Smart Hospitality: Leveraging Technological Advances to enhance Customer Satisfaction.

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ORIGINAL RESEARCH

Abstract— The advancement of technology has enhanced the evolvement of hospitality industry coupled with the wide acceptance and application of Artificial Intelligence and related technologies like Internet of Things (IoT) and Blockchain technologies. This constant evolvement of this industry is driven by continuous and improved customer's expectation for more personalized, effective and secure services that can be achieved through the integration of technological advancement to achieve a transformed traditional hospitality approach. Artificial Intelligence offers a versatile and advance solutions and opportunities to provide improved and more effective customers experience. This study explored various application areas of Artificial Intelligence (AI), smart and advanced technologies in hospitality management showcasing the improvement, transformation, security and modification these technologies can bring to hospitality industry. Some of the application areas explored in this study are development of chatboot and virtual assistant to enhance customers' accessibility to different services, development of different predictive models to enhance management's decision making and understands customers' reviews and sentiment analysis, other applications like predictive maintenance of equipment failure through analysis of sensors' data for improved service delivery among others were explored. This study shows that, there are a lot of advancement that hospitality industry can enjoy from to simplify and secure service delivery in hospitality industry which would in turn lead to revenue growth, and the challenges facing its adoption can be solved

Keywords— Technological advancement, hospitality, customer satisfaction, Opportunities.

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1.0 INTRODUCTION

The hospitality sector is continuously evolving over the decade with the technological advancement which is constantly driven by the sector' major focus of providing exceptional customer's experience which foster and enhance their loyalty, increase revenue and establish a continuous competitive edge. With the increasing customers expectation, there is need to provide innovative solution to enhance service delivery has become imperative. Application of different smart technologies to enhance good delivery of services and improve customer's experience in hospitality system has increased with increasing adoption of smart phones and other technology for improved customers' experience (Si-Tou, 2024).

The increasing advancement in technology have brought diverse development and transformation to different aspect of hospitality and tourism, therefore pave way for

more opportunities and novel approaches to create better service delivery to customers (Neuhofer *et al.,* 2015)

This shows that the adoption of technology to various sector for rapid developmental result is imperative and the rapid growth experience by technology and proven impact of the growth and development of sectors that employ technological advancement showed that, tourism and hospitality should also explore this incorporation for betterment and advancement.

As the revolution experienced in the digital economy continue to modify our culture, mode of life, travel and work, the hospitality sector is poised to gain from this technological advancement. From robotics to internet-of-things (IoT), business intelligence, speech recognition and automation, various technological advancement and innovation that hospitality can explore are numerous which would in turn transform customers' hospitality experience, elevate their satisfaction and redefine the service excellence experience by them. Moreover, as the world is been flooded with different technologies to improved mode of living and people travelers inclusive have become tech-savy, their expectation for seamless,

easier, personalized and memorable experience has drastically increased. Owing to this, hospitality stakeholders must seize the opportunities provided by smart technology to evolve and adapt to this changing customers' expectations. The vase amount of data present in hospitality industry is enough to make impactful decision using different data analytics techniques provided by the disruptive technology of machine learning approach (Cherenkov *et al.,* 2024).

Existing studies has focused mostly on tourism and impact and application of different technology for improved customers' experience most especially the use of Virtual reality (VR) and augmented reality (AR) technologies in tourism omitting the customers' experience and satisfaction in hospitality. Various studies have explored different applications of machine learning in hospitality management like forecasting of hotel room (Hu and Yan, 2022; Viverit *et al.*, 2023), prediction of food consumption (Zingg et al., 2021) and using chatbots for personalized customers' experience among others. All these studies focus on specific use cases representing the individual areas of application of different technological approach not providing a generic and comprehensive overview of how technological advancement can be employed to improve customers' satisfaction. Owing to this, this study bridge the gap by conducting a comprehensive overview and investigation into the application of technology and Artificial Intelligence to hospitality industry.

This study explored various ways in which this technological advancement was leveraged to enhance customer satisfaction ranging from personalized recommendation, and automation to predictive maintenance and customers' sentimental analysis and review analysis using Natural language processing.

2.0 TECHNOLOGICAL ADVANCEMENT AND SMART TECHNOLOGY IN HOSPITALITY

Technological advancement in the hospitality industry refers to the integration of different innovative tools, systems and processes to enhance customer's experience and improve the efficiency of the operational service which would help in driving the growth of the business. These advancements often involve the adoption of disruptive technologies or creatively apply the existing ones to address specific solution, tackle impeding challenges and pave ways for better opportunities within the hospitality sector.

Moreover, smart technology is the integration of Internet-of-Things (IoT) devices and artificial intelligence to create intelligent and interconnected system that gives a responsive output based on the detected customer input. Smart technology is been used to improve operationally experience of customers and improve business growth to enhance revenue and create more job opportunities.

3.0 APPLICATION AREAS OF TECHNOLOGICAL ADVANCEMENT IN HOSPITALITY INDUSTRY.

The integration of different innovative tool and approach to enable improved customer's experience can be employed in different area like Information Technology (IT), Mobile Technology, Internet-of-Things (IoT), Virtual and Augmented Reality (VR/AR) and Artificial Intelligence.

i. *Information Technology*: Advanced technology can be employed through the integration of different IT tools like Property Management Systems (PMS), this would help in the management of different operations in the hospitality industry like reservation, accounting and inventory management. This would enable seamless operation and improve the customer's experience through the application of software solutions. Moreover, room bookings and reservation can also be done through centralized reservation systems which would enable hospitality stakeholders to develop different IT solution to enhance reservation and booking of hotel rooms and food. Customer relationship management (CRM) solution could be developed as well to help in capturing customers' preferences, feedback and guest interactions to provide personalized services.

ii. *Mobile Technology:* Software development paradigm with the entrance of smart phones into the telecommunication market coupled with the customers' usage of different mobile applications have open the customers to usage of mobile devices (Tan *et al.* 2017). Hotels management in the Nigeria market should look into the development of comprehensive apps to cater for guest convenient services such as online checking, room service order

and mobile wallet to making payment of their hotel services to be seamless and more secure.

iii. *Virtual and Augmented Reality (VR/AR):* This can be used by hotel stakeholders to give guest immersive virtual tours of the hotel properties allowing them to explore different amenities and status of the hotel and restaurant before booking. This would help guest to have glance of the hotel in the virtual environment before place the booking. This would also put the management in check as they wouldn't want their hotel's black side to be seen by prospective customers. VR/AR can also be used to increase and improve customers' experience as they can create a virtual museum tour or gaming simulation the guests can explore while there are in the comfort of the hotel. Employing this technology would increase customer's experience, improve satisfaction and boost growth and revenue (Chung *et al.* 2017).

4.0 APPLICATION AREAS OF SMART TECHNOLOGIES IN HOSPITALITY INDUSTRY

Smart technology was explained earlier as the integration of different IOT devices and Artificial intelligence to the hospitality sector to transform guest experience. There are different smart technologies that could be incorporated into this industry to serve different purpose and generally transform customers' experience and attain better satisfaction from the hospitality services.

Some of the key applications of smart technologies in hospitality are:

i. *Smart Rooms:* Customers are more concerned about stress free services which would enable them to do various activities in their rooms in the comfort of their bed. This might seem impossible, however, the installation of IoT-based devices can help to control lighting, room temperature, curtains and other in-room amenities that would allow guest to enjoy personalized room services. Moreover, voice activated assistant with the assistance of AI would further enhance convenience as this feature would allow guests to control these aforementioned features using simple voice command and everything would be done without moving an inch or raising a finger (Femenia-Serra *et al.,* 2019).

ii. *Asset Tracking:* the problem of Hotel amenities lifting like the bedspread, towel, duvet and television remove among other is so alarming in recent times. This would bring a great loss to the hotel and drop its generated revenue. IoT tags can be attached to these valuables enabling real-time tracking of these valuables and prevent theft.

iii. *Predictive Maintenance:* maintenance of various hotel and restaurant equipment and valuable to help in increasing the runtime of the business and increase growth and revenue and enable customer's satisfaction. The breakdown of an equipment might disrupt the functionality and efficiency of an organization and drop its ranking. For instance, if a generator used in powering an hotel, restaurant or resort breaks down in the middle of the night during summer, this would inconvenient the customer and might even cause low patronage in future. Analyzing of data obtained from different IoT sensors attached to different appliances and equipment can help in predicting the equipment's failure and proactively schedule preventive maintenance which would help in reducing the downtime and improve operational efficiency of such equipment(s).

iv. *Demand Forecasting:* in this era of Machine learning of predictive modeling and forecasting, AI algorithms can be used to analyze historical data of the hotel and guest to predict future demand of room, food and beverages (Law *et al.,* 2019; Huang and Zheng, 2021). This would greatly help hotels to optimize the level of their staffing, management of inventory and allocation of necessary resources to cater to their expectation.

v. *Robotic Concierges:* Robots have been used in various sectors and industries like manufacturing, military, film, hospitality and tourism (Ivanoc and Webster, 2019). But there is still low turnout as robot can be used to provide information about the hostel being the guest first welcomer, assist with luggage, deliver room service, wash plates and laundry among other, this would help in fast service delivery and downtime or error resulting from human would be highly reduced (Bobillier Chaumon, 2021).

vi. *Chatbots:* AI powered Chatbot would be a great tool to be incorporated into the hospitality sectors' webpages, this would help to cater for any inquiries

by the quest and provide them with the best solution and recommendations to have their problem and questions solved (Huang and Rust, 2018; Parmar *et al.*, 2021). This can also be used to process simple requests like placing call through to the receptionist, kitchen, laundry and maintenance among other. This would be a good hotel representative to chat with and have a firsthand feedback and authentic response.

vii. *Sentiment Analyzer:* The concept and application of natural language processing of AI can be employed in this area by analyzing different reviews and feedback obtained from the customer about the service delivery and satisfaction derived from their money during their patronage (Kwon *et al.,* 2021). This would help the management to improve their service if any negative sentiment was discovered and also enable them to know what service they should improve on or maintain. This is a great application area that would enable the management to track their performance, identify customers' sentiment and understands their satisfaction levels to aid growth and increase revenue.

All the aforementioned application areas would have a good benefit on the hospitality industry and some of the identified benefits are but not limited to:

a) *Enhanced guest experience*: As earlier discussed, the integration of smart technologies like VR/AR, voice command, automated room and other technologies would improve customers experience and satisfaction, provide them with personalized, smooth and convenient experience.

b) *Competitive advantage*: The major difference abroad hotel possess which makes most Global Southern Countries to go for vacation there is the smart technologies that make the vacation seamless. This shows that hotels that embrace the incorporation of smart technologies would be able to differentiate themselves from their competitors and in turn increase their patronage.

c) *Increased Operational Efficiency*: Automation of task and optimizing allocation of resources and predictive analytics through analysis of sensors data would help in improving the operational cost of the properties and business. This would also help in preventing unplanned circumstances that might disrupt the smooth operation of the business.

d) *Improved sustainability*: Sustainability is a core goal of every business and improving this enables the business to maintain good standard and growth. Smart technologies would help in reducing energy consumption and minimize their impact on the environment.

5.0 CONCLUSION AND RECOMMENDATION

As smart technology continue to evolve, the hospitality industry should not lack behind and prevent itself from exploring and tapping from the juicy offers this disruptive technologies have to offer. The wide acceptance and application of different AI-based products shows that we are currently in the automation and AI era. As a result of this integration of different advanced and smart technologies to the hospitality industry in term of Robots, Predictive analysis, and demand and booking forecasting among others is imperatively important for the hospitality stakeholder in Nigerian and Africa at large to consider as this have numerous advantage and benefit to offer such as improved sustainability of business, competitive advantage, improved customers satisfaction and experience among other. This would also place this sector above many industry and increase revenue. The identified areas in this investigative research should be explore by prospective businesses and future work can focus on the current state of these technologies in various hostels and resort across Nigeria and Africa at large so as to show the stage where the continent is in terms of adopting these technologies.

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