

Technology in the Hospitality Industry - Scenarios and Challenges

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Abstract

The global economy is propelled forward by the leisure and hospitality sector. The manner that services are delivered and received has undergone a profound transformation as a result of the industry's recent broad embrace of new technology. This essay examines some of the state-of-the-art technologies used in the hotel sector and how they are enhancing customer experiences and altering the hospitality service landscape. In addition, we provide an overview of some prospective future developments in hospitality related to the Internet of Things (IoT). We also talk about the basic obstacles that must be removed in order to implement a progressive, long-term solution for the hotel sector.

I. Introduction and Motivation

For many years, there is a steady increase in both domestic and international tourism. Owing to the substantial profits obtained by offering lodging, food, and beverages, along with additional services, to this massive influx of visitors in the world of economy. Industry insiders contend that significant advancements in the caliber and kind of hospitality services are necessary for the industry to keep growing in order to adapt to the evolving travel and consumption patterns of its evolving customer base. The younger generation of frugal tech enthusiasts is the target audience for these upgrades [1]. When these enhancements

are put into practice, the service packages and underlying technology architecture that hospitality service providers (HSP) now utilize will undergo a whole makeover. These enhancements need to aim at: experience personalization and service digitalization [1].

Customizing interactions is necessary when promoting services to those on a limited budget. Customization and flexibility in the service packages supplied are two ways that personalization produces unique visitor experiences [1]. A variety of popular service combinations are included at a range of pricing points in the majority of HSP's current packages, with little to no room for negotiation. When it comes to deciding, travellers usually opt for the option of doing nothing at all. If HSP provided more individualized service packages, guests might personalize their visits to fit their interests and budgets. It may be much easier to create personalized value offers for each visitor if an effective technological platform is used to supervise interactions between service providers and visitors. Digitizing services is crucial if you want to draw in tech-savvy customers [2].

Consumers may easily incorporate technology into their vacation experience by exploring, planning, and selecting activities on a digital service platform at their convenience. Digital offers including social network integration, location-based services, personalized communication, and booking and reservation services attract tech-savvy visitors. Offering special incentives to users such as loyalty points, promotions, and bonuses could encourage them to utilize internal apps rather than ones from third parties.

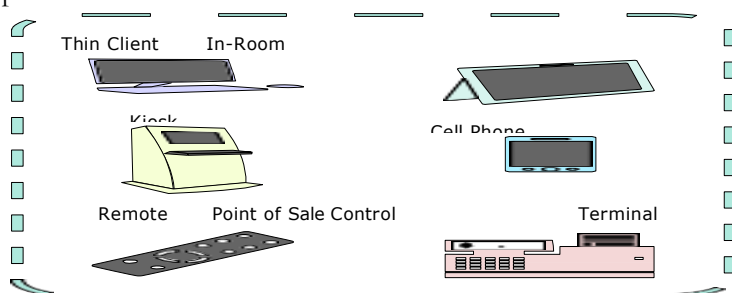
The current technological explosion is having an impact on how the hotel management industry develops. The network of common physical things, including smartphones, sensors, actuators, and identification tags that are networked together so they may be known like this [3]. Smart buildings, or hotels utilizing Internet of Things (IoT) technology, are essential elements of smart cities [4]. The increased ability of HSP to forecast visitor preferences and behaviors opens up new possibilities for localized, personalized, and immediate services within the IoT paradigm. Thanks to the Internet of Things, HSP may also employ cost-cutting strategies like smart energy management [6] [7] and increase the back-end productivity of several institutions [5]. The hotel industry is already embracing the Internet of Things through smartphone applications, in-room technologies, and public terminals [2].

Undoubtedly, new business possibilities will arise from some of the interesting new applications that may develop in the future, such as augmented reality experiences, environment monitoring, and body area sensor networks. In order to facilitate easy system updates in accordance with the quickly changing IoT

technology environment, HSP should work to future-proof its technological design. We provide a thorough analysis of the part technology plays in cutting-edge hospitality services in this essay. We also give a summary of prospective IoT-powered hotel services in the future. After that, the difficulties HSP is now facing are discussed, along with the necessity of resolving them to provide a long-lasting, progressive answer for the sector.

State of the Art Hospitality Services

HSP is investing a lot of money on IT to update their foundational technology. Midscale hotels accounted for the largest share of IT expenditures in 2016 [5]. In order to have the majority of the expenditures are directed towards digitalizing the service platform. Guest-Facing Systems and In-Room IoT Sensors are examples of smart device and IOT innovations.

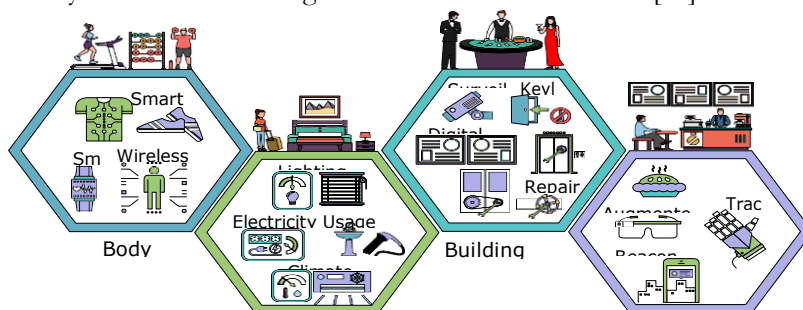


Hospitality Services

Driving the technology change in the platform for hospitality services. Through guest-facing systems, guest interactions are shifting to on-screen and online interfaces. In addition to making visitors feel at ease, this allows service providers to get useful information and input [1]. This has raised revenues; cut cost of items supplied, enhanced managerial effectiveness, and improved sustainability [2]. The main interfaces for communication between visitors and the HSP on a digitalized platform for hospitality services are guest-facing systems. The mobile apps for hospitality services, portable devices, and other technologies are examples of guest-facing systems [8] [9].

The visitor experience is enhanced by guest-facing systems in a number of ways. First and foremost, by giving guests command over their surroundings, guest-facing technologies guarantee their pleasure. Guest-facing systems [8] provide a number of advantages for visitors, including keyless entrance, automated check-in and check-out, and control over in-room activities. Using their mobile applications, Hilton and Starwood hotels, for instance, provide automated check-in

and keyless entrance for their patrons [10]. Similar smart phone apps are available from Telkonet under the Eco Smart Mobile brand, which now includes functionality to let visitors manage IOT devices in their rooms [10].



Energy Management

The guest-facing platforms, visitors can access services powered by sophisticated technologies for managing the building hierarchy. The BOH management systems comprise software for customer contact management, property administration, revenue and sales management, cleaning and maintenance, and other systems [2]. BOH management systems are becoming considerably more capable thanks to advancements in IOT and guest-facing technologies. For instance, hotel rooms may have their temperature and lighting controlled while they are empty or unsold by using in-room Internet of things and devices which can cut energy expenses by 20 to 45 percent. In [10]. One such energy-saving scheme is "daylight harvesting" to reduce energy usage and enhance interior lighting uniformity.

The nature of customer relationships between visitors and HSP is also changing as a result of the development of guest-facing technology. With the use of guest-facing technology, service providers may keep a careful eye on the visiting cycle by gathering information on each visitor's preferences, actions, and whereabouts. [8] [13]. Using this information, service providers and BoH systems may generate unique visitor profiles that can be used to tailor service offerings to returning customers. The ability to share these personalized visitor profiles with a wide range provided to guests tailored.

Increasing HSP's online brand value is another crucial management activity related to BOH management systems [14]. This entails encouraging visitors to evaluate and review services on internet portals and cultivating and preserving positive customer relations via the efficient use of social media platforms.

A company's income stream is intimately correlated with its internet reputation. When booking hospitality services, around 90% of today's tech-savvy tourists rely on internet reviews. Thus, a single unfavorable review has the potential to cost a business a significant number of clients. Therefore, it is essential that BOH internet portals and take appropriate measures to lessen their impact.

The BOH management systems expedite the cleaning and maintenance procedures, which further contributes to increased revenue of the management systems employing guest preference profiles and in-room technology. This greatly raises visitor happiness while also optimizing labour resource utilization and cutting down on hotel room downtime. On-site and in-room smart system maintenance is also aided by the BOH management systems. By assisting in the nearly real-time discovery of defects and malfunctions, these technologies enable timely maintenance.

Scope of the Services

As the Internet of Things (IOT) expands and permeates every aspect of daily life, we might be able to predict a day when every physical item we use collects, processes, and evaluates our data in order to provide us with services on an automated basis. In this part, we go over a few possible cases to explain the importance of ecosystem along with a list of the many service categories for which they may be used.

Body Area Sensors

Wearable and smart technology is leading the IOT revolution. Sales of gadgets like smart watches, cell phones, and other gadgets are skyrocketing, and smart technology is starting to show up in other wearable forms like smart apparel and shoes. These gadgets collect information about the user's location, fitness activities, heart rate, and body temperature. Wireless medical sensor technology offers comprehensive information on the body's systems and organs, hence broadening the breadth of data collecting. By properly analysing data from body area sensor networks, HSP can provide a number of new services to its guests, like automatically controlling the temperature in the guest room based on body temperature, modifying the lighting according to the guest's sleep cycle, and recommending meals based on the guest's preferences.

Augmented Reality

HSP is developing novel approaches to integrate beacon and augmented reality technologies into its on-site operations. These technologies may be utilised to provide visitors with a variety of services on the dietary restrictions, and interactive quiz games focused around interesting locations on the site. They may also be utilised to provide visitors virtual tours and sneak peeks at the accommodations. It is possible to combine these services and provide them as a component of internal loyalty schemes [17].

Energy Management

By utilising IOT technology, HSP may implement a number of cost-saving strategies and assist in achieving "green" operating of on-property systems. Many hotel facilities today have energy-saving technology installed, such as temperature control and smart lighting systems, in addition to low-power devices like LED lights and compact fluorescent bulbs. Using IoT technology, energy-saving technologies may be implemented in much more ways. Smart outlets and IoT-enabled devices, for example, can alert maintenance and housekeeping personnel when an outlet's power consumption exceeds a certain threshold during a predefined period of time. Subsequently, the personnel can ascertain whether the guests are cognizant of the amount of power they are consuming or if malfunctioning equipment is the source of power outages. [6] [7].

Building Automation

Automation and monitoring of the facility benefits both visitors and service providers. HSP experiences increased operational and managerial efficiency as a result of building automation. To schedule cleaning services, for instance, in-room monitoring systems can determine if a room is occupied or not. In addition to other utility systems like powerlines, pipelines, automated doors and windows, lifts, and other guest-facing systems in rooms and on the property, IoT-enabled systems have the ability should report malfunctions and defects and arrange for preventative inspections [18].

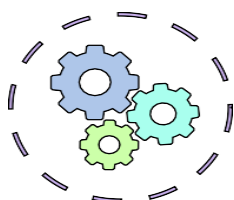
Challenges

In this part, we list the four main obstacles to an efficient IoT deployment in the hotel sector (Figure 3). For HSP to maintain continuous expansion, these issues must be solved by the new technology infrastructures that the company is implementing.

Interoperability

In the hotel industry, there are no rules. Many HSP are developing their own proprietary solutions utilising their own metrics and procedures in order to satisfy the technical support needs of today's visitors [19]. Consequently, various implementations have emerged, all aiming to provide a similar range of services. These techniques work well for a certain quality, but they don't work well in other intra- and interorganizational contexts [20].

Interoperability



Security and Privacy



Responsiveness



HSP must ensure that visitor data is managed and stored correctly to protect visitors' safety, well-being, and financial stability. The systems at hotels that deal with guests and point-of-sale terminals are the most susceptible to security breaches. To prevent theft and data breaches, these technologies need to have robust security features that ensure visitor communications are secure and private. To improve the security of guest device interfaces and that of in-room and on-property IoT devices, it is advised to fortify security measures inside the hotel

network. It also prevents hackers from reprogramming the Internet of Things devices in the hotel for malicious or annoying purposes.

The implementation of robust security measures in all visitor interactions and active connections on the hotel network places restrictions on the broader applicability of guest preference profiles due to the absence of a common platform for the exchange of guest data between enterprises. As a result, HSP could not be able to make money because they couldn't provide the tailored services that their guests require. Interoperability issues can negatively impact visitors' experiences since they can be inconvenient and disruptive, which takes away from their desire for a seamless user experience.

Unwelcome learning sessions are provided for guests while they are staying at various hotels due to non-standard processes. Additionally, there may be issues with these systems using and integrating data from users' own devices.

Data Management

One of the most important links in the hospitality supply chain is the collection and assessment of visitor-related data. There's no doubt that as new platforms and technologies are brought into the hotel industry, the amount of data will expand considerably. The amount of data that is gathered is greatly influenced by how the visitor experience is tailored. To provide visitors tailored services, BOH management systems need to assess visitor preference profiles in addition to ambient condition data collected from IOT devices and sensors. Therefore, BOH management solutions need to handle a heavy computational load that can only be satisfied by employing certain technological infrastructures.

Security and Privacy

HSP has to keep tabs on visitor choices, behaviour, and location in order to offer highly customised services.

Responsiveness

The timely delivery of services to visitors and the swift acknowledgment of their requests are the responsibilities of HSP. Digitalizing the interactions between visitors and HSP can help achieve this. By transferring guest interactions to guest-facing systems and implementing autonomous control via the use of Internet of Things sensors and devices, HSP is able to eliminate the need for human involvement and intervention when dealing with guests.

These techniques reduce the likelihood that visitors' requests may be misinterpreted or misconstrued. In addition, these technologies can easily complete demands from visitors more quickly than any committed hotel staff or workforce.

This contributes to the seamless experience that visitors want and significantly increases response to their needs. Additionally, responsiveness is essential to the management and repair of a hotel. The revenue per available room (RevPAR) of the hotel might be lowered by failing to respond promptly to repair and maintenance needs. For instance, if even the most basic of amenities like the phone is broken, the room cannot be leased [15]. Since the majority of IoT sensors and devices can identify and self-diagnose issues, repair and maintenance requests may be handled.

When hotel rooms are maintained and repaired on time, they get occupied more rapidly and result in less revenue loss from maintenance. Hotel systems must have increased processing capacity and unrestricted access to guest and BoH management data in order to be more responsive. A decentralised computing and data management platform is necessary for this.

II. CONCLUSIONS

In this paper, we list a number of crucial improvements that the hospitality sector must do in order to reorganize its service platform and make it compatible with today's technology. Two areas that require attention for these improvements are the customization of experiences and the digitization of services. We talk about some of the cutting-edge hospitality services that several HSP have implemented as a result of their drastic service redesign. A variety of new services that the hotel industry may offer are emerging as some of the cutting edge technology, such as augmented reality and body area sensors, mature. We also highlight a few key obstacles that must be removed in order to implement a long-term, forward-thinking solution for the hotel sector. Among these difficulties are interoperability, data management, privacy and security, and response.

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