Digital Transformation in the Hotel Industry: A Study of Four-Star Hotels in Szeged

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With the evolution of technology, the landscape of hotel management is set to undergo a remarkable transformation, reshaping operations and enhancing guest experiences like never before. This study investigates the pervasive impact of technology on hotel management and customer experience. The main goal is to explore the various ways digital innovations are revolutionizing guest services and enhancing operational efficiencies in the hotel industry responding to the highly volatile external environment. The secondary research part relied on literature review, predominantly sourced from electronic publications, press releases, and systematic website content evaluation. The market phenomena were examined through interviews with hotel managers of four-star hotels in Szeged. The findings indicate that enterprises in the centre of Southern Great Plain region (Hungary) have adopted IT-based solutions to enhance market efficiency to differing extents. The study identifies improvements in operational efficiency driven by IT-based solutions; however, guest-facing digital innovations remain limited. The study examined 11 units with official rating, enabling the results to be contextualised inside a specific market, while underscoring those trends identified internationally in small open economies are swiftly manifesting locally. The innovation of the research is in its market adaption and serves as a benchmark resource for hotel decision makers.

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1 Introduction

Hotel technology is categorized into five categories: front desk and back-office technology, meeting and events, restaurant and banquet management and customer service technology (Bulchand-Gidumal & Melián-González, 2015). This article explores only front desk technology, with a focus on presenting customer service technology in the guest areas.

Front desk technologies facilitate personnel to gain access into extensive customer information and seamlessly integrate it, ensuring efficient service delivery while minimizing both operational time and costs. Advanced front desk technologies elevate the service experiences of hotel guests by delivering timely and personalized assistance (Singh et al, 2023).

The front desk technologies mostly employed by front desk staff, cashiers, cleaning, and reservation departments. These technologies can include booking systems, reservation software, guest communication tools, and check-in kiosks, all of which help to create a seamless and efficient interaction between staff and guests.

Customer service technology focuses on enhancing guest satisfaction through personalized services and feedback mechanisms. Using customer service technology to collect feedback through surveys and reviews can help the hotel identify areas for improvement and address any issues promptly, ultimately enhancing overall guest satisfaction. The utilization of intelligent mobile technologies and connectivity enables real-time acquisition and updates of consumer data, resulting in ongoing enhancement of guest customization.

Together, these technologies work cohesively to create an enjoyable experience for hotel guests.

2 Theoretical Background / Literature review

2.1 Front desk operations

2.1.1 Reservation

Smart computerized solutions can well improve hotel capacity distribution by analysing market demand, competitor pricing, and booking patterns in real-time. This allows hotels to adjust prices dynamically, attracting more guests and increasing revenue (Bisoi et al., 2020). Advanced data analytics provides insights into customer behaviour, booking trends, and seasonal fluctuations, enabling hotels to make informed decisions about staff allocation or marketing strategies. Revenue Management Systems use algorithms and data analysis to provide pricing support and capacity management strategies, while channel management systems help hotels manage multiple distribution channels simultaneously (Guillet, 2020).

Dadić et al. (2022) detailed those smart computerized solutions can streamline the booking process, providing real-time availability updates and bookings across multiple channels. Guest profile management allows hotels to create personalized experiences and targeted marketing campaigns, increasing the likelihood of repeat bookings and improving occupancy rates. Capacity forecasting with predictive modelling helps hotels anticipate future occupancy and make informed decisions about pricing and inventory management (Bouchareb, 2023).

Antonio et al. (2019) states that flexible cancellation policies and dynamic pricing models powered by AI enable hotels to adjust prices in real-time, maximizing revenue and ensuring competitive pricing. By leveraging these solutions, hotels can achieve more efficient capacity distribution, enhance guest satisfaction, and ultimately increase profitability.

2.1.2 Check-in procedures

The check-in process is crucial for a guest's stay, and a smooth and efficient process can leave a positive first impression. Training front staff to handle check-ins professionally and having systems in place to address issues like room availability or special requests can help streamline the process and enhance guest satisfaction.

Mobile and web check-in or use of chatbots can improve guest options and overall experience by minimizing queuing times and allowing guests to interact at their convenience (Singh et al, 2023). As the economy increasingly relies on advanced technology, hotel guests are becoming producers and consumers, with an entirely automated online check-in and check-out system allowing them to independently handle routine procedures. However, relying solely on technology may result in a lack of personal interaction and personalized service for guests (Zeithaml et al., 2017).

2.1.3 Stayover procedures

Concierge services enhance client experience, retention, and satisfaction rates, however, executing these services can be challenging due to evolving visitor demands. Digital technologies have been used to improve concierge services, such as online reviews, wireless technology, and artificial intelligence (Das, 2023). These technologies can streamline stayover procedures, provide personalized recommendations, and improve customer service, leading to higher levels of guest satisfaction and loyalty.

2.1.4 Check-out procedures

Smartphones allow guests to check their bills, update payment information, and request housekeeping services before entering the lobby. Check-out is also facilitated through kiosks, mobile apps, or the hotel front desk. The Property Management System (PMS) connects with credit authorization systems for efficient payment processing. This integration ensures a smooth check-out process, reducing last-minute surprises and ensuring quick room turnover. Contactless payments, such as digital wallets and contactless cards reducing the need for traditional equipment for card transactions (Bouchareb, 2023).

2.2 Guestroom digitalisation

Hotels now offer rooms with advanced technology and a wider range of entertainment options similar to private homes. Digitalization aims to provide users with personalized experiences, reducing staff strain and improving customer experience.

2.2.1 Electronic locking systems

Intelligent room technology, including keyless entry systems, biometric identification, and smart doorbell cameras, enhances security and guest experience. These technologies reduce the risk of misplaced or stolen keys, while biometric verification adds an extra layer of protection (Das, 2023). In-room safes offer a secure, convenient solution for guests to store belongings.

2.2 In-room control solutions

In-room control consoles regulate room amenities, lighting, and temperature to customize the room for business, pleasure, or sleep environment. Autonomous lighting and climate control systems improve energy efficiency by adjusting settings based on guest preferences and occupancy levels (Das, 2023).

2.3 Entertainment and wellness solutions

High-definition smart TVs with streaming capabilities allow guests to access the preferred contents, stream their personal Netflix through in-room pay-per-view digital content platforms. In-room game systems, fitness systems, and artificial intelligence (AI) can also enhance the guest experience. AI and guest history can optimize bookings for recreational facilities, improving guest access and increasing hotel revenue (Bisoi, 2020).

2.4 Guestroom services supported by digital solutions

Intelligent room technology, such as high-speed Wi-Fi, USB charging ports, and smart workstations, promotes productivity and supports leisure activities. Voice-activated assistants like Google Assistant provide guests with quick access to information and personalized recommendations. Additionally, the use of devices for meal ordering and the use of historical data and trends allowing hotels to anticipate guest preferences, personalize services, and create memorable experiences (Bharwani & Mathews, 2021).

3 Methodology

The study seeks to find out whether four-star hotels in Szeged are taking advantage of digital technologies to enhance the hotel guest experience, or whether they are limiting the digital services they provide to the level of compliance with the legal environment. As digitisation is a complex subject that requires extensive study, exploratory research methodologies help understand operators' perspectives, experiences, and attitudes towards ICT technology. In domains where theories may not fully explain organisations' practices, exploratory qualitative research is suitable. A paradigm that allows incremental data collection and processing based on emergent patterns and categories is a strength.

The sources of data used in this study consist of semi-structured interviews and analysis of hotel websites besides the literature review. These methods are chosen as they enable the generation of detailed knowledge concerning the studied research questions. In Szeged, 12 facilities operate as four-star hotels; however, only 11 are recorded in the official registry of szallashelyminosites.hu, excluding the Science Hotel. The survey was administered to the managers of these units from 1 to 15 March 2025. The enquiries pertained to aspects of digitalisation that cannot be obtained via hotel websites. None of the unit managers contributed to the identification of the hotel in the text of the study.

4 Results

4.1 The hotel industry of Szeged

Szeged, a significant cultural and commercial centre in Southern Hungary, boasts a rapidly evolving hotel sector. The lodging options are varied, encompassing both luxury hotels and intimate, family-operated guesthouses independently managed or operated under a brand. The majority of hotels are situated in the downtown, capitalising on their closeness to tourist attractions. The vicinity of Széchenyi and Dóm Square is especially favoured by tourists. On the outside of the city and in adjacent locales, guesthouses and B&Bs provide alternate options. The hotel industry is intricately connected to conference, cultural and spa tourism.

The quality of hotel services has also evolved in the past years. The recent development of new hotels has heightened rivalry among accommodation establishments, particularly in the city centre and near important transport connections. Newly opened hotels have augmented their room capacity and enhanced service quality by introducing new leisure and recreational amenities. The diversification of the city's tourism sector, encompassing cultural events, festivals, and sporting activities, has led to increased hotel occupancy rates. The increasing number of services and the distinction among hotels is fundamentally driven by demand trends. However, hotel occupancy rates notably rise throughout the tourist season, particularly in the summer months and during festivals.

4.2 Requirements for four-star hotels

In Hungary, the classification of accommodations (by kind and quality) is mandatory; the hotel rating system is similar to the Hotelstars criteria. The certification remains valid for three years, during which hotels must consistently comply with the criteria of their category. The standards encompass hotel operations, services, common and guest areas, establishing a minimum service standard for properties ranging from 1 to 5 stars. Extra points may be obtained by fulfilling the optional services, which can be utilised to attain a superior level if the minimal points for this category are satisfied, although only the inferior category is achieved in mandatory services. The requirements have been revised effective 16 March 2025. The criteria for each quality class vary, but the requisites for digital technology in 4-star hotels only include: cashless payment systems, televisions with international channels, electrical outlets (with adaptors), telephones, Wi-Fi, printing facilities, a website, and the management and analysis of guest complaints.

Moreover, hotels must implement a compliant PMSs that deliver data in real time to National Tourist Information Centre, to National Tax and Customs Administration and to Guest Information Closed Database, which handles visitors' anonym personal information. The compilation of compatible software comprises 45 applications from 40 distinct businesses (Hungarian Tourism Quality Certification Board).

5 Discussion

Among the surveyed hotels, one is affiliated with the Novotel brand (Accor group), one belongs to the Hungarian Hunguest Hotels chain, and one is operated under a management contract by Accent Hotels. Three hotels are managed by a single operator. In accordance with the particular rules of Hungary, all units utilise PMS either developed in Hungary or modified for the Hungarian market: six units employ Hostware, four use Previo, and one utilises Sabeeapp. Despite Hostware providing a booking engine, its users utilise RoomSome or RESnWEB for website booking management. Users are often satisfied with the functionalities of their selected software; nonetheless, two hotels utilising Hostware are contemplating shifting to a more contemporary cloud-based solution. None of the units have an application specifically tailored for guests to improve their experience. Novotel provides the All.com application for managing reservations, whilst Hunguest offers a digital restaurant menu on the hotel website.

The ratio of direct to indirect online reservations for units generally fluctuates with the seasons; nonetheless, the predominant distribution is evenly split at 50% from own websites and 50% from intermediary sources. Two units are absent on booking.com, and one is missing from the popular Hungarian online travel agent site, szallas.hu. Five units lack dynamic pricing and instead implement varying room rates based on seasonal changes on their booking platforms. All except one of them provide package deals; however, these are not based on a dynamic ensemble. Certain units - RESnWEB users - provide additional services that can be incorporated into the reserved rooms during the booking process. Only two units have adopted a special AI-assisted solution to enhance bookings (e.g., Peaq Plus, STR, OTA Insight).

Check-in occurs traditionally on-site at the surveyed units, with just two properties allowing for a reduction in administrative effort by submitting data in advance. The mandatory scanning of the travel document is unavoidable in this instance as well. In the absence of digital check-in, guests may generally submit requests for a room or its amenities during the booking process or via email to reception. 73% of properties fail to utilise the data provided by national-level mandated systems, which are deemed inadequate in quality or scope.

Hotel stayovers are the least supported electronic solutions. Despite the literature emphasising the beneficial effects of these applications on guest experience, their use by hotels in Szeged remains minimal. One hotel still employs a mechanical door opening system, whereas five do not utilise guestroom electricity management system. Among the 11 units, all provide essential in-room services including Wi-Fi, television, telephone, radio, printing upon request, and cashless payment; however, limited additional services are offered. While the optional services "individually controlled air conditioning" and "in-room kettle" are available in all rooms, only two hotels include a Nespresso coffee machine, and one unit offers an electronic blackout function. No applications or voice-activated lighting or heating systems are accessible anywhere. Netflix is offered in only two hotels, neither of which has a gaming console or an integrated sound system. Direct USB charging is offered in only five units. Only 2 hotels use an AI-supported solution to understand the consumption habits of their guests.

Contactless check-out is limited, with merely two units providing this service; in case of pre-payment, only the room card must be left at the reception. It is regrettable that guests are unable to review their bill in advance at any of the hotels, highlighting a deficiency in transparency. Furthermore, cashless card-free payment methods (such as Revolut or Google Pay) are not prevalent, there are no available options for such transactions anywhere.

The utilisation of data produced at the front desk for Housekeeping is limited in the examined units, relying solely on the reporting and roster supplied by the PMS. Two units exclusively utilise the asset register provided as a module within the Hostware PMS.

6 Conclusions

The newly established units failed to leverage the technical benefits available, opting instead to commence operations with conventional equipment and services to fulfil the criteria of the four-star classification. The existing units continue to utilise their current digital solutions, exhibiting little desire for change despite the presence of more advanced digital alternatives on the market.

This resistance might originate from the following areas.

- Cost and investment: the introduction of modern technologies requires a significant initial investment, which can be a major barrier for many hotels, especially smaller ones.
- Staff training: learning to use new systems is time-consuming and staff training is an additional cost. Employees can also learn from each other, which saves costs.
- Security concerns: digital systems can be vulnerable to cyber-attacks, which can mean sensitive guest data is compromised. Data protection should be a priority.
- Respect for tradition: personal contact and traditional hospitality are important in hospitality, and many fear that technology could impersonalise the service.
- Resistance to change: many in the hotel industry are attached to tried and tested methods and are averse to innovation. This is especially true for older managers.
- Customer base: the customer base is very mixed, with many older people not liking or able to use modern technology. Therefore, online and offline solutions are often used in parallel. For family-friendly and youth hotels, the level of digitalisation is expected to be higher.
- Systems integration: lack of compatibility with existing systems can also be a barrier to digitalisation. In such cases, systems developed for the hotel's needs can provide a solution.

The above issues generally arise in the realm of full system integration, indicating significant potential for development in hotel guest room entertainment. Digital enhancements to guest rooms are predicated on visitor experience, incurring no training expenses. Adaption of Service Blueprinting framework may enhance the study by mapping touchpoints where digital interventions could improve guest experience.

Further area of interest of the research is to examine the supply side of the four-star hotel industry in Szeged, assessing if the general degree of digitisation aligns with demand requirements or is predominantly tailored to the operator's competencies

and/or making a comparative industry analysis to benchmark local results against international experiences.

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