INNOVATIONS IN HOTEL MANAGEMENT: THE IMPACT OF NEW TECHNOLOGIES ON IMPROVING CUSTOMER SERVICE

ІННОВАЦІЇ В УПРАВЛІННІ ГОТЕЛЯМИ: ВПЛИВ НОВИХ ТЕХНОЛОГІЙ НА ПОКРАЩЕННЯ ОБСЛУГОВУВАННЯ КЛІЄНТІВ

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In today's world, the hospitality industry is undergoing significant transformations driven by innovative technologies that open new horizons for enhancing customer service. Hotel management increasingly relies on digital solutions that improve the quality of services, personalize guest interactions, and refine internal business processes. Among the key technologies transforming the hotel sector, artificial intelligence, the Internet of Things, automation, and big data stand out. Their implementation fosters the effective development of hotels and enhances their competitiveness in the global market. In this context, studying contemporary innovations in hotel management, their impact on the customer experience, and analyzing the challenges associated with implementing cutting-edge technologies is a particularly relevant task for the academic community. This article aims to explore how innovative technologies transform the approach to customer service in hotels, specifically through the examples of hotel chains such as Hilton and Marriott International.

Keywords: automation, big data, artificial intelligence, Internet of Things (IoT), mobile applications, digital keys.

У сучасному світі індустрія гостинності зазнає значних трансформацій під впливом інноваційних технологій, які відкривають нові горизонти для підвищення рівня обслуговування клієнтів. Управління готелями все частіше спирається на цифрові рішення, що дозволяють не лише покращувати якість послуг, а й персоналізувати взаємодію з гостями та вдосконалювати внутрішні бізнес-процеси. Серед ключових технологій, що змінюють готельний сектор, особливу увагу привертають штучний інтелект, інтернет речей (IoT), автоматизація та великі дані. Їхнє впровадження не тільки сприяє ефективному розвитку готелів, але й підвищує конкурентоспроможність на глобальному ринку. У зв'язку з цим дослідження сучасних інновацій в управлінні готелями, їхнього впливу на клієнтський досвід та аналіз викликів, пов'язаних із впровадженням новітніх технологій, є особливо актуальним завданням наукової спільноти. Ця стаття спрямована на аналіз того, як інноваційні технології трансформують підхід до обслуговування клієнтів у готелях, зокрема на прикладі таких мереж, як Hilton та Marriott International. За результатами дослідження доведено, що інновації в управлінні готелями є невіддільною частиною сучасної індустрії гостинності. Серед основних напрямів, через які новітні технології впливають на готельний бізнес, ми виділили: автоматизацію процесів і штучний інтелект, мобільні додатки та цифрові ключі, інтернет речей, хмарні рішення та великі дані, безконтактні платежі, системи керування енергоспоживанням тощо. Завдяки новим технологіям готелі можуть підвищити якість обслуговування клієнтів, оптимізувати операційні процеси та значно підвищити свою конкурентоспроможність на ринку. Зміст окреслених положень підтверджують наступні висновки: технології дозволяють готелям надавати більш персоналізований та ефективний сервіс; підвищувати рівень задоволеності гостей, які частіше повертаються та рекомендують готель своїм друзям; автоматизувати основні процеси обслуговування гостей та оптимізувати енергоспоживання, що дозволяє знизити витрати готелю. Перспективи подальших досліджень полягають в ідентифікації стратегій, через які різні технології будуть інтегруватися між собою, створюючи єдину екосистему.

Ключові слова: автоматизація, великі дані, штучний інтелект, інтернет речей (IoT), мобільні додатки, цифрові ключі.

Problem statement. In the modern world, the hospitality industry is undergoing significant transformations under the influence of innovative technologies, opening new horizons for enhancing customer service levels. Hotel management increasingly relies on digital solutions, which improve the quality of services provided, personalize guest interactions, and enhance internal business processes. Among the key technologies transforming the hotel sector, special attention is drawn to artificial intelligence, the Internet of Things (IoT), automation, and big data. Their implementation promotes the effective development of hotels and enhances their competitiveness in the global market. In this context, the study of modern innovations in hotel management, their impact on the customer experience, and the analysis of challenges associated with new technology adoption is a particularly relevant task for the scientific community.

The analysis of recent researches and publications. Although the theoretical aspects of using innovations in hotel management have been well studied (Hirnyak L., Hlahola V., Zavadynska V.O., Osidach O., Kozhukhivska R., Lysiuk T., Tereshchuk O., Pasichnyk M., and others), the practical aspects of their application to improve customer service require more detailed analysis.

It is important to identify technologies that are most effective in enhancing guest satisfaction and how they can be successfully implemented in the hotel industry.

Purpose of the article. This article aims to analyze how innovative technologies are transforming the approach to hotel customer service. It will specifically use examples from networks such as Hilton and Marriott International.

The paper main body with full reasoning of academic results. The research highlights that innovations in hotel management play a crucial role in enhancing the quality of customer service and improving operational efficiency. Thanks to new technologies, hotel operators can provide a more personalized, efficient, and convenient service for guests, which positively impacts the overall experience of their stay at the accommodation. Among the main areas through which emerging technologies impact the hotel business, we identify [1-2; 4; 6]:

1. Process automation and artificial intelligence (AI) use software and algorithms to automate routine tasks in hotels and make decisions based on extensive data analysis.

2. Mobile apps and digital keys are mobile applications that allow guests to book rooms, make payments, access information about the hotel and its services, and use a digital key to enter their rooms.

3. The Internet of Things (IoT) is a physical device network interconnected and exchanging data with one another.

4. Cloud solutions and Big Data refer to storing hotel data on remote servers and using analytical tools to identify patterns and make informed decisions.

4. Contactless payments are a way to pay for goods and services without using cash or plastic cards. It is a way to pay for smartphones, smartwatches, or other devices using.

5. Energy management systems are a set of technical solutions that automate and optimize energy consumption processes within a building.

The impact of these technologies is quite broad and complex, making it a subject for further study. In particular, it is important to examine the economic, technical, and social consequences of implementation through specific practical examples. In this study, we examined the experiences of Hilton and Marriott International, two of the world's largest and most renowned hotel chains. They own thousands of hotels worldwide (under various brands) and continuously invest significant resources in the development and implementation of new technologies to provide guests with the most comfortable and personalized service.

Automation of processes and artificial intelligence (AI) help to streamline core aspects of hotel operations through chatbots and virtual assistants that handle customer inquiries in real-time, as well as AI systems for personalizing the guest experience [4]. In particular, chatbots and virtual assistants assist guests with bookings, respond to inquiries about services, and provide recommendations for local attractions. Artificial intelligence can analyze guest behavior, previous bookings, and preferences to offer personalized suggestions and recommendations [1; 4]. One successful example of using process automation and AI in the hospitality industry is the experience of Hilton Hotels with the implementation of an AI-based virtual assistant named Connie. This chain operates on IBM Watson technology, leveraging AI capabilities to interact with guests in real-time. Specifically, Connie assists guests by responding to customer inquiries in real-time, providing personalized recommendations, analyzing guest behavior, and optimizing interactions based on the specifics outlined in Table 1.

Another example of the successful use of process automation and artificial intelligence in the hospitality industry is Marriott International,

Table 1

**The impact of process automation and artificial intelligence (AI)
on improving customer service in the Hilton hotel chain**

Applications of Connie	Features of using Connie in the operations of the Hilton hotel chain
Real-time response to customer inquiries	Connie can answer questions about hotel services (such as restaurant hours, pool access, and accommodation policies), assist with room bookings, and provide information about available services.
Personalized recommendations	Connie offers guests recommendations for local attractions and interesting places based on their previous preferences and vacation type data.*
Guest behavior analysis	The AI-based system learns from guests' past behavior and inquiries, allowing for a personalized experience for each client.**
Interaction optimization	By automating booking and information provision processes, Connie helps reduce staff workload, enhancing service levels and customer satisfaction.

Note

* For example, if a guest previously inquired about vegetarian restaurants, Connie can provide up-to-date recommendations for new places.

** For instance, if a guest regularly books rooms with an ocean view, the system automatically suggests options with those features for future bookings.

Source: formulated by the author based on [4: 6]

which employs chatbots and AI systems to enhance the level of service for its customers [4; 6]. Specifically, Marriott's mobile chatbot allows guests to submit requests at any time (such as requests for extra towels or spa bookings [4; 6]) through the hotel app. The personalization AI system at Marriott helps analyze previous guest reviews and preferences to make the next visit more tailored –such as automatically suggesting a room with specific features (like pillow type or air conditioning) or other services based on past experiences.

Based on the above points, it is clear that through artificial intelligence, these technologies not only enhance guest comfort and satisfaction but also enable hotels to better adapt to the needs of each customer by offering personalized solutions based on large datasets. Thus, their impact includes improving staff efficiency, reducing errors, personalizing service, and optimizing costs.

Mobile apps and digital keys are transforming guests' interaction with hotels [1]. Specifically, booking, check-in, and stay management apps enable guests to independently perform many operations, including online check-in, room selection, service ordering, and payment [3-4]. Digital keys on smartphones allow guests to use their phones to access their rooms, reducing the need for physical keys or cards. For example, a notable implementation of digital keys on smartphones is the Marriott International hotel chain, which launched the Mobile Key feature. It allows guests to access their rooms using only their smartphones, as detailed in Table 2.

It is worth noting that the Hilton hotel chain also offers a similar feature called Digital Key. Guests can use their phones to access their rooms and common areas of the hotel, such as gyms or pools. This not only enhances guest convenience but also reduces the workload on staff [1].

These examples also demonstrate that digital key technologies are transforming processes in the hospitality industry, making them more efficient and convenient for customers. Thus, the impact of mobile apps and digital keys is focused on increasing guest autonomy, simplifying the booking and check-in processes, and enhancing customer satisfaction.

IoT technologies integrate devices and systems within hotels to provide guests with a more comfortable and tailored experience [2-3]. Specifically, this enables the creation and offering of smart rooms with automatic adjustments for lighting, temperature, and other parameters based on guest preferences, as well as voice control for interacting with household devices (such as Amazon Alexa or Google Assistant), providing greater convenience [2]. A notable example of implementing Internet of Things (IoT) technologies in the hotel business is Marriott International. They actively use smart technologies to enhance the guest's experience, as detailed in Table 3. It is also worth mentioning that the Hilton hotel chain is implementing IoT technologies

Table 2

**The impact of mobile apps and digital keys on improving customer service
in the Marriott International hotel chain**

Applications of Mobile Key	Features of using Mobile Key in the operations of the Marriott International hotel chain	Advantages of using mobile apps and digital keys
Booking and check-in	A guest books a room through the Marriott mobile app. After the booking is confirmed, the system automatically generates a digital key for room access.	Guests do not need to carry physical keys or cards, reducing the likelihood of loss or forgetfulness. The check-in process and access to the room become faster and more convenient, enhancing the overall stay experience. Digital keys can be deactivated at any time through the app, providing an additional layer of security.
Receiving the key	On the day of check-in, the guest receives a notification on their phone that the digital key is activated, allowing them to go directly to their room, bypassing traditional front desk check-in.	
Using the digital key	The guest opens the Marriott app, presses the "Unlock" button, and holds their phone near the door lock. It unlocks the door via Bluetooth.	

Source: formulated by the author based on [1; 3-4]

Table 3

**The impact of IoT technology on improving customer service
in the Marriott International hotel chain**

Applications of IoT	Features of using Mobile Key in the operations of the Marriott International hotel chain	Advantages of using IoT and digital keys
Automatic adjustment of parameters	In some Marriott hotels, guests can adjust the lighting and temperature through a mobile app or a control panel in the room*	Adaptation to seasonal fluctuations Implementation of new services Rapid recovery after disruptions Automation of core processes Adaptation to seasonal fluctuations Implementation of new services Rapid recovery after disruptions Automation of core processes
Voice control	Marriott has integrated Amazon Alexa into its smart rooms. Guests can use voice commands to control the lighting, televisions, thermostats, and other devices**	
Interactive experience	Guests can also ask questions about the hotel, request local recommendations, or even order services using voice commands. This creates a more interactive and convenient stay experience.	

Note

* For example, a guest can set a comfortable temperature in the room before arrival or adjust the lighting to their preference.

** For instance, a guest might say, "Alexa, turn on the TV" or "Alexa, set the temperature to 22 degrees."

Source: formulated by the author based on [2-3]

through its Connected Room project. Thus, IoT technologies enable guests at this hotel chain to control all aspects of their rooms through a mobile app, including using voice commands to perform various tasks. Therefore, the integration of IoT technologies in the hotel business significantly enhances the guest experience, making it more comfortable and tailored to their needs.

Cloud solutions and Big Data provide hotels with unique opportunities to optimize operations, increase efficiency, and, most importantly, enhance the guest experience [2]. Specifically, these technologies transform the hotel business through centralized management, flexibility and scalability, and process automation [2-3]. For example, most major hotel chains worldwide, including Marriott International and Hilton, now use a unified data platform, resulting in information about bookings, finances, room service, and marketing being consolidated in a single cloud system. It allows hotel staff to access the necessary information anytime and from any device, significantly simplifying operations and improving coordination. In such conditions, if a guest requests a room change or additional services, staff can quickly find the necessary information

in the system and fulfill the request. Additionally, cloud solutions ensure transparency in all operations, allowing hotel management to monitor the performance of each department [6].

Contactless payments simplify the payment process for guests and open new opportunities for hotels [1-2]. Specifically, with these technologies, guests can instantly settle their bills using smartphones, smartwatches, or other mobile devices. Moreover, contactless payments easily integrate with other hotel systems, such as revenue management and loyalty programs. So, the Hilton hotel chain, through the use of contactless payments, ensures quick check-in and check-out for guests (for instance, guests can settle their bills right at the front desk by simply tapping their bank card or smartphone on the terminal), pay for minibar services (where guests can pay for drinks and snacks from the minibar using a contactless bracelet or smartphone without leaving their room), as well as make payments at restaurants and bars. In the Marriott International hotel chain, in addition to the mentioned payments, guests can also pay for additional services such as spa access, bike rentals, or gym visits without using cash. Many hotels now offer their guests mobile apps that allow them to book rooms, order room service, and make all payments without cash. At the same time, information about all transactions is automati-cally recorded in the hotel management system, allowing services to analyze guest behavior and offer personalized proposals. Thus, the impact of contactless payments focused on optimizing energy consumption, enhancing guest comfort, creating smart rooms, and providing proactive service [6].

Energy management systems (EMS) are popular in the hotel business [5-6]. Overall, EMS is a set of technical solutions that automate and optimize energy consumption processes in a building, leading to reduced energy costs, increased guest comfort, decreased negative environmental impact, and improved staff efficiency. For example, the Hilton hotel chain uses automatic brightness adjustment, zonal lighting, and optimization of heating, ventilation, and air conditioning systems, as detailed in Table 4.

Marriott International utilizes energy management systems to manage hot water. Specifically, these systems allow for temperature regulation of hot water based on the time of day and demand, and they can detect leaks and automatically shut off the water supply, preventing potential damage.

Additionally, starting in 2023, the outlined entities are working on implementing real-time energy consumption monitoring systems, which will provide detailed information about energy usage in various areas of the hotel. This will allow

Table 4

The impact of energy management systems on improving customer service in the Marriott International hotel chain

Directions for the use of lighting management systems	Features of lighting management systems in the operations of the Hilton hotel chain	Advantages of using energy management systems (EMS) and digital keys
Automatic brightness adjustment in common areas	The system detects the level of natural light and automatically adjusts the brightness of artificial lighting, allowing for energy savings and creating a comfortable environment for guests.	Reduction in energy costs Increased guest comfort Decreased negative environmental impact Improved staff efficiency Enhanced hotel image
Zonal lighting for guest rooms and common areas	The system allows for the creation of various lighting scenarios for different areas of the hotel (lobby, restaurants, corridors), optimizing energy consumption and creating an atmosphere that suits the time of day and the purpose of each space.	
Individual climate control in guest rooms	Guests can adjust the temperature in their rooms themselves, but the system automatically turns off heating or air conditioning when the room is unoccupied	
Zonal regulation	The system allows for the creation of different temperature zones within the hotel building, which helps save energy and provides comfortable conditions for guests.	

Source: formulated by the author based on [1; 4-6]

them to identify inefficiencies and take measures to optimize them.

Energy management systems are an investment in the future of the hospitality industry [4-5]. Therefore, the impact of these systems is aimed at reducing energy costs, minimizing environmental impact, and enhancing guest comfort.

Based on the outlined points, it is evident that the advantages of using technology in the hospitality industry include enhanced service quality, increased guest loyalty, reduced costs, and improved competitiveness.

Conclusions from this study and prospects for further exploration in this direction. The research findings demonstrate that innovations in hotel management are an integral part of the modern world. The key areas through which new technologies impact the hospitality business include process automation and artificial intelligence (AI), mobile applications and digital keys, the Internet of Things (IoT), cloud solutions and Big Data, contactless payments, and energy management systems, among others.

Thanks to new technologies, hotels can enhance the quality of customer service, optimize operational processes, and achieve greater success in the market. The content of the outlined points supports the following conclusions:

• Technologies enable hotels to provide a more personalized and efficient service.

• Technologies increase guest satisfaction, leading to more frequent returns and recommendations to friends.

• Technologies facilitate the automation of core guest service processes and optimize energy consumption, which can reduce hotel expenses.

In general, hotels that adopt new technologies have a greater chance of success in the market. Future research prospects lie in exploring strategies for integrating various technologies into a cohesive ecosystem.

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