



# INNOVATION DIFFUSION AND ASSIMILATION OF SMART HOTEL TECHNOLOGIES

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This investigation seeks insight into the widespread adoption of smartness in the hospitality sector as well as the implementation of Smart technologies into hotel business units. 36 five-star luxury hotels were contacted for an in-depth study as part of a qualitative investigation using an inductive research approach. Inductive data analysis was used to determine technological, organizational, and environmental trends and provide potential directions for additional research. The investigation revealed critical insights into how to conquer impediments to the globalization of smartness and merge innovative technologies into modern hotel organizational frameworks and operations. The study recommended basic parameters for implementing smart technologies in hotels.

**Keywords:** *Smart Technologies, Investigation, Organization, Innovation, Diffusion, Assimilation.*



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## 1. INTRODUCTION

The adoption of various smart technologies in hotels in order to enhance the guest experience, streamline operations, and save costs is becoming increasingly common in the hospitality industry. The following discussion is regarding a few samples of technological innovation that can often be found in hotels:

The hotel sector has a dynamic, adaptable, and innovative structure as well as the fact that it is one of the concerns that attract attention, the usage of smart technology is becoming more and more crucial to the tourism enterprises operating in this area. One of the fundamental components of the travel industry is

lodging facilities, which use technology in an analyzing area including reception, reservations, guest interactions, and customized average services. The primary technologies utilized in hotel enterprises nowadays are central reservation systems and hotel automation systems used in the operation and management of all departments of the hotel industry. However, there is also a growing trend in the usage of smart technology in the hotel industry, such as mobile applications. Mobile check-in and check-out services are offered at many hotels, which could assist guests to save time while enjoying a more seamless experience. Smart room controls: Hotels can give customers the capacity to regulate the lighting, temperature, and

other amenities of their rooms using voice commands or Smartphone apps.

**Personalized recommendations:** By analyzing guest details and preferences, hotels have the capacity to make customized recommendations for events, restaurant choices, and other attractions near the hotel. Hotels may use interactive displays to remind guests about forthcoming activities, services that are available, and special offers.

**Keyless entry:** Some hotels have introduced keyless entrance systems that let guests access their rooms using their mobile devices as keys.

**Robot assistants:** There are a few hotels trying out robot employees that can deliver service to rooms, provide recommendations, and assist guests checking in and out. Voice-activated staff members like Amazon Echo or Google Home can assist guests with anything from placing an order for room service to delivering recommendations for the area. By analyzing guest data and preferences, hotels can provide personalized recommendations.

**Smart energy management:** To track and monitor the consumption of energy, hotels can use technology, which may reduce costs and enhance sustainably. In general, such as smart technologies are changing the hospitality industry by providing guests with new levels of comfort and customization and aiding hotels in enhancing efficiency and minimizing expenditures. The way customers are served at restaurants and hotels is evolving as a result of smart technologies, which render it easier, convenient, and customized. Following are a number of smart technologies utilized in restaurant and room service customer care:

**Mobile ordering:** Customers can use their Smartphone to order food and drinks from a restaurant menu. This can save time and reduce the need for human interaction.

**Self-ordering kiosks:** Self-ordering kiosks allow customers to place orders and pay for them without the need for a server. This can speed up the ordering process and reduce errors.

**Tabletop tablets:** Tabletop tablets can be used to place orders, request service, and pay for meals. They can also provide entertainment, such as games or news.

**Smart menus:** Smart menus can be customized based on customer preferences and dietary restrictions. They can also provide information about the ingredients, nutritional value, and origin of the dishes.

**Mobile payments:** Customers can place food and drink orders from a restaurant's menu via their Smartphone. Time will be saved, and less contact with people may be required.

**Self-ordering kiosks:** such devices allow guests to place orders and make payments without any servers present. This may speed up the ordering process and cut down on mistakes.

**Tabletop tablets:** Guests can order food, make service requests, and send payments using tabletop tablets. Additionally, they can offer entertainment in the form of games or news.

**Smart menus:** Depending on customer tastes and dietary requirements, smart menus can be changed. They may also provide details about the food's ingredients, calories, and place of origin.

**Automation of room service:** Hotels can automate room service utilizing smart technology, enabling guests to place orders via their Smartphone or in-room iPods.

**RFID-enabled trays:** By monitoring the delivery of hotel room service orders, RFID-enabled platters can guarantee that the food is served on time and at the proper temperature.

**Voice assistants:** Hotels can equip guests with voice-activated assistants like the Amazon Echo or Google Home, which can assist with anything from placing a room service order to giving travel advice. Overall, smart technology is improving the convenience, individualized, and effectiveness of room service and restaurant customer care. Businesses can improve customer satisfaction and operational efficiency by automating repetitive operations and offering easy access to information.

## 2. DEFINITION OF DIFFUSION

Diffusion is the method by which the members of a social system gradually learn about innovation through certain routes over time.

## 3. TYPICAL DIFFUSION PATTERN

The Diffusion Pattern is an "S-shaped" cumulative adoption curve resulting from a gradual start among early adopters, a "take-off" as a growing community of adopters created and the benefits of peer influence emerge, and there is a leveling-off once the pool of possible adopters is exhausted.

## 4. INNOVATION CHARACTERISTICS

Innovations have particular qualities (relative advantage, compatibility, complexity, trialability, and observability), which, as viewed by adopters, affect the final adoption rate and pattern. Diffusion of Innovation (DOI) theory provides a broad perspective of the technological diffusion phenomenon and can offer good explanations about how new innovations are adopted by firms [Martins et al., \(2016\)](#). DOI theory contends that new tangible products and services are more likely to be adopted when they are perceived as consistent with existing systems, procedures, and values of the potential

adopting organizations. [Awa et al. \(2016\)](#) signified that the implementation of new technologies is influenced by certain managerial factors that are internal and external to the organization. A key DOI enabler is technical compatibility, which is an innovation's compatibility with the current system in place, including hardware and software applications. Therefore, technical compatibility can offer organizational benefits by enabling firms to easily integrate new technologies, especially based on AI with existing technologies or systems. [MacVaugh and Schiavone \(2010\)](#) have also indicated that network externalities facilitate the diffusion of new technology at the industry/market level and are critical in the network industries, including tourism and hospitality [Kimbu and Ngoasong, \(2013\)](#). [As Lai \(2015\)](#) postulated, diffusion of an innovation is achievable in the hospitality industry if

- Specific complementary technological infrastructures are available, and
- Work is properly driven by certain degrees of compatibility, complementarity, and standards.

Another critical and intangible factor that can determine the extent to which innovative managerial practices and transformations may be accepted and diffused is an organization's corporate culture. Trust and emotional engagement among individuals internally, as well as throughout the wider business environment, are essential behavioural components to support the transformation of the organization via innovations sad to [Kim and Koo, \(2017\)](#). [Kandampully et al., \(2016\)](#) found that the combination of human resources with innovation can create a hybrid organization that may provide a constructive corporate climate and culture to foster innovation and encourage the formation of smart networks. [Chan et al., \(2018\)](#) found that the most influential individuals in the hierarchy of a hotel play a key role in advocating for or against the adoption of any new strategies. Managers who hold a positive perception of new technologies are likely to encourage adoption and facilitate the allocation of resources financial or otherwise to assimilation ([Ezzaouia and Bulchand-Gidumal, 2020](#)).

In recent years, the hotel industry has had access to an ever-expanding range of technologies for efficient management operations, interactions with guests, and promotional services. In line with this, the important adoption of smart and green hotel technologies for enhancing corporate image and facilitating support from local communities by demonstrating a commitment to action that contributes to the environmental and social well-being of the community ([Mombeuil, 2018](#)). However, the extent to which smart hotel technologies are accepted

and diffused does not depend solely on their relative benefits, but also the perception of involving a low-risk and low-cost implementation. Considering the diffusion of smart hotel technologies, the technology-organization-environment framework seems to offer a robust lens that encapsulates multiple factors that may affect the adoption of technology and the probability of its occurrence. According to this framework, the way and extent that an organization adopts and assimilates technological innovations is likely to be influenced by the technological, organizational, and environmental contexts. In this line, [Lin and Lin \(2008\)](#) concluded that identifying the factors relating to these three contexts is key to supporting digital integration and diffusion of new technologies. Furthermore, [Pateli et al. \(2020\)](#) examined the interrelation between the diffusion of innovation theory and the technology-organization-environment framework and found that the level of innovativeness is a prime driver for the hospitality sector. This finding is important for both the hospitality management literature as well as for the organizational innovation adoption field of inquiry as found by [Anning-Dorson and Nyamekye, \(2020\)](#).

Focused, targeted decisions and actions can lead to substantial improvement in the diffusion and assimilation of smart technologies in distinct organizational structures ([Cai et al.,2019](#)). Thus, customized technology solutions are an important asset of 'smartness' [Zhang et al., \(2019\)](#). As smartness is based on a combination of state-of-art digital technologies to serve distinct business settings and organizational needs, the technology-organization-environment framework can serve as the proper background for the configuration of selected innovative technological components into specific systems. Since its prominent emergence a few decades ago, configurationally technology has been developed to meet specific organizational needs ([Fleck, 1994](#)). Configurationally usage of digital technologies identified two essential elements: the collection of necessary tools and a stable model of interactions amongst the actors engaged with the digital technology within an organization ([Verstegen et al., 2019](#)).

Configuration technologies have a significant positive impact on long-term customer and hoteliers relationships since these technologies offer a plethora of services that over an extended period of time remain closely linked together in the organizations and are indispensable in meeting guests' smart service level expectations ([Wang et al., 2016](#)). Organizational adaptability is an important parameter regarding smart hotelling success as it represents the level of a hotel's flexibility to transform its structure and processes efficiently and effectively, to ultimately achieve its goals in the current dynamic business environment. Previous research has shown that high

organizational adaptability can easier indicate possible problems in the structure of a complex system. As [Schneider and Somers \(2006\)](#) postulated, complex systems cannot maintain their behaviors, because small changes can result in systems disruption.

Accordingly, when introducing pioneering technologies in an organization it is important to explore whether its structure can be adaptive to the contemporary system parameters and needs, and furthermore, what would be required to reach a well-established organizational adaptation to the new settings. In this vein, interviewees' responses indicate a recognition of the importance of implementing internal marketing and commercial marketing research programs to support the diffusion and assimilation of smart apps in the hotel systems and advance stakeholders' training on identifying and implementing smart configurable applications. This too follows the organizational aspect of the technology-organization-environment framework. The following are reflective comments by interviewees: 'We conduct extensive market research to find the best solution that would match smart apps with our marketing objectives'. (P15). 'We overcome any problems with adaptation by spreading awareness internally and explaining to our staff the benefits of hotel cultural transformation to support the technological one. Communication and training are the keys to technological adaptation. This way one makes the smart system easy to use and also fast, as people want things to respond to their needs instantly.' (P9). 'Put work on developing technological solutions accordingly, and then train our staff on utilizing them, as well as being able to educate guests on how to use the new solutions' (P20).

## 5. ORGANIZATIONAL RESOURCE EFFECTIVENESS

Enterprise resource planning has been acknowledged in the research literature as a requirement that facilitates the adoption of innovations and achieves organizational resource effectiveness (Wang et al., 2016). According to Buhalis and Leung (2018), smart hospitality would enable hotel administrations to manage better employee workloads which would contribute to increasing personnel satisfaction and the effectiveness of processes.

The interviewees took it one step further by expressing their consideration of smart technologies' performance concerning the costs of installment and maintenance: 'Technology is expensive and introducing new technologies frequently can be a problem, especially if hotel growth rates run low. The use of smart technologies can greatly contribute to service improvement, but this is also costly and, thus, it has to be taken under careful consideration' (P27).

'I believe that the available smart applications and furnishing of rooms with smart fridges and smart bathrooms, smart TVs, and other

smart devices can be very costly, so these may be offered at elite and luxury suites first, before providing them in other room types' (P16). 'Company needs a lot of cash to fund the change. Guests will benefit from the change at a considerable price increase to balance initial investment and launch costs' (P37). The following suggestion was made by a respondent for improving their hotel's smart resource effectiveness in the near future: 'Smart devices placed in every room and wearables that can operate everything, without requiring guests to move to reach services, could reduce the cost of switch and system errors.' (P32). Knowledge accumulation: Experience and knowledge accumulation were proposed by interviewees as an important second-order theme that functions as a pillar of smart hotel sustained learning.

The relationship between STAs and perceived destination image clearly exists. The formation of a destination image can be influenced by travel information (such as local attractions, outdoor and cultural attractions, and price) on websites [Jeong, et al. \(2012\)](#). [Zheng and Zhang \(2015\)](#) found that tourists primarily use STAs to look for entertainment options and real-time queuing information. Improving, promoting, and adjusting the content of an online information platform is necessary to promote smart tourist destinations. The effect of an advanced technological infrastructure on tourists' behavior is examined by [Da Costa Liberato et al. \(2018\)](#). These technological infrastructures include ICT infrastructure, wearable technology, mobile devices, virtual reality, technological development, services based on user locations, and recommendation systems. Tourists have also addressed the importance of Internet access as a factor impacting their intention to return to a destination. [Kim, et al. \(2017\)](#) investigated the effects of tourism information quality in social media on destination image. Relevance (relevance of information to travel and intention to use) is a key factor associated with cognitive and affective destination image. Completeness (accurate and detailed information) and webpage design (attractive to users) are associated with cognitive factors and added value (useful and beneficial to the users) and interestingness (information is perceived to be interesting) influence affective destination image. [Xia et al. \(2018\)](#) examined the effectiveness of the DMO's website based on navigation, content, and accessibility via a Smartphone application. The results showed that website effectiveness can positively enhance perceived usefulness, ease of use, online experience, and destination image.

## 6. PRACTICAL IMPLICATIONS

The study offers some crucial takeaways for practitioners. By making sure that their company is up to speed with organizational adoption of smart

hoteling technology, hotel managers can take advantage of the findings from this study. More significantly, hotel managers are better positioned to confront and overcome these hurdles in order to achieve competitive advantages by being informed upfront of the anticipated obstacles to the deployment and dissemination of smart hoteling technology. In order to improve the effectiveness of smart technology integration, hotel managers can use the extracted aggregate dimensions. They provide actionable advice on how to build innovative smart systems that best meet the needs of associated stakeholders and those of other people, such as customers, suppliers, and the local community. The actions hotel managers can implement for configurationally innovation to create smart systems that best fulfill the demands of this astute transformative business viewpoint would help the network of stakeholder's function effectively as a single resilient entity and, of course, would also best serve each stakeholder's specific interests and strategic business and service objectives. Hotel operators can gather as much information from guests as they can and provide third-party smart interactions. They could provide better services and more distinctive, memorable experiences if they were done so discretely and with respect for privacy. Work automation can help hotels lower their labor expenses and endure erratic periods, such as the effects of COVID-19 currently being felt. Finally, new training techniques and strategies made possible by sophisticated hotel technologies can guarantee a constantly prepared and highly competent workforce that can concentrate on the goals of their establishment by providing greater services to visitors and higher employee well-being. They might provide more distinctive, memorable experiences together with better services.

## 7. LIMITATIONS AND RECOMMENDATIONS FOR MORE STUDY

Despite the importance of this study, it has limitations, particularly in the utilization of in-depth interviews that are typical of any qualitative research. In other words, despite being rich and detailed, in-depth insights should not be applied generally. Additionally, these observations don't apply to hotel managers and HR professionals interviewed outside of Chennai City. Future research is encouraged to employ a wider variety of qualitative techniques (such as focus groups, case studies, or mixed-methods approaches) in order to better understand the organizational dynamics of smart hotelling and the organizational obstacles to the adoption and spread of these technologies. Such a qualitative study could be carried out in other tourism-related industries as well, and the results should be compared. The reliability and validity of the parameters for the diffusion and assimilation of smart hotelling according to the framework provided

in this study are recommended to be empirically tested in future studies.

## 8. SCOPE OF THE STUDY

Smart technology helps organizations by making it simple for businesses to integrate new technology with existing systems or technologies. Internally and across the entire business environment, trust and emotional engagement must exist. The merger of human resources with innovation can help organizations foster a culture and environment that will foster the development of smart technology more quickly. It improves how individuals and organizations view new smart technologies in the hospitality industry. More digital means of controlling, organizing, and promoting changes in various organizational processes are examples of technological innovation.

## 9. CONCLUSION

This study looks at the expected future developments in smart technologies in the hospitality sector. The hotel business is one of the ones that use information communication technology and the internet the most due to its innovative, nimble, and quick reaction to changes. When it comes to hotel operations that aim to go above and beyond the needs and expectations of the guests, intelligent tourism technologies can be seen as a crucial strategic tool. Businesses that wish to gain an advantage by keeping their presence in the highly competitive climate of the global hospitality industry must adapt these technologies to their activities.

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