powered menus: the future of eating out?" Richard Van Hooijdonk. <https://blog.richardvanhooijdonk.com/en/fully-autonomous-restaurants-with-ai-powered-menus-the-future-of-eating-out/>
- Wadhwa, R. 2023. "Is artificial intelligence the future of the hospitality industry?" Press Reader, February 23, 2023. <https://blog.pressreader.com/hotels/is-artificial-intelligence-the-future-of-the-hospitality-industry>
- Walker, J. 2019. 'Fast Food Robots, Kiosk and AI Use Cases from 6 Restaurant Chain Giants.' Emerj. <https://emerj.com/ai-sector-overviews/fast-food-robots-kiosks-and-ai-use-cases/>
- Xu, Jingjing, Aaron Hsiao, Sacha Reid, and Emily Ma. "Working with service robots? A systematic literature review of hospitality employees' perspectives." *International Journal of Hospitality Management* 113 (2023): 103523. doi: 10.1016/j.ijhm.2023.103523

Zeithaml, Valarie A. 1988. "Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence." *Journal of Marketing* 52 (3):2-22. doi: 10.1177/002224298805200302.