HOTEL DIGITAL TRANSFORMATION: THE ROLE OF ARTIFICIAL INTELLIGENCE

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Abstract: *In the context of an increasingly digitalized environment, the integration of artificial intelligence (AI) within the hotel industry has evolved from a strategic advantage to a fundamental requirement for long-term success. Ongoing advancements in AI are redefining hotel operations by delivering innovative solutions aimed at streamlining processes, enhancing service personalization, and optimizing resource management. Thus, the paper aims to analyze how artificial intelligence is transforming the hotel industry, focusing on: the use of artificial intelligence in hotels' booking engines or websites; the most innovative services for hotel chains; the interest in AI chatbots among European accommodation businesses, while also presenting the hoteliers' opinions on the impact of AI on hospitality.*
Key words: *artificial intelligence (AI); AI integration; AI chatbots; hotel technology; hotel industry; innovation;*

1. INTRODUCTION

In the context of rapid technological advancement, artificial intelligence is playing an increasingly role in transforming the hospitality industry, driving innovation through tools such as chatbots, virtual assistants, predictive analytics, facial recognition, robotic services, and dynamic pricing systems. These advancements are redefining how hotels design, deliver, and personalize services, enhancing both operational performance and the overall guest experience (Gupta et al., 2023; Sankar and David, 2023).

AI technologies enable hotels to interpret guest behavior and preferences with precision, allowing highly personalized recommendations. Beyond personalization, AI also plays a critical role in boosting operational performance by automating routine processes and reducing inefficiencies, thus indirectly contributing to higher levels of guest satisfaction (Bhuiyan et al., 2024)

Therefore, the integration of artificial intelligence (AI) is shaping every aspect of the hotel ecosystem, enhancing revenue generation, improving operational efficiency, and strengthening competitive advantage through personalized booking solutions, automated content creation and data-driven management strategies.

This article examines the role of AI in hotel digitalization, highlighting its impact across various departments, differences in adoption across hotel categories, and regional variations in implementation strategies. Through this analysis, the

study aims to provide an overview on how AI is not only facilitating digital transformation but also shaping the strategic direction of hotels in a highly competitive and dynamic global market.

2. ADOPTION OF ARTIFICIAL INTELLIGENCE IN HOTEL INDUSTRY: A MULTIDIMENSIONAL PERSPECTIVE

In the context of the contemporary hospitality landscape, a growing number of businesses have acknowledged the strategic importance of digitalization and have begun investing in the transformation of their operations. The implementation of advanced technologies has become an essential pillar for hotels, aiming to remain competitive and relevant in a rapidly changing business environment, enabling them to respond effectively to new market challenges and demands. Artificial intelligence, blockchain, and process automation contribute significantly to increasing operational efficiency, reducing costs, and enhancing the personalization of guest experience.

Within this framework, Figure 1 illustrates the key hotel chain areas where the most significant innovations are expected to emerge globally over the next two years, as of 2024.

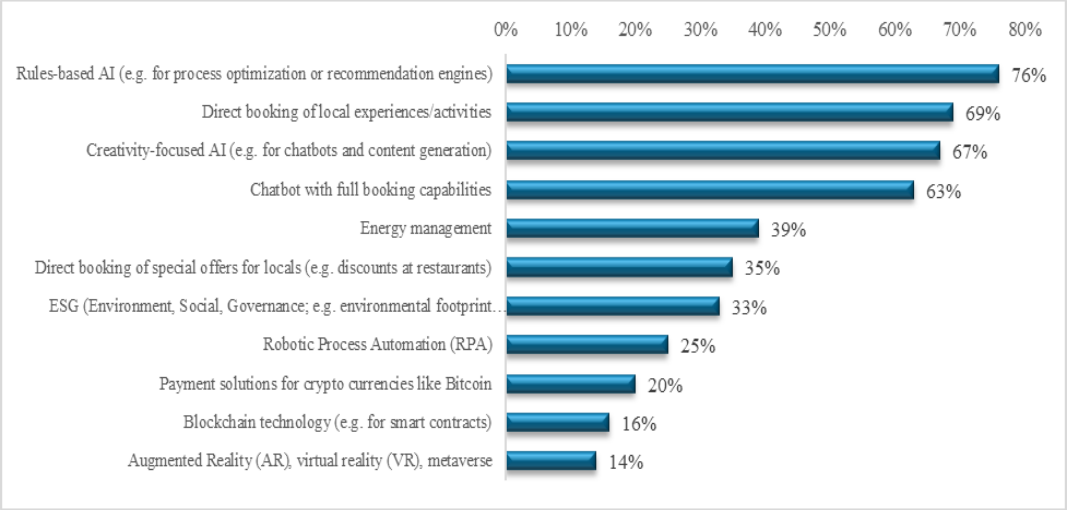

Figure 1. Hotel chain areas with the most innovations arising in the next two years worldwide in 2024
Source: www.statista.com

Analyzing the data contained in the figure above, we note that 76% of hotel chains managers stated that rule-based AI is the most innovations arising in the next two years, followed by direct booking of local experiences (69%), the integration of creative technologies for content generation 67% and chatbot with full booking capabilities (63%).

At the same time, advanced technologies support energy management (39%) and ESG goals through improved environmental monitoring, inclusive practices and transparent governance (35%).

Finally, one of the innovative services that allows adapting to modern guests' preferences, namely cryptocurrency payments, is mentioned by 20% of hotel chains managers.

Regarding the use of artificial intelligence by hotels to enhance efficiency and guest experience through websites and booking engines, as can be seen from data provided in figure 2, most applications include yield management systems that optimize pricing based on real-time demand (37% of hotels already using it and 29% planning to implement it), content creation for generating marketing materials or automating guest communication (31% of hotels already using it and 27% planning to adopted it) and AI chatbots to handle guest inquiries and streamline the booking process (27% of hotels already using it and 29% intending to implement it in the future).

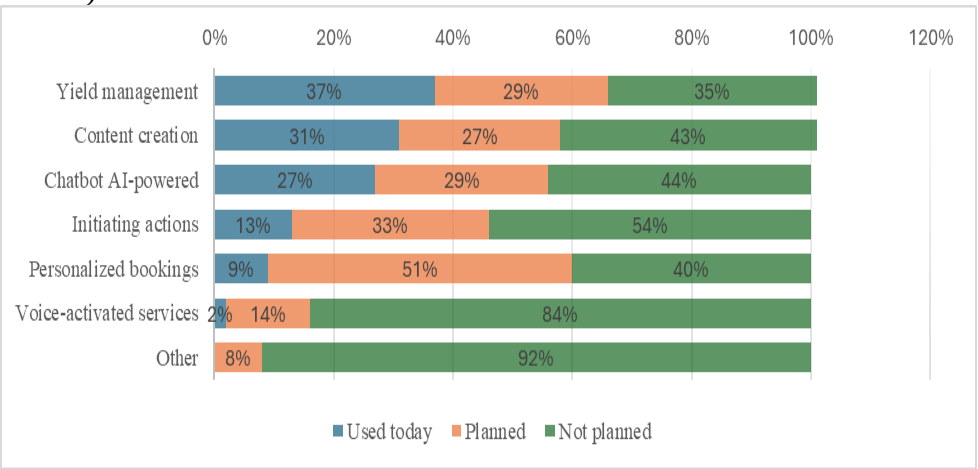

Figure 2. Use of artificial intelligence (AI) in an internet booking engine (IBE) or website of hotels worldwide as of 2024, by type
Source: www.statista.com

Although action-triggering tools and personalized bookings are not yet widely adopted, hoteliers mentioned that they plan to use them in the future, highlighting a strong intention toward further digital integration.

In this context it is important to highlight the hotelier opinions from different departments on the impact of AI on hospitality (see figure 3).

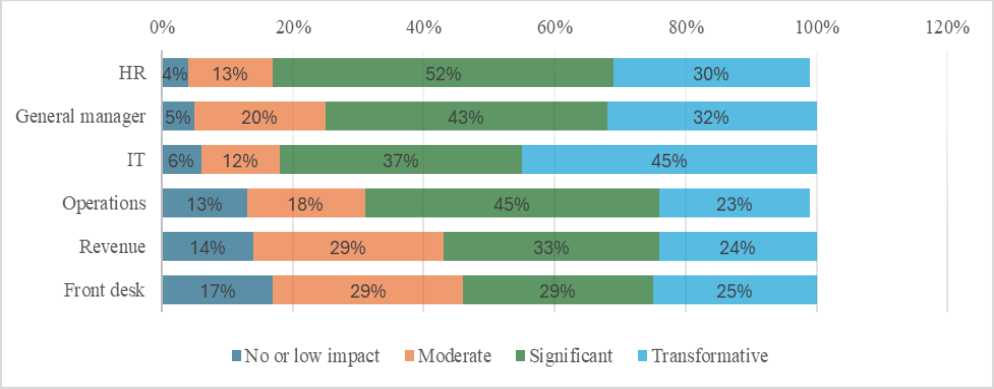

Figure 3. Opinions on the impact of artificial intelligence (AI) on hospitality according to hoteliers worldwide as of 3rd quarter 2024, by department
Source: www.statista.com

Thus, in the third quarter of 2024, hoteliers' perceptions of the impact of artificial intelligence (AI) on the hospitality industry vary considerably across departments: 82% of respondents in HR and 75% of respondents in general management view AI's impact as either significant or transformative.

Key opportunities for implementing artificial intelligence (AI) in the property operations of hotel chains include reducing maintenance costs through predictive techniques and optimizing materials procurement. AI can also support environmental sustainability through predictive modeling that monitors energy, water, and waste usage. Intelligent forecasting enables more efficient staff allocation and improves the management of Food & Beverage spaces.

Meanwhile the perception of respondents from revenue management and front desk departments are more moderate with only 33% and 29% respectively identifying its impact as significant, suggesting that in these department areas, AI is either less integrated at present or its potential is not fully recognized by respondents, compared to departments with a more strategic focus.

In this context it is important to highlight the expected time of the impact of AI in the hospitality sector, by hotel category (see figure 4).

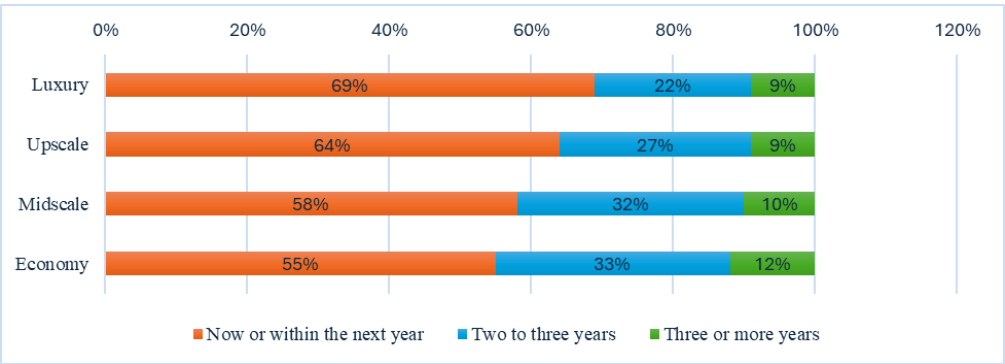

Figure 4. Expected time of the impact of artificial intelligence (AI) on hospitality according to hoteliers worldwide as of 3rd quarter 2024, by hotel category
Source: www.statista.com

As shown in the figure above, most respondents across all hotel categories anticipate that AI will begin to make a noticeable impact either immediately or within the next year:

- Luxury hotels show the highest immediate adoption rate, with 69% expecting AI to have an impact now or within the next year, followed by 22% within two to three years, and 9% in three or more years.
- Upscale hotels follow closely, with 64% expecting short-term impact, 27% in the medium term, and 9% in the long term.
- Midscale hotels report 58% for immediate or near-future impact, 32% within two to three years, and 10% expecting longer timelines.
- Economy hotels show the lowest immediate expectations, with 55% projecting impact within a year, 33% in two to three years, and 12% beyond three years.

Overall, luxury and upscale hotels are leading in early AI adoption, likely driven by greater financial resources, stronger innovation strategies, and a commitment to offering personalized guest experiences. Midscale and economy hotels appear more reserved in AI adoption, possibly due to budget constraints or a focus on maintaining short-term operational efficiency.

Similar to how luxury and upscale hotels are leading AI adoption due to stronger financial and technological resources, countries with higher interest in AI chatbots may represent more innovation-driven or competitive hospitality markets, where enhancing the guest journey through automation is becoming a top priority.

Therefore, based on the data presented in figure 5, the interest in using AI chatbots during the booking process varies significantly among accommodation businesses across European countries.

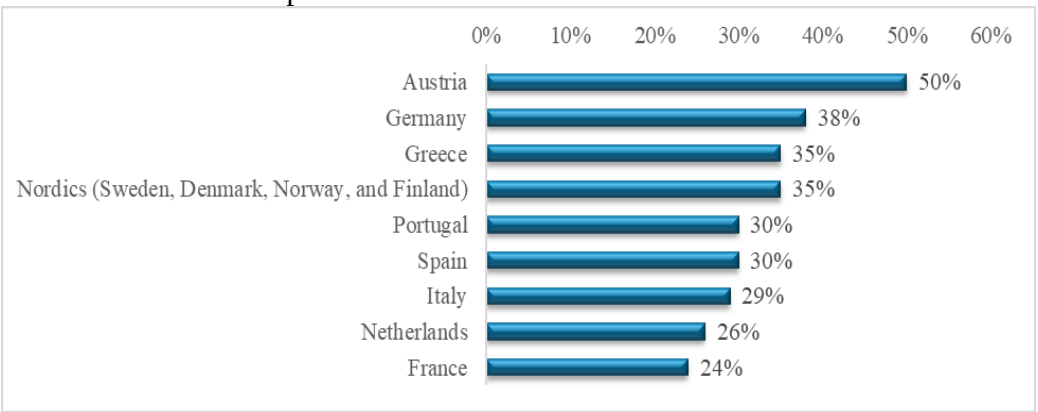

Figure 5. Interest in AI chatbots among European accommodation businesses 2024, by country
Source: www.statista.com

Austria reports the highest level of interest, with 50% of businesses seeing AI chatbots as a main opportunity for enhancing the guest journey from the first interaction. Other countries with relatively high interest include Germany (38%),

Greece and the Nordics (both at 35%), Portugal and Spain (each at 30%). Italy follows closely with 29%, while the Netherlands (26%) and France (24%) show the lowest enthusiasm.

These differences may reflect varying levels of digital maturity, guest expectations, and strategic priorities across markets.

3. CONCLUSIONS

The digital transformation of hotels is increasingly driven by artificial intelligence, which is reshaping how the industry operates and engages with guests. AI-powered innovations, from process optimization and personalized booking experiences to creative content generation and intelligent chatbots, are enhancing both operational efficiency and guest satisfaction. While some advanced technologies like robotic automation, blockchain, and immersive reality remain in early stages of adoption, they signal important directions for the industry's future.

Perceptions of AI's impact vary across hotel departments: HR professionals and general managers view AI as having a significant or transformative effect, whereas front desk and revenue teams tend to have a more moderate outlook.

AI adoption differs across hotel category, with luxury and upscale hotels expecting noticeable AI-driven changes, while midscale and economy hotels anticipate a more gradual integration.

Moreover, regional differences in embracing AI solutions highlight the varied pace of technological evolution worldwide. Austria leads adoption plans, followed by Germany, Greece and the Nordics, whereas countries like France and the Netherlands are more cautious in their engagement.

Together, these developments illustrate a hospitality industry in transition, open to AI's potential but progressing thoughtfully and strategically according to unique organizational and market contexts.

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