

Embracing Technological Innovation: A Review of Hi-Tech Services in Hospitality Industry

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Embracing Technological Innovation: A Review of Hi-Tech Services in Hospitality Industry

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Abstract: Tourism, dining, and travel have always benefited from technology. The pandemic has forced many companies and customers to rethink hospitality and its operations. This study reviews innovative high-tech hotel management services that promote responsible and sustainable hospitality. A fifteen-year review examined study methods, technology advances, and points of view. The findings bode well for hotel management technology and research. After a content analysis, it is found that the hotel uses cutting-edge technology to run its restaurant, lobby, concierge, guest feedback, and room services. Although cutting-edge technology has benefits, the writers find that implementing digital technologies is tough. The benefits include guest enjoyment, safety, and environmental protection. The proposed research only considered works published in journals indexed with reliable sources.

Keywords: *Technology; Innovation; Hospitality Industry; Adoption; Advancement*

1. Introduction

The travel and hospitality industry is currently undergoing quick expansion and is regarded as the fastest-growing industry worldwide, contributing significantly to economic gains and job creation. The industry of Hospitality accounts for the biggest contribution to the economy that is currently encountering noteworthy challenges. The sector under consideration has been identified as one of the rapidly expanding sectors, contributing approximately 10% to the worldwide Gross Domestic Product (GDP)¹. Innovations help in exploring strategies for enhancing revenue streams from various hospitality and tourism-related services example lodging, Food & Beverages, recreation, and amusement. The hotel industry has undergone significant changes in its operation and management due to the digital revolution². Efficiency and competitive advantage in this industry are largely attributed to the widespread adoption of digital technology. The effects of Innovative technologies on the hotel industry have been noted, given its reputation as a labour-intensive sector³. The concept of digital transformation enhances an entity by inducing substantial modifications to its attributes through the utilization of a blend of connection, computer, data, and networking technologies⁴. The present industry is utilizing cutting-edge innovative technology to broaden the scope of its domain.

In the current situation, The hospitality and tourist industry necessitates innovation owing to their dynamic

nature with constantly evolving consumer demands. Problems that the hospitality sector must solve significant challenges due to evolving consumption patterns, demographic shifts, and advancements in consumer electronics also shown in Fig. 1. Therefore, for hotels to stay on par in the future, it will be imperative that they develop innovative service concepts and methods. Furthermore, the influence of the Internet, advancements in electronic distribution channels⁵, and the growing knowledge and bargaining power of consumers will persistently affect the Hotel Industry. Recognizing the effects of digital tools on lodging efficiency is essential for hotel managers to make knowledgeable choices on the deployment of appropriate technologies. Previous research has examined What Effect Different Digital Technologies Have On Hotel Efficiency? It is also described in Fig. 1 that the innovation is impacted in various sectors of Hospitality and Tourism. These technologies include Artificial machines, social media platforms, automated customer service tools, and service automation, virtual reality, front desk technologies, Biometric technology, and mobile apps^{6,7,8,9} have all contributed to this body of literature.

The utilization of diverse technologies can assist motels in efficiently overseeing service quality, order processing, resource availability, customer rapport, and vendor rapport. This, in turn, can lead to improved Profitability, customer satisfaction, competitive advantage, resource utilization, adaptability, and novelty, as suggested by previous research studies^{10,11,12}.

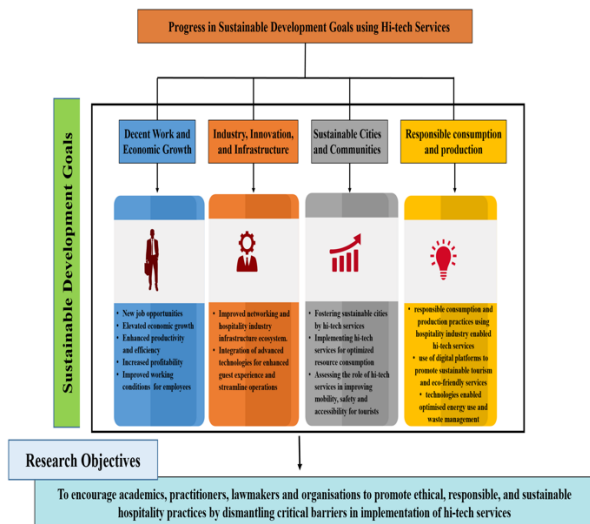


Fig. 1: An overview of the United Nations sustainable development goals addressed and the primary objective of the present study.

The present investigation employed an interdisciplinary and systematic approach to analyse various scholarly articles from the Scopus, Emerald Insight, SCI, Mendeley, and Google Scholar databases spanning the years 2010 to 2024, to achieve the stated objectives. The databases in question offer articles of superior quality that have been approved by reputable publishing authorities, acknowledged by libraries, and selected to meet the particular needs of scholars and researchers. The databases encompassed in this category are those that are frequently utilized by researchers in the realms of hospitality and travel. Our investigation has uncovered many innovative technology digital, challenges and their applications that have garnered significant attention from scholars. These technologies include smart service automation systems, and reception technologies; social media; mobile applications; AI; robotics, augmented reality, online trade, social media marketing, and data management.

The topic of innovation adoption in the area of the tourist and hospitality business has been thoroughly examined in the literature that is now in publication. Specifically, this study intends to classify and examine the many types of innovation that have been implemented in the sector. These comprise a broad spectrum of innovations, which include breakthroughs in technology, innovations focused on services, transformations inside organizations, and tactics related to marketing. Furthermore, it thoroughly investigates the profound implications of these innovations, delving deep into their potential consequences. This goes beyond simple issues of efficiency in operations and competition within the sector, embracing the various dimensions of customer service, sustainability, and regional growth.

Furthermore, our study aims to illuminate the myriad of challenges and obstacles that various stakeholders within the tourism and hospitality sector may potentially face

throughout the process of adopting new practices or technologies. This includes the examination of various challenges such as financial limitations, regulatory obstacles, and cultural opposition, which are integral to gaining a comprehensive understanding of the phenomenon. Furthermore, this analysis provides valuable insights into potential strategies that can be employed to effectively surmount these barriers. Through these dimensions, this article presents a comprehensive and intricate viewpoint on technological innovation within the realm of the tourism and hospitality sector. This contribution not only offers practical implications but also outlines a trajectory for further exploration by researchers, practitioners, and policymakers alike.

Although the listed works have made a substantial contribution, there is still a need for a thorough and up-to-date evaluation of the literature on breakthroughs in hospitality administration. Engaging in this activity will enable us to gain a more comprehensive comprehension of the most up-to-date information about technology's incorporation into the administration of hotels. Consequently, this will be useful for figuring out the advancements made in this field of study and provide insights into potential avenues for future research.

To achieve this objective, we will address the following inquiries:

- Which technologies are that are involved?
- Which subjects are covered by research?
- Which research approaches are most commonly utilized?

The emergence of innovation has attracted the interest of both professionals and scholars; nonetheless, their efforts remain disjointed. By understanding the prospective benefits of integrated hotel management owners can gain from the access to data facilitated by advanced technologies and invest facilities towards suitable technological enhancements.

2. Innovation

According to Panfiluk (2021)¹³, innovation pertains to the emergence of a novel or enhanced product or service, or a fusion of both, resulting from the application of knowledge as a foundation for originality, practicality, or worth, which has been embraced by the organization. The innovation strategies employed by service providers seem to differ significantly from those of manufacturing enterprises. The organization of services innovation exhibits a diverse range of approaches. The significance of expenditures on R&D for the achievement of innovation in manufacturing enterprises has been widely acknowledged, whereas it is comparatively less crucial for service sector firms. According to previous research, hospitality companies exhibit a lower propensity towards engaging in research and development activities¹⁴⁻¹⁸. In contrast to manufacturing companies, service companies prioritize organizational innovation over product and process innovations, as per previous research¹⁵. The

prevalent innovations observed in the hotel industry are service and marketing innovations, as reported in previous studies^{16,17)}. However, certain innovations have been disrupted by technological advancements, as noted in one study²⁰⁻²⁵⁾.

According to Westcott and Anderson (2021)⁹⁾, the hospitality industry comprises the amalgamation of the lodging and food and beverage industries. These two sectors collectively contribute a significant portion of the industry's revenue. The ability of hotels to obtain, distribute, and apply knowledge is a determining factor in their innovation potential¹⁸⁾. Social media platforms can be utilized by hotels to gain insights into their customers and comprehend their preferences and requirements²⁷⁾. There is a lot of rivalry in the hospitality industry right now. This includes businesses that provide food, lodging, recreation, and mobility. In contrast to other service sectors, the hospitality industry is characterized by competition between enterprises operating within the same geographical location as well as those with distinct objectives. The amalgamation of technology and innovation in certain nations has caused the hotel sector to undergo radical change²⁸⁻³⁰⁾.

2.1 Benefits & Challenges of Innovative Technology

The results of an innovation activity can be predicted in advance. The results of innovation initiatives and money generated by a company are interconnected³²⁻³⁵⁾. The tourist business would be far less productive and less competitive without the help of information technology. Innovators have a rosier view of the importance of entrepreneurial success criteria than those who are not creative thinkers. Back-office innovations that boost effectiveness, productivity, and portability are what we often mean when we talk about innovation. The commercial viability of a new offering is a common measure of innovation. It can be difficult for certain businesses to predict how much their inventions would boost the economy in terms of things like sales³⁴⁻³⁷⁾.

However, there are some challenges that only product inventors' innovation success is evaluated since calculating the revenue contribution of process innovations is more complicated which is described in Fig. 2. When evaluating the success of an invention, most forward-thinking hotels in the hospitality sector look at how much money they made off of it. The success of an invention in the hospitality business is often measured by its impact on sales volume^{19,40)}. Most Spanish hotel managers evaluate the success of innovations, including operational improvements, by the increase in gross operating profit and sales revenue. It has been shown, however, that sales of new and enhanced hotel items are among the lowest of any industry³⁸⁾. Recent research shows that different sorts of improvements in provider-led services have a minimal effect on revenue^{14,45)}. As a result, it appears that the hotel industry is comparatively less advanced in innovation than other industry⁴²⁻⁴⁶⁾.

Innovation is associated with better financial (market share) and non-financial (customer retention/loyalty) outcomes for hotel goals^{19, 48)}. Based on their research, Qian, J., & Law, R. (2021)²¹⁾ conclude that successful hotel innovation involves a combination of factors such as enhanced productivity, decreased costs, better decision-making, more efficiencies, better staff skills, higher work satisfaction, and higher profits.

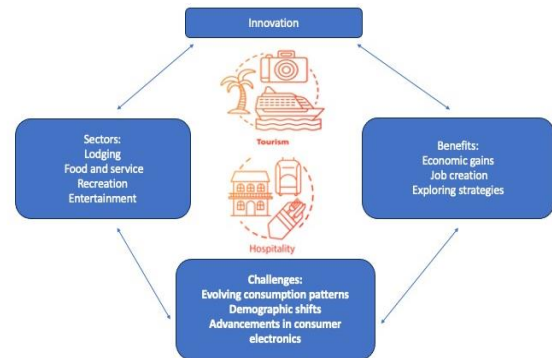


Fig.2: Benefits and Challenges in Sectors of Hospitality and Tourism

According to the available literature, hotel chains may display creative behaviours more typical of manufacturers than of other service providers. For example, Miles, I.²²⁾ notes that many service industries, such as catering, transportation, and commerce, as well as manufacturing and agriculture, employ a disproportionately large number of low-skilled people⁴⁸⁻⁵⁰⁾. As an example of a vendor-led service, hotels and restaurants are products in a larger sector. Businesses in this category have poor technological content, a low capacity for developing new goods and processes internally, and a low capacity for innovation⁵²⁻⁵⁵⁾.

As shown in Figure 2. Technology's cost-cutting and time-saving benefits in the Hospitality sector and Prioritize enhancements to service quality and customer satisfaction. Information technology has helped bridge the communication gap between individuals, groups, and businesses.

McKinsey & Company published research titled "The next big thing in customization—and how to be prepared for it" that delves into the potential benefits of utilizing machine learning and AI in personalizing client experiences in the tourism sector. According to the study, these tools can help businesses learn more about their customers' tastes so they can better cater to their needs⁵⁶⁾. The paper acknowledges, however, that there are obstacles to integrating these technologies, such as worries about data privacy and the requirement for trained individuals to run the systems⁵⁷⁻⁷⁰⁾.

Phocuswright (2018)²⁹⁾ has published yet another paper that surveys the present state of utilizing AI within the tourism industry. This one's titled "Artificial Intelligence in Travel: Where Are We Today?" Despite all the excitement, the paper stresses that there is still work to be

done before AI technology can be widely deployed. The usefulness of AI systems can be hindered, the paper explains, because, for instance, many travel companies have problems with data quality and integration^{29,65}).

2.2 Adoption and Implementation of Innovative Technology in Industry

The significance of integrating novel innovations in the Tourism and Hospitality Technology sector has grown considerably in recent times. The introduction of new Innovative High-tech services has transformed how organizations work and interact with their customers, and ultimately succeed which enhances their overall productivity⁶¹⁻⁶⁵. Several key areas have been identified where innovative technology is being adopted and implemented within the industry.

The advent reservation system and reservation systems have significantly streamlined the act of reserving a spot for travellers⁶⁷. Online travel booking systems enable users to conveniently and flexibly reserve lodging, air travel, vehicle rentals, and additional services via web-based platforms or mobile applications⁶⁶⁻⁶⁸).

Mobile applications have emerged as indispensable tools for both tourists and hospitality enterprises⁷⁰. The travel and hospitality sectors have adopted exclusive mobile apps to cater to individualized preferences, optimize check-in procedures, facilitate mobile transactions, and furnish geographically relevant amenities. The utilization of these applications has been found to increase customer engagement and optimize operational efficiency⁷⁰⁻⁷⁴).

The topic of interest is Artificial Intelligence (AI) and Chatbots. AI-based technologies, such as chatbots, are currently being employed to automate customer service and support. Chatbots can furnish immediate responses to frequently asked questions, provide tailored suggestions, and aid in the reservation procedures. The implementation of such measures has been found to increase happy customers while simultaneously reducing the workload on personnel, thereby enabling them to concentrate on more intricate duties⁷⁵⁻⁷⁹).

The Internet of Things (IoT) facilitates interconnectivity among various devices and systems, thereby establishing a network of intelligent devices. The Internet of Things (IoT) application in Industry enables the automation and regulation of diverse features of hotel rooms⁸⁶, including but not limited to lighting, temperature, and entertainment systems⁸⁷. The technology under consideration facilitates effective energy utilization, improves security measures, and offers customized guest experiences⁸¹⁻⁸⁵).

The utilization of VR and AR technology is revolutionizing how tourists perceive and interact with various travel destinations. Potential benefits of using VR technology include offering virtual tours of accommodations or attractions, and providing potential customers with immersive experiences before making a

booking²⁵). One possible outcome of implementing augmented reality technology is to improve on-site experiences through immediate transmission of info, navigation assistance, and interactive elements⁸¹⁻⁸²).

The hospitality industry engages in the collection of extensive data on customer preferences and behaviours for data analytics and personalization. The utilization of sophisticated data analytics methodologies is currently underway to scrutinize the data and derive significant findings. The data gathered is subsequently utilized to customize services and experiences, focus marketing initiatives, enhance pricing tactics, and optimize overall operational efficiency⁸⁵⁻⁸⁷). The significance of innovation in the success of hospitality organizations cannot be overstated described in Fig. 3. They may use it to make better goods, optimize their operations, minimize expenses, adapt to evolving customer preferences, boost revenue and profitability, expand their market share, and establish a unique brand identity that sets them apart from their rivals. Innovation serves as a methodical strategy for attaining a competitive edge in travel companies and hotels, particularly during periods of adversity.

The integration of automated systems in the hotel business is aimed at automating repetitive tasks. The promise of robotics lies in its utilization for a variety of tasks, such as, but not limited to room service, luggage handling, and concierge services. Automation technologies have been observed to enhance the efficiency of back-office operations, including inventory management and accounting processes⁸⁹).

As a result of the COVID-19 outbreak, the hotel industry has been quick to embrace contactless payment methods. The implementation of contactless registration and departure processes, mobile payments, and digital key systems have been found to reduce physical interactions and promote guest safety. These technologies will probably continue to maintain their popularity beyond the current pandemic⁹¹).

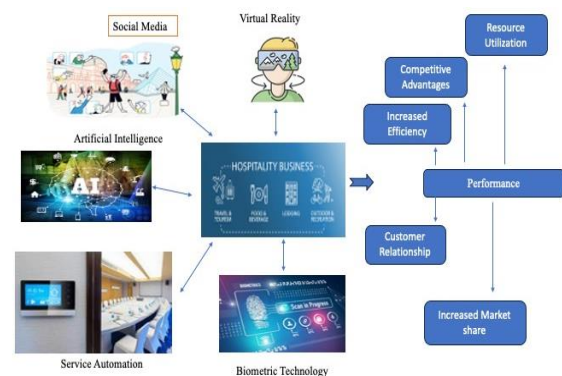


Fig. 3: A summary of the contributions of Innovative technologies

3. Data Collection

The initial objective is to define the scope of our subject matter, which involves identifying the specific works

related to Innovation in hotel management that will be analysed. Our study will primarily concentrate on analysing research papers included in peer-reviewed journals that are associated with Scopus, WoS, SCI, and Emerald Insight, and are well-regarded where hospitality and tourism are concerned. Therefore, We do not include books or conference papers which not indexed in the IEEE and Scopus databases in our search.

The systematic review strategy was employed to review the publications published from 2010 to 2024 to achieve goals. The timeframe enabled us to concentrate on developing digital innovations that align with the change in the Hospitality industry, offering significant and up-to-date insights for researchers and professionals in the hotel sector. Various nascent technological advances have been employed within the hospitality sector to improve hotels' operational efficiency. Through an exhaustive review of studies examining the application of technical advancements in the hotel business, we have identified certain technologies that are consistently emerging in the hotel business. The meanings of those technologies are presented in Table 1. The pertinent terms about Innovation, technology, High tech services, hotels, and hospitality were identified by an examination of the titles, abstracts, and key phrases among the pieces that appeared in the technological revolution in the hotel business. The terms "Artificial intelligence", "Service automation", "Virtual reality", "Augmented reality", "Smart services", "Self-services", "ICT", "Biometric", "Robot", and "Fintech" were used in conjunction with the word "Hotel" to search for articles in journals. The search was conducted with the research topic, abstract, & key phrases of Research articles.

Table 1. Innovative services and their Description.

Innovation	Description
Self-Service Technologies and Robots	Customer service that doesn't involve human agents is known as self-service technology. Machines, self-check-in/check-out infrastructure, and computerized ordering systems are only a few examples of the self-service technology used by hotels. One kind of self-service technology that can engage with hotel customers and provide them with services that are comparable to human ones is a robot ^{30,82,96} .
Artificial Intelligence	An analytical technique that aims to imitate human intelligence in machines is known as artificial intelligence (AI) ³¹ . Using AI, hotels may gain valuable knowledge from big data ^{32,93-96} .
Virtual Reality	"Virtual reality is a technology that allows users to enter a generated by computers, three-dimensional world". Customers can get a feel for the hotel with virtual reality ^{32,101-102} .

Information Systems	When we talk about computer-based systems that help with data capture, storage, management, and transmission, we're talking about information systems ³⁴ . Some examples of information systems are ERP, CRM, and KMS, which stand for enterprise resource planning and supply chain management, respectively ⁸¹ .
Smart Systems	When we talk about "the incorporation of intelligent functions that optimize and improve daily business activities," we're talking about smartness ^{35,82} .
Front Desk Technologies	Front desk technology collects data that helps personnel provide successful, customized assistance to customers in the quickest possible time ^{36,81-83} .
Mobile Apps	Applications developed specifically for mobile devices, such as smartphones and tablets, are known as "mobile apps" ³⁷ . A hotel's mobile app may do a lot of things, such as book a room, obtain basic info, be a key to your room, and even request service.
Drone Services	The term "drone" refers to tiny, unmanned aircraft that can fly itself with the help of computers and sensors mounted on board ³⁸ .
Service Automation	By "service automation," we mean the practice of executing a service's specified set of steps automatically through the use of machines. Service automation helps service providers save money while also improving their operations and administration. ^{39,58} .
Biometric Technology	Biometrics is the practice of using an individual's physiological or biological traits to automate the identification process. Major biometric methods include signature verification, voice recognition, face identification, iris imaging, hand geometry, vein trends, and recognition of fingerprints ⁴⁰ .

We used the subsequent criteria for incorporation and exclusion to choose the appropriate documents: 1) Periodical and scholarly publication, Articles must be written in the English language. 3) Articles must have a publication date that is later than 2010. The paper should focus on discussing the applications and contributions of innovative technology in the hotel business. 5) Articles published in journals categorized as each quadrant is named after a different quality: Q1, Q2, Q3, and Q4. The study restricted the selection of publications to esteemed journals to guarantee the inclusion of high-quality articles^{41,42}.

Our literature review on innovative technologies in hotel management is based on the journals in which most

prominent research by writers like Iranmanesh et al. (2022)⁴¹⁾, Gonzalez et al. (2019)⁴²⁾, Nicolau et al. (2013)⁴³⁾, Hole, Y. (2019)¹⁾, Liu, C., & Hung, K. (2020)⁷⁾ that reviewed literature on technological advancements in hospitality management served as our primary sources for compiling this journal list^{45,68)}. We searched the aforementioned journals for articles published up until 2024 that included "in any area other than the complete text" at least one each of the subsequent phrases: Innovation, Hi-tech tech, Innovative Hotel services, electronic word-of-mouth marketing, biometrics, global distribution systems, geographical information systems, global positioning systems, information technology, the net, social media platforms, website, artificial intelligence, and internet, VR.

By limiting our analysis to these journals, we were able to weed out any articles that were either editorial remarks or reviews of websites, as they did not pertain to the subjects of hospitality or hotels. After the computerized search, a manual search was conducted, with a focus on following the works cited in the bibliographies of the previously chosen papers. Because we wanted to look at the literature on Hotel Innovation and Innovative hi-tech services adopted in hospitality management throughout time, we didn't restrict our search by any particular date. Our final tally was 87 papers, all of which underwent full-text analysis.

4. Result

The analysis of the results will begin by specifying the period and the publications which were subject to the review. Following this, we will describe the viewpoints used, which may be a consumer's, the property's, or both points of view, and we will determine if the techniques that were used were factual or conceptual. Additionally, we will highlight The statistical approaches that are most often used in the articles that are under review. Our research will focus on the subjects addressed in the publications and the technology examined in them.

4.1 Period analysed

We have conducted a review of 87 papers that were published over 15 years. To make easier the analysis of time evolution within these articles, the time frame has been categorized into three phases: Firstly, we analysed the works published before 2014, Secondly, Stage two includes all publications made public between 2015 and 2029. Lastly, the third stage equates to the published time frame between 2021 and 2024. The number of published articles on Hotel and Tourism Innovation has consistently and substantially increased during the period being studied.

4.2 Research methods

The categorization of articles based on the research

methodology employed relied mostly on the paper authored by Strasser, A., & Westner, M. (2015)⁴⁵⁾, which, in turn, drew upon the research conducted by Gonzalez (2020)⁴⁶⁾ to classify empirical investigations.

Instead of a structured and thorough examination of reality, these works depend on ideas and theoretical frameworks. This indicates that as the research field has developed over time, scholars have shifted their attention towards directly witnessing reality instead of relying solely on theoretical speculation from an external standpoint.

Regarding the empirical works, we categorized them into many types: field investigations, analysis of material, tests, case research, research reviews, a mix of example and field research, and specialist groups. We find that the Field investigation, which makes up the biggest share of the studied publications, mostly uses a quantitative approach to obtain the necessary data for their research. This is generally done through the use of questionnaires. In these publications, the researcher collects information concerning uncontrolled settings, preventing any potential modification to the target of inquiry. In every period that was looked at, this approach was superior to the others.

4.3 Statistical methods

The article, like Leung et al. (2015)⁴⁴⁾, investigates the statistical approaches employed in the studies analyzed, as shown in Table II. The designation of each work was based on the most complex technique it uses. This was done while keeping in mind that descriptive statistics involve relatively simple techniques ((like crosstabulation, ANOVA, ANCOVA, Chi-square, and means difference tests) and that multivariate analyses (like factor analysis, regression, discriminant analysis, clustering, or multidimensional scaling) need more work. Lastly, even though they are multivariate, path (or pattern) analysis and structural equation model (SEM) analyses are taken into distinct consideration because of their increasing significance and usage^{42,45)}.

A qualitative evaluation was conducted to track the trend of prior investigations. According to the study, the spread of publications by years of publishing indicates that there has been a rapid and recent increase in the hotel industry's digital revolution with curiosity. To gain a better comprehension of the patterns seen in past research, We analysed the distribution of papers according to the specific technologies that were researched, categorized by year. While certain technologies like AI, social networking sites, technology for self-service, and automated machines have garnered significant scholarly interest, Virtual reality, e-business, smart systems, and front desk advances are among additional technologies

Table 2: An overview of recent literature showcasing the recent advancement in the field of hi-tech based hospitality sector

Authors & dates	Objectives	outcome	Research gap	Technology used
Hossain, M. R. et al.,(2022) ¹⁰⁴	To assess the Application and Adoption of technology in tourism and hospitality	Fourth industrial revolution technologies and ubiquitous usage have been rapidly infiltrating every aspect of the tourism industry.	There is need to find how technology alter the tourists' travel experience and tourism service providers	Virtual Reality, Social media, IOT
Petrenko, A., Ekinil, G., & Provotorina, V. (2024) ¹⁰⁵	analyse the specifics of using innovative technologies and study the innovative activities of hotels	Hotels are constantly improving and it helps to improve the quality of services provided and improve service processes	There is need to study the implementation and the formation of an innovation strategy	Artificial intelligence, AR, and digital connectivity.
Hsu, M. J.,(2022) ¹⁰⁶	Best practices and potentials around the application of artificial intelligence of things (AIoT)	smart hotel framework through hospitality-software-as-a-service (HaaS) is developed	Need to work on the business strategy to implement the technology	AI, blockchain technology, Extended reality(XR)
Molina-Castillo, F. J.,(2023) ¹⁰⁷	the innovative behaviour of large Spanish companies by comparing hotel companies	Innovation affects performance through sales, product, process, and other effects.	innovation and technology are integrated into the hospitality sector	Service Innovation
Kanade, T. M. et al.,(2023) ¹⁰⁸	implementation of recently upgraded technology is useful from the view of guest services provided to them	updated technology improves guest services. Post-pandemic tourism and hospitality (T&H) industries use current technologies	How clubbing AI with personalised service give the better experience	Artificial Intelligence and Machine learning
Meo, M. S., (2022) ¹⁰⁹	To assess how innovative technology affects tourism	Asian regions, primarily South Asian ones, are adopting new tourism technology, but their main difficulty is funding. Digitalisation is particularly beneficial to tourism, especially hotels.	Challenges of Tourism in the South Asian Region	AI, VR, Mobile technology
Misichia, C. V. et al.,(2022) ¹¹⁰	examine chatbots in the customer service context, pointing out to what extent they have an influence on service quality	chatbots relevant to customer service quality, Increase in service performance and match customer expectations, thus improving service quality.	explore the applications and/or sectors in which chatbots generate greater value	Chatbots
Rane, N. et al., (2023) ¹¹¹	synergistic potential of advanced technologies	Innovation and ethics can make tourism a powerful force for environmental stewardship, cultural preservation and leads to sustainability	There is need to study on the integration challenges for adoption of technology	AI, VR, AR, Blockchain

that haven't gotten sufficient recognition. Given the significance of artificial intelligence (AI), social networking sites, self-service technology, and robotics, it was anticipated that there would be a heightened emphasis on these advances in the present competitive corporate landscape. Smart structures, online businesses, mixed reality, and customer service technologies are essential systems that have a significant impact on resources and operation oversight and making decisions⁷⁷⁻⁸³.

Almost all of the research on hotel types and sizes failed to account for the fact that various client types possess distinct desires, necessities, and demands depending on

the kind of hotel they stay at. As a result, big, modest, budget, and luxurious lodging can all use digital technologies in different ways. For example, intelligent machines can improve guests' experiences with modest and smaller hotels, but they could ruin it for high-end establishments where customers pay a pretty penny for a stay and anticipate personal attention from the employees^{48,49}.

A significant proportion of investigations have been quantitative, and subjective and a combination of methods studies are noticeably lacking. In addition, secondary data from various studies has been utilized, and data acquired

from personnel is scarce. The majority of data has been obtained from managers and consumers.

4.4 Ethical Implications of Hi-Tech Services in the Hospitality Industry

The incorporation of new technologies in the hospitality sector, whilst providing several advantages, also presents considerable ethical dilemmas. This research can expand its scope by exploring the below-listed ethical concerns.

Data Privacy and Security:

The proliferation of technology in the hospitality sector necessitates the accumulation of extensive personal data from patrons. This elicits apprehensions regarding data privacy and security. Hotels must guarantee the ethical and responsible collection and storage of data, adhering to applicable data protection rules. The dissemination of guest data to third-party service providers or for marketing objectives may present ethical challenges. Hotels must secure explicit agreement from visitors and establish stringent steps to safeguard their data against illegal access.

Employment Displacement and Automation:

The automation of tasks via technology may result in employment loss within the hospitality sector. This generates apprehensions regarding the possibility of unemployment and its effect on workers' livelihoods. The shift towards a technology-centric industry may necessitate individuals to develop new competencies. Hotels must allocate resources for training and development programs to guarantee their personnel is prepared to address the evolving landscape's expectations. Algorithmic Bias and Discrimination:

Equity:

Algorithms employed in hospitality technology, including those for pricing or tailored suggestions, may reinforce prejudices inherent in the data on which they are trained. This may result in discriminatory practices towards specific groups of individuals. Hotels must disclose the algorithms they employ and guarantee their impartiality and equity. Systematic audits and assessments of algorithms can facilitate the identification and rectification of any biases.

Accessibility and Inclusion:

The growing dependence on technology can intensify the digital divide, marginalizing persons lacking access to or proficiency with technology. Hotels must endeavour to ensure their services are accessible to all guests, irrespective of their technological aptitude. By examining these ethical issues, the study may offer a more thorough and critical evaluation of the effects of high-tech services in the hospitality sector. It can also underscore the significance of responsible and ethical technology

adoption to guarantee that the advantages of innovation are actualized while mitigating possible detriments.

5. Theoretical and managerial implications of the study

5.1 Theoretical Implications

Our research has important ramifications for the academic world. Research has demonstrated that the hospitality sector exhibits distinctive innovative behaviour concerning having a focus on innovation processes, outputs, and results, with a specific emphasis on research and development.

Our research results provide light on the nature of innovation within the service industry, specifically highlighting a distinct behaviour observed in conventional sectors such as hospitality. Our study may provide valuable insights for fellow researchers regarding the important facts of innovation in hospitality firms. This study is significant in the already published works concentrating on the comparison when comparing in-house R&D to that of forms of innovation activities. Additionally, we have formulated objectives regarding the variables of innovation in Hospitality and tourism.

5.2 Managerial Implications

The hospitality industry exhibits distinct characteristics that differentiate it from both the manufacturing sector and other service industries. Innovation through alternative means is a common practice among firms, particularly changes for those working in the hotel and tourist sector for managers to grasp that they need to identify the most relevant and effective technologies for their businesses and implement them effectively to stay competitive and attract more customers. This variance can be observed in several areas, including innovation activities, outcomes, and the resulting impact on performance. The results of our study can provide valuable useful recommendations for hotel managers on the lookout to enhance their innovation strategies. Our research indicates that there is a growing trend towards technological advancements in hospitality services, thus suggesting that investing in IT innovation may be a prudent course of action. Furthermore, our findings suggest that hospitality managers should prioritize innovation due to its significant revenue-generating potential within the industry.

Conclusion:

This review successfully performed an extensive analysis of the cutting-edge technological services implemented in the hotel sector by taking into account the research publications of past fifteen years and provides a significant insights into the technological breakthroughs in reshaping the hotel management sector. The primary emphasis that can be drawn from the proposed research

are listed below:

(1) Innovative Hi-tech services are becoming significant in the hotel business encompassing artificial intelligence (AI), service automation, virtual and augmented reality, Internet of Things (IoT), mobile applications, and biometric systems. These technologies empower hotels to augment guest experiences, optimize operational efficiency, and secure a competitive advantage. The study has investigated how innovations might enhance profitability, customer satisfaction, resource efficiency, and overall business performance.

(2) The review highlights an increasing trend in technology developments within hospitality services, implying that investment in hi-tech services and other technological innovations could be a judicious approach for hotel managers. The results highlight the revenue-generating capacity of innovation in the industry.4. Nevertheless, the adoption of digital technologies poses considerable obstacles, including data privacy issues, job displacement resulting from automation, and the necessity for specialized skills. Hotels must adeptly address these ethical problems to guarantee responsible and inclusive technology implementation.

(3) The study emphasises the unique attributes of the hospitality industry that set it apart from the industrial sector and other service industries. Innovation in the hospitality industry frequently entails various approaches, including modifications in services and organizational procedures, rather than exclusively concentrating on research and development. This thorough assessment offers significant insights for researchers, practitioners, and policymakers concerning the technology advancements reshaping the hotel business. The results highlight the necessity of remaining knowledgeable about industry trends and adopting innovative technologies to sustain a competitive advantage in the swiftly changing hospitality sector.

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