

Beyond Smart: Enabling Smart Technologies to Deliver Smart Experience in Hotel Industry

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Research Article

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ABSTRACT

The chapter undertakes to provide in depth knowledge on emerging smart technologies that will aim to reshape and redefine the hotel industry. Tourism sector is one of the growing and prospect sectors, which remains positive. Keeping in mind the rising demands of the tourism there is a need of an hour to adapt, innovate, identify and explore next generation's technological solutions to enhance the experience of the owner and the guest in the hotel industry. The objective of the study is to explore the smart technologies that will benefit hotel industry and enhance experience of the guest. The attempt is made to understand the challenges and opportunities in adopting smart technological solutions and to understand the role of smart technologies in enhancing owners and guest experiences and thus contributing to the concept of smart hotels. The study will explore the latest technologies that can be adopted by hotel owners to fulfill the demands and expectations of the techno-savvy guests. Thus the smart hotel experience can be made possible through the smart digital technology and can aid hotels overcome current issues and prepare for future trends.

Keywords: Smart hotel technology; Artificial intelligence; Predictive analysis; Internet of things; Self-service technology; Biometric recognition; Video analytics

INTRODUCTION

The tourism sectors prospect remains positive with the rise in technologies and social media platforms. The International Visitor Arrivals (IVA) for the Asia Pacific region are anticipated to increase at a rate of 4.9% per year from 2010 to 2030; thus, the tourism industry is anticipated to grow positively. To take advantage of this expansion, the sector needs to evolve and develop new technologies to address obstacles like as rising competition, a lack of available labour, a shifting focus on the guest experience, and a great number of other issues. In order to accomplish this, it is essential to make use of new technologies and to be aware of the ways in which they might improve upon established procedures and solutions in order to maximize efficiency and improve the quality of service. Hospitality industry is one of the most growing and demanding industry. Rise in the smart technology demands every sector to be technology oriented.

The never ending demands of tourist especially in hotel industry forces the hoteliers to adopt effective, innovative and creative experiences and services that enables them to differentiate from the competitors. Hotels need to bring in innovative and intelligent ways to control and monitor business. Advance technologies like sensor based technologies, embedded systems, ubiquitous communication, media management and handling, natural interaction, contextual awareness and emotion computing will enhance the overall hotel and guest experience and services. Hotel industry needs to identify and explore the next generation system that can cater the demands and needs of guest. Smart hospitality is envisaged as an interoperable and interconnected system enabling information sharing, which enables hoteliers to provide added values for the entire ecosystem of stakeholders through digital platforms according to the insights provided [1]. Smart hotel is a novel concept, in the hospitality industry, and few studies have examined hotel consumes intentions to visit smart hotels [2]. Smart hotels are a hotel that uses internet-connected devices capable of communicating or interacting with one another.

Smart hotels are a hotel equipped with disruptive technologies such as AI, IoT, predictive analysis, self-service software, biometric recognition, video analytics and lot more to explore etc., with the aim of improving management efficiency and control from the hotel management as well as offering a better service to the guests. Smart hotels are intended to provide an enhanced stay for visitors in terms of the services provided and the level of comfort offered, but their primary purpose is to enable optimized management in the interest of increased safety, efficiency, and control capacity. Smart hotels are able to give a better and more efficient tourism service, in terms of operational duties and sustainable gains, without sacrificing essential human interaction. This is a strategy that may be used to strengthen the hotel's relationship with its guests [3].

Emergence of smart hotels using AI has changed customers purchase intentions and business operational process. Smart hotels are quick to adopt new technologies, prompting a need for practitioners and marketers to investigate how consumers perceive smart technologies in hospitality and the strength of their intentions to visit smart hotels.

MATERIALS AND METHODS

To make the accommodation at hotels comfier, various changes are introduced in the hospitality industry. Intelligent Robots aid in making the hotel visits more notable [4]. New and modern technical world provides a competitive edge towards winning strategies by improvising monetary outcomes and attaining customer satisfaction. A smart hotel is one that makes use of internet-connected equipment to facilitate guest-to-guest communication and interaction. It's also known as the Internet of Things (IOT) as it allows everyday appliances and gadgets to be used as communication tools as emphasized [5].

In response to shifting demands from both customers and businesses, service providers in several sectors are focusing on developing and deploying touches solutions. Smart technology integration helps businesses provide better service to their customers. Technology convergence with market developments should help bring the "Internet of Things" concept closer to realization. The adoption of IOT solutions changes the landscape of the hospitality industry as a whole and creates new possibilities for smart hotel technology. The researcher had looked at many Internet of Things solutions popular in the entertainment and hospitality industries and how the hospitality industry is focusing on fostering vacationers' hopes and ambitions, and how touchless technology items with little interaction boost those operations [6].

The research provided useful information for overcoming obstacles to the spread of smartness and integrating smart technologies into pre-existing hotel infrastructure and procedures. Organizational sustained learning and the synergism of smart networks are highlighted as important for molding configurationally system innovations by the aggregate

dimensions offered for accomplishing absorption of automated systems in hotels as mentioned ^[7]. Using an expanded version of the Technology Acceptance Model (TAM), researcher looks into how factors like TR and TA affect tourist plans. The results of a web-based poll with 648 valid replies show a correlation between TA and PU and PU and TA, but not TR. Additionally, whereas TA has no effect on travel inclinations, TR does. These results contribute to the body of hospitality research and have direct consequences for the development of technology-related marketing strategies by hospitality industry professionals. The findings of this research help highlight how much guests value technological conveniences while deciding which hotels to stay at in the future according to the literature contributed.

Although running a company providing services can be difficult owing to the nature of the service itself, it is still necessary to pursue useful missions in order to remain competitive. Production businesses aren't the only ones whose operations are impacted by advances in technology; information technology service businesses are also benefiting from the trend. The current generation of technologies, known collectively as Industry 4.0, can be used in many different ways depending on the business strategy of the company. This research looks at how previous studies on Industry 4.0 have affected business administration in the service sector.

As technology progresses, it is inevitable that many disciplines will undergo transformations. People's daily routines are drastically altered as a result of these shifts, and new habits take their place. As the field of information technology evolves, so does the level of rivalry between firms. The age of information capture ratings is the most fundamental factor in determining where firms should be located in the current cutthroat market ^[8].

The effects of new technology on society and the economy as a whole have been far-reaching. The travel sector is well-known for its propensity towards innovation, so it was only natural that it would be among the first to adopt modern technology advances. Hotels, restaurants, and other tourism-related businesses have increased their use of robotic systems to enforce cleanliness, sanitation, and social distance in the wake of the global epidemic. To remain competitive, however, tourism businesses must adapt to the many new difficulties posed by the digital revolution. In the tourism industry, robotics has shown itself as a highly helpful trend, streamlining procedures and introducing new innovations. In turn, this enables businesses to cater specifically to the needs of "digital tourists". To sum up, cutting-edge technology is transforming the travel sector and pushing it towards higher productivity and happier clients ^[9].

Research methodology

The present study is an attempt to explore through systematic review of literature the diverse smart technologies being adopted worldwide that will enhance and enable to deliver smart experience in hotels in India. Our aim is to study and search answers for the following research questions.

- How smart technologies can enhance and enable to deliver smart experience in hotel industry?
- What are the key implications of smart technologies in hotel industry?

Hotels are customer-focused businesses, and the satisfaction of their customers is the primary driver of income. To put it another way, satisfied customers spend more money and return to the same business. This chapter identifies essential technologies which can be employed by hotel industry to deliver differentiated value propositions to engage visitors and heighten experiences. The proliferation of new types of businesses is causing problems with the available alternatives for accommodations.

Diminished profit margins as a result of decreased customer loyalty to the brand and increasing operating costs as a result of innovations made throughout the value chain is creating hassles in survival of hotels. Increasing expectations

from technologically savvy and adequately informed customers, hotels are expected to understand and anticipate the individual demands of guests at every touch point and there is a need of consistent services and information to be made available to the guests at their own pace.

Smart technologies for hotel industry

Real time marketing: This is one of the most effective tool in the hands of hoteliers to showcase their presence globally. Hoteliers need to be far more strategic in their operations and marketing as the hospitality business evolves from a "art" to a "science". Real time marketing is a continuous process which has to be carried out on a regular basis while incorporating creative and effective content, revenue management and social media presence. This marketing involves also considered to be the most influential component in the hands of hotel industry.

Marketers engage in "real-time marketing," or "RTM," when they respond rapidly to online or offline events in order to insert corporate marketing into consumer conversations *via* social media messaging or increase brand recognition through marketing channels. Real time marketing demands and expects presence of the organization through social media platforms on the events happening globally attracting attention of the target audience. Hotel industry face a fierce challenge of staying relevant in the competitive era. Thus real marketing can help in attracting attention of target audience by reacting promptly on the events happening globally.

Real Time Marketing revolves around three major elements (Table 1). Hotel industry has to work out and figure out various techniques and strategies that can enhance and enable better customer experience and services. To increase customer engagement, competitive advantages, cultivate brand awareness and to generate better return on investment a relevant and swift real time marketing strategies has to be implemented.

Table 1. Real time marketing elements.

Elements	Description
Customer needs	In order to maintain efficient hotel brand, it is necessary for them to anticipate what it is that people want and need at any given moment. In order to produce content that is relevant to their audience and appeals to them, businesses need to have a comprehensive awareness of both their existing clientele and the current trends in their industry.
Relevancy	Real time marketing requires marketers to be vigilant and keep an eye on the events that are happening or going to happen in upcoming span of time and attract customer base with their creative and innovative messages.
Agility	Real-time marketing is characterised by its rapid pace, hence agility is essential to one's level of success in the field. It is necessary for companies to be able to generate content rapidly and successfully without compromising its quality.

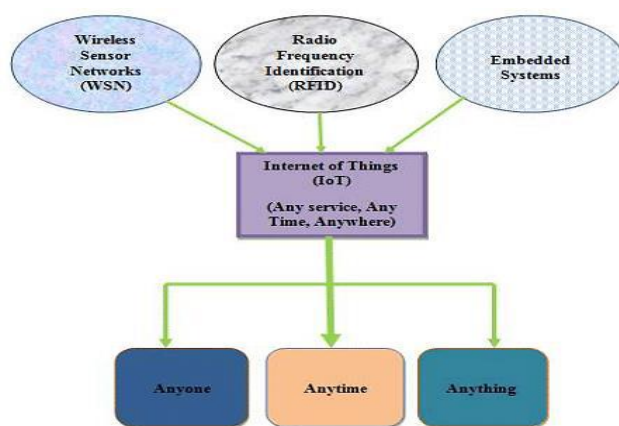
The use of real-time marketing is a potent marketing strategy that can help a firm accomplish its goals through implementing appropriate real time marketing strategies. Real time marketing techniques are through social media platforms, influencer marketing, SMS marketing, IM marketing (Instant Messaging), Push notifications and email marketing. These techniques are few effective techniques that provide real time updates, constant monitoring to engage target audience, creativeness, instant response to upcoming events which significantly enhances and boost brand awareness and better return on investment.

Some examples of technologies that help retrieve and/or compile real-time information from a variety of sources are Data Management Platforms (DMP), Customer Relationship Management (CRM) systems, and social listening tools. They then provide the data in a structured manner so that it can be viewed, managed, decisions can be made, and subsequent actions can be taken with ease. This gives companies the opportunity to learn more about their clientele, their

competitors, and the appropriate chances for expansion in a variety of markets. On the other side, technologies such as content management systems, dynamic prospecting, and retargeting employ compiled information to share and distribute individualized content *via* a variety of channels that have been specifically targeted.

Internet of Things (IOT): 'Internet of Things' was coined in the year 1999. The Internet of Things (IoT) refers to a vast network of interconnected physical devices, including but not limited to cellphones, hallway signs, and room thermostats (Figure 1). The sharing of data and its examination are both made possible by this connectedness. After then, hotels can collect this data in order to discover new business insights and opportunities that can be acted upon. The Internet of Things (IOT), is a network that allows for the identification, localization, tracking, monitoring, and management of smart devices *via* RFID (Radio Frequency Identification), WSN (Wireless Sensor Network), and 3G/4G/5G mobile communication using a standardized protocol [10].

Figure 1. IoT design.



The hospitality industry in India is part of the larger travel and tourism industry, which accounts for 8%-9% of India's gross domestic product. Keeping things running smoothly by optimizing them is an important. Hotels and resorts, cruise ships, and gambling establishments can all benefit from collecting customer data in order to streamline their operations and provide a more satisfying experience for their visitors (Table 2). A paradigm in which things having sensors, actuators, and computers connect with each other for a meaningful purpose is Internet of Things (IoT) [11].

Table 2. IoT Key Technologies.

S.no	Technologies	Description
1	Wi-fi	31% of all IoT connections are made <i>via</i> Wi-Fi. In 2022, the most recent Wi-Fi 6 and Wi-Fi 6E technologies, promising more rapid and trustworthy wireless connectivity, were used in more over half of all Wi-Fi-enabled devices shipped around the world.
2	Bluetooth	Bluetooth is used in 27% of all IoT connections worldwide. IoT devices may stay connected reliably while using very little power thanks to Bluetooth Low Energy (BLE), also known as Bluetooth Smart. Therefore, IoT devices that run on batteries, including smart home sensors and asset tracking devices, have shifted their focus to BLE.
3	Cellular Market	The percentage of IoT connections that use cellular networks (2G, 3G, 4G, 5G, LTE-M, and NB-IoT) has increased to about 20%. IoT Analytics reports that the growth rate of cellular IoT connections worldwide in 2022 was 27% year-over-year, which was much higher than the growth rate of overall IoT connections worldwide.

IoT makes staying at hotels more convenient for visitors. In some hotels, guests may be able to control their lighting and make phone calls to the front desk from the comfort of their beds using in-room automation technology and TVs or mobile devices. And while we're on the topic of mobile devices, IoT allows for further integration between the hospitality industry and visitors own devices.

Here are some of the ways in which hotels might benefit from implementing IoT technology. HR, front desk, and cleaning costs can be reduced. More recommendations from satisfied customers and direct interaction with those customers means more money in your pocket. Fewer unscheduled maintenance visits mean less downtime for your business. The hospitality business may benefit from a new model brought about by the integration of IoT and advanced technology.

What it means for the hospitality sector:

- Controlling energy use *via* remote monitoring and reporting.
- Fault Detection and Diagnosis (FDD) using artificial intelligence and predictive maintenance.
- Keeps tabs on the air's temperature, humidity, and AQI (Air Quality Index).
- Automated digital ticketing processes that send out alerts in the moment.
- Anomaly identification for vital safety indicators using data.
- Optimal control of the heating, ventilating, and air.

Artificial Intelligence

AI is a subfield of computer science that enables robots to feel, comprehend, and learn; in other words, to function and react in the same way that people do. It is possible to use it in conjunction with machine learning to identify patterns and relationships within sets of data. It is able to make recommendations and suggestions in real time when it is combined with algorithms that perform predictive analysis.

The term "Artificial Intelligence" (AI) is a combination of the words "artificial," meaning "man-made," and "intelligence," meaning "the capacity for independent thought," therefore AI can be thought of as "human-made" intelligence ^[12]. The hospitality business is making use of AI to improve face-to-face interactions with customers.

The emergence of intelligent robots are the future prospects of AI. It can already handle simple interactions with customers. Hilton's new AI robot, affectionately named "Connie," is the best instance of this type of thing we've seen so far. Customers who engage with the robot can get tourism information from it. The most remarkable aspect is its ability to study human speech and tailor itself to specific users. This means that the more customers use it, the more sophisticated it will become.

Many practical innovations, such as substantial improvements in voice recognition, have resulted from research into artificial intelligence. People have become accustomed to digital assistants and other voice-activated technologies in the house and on their mobile devices.

The hospitality sector is an ideal use for this technology. Any electronic gadget, from the hotel's tablet to the guest's own smartphone or laptop, can feature voice activation. A guest can control the temperature in their room, the entertainment system, room service, and even make calls to the front desk with these systems.

The data collected from customers through loyalty programmers can be used by artificial intelligence to better tailor products and services to each individual client.

In doing so, you'll strengthen customer loyalty, which in turn reduces customer attrition and ensures your hotel a steady stream of repeat business (Figure 2).

AI can also be used to create novel products and services for new customers, with a focus on retaining them as repeat clients.

Figure 2. AI automation and hotels



Understanding AI makes it easy to understand how consumers feel about a business. more and more travelers are turning to social media to research lodging options and share impressions of their experiences while on vacation, making social media a crucial channel for connecting with guests and learning how the general public views your establishment. Finding and collecting this volume of information manually would be quite challenging. For AI, this is a piece of cake. Modern sentiment analysis software can monitor and analyze guest reactions to specific amenities, and identify patterns of praise or criticism. This information can be used to fine-tune the services provided.

Predictive analysis: Although predictive analysis has been available for quite some time, it is just now reaching its full potential. Nearly every industry is using it as a means to improve their bottom line. It is done by predicting customers' actions based on the information collected from them (Figure 3). Data mining, predictive modelling, and machine learning are just a few of the methods that make up what's known as "predictive analysis," which is used to make predictions about the future based on patterns seen in the present or in previously collected data.

Figure 3. Bringing predictive analysis to the hotel industry.



By 2030, the global market for predictive analytics is anticipated to grow at a staggering CAGR of 24.9%. From 2019 USD 6.9 billion, the predictive analytics market is expected to grow at a CAGR of 24.9% between 2020 and 2030,

reaching a value of over USD 23.4 billion by the end of that time. The market benefits from increased performance, decreased expected risks as a result of better informed decisions made with the use of analytics for prediction, and enhanced consumer value. The expansion of this market can be attributed to a number of factors, including rapid technological advancements, the proliferation of AI, and intense levels of competition. Increased adoption of big data and cloud computing by businesses, as well as the need to differentiate products through innovation, are also fueling the expansion of the predictive analysis market.

Power of predictive analytics

Customized interactions: Customers purchasing habits can be predicted with the use of predictive analysis. You can extrapolate his shopping habits and other interests from this information. When we talk about "other preferences," it's important to keep in mind that our guests' stay doesn't end when they check out. The story begins from that point. The guest's behavior during his stay at your hotel is determined after check-in. Similarly, you may keep tabs on your hotel's clientele and tailor your offerings to their specific needs. Both broad and highly customized offerings are planned.

Room rate is just right: Many variables, including predicted occupancy rate, future booking trends, and the amount of travelers in your area, influence the optimal room rate during a given season. Hotel bookings might be affected by anything as simple as the weather report. Therefore, using a predictive analysis is crucial to your pricing studies. You can determine whether it's time for a price increase or decrease with the help of statistics. How much, exactly. This is vital since hotels have extremely slim profit margins. Inaccurate and unreliable results from the standard manual analysis lead us to believe that we should either lower or raise prices. It's not just about lowering or raising prices; it's about finding the sweet spot. Price fluctuations, no matter how slight they may seem at first glance, can ultimately amount to hundreds or even thousands of dollars.

Prevent loss of clientele: The term "customer churn" refers to the loss of a company's regular clientele, whether they are customers, users, players, subscribers, or other types of repeat clients. The hospitality sector is no exception; it costs much more to attract a new customer than it does to keep an existing one. Especially when hotels compete with OTAs for direct bookings, this issue becomes increasingly pressing. Predictive analysis allows you to avoid this attrition. Your hotel can avoid losing future business by learning why previous visitors stopped returning. Necessary Steps to be taken to stop customers from leaving.

Marketing: When it comes to promotion, we can learn which channel will be most effective and which consumer segment will be receptive to whatever strategy thanks to predictive analysis. Predictive analysis will help narrow down the marketing leads to those who are most likely to convert into paying customers. This will aid in further marketing or sales efforts by providing insight into potential customer booking patterns. After that, it will also be useful for content promotion. Predictive analysis will be useful in determining what material to create for which demographic.

Anticipating stock needs: It is important to anticipate customer needs if you want to run a profitable hotel. You can analyze the consumer demand curve and have enough stock on hand with the help of predictive analysis. Data mining and forecasting tools help you anticipate stock needs so you can keep up with sales.

Virtual reality: By putting on a pair of VR goggles and using content provided by the hotels, the target audience will be able to gain virtual experience of the hotel and will prompt the decision making process. VR enables potential customers to virtually experience the 360° view of the hotels amenities and rooms that are offered. It enriches the concept of virtually 'experience before you stay. It's not possible to physically check in the ambience and hospitality of hotels that is located miles away. It is also not possible to book the hotels on the comments and reviews left on the website.

Virtual reality will be able to help in making decisions through the use of a VR headset, users are transported to a fictitious 3D setting in which they are immersed in simulated pictures, sounds, and sensations.

Users are able to "experience" the artificial world, navigate inside it, and interact with virtual features and objects. The VR will provide the real view of the hotel and the amenities along with the services that are being offered. Through VR the hotel industry will be able to educate, inform, engage customers, host events, and promote hotel rooms and facilities easily without any lengthy site inspection physically. VR is a powerful tool that enables the hotel industry to emphasize on experience marketing as this can provide key benefits to the customers before planning their ideal holiday. VR also provides interactive elements, increases the possibilities of direct booking, increases up-sell and cross-sell and takes up the competitive advantage by showcasing their USP virtually.

Self-service software's: Consumers are becoming more accustomed to and frequently prefer unassisted self-service over aided service, which has contributed to the growth of self-service both as a business model and as a trend in the market. The majority of companies claim that the implementation of self-service applications leads to a reduction in operating expenses while simultaneously significantly increasing levels of customer satisfaction ^[13]. Self-service software provides electronic assistance without requiring any interaction with a service agent or any staff. This program is specifically created with straight-forward features that empower users to have full control over their service experience. Self-service software-based technologies provide a wide range of potential applications and presentation formats, such as through kiosks or app-based technologies.

The tools that make up hotel self-service technology give customers the ability to handle essential areas of their customer journey, such as check-in and concierge requests, on their own and according to their own schedules and preferences (Figure 4). Guests have increased control over their stay thanks to the increased autonomy afforded to them through self-service technology solutions such as keyless access options and check-in kiosks ^[14]. We have conducted a study on kiosks as self-service technologies in hotels, the findings of the study stated that the consumers agreed that kiosks were simple to use, quick to operate, and enjoyable to manage; nevertheless, concerns were raised regarding the kiosks' lack of human interaction and limited language capabilities.

Figure 4. self-service & contactless check-in technology.



Recent reports from the business as well as research make it abundantly evident that visitors are showing a rising interest in these types of solutions. For instance, according to a report that was published in July, 2020 by Oracle Hospitality and Skift Research, customers are more likely to stay in a hotel if that hotel offers them the option to use self-service technologies.

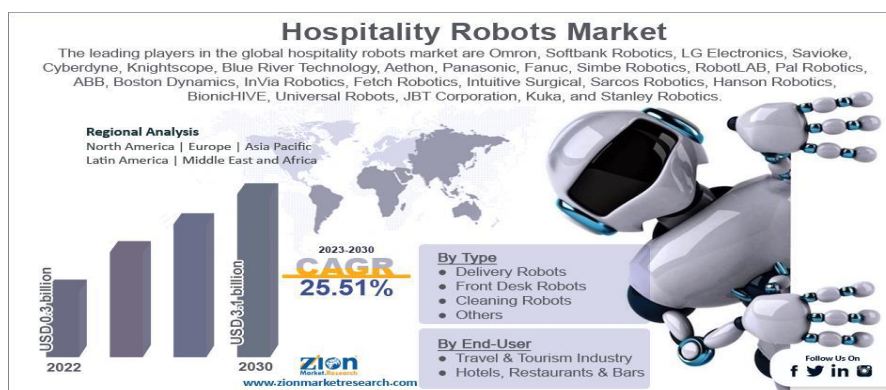
In addition, a recent survey that was conducted by Deloitte revealed that sixty percent of travelers are more likely to stay at a hotel that enables contactless check-in and the use of a smartphone as a room key. Guest want an interfere less and quick stay without having to wait for their turns. Kiosks are becoming increasingly popular in hotels as a form of self-service technology, and they play an important part in minimizing problems in hotel operations. The fear of new technologies and the counter-service argument are only passing phases that will pass away over time.

Self-service technologies aim at providing more autonomy, support, smooth payment procedures and 24/7 services to guest without any interpersonal interactions. Hotel industry needs to emphasize on prioritizing the guest experience by implementing effective self-service technologies and software. However, it should not completely remove or replace the human interaction, skills and efforts.

Robotic process automation: Within the context of the ongoing process of digital transformation, Robotic Process Automation (RPA) is garnering a significant amount of interest from businesses according to the literature provided [15]. Robot are capable of performing all those chores of life that are usually been done by human workforce. When it comes to automating Organizational and business procedures, Robotic Process Automation (RPA) offers a number of benefits that are hard to ignore. In addition to these benefits, the application of Artificial Intelligence (AI) algorithms and techniques as a complementary tool enables an improvement in the level of precision and effectiveness of carrying out RPA processes in the extraction of information, as well as in the recognition, classification, forecasting, and optimization of processes.

This is possible because of RPA's ability to recognize and classify data [16]. Today, with the assistance of AI, robots are assisting departments like as finance, HR, sales, purchasing, and logistics, as well as other departments that are responsible for the collecting and processing of information (Figure 5). Robots have made the world more fascinating in the field of services.

Figure 5. Hospitality robots market.



According to the findings of the study that our research analyst has revealed, it is anticipated that the global market for hospitality robots will expand at a compound annual growth rate (CAGR) of approximately 25.51% throughout the period of forecast (2023-2030). When measured in terms of revenue, the global market for hospitality robots was estimated to be worth approximately 0.3 billion US dollars in 2022 and is expected to reach 3.1 billion US dollars by 2030.

Services robots are trending and are greatly influencing the hotel industry and customer's experiences. In hotels the guest experience would be filled with excitement when a service robot serves the welcome drinks at the reception. Imaging robot taking the charge of the luggage's the moment the guest check ins and place the luggage's in the concerned room in the respective places and gradually takes away the luggage at the time of check out. Robot will also help in providing in room dining services along with delivering amenities to the guest. These robots can prove to be a novelty factor for the guest and also be an amazing experience.

Additionally, there is a growing need for people's travel experiences to be unique to them and customized, which may lead to an increase in the use of robots. Before the plan can be put into action, the travel routes shall require to be evaluated to verify that there are no obstacles along the way that could impede the movement of the robot. These obstacles could include narrow corners, staircases, or uneven floors. RPA is committed to employing cutting-edge technology such as Artificial Intelligence (AI) and machine learning in order to automate more processes and give individuals more agency ^[17]. RPA is most effectively utilized in settings that are rule-based, involve human actions in high volume, and are repetitive in nature, such as data entry. The incorporation of human discretion into the decision-making process is essential.

Biometric recognition and video analytics

The objective of identification or authentication using facial recognition technology is to measure and compare an individual's distinct traits to pre-existing templates that have been saved in a database. It functions as a supplement to Video Analytics, which performs digital analysis on vast amounts of video input and converts the results into data that may be used for decision making. In most cases, it is utilized to differentiate between objects and to recognize behaviors or activities in real time. The process of gleaning useful information from raw video data through the application of computer vision, machine learning, and artificial intelligence is referred to as video analytics ^[18]. It has a number of potential applications, including safety and surveillance, as well as marketing, entertainment, and educational purposes. For instance, hotel swissotel the Stanford of Singapore implemented self-check-in and self-check-out kiosks, the hotel completely rethought the visitor's experience. The hotel has more than 1200 rooms, long waiting time and queues in peak hours disturbed the guest as well the management (Figure 6). Therefore, to overcome this issues self-check in/check outs were implemented through facial recognition, biometric recognition and other technologies. Self-service stations are able to retrieve bookings using a booking reference number, auto-fill information for registration fields via scanning of passports, authenticate guests' identities using the passports they present, pre-authorize credit cards, and issue key cards because they are equipped with a variety of technological capable of recognizing face, optical characters etc.

Figure 6. Biometric recognition and video analytics.



Biometric recognition technology provides many advantage to the hotels in terms of guest verification at the time of self-check in/check outs or when the guest has to access rooms and other amenities. It can also be used to track movement of guest and notify them about the waiting times at restaurants, business decisions, added securities and conveniences

and to ease the routine process of housekeeping. Video analytics can be used to study and analyses the mood of the guest by their expressions and thus providing opportunities for up selling and cross selling of rooms [19].

Practical implications of the study

The hospitality industry has historically relied heavily on human labor, there are many potential ways to improve operational efficiency through the use of technology. This can assist build work settings that are more suitable for employees, and it can also help restructure occupations so that they meet the career expectations of job seekers who are younger. Hotel management has to focus on the various technical and non-technical factors are likely to affect implementation of high end technological solutions.

Chabot's and voice automated virtual assistant are the most vigilant technology which tends to answer all the queries of the furious guest. The company's website must provide an online Chabot's that may be used to receive assistance and deliver instant responses to any questions. In cases where the answer is not readily available, the hotel is prompted to perform an automatic follow-up. The guest is spared the trouble of searching several websites for the information they require.

Implementing robotic automation process can add up the cost, thus hotel management can lease the robots instead of purchasing. RPA can reduce the work of physical labor workload during the peak hours, thus allowing the staff to focus on guest engagement and adding high values to job and services. Hotels usually face multiple problems in the peak seasons. The housekeeping staff has to deliver multiple services and orders, which many a times get delayed and also consumes lots time. This type of hassles may adversely affect the customer satisfaction and experience. Thus robots can be a boon in serving the guest at right time without any delay in serving the requested orders.

To encourage consumption, one needs content that is compelling from the point of view of the consumer. To attract target audience compelling content is the need of the hour. Unique positioning in smart technologies coupled with benefits of energy efficiency, smart water usage with lower maintenance, providing cost saving and cutting down of time can benefit the overall organization goals and efficiency. Strong emphasis is needed on providing latest smart technologies which in turn will enhance the end user's lifestyles and experiences. Effective and innovative data analytic technology can be implemented to get clear and actionable insight, so that clients can price, forecast and report with speed and confidence thus optimizing business performances [20].

CONCLUSION

The global smart hospitality market was estimated at USD 10.71 billion in 2021 and is projected to grow at a CAGR of 29.79%. The smart hospitality industry is expected to increase from its 2021 valuation of USD 10.71 billion at a CAGR of 29.79%. Hotels may boost their bottom line by offering digital in-room entertainment systems to their guests. Back-end solutions and those that provide guests with a unique stay are two areas where different hotel chains have considerable leeway. Smart hospitality, for instance, offers complimentary High-Definition (HD) channels, interactive television, Internet Protocol Television (IPTV), and Wi-Fi to hotel guests. It's useful for boosting customer happiness and service quality. For instance, the front desk and housekeeping may now work in tandem thanks to the hotel management system, which also does away with paper check-in forms. Also, modern hotels have TV, light, and speech recognition sensor integration to better respond to guests' needs. These cut down on expenses and rates for guests by relieving the front desk of a lot of work. The room's temperature and humidity can be managed by the portable device. The visitor can control the temperature and the window coverings from afar.

This means that "digital hospitality" is the backbone of the smart hospitality model. In order for hotel appliances to work together, they must be networked, and here is where "smart hospitality" comes into play. It's analogous to IoT, which

enables even mundane items like household appliances or hotel equipment to exchange data and form inferences. It provides better warning and mobilization for guest safety, as well as better mobility for workers, better guest reservation options, and better storage solutions.

The majority of the technological solutions mentioned in the previous sections have already been adopted by hotels and other organizations in other countries, making it feasible to have the experience of staying in a smart hotel today. Others seem to be in their infancy in relation to the hospitality business, although they have been created and tested in other fields. Utilize the power of digital technology to help your hotel handle the issues that are already present and get ready for the trends that may emerge in the future. Start planning a comprehensive digital strategy for your hotel right away.

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