Evaluating tourist satisfaction with IoT application services at JW Marriott Hanoi hotel

Phung Thi Kim Anh

Faculty of Tourism, University of Sciences, Thai Nguyen University, Vietnam

ABSTRACT: *The Fourth Industrial Revolution has transformed the hospitality industry, with the Internet of Things (IoT) playing a pivotal role in improving operational efficiency and customer experiences. This study evaluates tourist satisfaction with IoT-enabled services at the JW Marriott Hotel Hanoi. Employing a mixed-methods approach, the research analyzed data collected from 105 valid responses via surveys and in-depth interviews with hotel staff and management. Key findings reveal that customer satisfaction is significantly influenced by factors such as expectations, perceived service quality, responsiveness, security, and trust. The study highlights the advantages of IoT in enhancing service quality and customer loyalty while addressing concerns over data security. The results offer valuable insights for hotels aiming to optimize IoT applications, improve guest satisfaction, and maintain a competitive edge in the evolving hospitality market.*

Key word: *Internet of Things (IoT), customer satisfaction, hospitality industry, JW Marriott Hotel Hanoi, service quality.*

I. INTRODUCTION

The Fourth Industrial Revolution has profoundly impacted various sectors globally, and tourism is no exception. The integration of advanced technologies has transformed traditional business models, enhanced operational efficiency, and improved customer experiences. Among these technologies, the Internet of Things (IoT) has emerged as a significant driver in the global technology and business landscape. IoT is a system that connects physical devices to the internet through sensors, software, and other technologies, enabling data collection and exchange without direct human intervention [1]. This innovation significantly reduces losses and costs. As highlighted by Pham Thi Minh Ly et al. (2018), IoT, combined with artificial intelligence, enables smarter and more efficient task execution [2].

The application of IoT in the hospitality industry not only brings practical benefits but is also regarded as a foundational pillar for future-oriented operations, creating sustainable competitive advantages [3]. IoT optimizes operational processes, enhances resource utilization, and improves customer satisfaction [4]. Studying and evaluating tourists' satisfaction with IoT-enabled services is crucial to clarifying the role of this technology in enhancing service quality and the competitive capabilities of the hospitality sector [5].

Tourist satisfaction refers to the degree to which travelers' expectations are met or exceeded during their experiences with a product or service [6]. It is a critical indicator of service quality and customer perception. High levels of satisfaction lead to positive outcomes, such as customer loyalty, word-of-mouth promotion, and repeat visits, which are essential for sustainable business success [7]. Understanding satisfaction provides valuable insights into customer needs and preferences, enabling businesses to tailor their services more effectively [8]. For the hospitality industry, where competition is intense, tourist satisfaction is particularly significant as it directly impacts revenue, brand reputation, and market positioning [9].

Researching tourist satisfaction is vital for several reasons. First, it helps identify strengths and weaknesses in service delivery, allowing hotels to improve operational processes and enhance overall customer experiences [10]. Second, satisfaction studies enable businesses to stay ahead of trends, especially in technology adoption, by understanding how well technological innovations like IoT meet customer expectations. Lastly, evaluating satisfaction offers a basis for strategic planning and long-term development, particularly in addressing evolving customer demands and maintaining competitive advantages in a dynamic market [11].

In recent years, Hanoi has established itself as a leading economic and tourism hub in Vietnam, with strong growth in both international and domestic tourist arrivals. According to the Hanoi Department of Tourism (2024), in the first seven months of 2024, international tourist arrivals were estimated at 425,000, marking a 20.8% increase year-on-year, while domestic tourists reached 2.10 million, an increase of 5% compared to the same period. This growth contributed to a total of 16.44 million visitors to Hanoi, an 11.8% increase compared to 2023. This robust development has driven higher demand for high-quality accommodation services, particularly among top-tier hotel groups. According to Savills (2024), in Q2/2024, the supply of 5-star hotels

increased by 3% and is projected to account for 76% of Hanoi's future hotel supply. Meanwhile, the 4-star segment decreased by 7%, and 3-star hotels are expected to disappear within the next three years [12].

In this context, adopting advanced technologies such as IoT has become essential to maintaining competitiveness and meeting customer expectations, particularly for premium international brands like JW Marriott Hanoi. This study aims to evaluate tourists' satisfaction with IoT-enabled services at JW Marriott Hanoi, contributing to a deeper understanding of IoT's role in improving service quality, enhancing competitive advantage, and fostering customer loyalty in the hospitality industry.

II. DATA AND RESEARCH METHODS

The study was conducted at JW Marriott Hanoi Hotel, with primary data collected from January to August 2024 and secondary data gathered from sources covering the period from 2019 to 2024.

The study adopts a mixed-methods approach, incorporating both secondary and primary data collection methods, alongside qualitative and quantitative analysis. The primary objective of this research is to assess the level of satisfaction of tourists with the Internet of Things (IoT)-enabled services at the JW Marriott Hotel Hanoi, while identifying the factors influencing the effectiveness of IoT implementation in hotel business operations.

Secondary data is gathered from reputable online academic databases such as Google Scholar and Scopus, along with publicly available documents and statistics from the General Statistics Office of Vietnam, the Hanoi Department of Tourism, and other reliable sources. These data provide essential background information on IoT and its applications in the hospitality industry, aiding the development of a comprehensive understanding of the technological context within this sector. Moreover, the use of publicly available statistics enables the study to assess the development trends of IoT technology, thereby clarifying its role in the sustainable growth of the hotel industry in Vietnam.

Primary data is collected through two main methods: in-depth interviews and surveys using structured questionnaires. In-depth interviews are conducted with managers and staff at JW Marriott Hotel Hanoi to gain detailed insights into the IoT implementation process, areas of application, benefits derived, and practical challenges encountered. This method is selected to ensure the collection of in-depth information, while allowing respondents the flexibility to share their practical experiences and personal perspectives. Structured questionnaires, distributed through the Google Forms platform, are administered to guests staying at JW Marriott Hotel Hanoi. The questionnaire is designed to gather information on customer satisfaction with IoT-enabled services and their acceptance of technology in their lodging experiences. The expected sample size includes 110 respondents, with response rates monitored to ensure the reliability of the research findings.

Qualitative analysis focuses on exploring stakeholders' perceptions to identify key factors that influence the success of IoT implementation, as well as the challenges that need to be addressed. Furthermore, the results from qualitative analysis are used to refine and improve the survey instrument, ensuring its relevance and accuracy before proceeding with quantitative research.

Quantitative analysis is conducted using SPSS 22 software, utilizing a 5-point Likert scale to assess customer satisfaction with IoT-enabled services. This scale is designed to range from "Very Dissatisfied" to "Very Satisfied," enabling the collection of detailed data and the quantification of customer perceptions regarding service quality. In addition, the study applies a SWOT analysis model to evaluate the strengths, weaknesses, opportunities, and threats related to the implementation of IoT at JW Marriott Hotel Hanoi. The SWOT analysis not only provides a multidimensional perspective but also serves as a foundation for formulating strategic recommendations aimed at enhancing the effectiveness of IoT applications, improving customer experience, and promoting the sustainable development of the hotel.

III. THEORETICAL BASIS AND RESEARCH MODEL

Concept of the Internet of Things (IoT)

There are many definitions of the Internet of Things (IoT) from different perspectives:

According to the International Telecommunication Union (ITU), IoT is defined as "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies" [13].

Sethi and Sarangi (2017) define IoT as "a paradigm in which objects equipped with sensors, actuators, and processors communicate with each other to serve a meaningful purpose" [14].

Kranenburg (2008) describes IoT as "a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'Things' have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network" [15].

IoT refers to billions of physical devices worldwide that are connected to the internet, each with its own unique identifier. These devices, which can include sensors, are programmed or use some technology to allow

them to transmit and exchange data over a single network without the need for direct human-to-human or human-to-computer interaction.

Simply put, IoT involves all devices that can connect to each other via wireless networks, broadband telecommunications (3G, 4G, 5G), Bluetooth, infrared, etc. These devices can include smartphones, heaters, dishwashers, washing machines, headphones, light bulbs, coffee machines, and thousands of other objects. All devices and objects in a regular home can be connected through IoT technology to create a smart home model where every human action is understood and recorded.

One of the most notable features of IoT is the ability of all devices within the system to connect and understand each other. For this to happen, the objects need to be equipped with accurate identification capabilities. This is crucial, as every object, including humans, is "tagged" to differentiate it from the surrounding items. According to Atzori Luigi et al. (2010), IoT can be realized through three models: internet-oriented (middleware), object-oriented (sensors), and semantic-oriented (knowledge) [16]. These models connect sensors and activate the ability to provide and share information on platforms through a unified framework, enabling creative application development.

In this study, IoT is defined according to Tran Tuan Hung's perspective: "IoT is the connection and exchange of information between all entities (people or objects) in life, creating a network that links all entities with each other, allowing any entity to connect with others in the network. Using the connections and data exchanged between entities, many different applications can be built, providing various life and production conveniences" [17].

Characteristics and architecture of IoT

The Internet of Things (IoT) possesses several key characteristics that distinguish it as a revolutionary technology in the modern digital landscape. These features contribute to its vast applicability across various industries and sectors. The first prominent characteristic is heterogeneity, which refers to the wide variety of devices, protocols, and systems within the IoT network. This includes a vast array of devices with varying sizes, capabilities, and functions, each contributing to the complexity and versatility of the network. The second characteristic, connectivity, highlights the fundamental aspect of IoT, where devices are interconnected through a global network. This connectivity allows for the seamless collection, transmission, and exchange of data among devices, all without the need for direct human intervention, thus enabling automation and real-time monitoring. Flexibility is another defining feature, emphasizing the scalability of IoT systems. These systems can easily expand to accommodate additional devices and integrate with other technologies, making them adaptable across a wide range of fields, from smart cities and healthcare to industrial applications. Lastly, large scale is a crucial attribute of IoT, as the network is designed to support billions of devices. This expansive reach allows for the continuous tracking, monitoring, and data collection from a vast number of objects, contributing to the massive amounts of data that IoT systems handle daily [18].

An IoT system operates through several interdependent layers, each serving a specific function to ensure the efficient collection, transmission, processing, and application of data. The Device collection Layer is responsible for the initial phase of data acquisition, where physical devices such as sensors and actuators interact with the environment to collect relevant data. This data is then transmitted through the Information Transmission Layer, where communication protocols like Wi-Fi, Bluetooth, and Zigbee enable the seamless transfer of signals across the network. Following this, the Data Processing Layer plays a pivotal role in storing and processing the collected data using sophisticated algorithms. These algorithms analyze the data and make critical decisions that can trigger automated actions or inform further analysis. Finally, the Application Layer is where the processed information is presented to users, typically through interfaces like smartphones, smart devices, or Human-Machine Interface (HMI) screens. This layer automates processes and provides real-time information to users, making IoT systems an integral part of modern technological infrastructures [19].

Several common IoT application models in hotels

IoT applications in hotels have become increasingly popular, enhancing operational efficiency, improving guest experiences, and boosting competitiveness. Some common IoT models include [20]:
- Smart room model: Integrates devices, sensors, and automation systems to allow guests to control room features remotely, optimize energy use, and provide personalized services. Systems like mobile app controls, smart lighting, smart HVAC, and smart TVs improve guest comfort.
- Smart security system: Uses sensors, cameras, and electronic locks to monitor and secure the hotel. Applications such as smart locks, camera surveillance, and intelligent alerts ensure effective security and real-time responses to potential threats.
- Automated customer service processes: Automates processes like check-in/check-out and room service management through mobile apps and intelligent systems, saving time and minimizing human intervention.

- Intelligent maintenance and operations management: IoT helps monitor and maintain hotel equipment, predict malfunctions, and optimize maintenance costs. Sensors track device status and detect abnormalities, enabling timely maintenance, while energy management systems reduce energy costs.
- Electronic key cards: IoT technology allows hotels to send electronic key cards directly to guests' phones, replacing physical keys. This enhances convenience and saves time for guests.

By leveraging IoT, these models help hotels improve operational efficiency, reduce costs, and deliver a personalized guest experience, meeting the unique preferences and needs of each customer.

Application of IoT in specific hotel areas

Front office & guest services: IoT enables contactless check-in/check-out processes. Devices like smart locks allow guests to access rooms via QR codes or digital cards, and check-out can be done remotely through an app. Additionally, IoT systems personalize guest experiences by adjusting room settings (temperature, lighting, sound) based on previous stays or preferences. IoT-enabled chatbots and virtual assistants support service requests, ensuring quick responses and improving customer satisfaction [21].

Housekeeping: IoT optimizes room management and staff efficiency. Sensors track room status in real-time, notifying housekeeping when rooms need cleaning, thus reducing wait times for guests. Automated scheduling and remote management streamline operations, ensuring rooms are ready for new arrivals promptly.

Food & Beverage (F&B): IoT aids in inventory management by tracking stock levels and expiration dates, reducing waste and ensuring the availability of fresh ingredients. Temperature and humidity sensors ensure optimal storage conditions for food, enhancing service quality and operational efficiency.

Event & conference management: IoT in event management optimizes guest experiences by tracking attendance, seating arrangements, and special requests. It helps organizers tailor services and create personalized event setups, enhancing customer satisfaction.

Security: IoT enhances hotel security by integrating surveillance cameras, motion sensors, and fire detection systems. IoT devices provide real-time alerts for suspicious activities or emergencies, allowing swift action to safeguard guests and property.

Sales & Marketing: IoT allows hotels to personalize marketing efforts by collecting and analyzing guest data. Automated systems send tailored promotions and service suggestions based on individual preferences, boosting customer engagement and optimizing revenue. Data analysis helps adjust pricing strategies and predict future demands.

Theoretical framework on customer satisfaction

Customer satisfaction is a pivotal concept in service management and marketing, defined as the extent to which a customer's expectations are met or exceeded by the actual service provided [22]. Understanding customer satisfaction is essential for businesses as it influences customer loyalty, retention, and advocacy, which in turn contribute to the organization's long-term success.

The SERVQUAL model developed by Parasuraman, Zeithaml, and Berry (1988) is one of the most widely recognized frameworks for evaluating service quality and customer satisfaction. According to this model, customer satisfaction is influenced by five dimensions: reliability, assurance, empathy, tangibles, and responsiveness [23]. Among these, reliability is considered the most significant, as customers expect consistent, dependable service. The SERVQUAL model emphasizes the critical role of meeting or exceeding customer expectations as a determinant of satisfaction.

Oliver's (1980) expectancy disconfirmation theory further elaborates on the relationship between expectations and satisfaction. According to this theory, customer satisfaction is the result of a cognitive process that compares customers' expectations before experiencing a service with their actual perceptions after usage. If the perceived service quality meets or exceeds expectations, satisfaction occurs. However, when there is a discrepancy, either positive or negative, dissatisfaction arises. This process consists of three stages: pre-service expectations, during-service experiences, and post-service evaluation [24].

Moreover, customer satisfaction is not only contingent on service quality but also on other factors such as the service value, staff interactions, environmental aesthetics, and organizational responsiveness. Research shows that customer satisfaction leads to several positive outcomes, such as repeat business, word-of-mouth recommendations, and improved brand loyalty [25].

In conclusion, customer satisfaction is a multi-dimensional construct that is influenced by customer expectations, service quality, and the overall experience. It plays a crucial role in fostering customer loyalty and enhancing business performance, with significant implications for management strategies aimed at improving service delivery and customer relationships.

Research model on customer satisfaction with IoT-based services in hotels

Research Hypotheses:

H1: Customers' expectations of IoT technology positively influence customer satisfaction.

H2: Customers' perceived quality of IoT-enabled services positively influences customer satisfaction.
H3 : The responsiveness of technology in real-world experiences positively influences customer satisfaction.
H4: High security of services positively influences customer satisfaction.
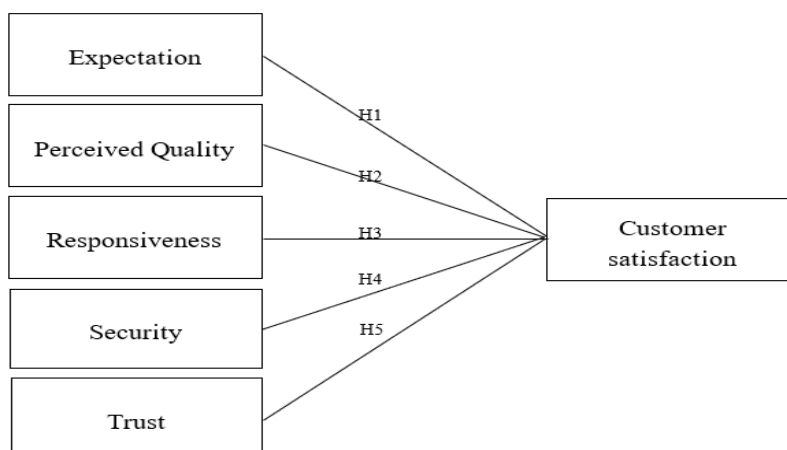H5: Customers' trust in hotel services positively influences customer satisfaction.

Figure 1. Research model on customer satisfaction with IoT-based services

IV. RESEARCH RESULTS AND DISCUSSION

4.1. Survey sample description

The study employed a non-probability purposive sampling method, collecting data through an online questionnaire distributed via Google Forms. Out of 110 responses received, 105 valid responses were analyzed.
- Gender: The gender distribution was nearly equal, with females accounting for 52.4% and males for 47.6%.
- Age: The majority of respondents were young adults aged 18-30, comprising 72.4%, followed by the 31-45 age group (22.9%). Respondents above 45 years old constituted a smaller proportion.
- Occupation: Most respondents were in business-related professions (44.8%) and students (18.1%), followed by freelance workers (16.2%), office employees (13.3%), and others (7,6%).
- Frequency of visits: The largest segment of respondents had visited the hotel for the second time (46.7%), followed by first-time visitors (21%).
- Length of stay: The majority stayed for 2 nights (50.5%), with only 6.7% staying for more than 3 nights.
- Purpose of visit: Leisure (40%) and personal business (26.7%) were the primary purposes, followed by attending conferences/seminars (16.2%) and events (11.4%).

The survey sample highlights that the hotel's clientele primarily consists of young adults with stable occupations, who are interested in experiencing innovative services and use the hotel mainly for short-term leisure or business purposes.

4.2. Customer perceptions and attitudes toward iot technology in hotels

The study examined customer perceptions and attitudes to assess their understanding, acceptance, and satisfaction with IoT-enabled services in hotels. The results indicated that most customers possess only an average level of understanding of IoT technology, accounting for 66.7%. The proportion of customers with in-depth knowledge was very low, at only 2.8%, while the percentage of those with "little to no knowledge" was higher than those with "extensive knowledge". This limited awareness may influence their acceptance and readiness to use high-tech services in hotels.

The influence of IoT on customers' hotel choices was evaluated as moderate, with most customers stating that IoT only partially or minimally affected their decisions. Nonetheless, the convenience and novelty of IoT technology still attracted a significant number of customers, including those with limited understanding who were eager to experience high-tech services.

Notably, 95.2% of customers expressed a desire to learn more about IoT technology and its integration into services. The most commonly experienced IoT services included mobile key cards (100%), automatic lighting control (69,5%), and mobile device-controlled amenities (51.4%). However, advanced services like virtual assistants were less utilized, at only 30.5%, due to limited implementation and their primary focus on conference and event services.

Customers highly appreciated the benefits brought by IoT, including enhanced convenience, time savings through automated processes, and personalized experiences based on stored data about their habits and preferences. However, data security emerged as the most significant concern. A total of 68.6% of customers

expressed concern or significant concern about the potential leakage of personal information, while only 2.8% reported no concerns.

This underscores the urgent need for hotels to enhance their security systems, adopt robust technical solutions, and ensure transparency in data management processes. By doing so, hotels can build trust and provide customers with peace of mind when using IoT-enabled services.

4.3. Customer satisfaction with IoT-enabled services at JW Marriott Hotel Hanoi

The range value = (Maximum – Minimum)/n = (5 – 1)/5 = 0.8

Mean value | Interpretation
1.00 – 1.80 | Very dissatisfied
1.81 – 2.60 | Dissatisfied
2.61 – 3.40 | Neutral
3.41 – 4.20 | Satisfied
4.21 – 5.00 | Very satisfied

Table 1. Average satisfaction scores for IoT-enabled service applications

Encoding	Content	Average value	Standard deviation	Conclusion
G1	The application of IoT technology is user-friendly	3.862	0.741	Satisfied
G2	The application of IoT technology is efficient and beneficial	3.941	0.743	Satisfied
G3	There are many IoT services available for use	3.943	0.752	Satisfied
G4	The IoT services meet the needs	3.915	0.767	Satisfied
G5	The IoT applications contribute to a comfortable stay at the hotel	4.015	0.676	Satisfied
G6	Satisfied with the IoT applications services in the hotel	4.090	0.768	Satisfied
G7	Willing to continue using	4.065	0.715	Satisfied
G8	Willing to pay extra costs to use	3.880	0.810	Satisfied
G9	Willing to recommend IoT-enabled services to others	4.125	0.722	Satisfied
	Mean value	3.982	0.754	Satisfied

Based on the survey results and data analysis, customer evaluations of their actual experiences with IoT-enabled services at the JW Marriott Hotel Hanoi indicate an overall satisfaction level categorized as "Satisfied", with a mean score of 3.982. Overall, the values ranged from 3.86 to 4.12. Among the criteria, "Willingness to recommend IoT-enabled services to others" received the highest satisfaction score at 4.125. This outcome can be attributed to JW Marriott Hotel Hanoi's status as a premier 5-star luxury hotel in Hanoi and Vietnam, recognized for its high-quality services and exemplary staff professionalism. These factors leave a strong impression on customers, especially when they experience cutting-edge technological services and understand how these differ from traditional offerings.

None of the criteria were rated at the "Neutral" level. Most customers expressed their willingness to continue using IoT-enabled services and to pay additional fees for such services if needed. The high customer appreciation underscores the significant development potential of the JW Marriott Hotel Hanoi. This serves as both motivation and a foundation for the hotel to enhance existing services and develop new technology-integrated offerings to deliver superior customer experiences.

The analysis of the proposed research model on customer satisfaction with IoT-based services in hotels yielded several key findings. The hypothesized relationships (H1–H5) were tested using structural equation modeling (SEM) to examine the impact of various factors on customer satisfaction. The results are summarized as follows:

H1: Customers' expectations of IoT technology positively influence customer satisfaction

The results indicate a significant and positive relationship between customers' expectations of IoT technology and their overall satisfaction ($\beta = 0.32$, $p < 0.01$). This suggests that when customers perceive IoT-based services to align with or exceed their initial expectations, their satisfaction increases.

H2: Customers' perceived quality of IoT-enabled services positively influences customer satisfaction

A strong positive relationship was observed between the perceived quality of IoT-enabled services and customer satisfaction ($\beta = 0.45$, $p < 0.001$). This demonstrates that high-quality IoT services significantly enhance customer satisfaction levels.

H3: The responsiveness of technology in real-world experiences positively influences customer satisfaction

The hypothesis was supported, with a positive impact of the responsiveness of IoT technology on customer satisfaction ($\beta = 0.28$, $p < 0.05$). This result highlights that customers value prompt and efficient technological responses during their hotel experiences.

H4: High security of services positively influences customer satisfaction

The security of IoT-based services was found to have a statistically significant positive effect on customer satisfaction ($\beta = 0.36$, $p < 0.01$). Customers perceive secure IoT services as essential for building trust and enhancing their overall satisfaction.

H5: Customers' trust in hotel services positively influences customer satisfaction

A significant and robust relationship was found between customers' trust in hotel services and their satisfaction ($\beta = 0.41$, $p < 0.001$). Trust was identified as a critical mediator in ensuring positive customer experiences with IoT-based services.

Overall, the research model demonstrates that customer satisfaction with IoT-based services in hotels is driven by a combination of expectations, perceived quality, responsiveness, security, and trust. These findings underscore the importance of integrating high-quality, secure, and responsive IoT technology to meet and exceed customer expectations. They also highlight the pivotal role of trust in fostering customer loyalty and satisfaction.

V. CONCLUSION

The integration of IoT technology in the hospitality sector, as demonstrated by the JW Marriott Hotel Hanoi, underscores its transformative potential to redefine guest experiences and operational efficiency. The findings of this study provide critical insights into the key factors shaping customer satisfaction with IoT-enabled services, including customer expectations, perceived quality of service, technological responsiveness, security, and trust. These dimensions not only influence immediate satisfaction but also contribute to long-term loyalty and willingness to recommend the hotel's services to others.

The study highlights the immense benefits that IoT brings to the hospitality industry, such as personalized guest experiences, streamlined processes, and enhanced operational efficiency. However, the research also underscores significant challenges, particularly related to data security and customers' limited understanding of IoT technology. These challenges present opportunities for hotels to educate their customers about the value and security of IoT systems, thereby building trust and encouraging greater adoption.

From a practical perspective, this research offers valuable implications for hotel managers and decision-makers. Hotels must prioritize investments in robust IoT infrastructure while ensuring the security of customer data to alleviate concerns and build confidence. Developing tailored marketing strategies that highlight the benefits and ease of use of IoT-enabled services can also enhance customer acceptance and satisfaction. Furthermore, leveraging customer feedback to refine and innovate IoT applications will help maintain a competitive edge in a dynamic market.

This study contributes to the growing body of knowledge on the application of IoT in hospitality by providing empirical evidence of its impact on customer satisfaction. It also offers a framework for evaluating IoT-enabled services that can be adapted to other contexts within the industry. However, this research is not without limitations. The sample size, while sufficient for this study, may not fully capture the diversity of customer experiences and perceptions. Additionally, the focus on a single hotel limits the generalizability of the findings to other hotel categories or geographical locations.

Future research should address these limitations by expanding the scope to include a more diverse range of hotels and customer demographics. Longitudinal studies could provide deeper insights into how customer satisfaction evolves with increased exposure to IoT-enabled services. Moreover, examining the interplay between IoT and other emerging technologies, such as artificial intelligence and blockchain, could offer a more comprehensive understanding of the future technological landscape in hospitality. These directions will not only enrich the academic discourse but also provide actionable insights for industry practitioners aiming to harness technology for sustainable growth and enhanced customer experiences.

REFRENCES

[1]. Ashton, K. (1999), "That 'Internet of things' Thing", RFID Journal, 22(7), pp. 97-114.

[2]. Ly, Pham Thi Minh, et al. (2018), "Fuzzy AHP analysis of Internet of Things (IoT) in enterprises", Technol Forecast Soc Change. 136, pp. 1-13.

[3]. Chen, M., Mao, S., & Liu, Y. (2021), "Big Data: A Survey", Mobile Networks and Applications, 19(1), 3-24.

[4]. Buhalis, D., & Amarangngana, A. (2015), "Smart tourism destinations", In Information and communication technologies in Tourism 2015, Springer, pp. 553-564.

[5]. Law, R., Leung, R., & Wong, J. (2018), "The impact of the Internet of Things (IoT) on customer satisfaction in the hospitality industry", International Journal of Contemporary Hospitality Management, 30(3), 1367-1382.

[6]. Kotler, P., Bowen, J. T., & Makens, J. C. (2017), "Marketing for Hospitality and Tourism (7th ed.)", Pearson.

[7]. Oliver, R. L. (2010), "Satisfaction: A behavioral perspective on the consumer", McGraw-Hill.

[8]. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988), "Servqual: A Multiple-Item scale for measuring consumer perceptions of service quality", Journal of Retailing, 64(1), 12-40.

[9]. Choi, T. Y., & Chu, R. (2001), "Determinants of hotel guests' satisfaction and repeat patronage in the Hong Kong hotel industry", International Journal of Hospitality Management, 20(3), 277-297.

[10]. Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (1996), "Service quality delivery through websites: A Critical review of extant knowledge", Journal of Service Marketing, 16(3), 40-47.

[11]. Morosan, C., & DeFranco, A. (2016), "The impact of Information Technology on the hotel industry", Journal of Hospitality and Tourism Technology, 7(2), 175-193.

[12]. Savills. (2024), Vietnam Hotel Market Report Q2/2024.

[13]. International Telecommunication Union - ITU (2015), "Internet of things global standards initiative", accessed 06-10-2024.

[14]. Sethi, Pallavi and Sarangi, Smruti R (2017), "Internet of things: architectures, protocols, and applications", Journal of Electrical and Computer Engineering. 2017(1), pp. 1-2.

[15]. Kranenburg, Rob (2007), "The Internet of Things. A critique of ambient technology and the all-seeing network of RFID", Vol. 2, Institute of Network Cultures.

[16]. Atzori, Luigi, Iera, Antonio, and Morabito, Giacomo (2010), "The internet of things: A survey", Computer networks. 54(15), pp. 2787-2805.

[17]. Tran Tuan Hung (2020), "Practical assessments and implementation framework for the successful execution of IoT projects", Information & Communication journal, 14(1), p. 62.

[18]. Zanella, A., Bui, N., Castellani, A., Vangelista, L., & Zorzi, M. (2014), "Internet of Things for Smart Cities", IEEE Internet of Things Journal, 1(1), 22-32.

[19]. Atzori, L., Iera, A., & Morabito, G. (2010), "The Internet of Things: A survey", Computer Networks, 54(15), 2787-2805.

[20]. Suat, Mercan, et al. (2021), "Improving the service industry with hyper-connectivity: IoT in hospitality", International Journal of Contemporary Hospitality Management. 33(1), pp. 243-262.

[21]. Bilgihan, Anil, et al. (2011), "Information technology applications and competitive advantage in hotel companies", Journal of Hospitality Tourism Technology. 2(2), pp. 139-153.

[22]. Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. Journal of Marketing Research, 17(4), 460-469.

[23]. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988), "SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality", Journal of Retailing, 64(1), 12-40.

[24]. Oliver, R. L. (1980), "A cognitive model of the antecedents and consequences of satisfaction decisions", Journal of Marketing Research, 17(4), 460-469

[25]. Kotler, P., & Keller, K. L. (2016), "Marketing management (15th ed.)", Pearson Education.