**UNIVERSITI TEKNOLOGI MARA**

# EXPLORING THE IMPLEMENTATION OF SMART HOTEL IN BATAM ISLAND, INDONESIA: A QUALITATIVE STUDY

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**PhD**

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# UNIVERSITI TEKNOLOGI MARA

# EXPLORING THE IMPLEMENTATION OF SMART HOTEL IN BATAM ISLAND, INDONESIA: A QUALITATIVE STUDY

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Thesis submitted in fulfilment
of the requirements for the degree of
**Doctor of Philosophy**
**(Hotel and Tourism Management)**

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# ABSTRACT

The hotel industry is undergoing rapid digital transformation driven by evolving guest expectations and advancements in automation, data analytics, and Internet of Things (IoT) technologies. Smart hotels have emerged as a strategic response to these changes, offering opportunities for operational optimisation and enhanced guest experiences. However, in Batam, the implementation of smart hotel initiatives remains limited, reflecting disparities in technological readiness, organisational capacity, and institutional support. Addressing this gap, this study investigates participant perceptions of smart hotel implementation in Batam, examines factors influencing implementation, identifies key challenges, and develops an implementation model tailored to the city's hospitality sector. Using a qualitative phenomenological design, in-depth interviews were conducted with hotel general managers and government officers to explore how they understand, experience, and enact smart hotel concepts. The interview data were analysed using thematic analysis and organised into five major themes and twelve subthemes, capturing the core dynamics shaping smart hotel transformation in Batam: (1) Perceptions of Smart Hotel Implementation, (2) Expected Benefits, (3) Implementation Challenges, (4) Role of Government and Supporting Infrastructure, and (5) Future Vision for Smart Hotels. Findings highlights that smart hotel implementation in Batam remains at an early stage, characterised primarily by physical modernisation and discrete digital upgrades such as contactless services and property management enhancements rather than fully integrated digital transformation involving IoT connectivity and system integration. While efficiency gains and improved guest experiences are viewed as key motivators, implementation is constrained by high investment costs, limited digital competencies, inadequate digital infrastructure, fragmented systems, and inconsistent policy alignment. In response, this study proposes a Smart Hotel Implementation Model for Batam that conceptualises smart transformation as a gradual and hybrid process shaped by the interplay between technological capability, organisational readiness, and institutional support. The study contributes theoretically by contextualising smart hotel implementation and introducing a context-specific implementation model for emerging tourism destinations, practically by providing phased implementation guidance for hotel managers, and from a policy perspective by emphasising the importance of coordinated, ecosystem-based digital transformation strategies.

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# LIST OF ABBREVIATIONS

| **Abbreviations** | |
|---|---|
| AI | Artificial Intelligence |
| ADR | Average Daily Rate |
| DOI | Diffusion of Innovation |
| CRM | Customer Relationship Management |
| CRS | Central Reservation Systems |
| EMS | Energy Management System |
| FO | Front Office |
| HR | Human Resources |
| HVAC | Heating, Ventilation, and Air Conditioning |
| ICT | Information and Communication Technology |
| IOT | Internet of Things |
| KEMENPAREKRAF | Kementerian Pariwisata dan Ekonomi Kreatif |
| KPI | Key Performance Indicator |
| LED | Light Emitting Diode |
| LEED | Leadership in Energy and Environmental Design |
| MICE | Meetings, Incentives, Conferences, and Exhibitions |
| OTS | Operations Technical Support |
| PMS | Property Management System |
| POS | Point of Sale |
| REVPAR | Revenue Per Available Room |
| ROI | Return on Investment |
| ROR | Rate of Return |
| RMS | Revenue Management System |
| RQ | Research Question |
| SDL | Service-Dominant Logic |
| STB | Singapore Tourism Board's |
| TOE | Technological-Organizational-Environmental |

# CHAPTER 1
# INTRODUCTION

## 1.1 Chapter Overview

This chapter provides an overview of this research. A brief introduction to smart hotels is also discussed and the current state of smart hotel implementation in the hospitality industry is elaborated. This chapter begins with the preface of technological advancement affecting hotel operations. Then, the chapter discusses the relevancy of smart hotels to Batam. This is followed by a discussion on the problems and challenges in the implementation of smart hotels in Batam. This chapter also highlights the relevancy and the theoretical and practical contributions of the study in the implementation of smart hotels in Batam. Finally, this chapter also presents relevant key terms applicable in the context of this research.

## 1.2 Research Background

The travel and tourism sector is expected to increase significantly in 2024, having overcome the challenges caused by the COVID-19 epidemic (Gupta et al., 2024). While choosing travel packages and measuring travellers' pleasure, a hotel is one of the most important considerations (Pujiastuti et al., 2025). Since there has been an increased number of people travelling beyond their home residence, there has been some demand for greater connectedness, to access information automated spaces. Hence, hotels must adopt technology to meet customer expectations and needs, gaining a competitive advantage and delivering unique experiences (Cheng et al., 2026).

These unique offerings can draw not only new customers but also retain existing and repeated guests placing the hotels ahead of their competitors (Trisdiarto et al., 2026). As the challenge facing hotel management is stiffer due to the increase in the number of hotels, hoteliers must seek ways to retain repeat guests while attracting new ones (Daruni et al., 2026). Though some hotel companies have moved towards expanding their size by providing new facilities to improve guest satisfaction, the future

of an organization does not correlate with the size of the organization (Kukanja & Planinc, 2025). Instead, embracing Information and Communication Technology (ICT) innovation supported by quality human resources will be a way forward (Zhang & Cheng, 2024).

The dramatic development of the hotel industry to elevate customers' expectations to the next level has fuelled intense competition among hotels (Franco & Meneses, 2024). Although the implementation of high technology is repeatedly considered the most valid way, the level of technology implementation varies among hotels (Somera & Petrova, 2024; Fornells Herrera et al., 2024). The global shift toward digitalisation in hospitality represents more than a technological upgrade, it marks the emergence of smart hotel ecosystems, where intelligent, interconnected systems deliver seamless operational efficiency and personalized guest experiences (Liu, 2024; Abdou, 2025). Despite rapid global progress, implementation in developing regions remains inconsistent (Fornells Herrera et al., 2024). Batam, with its strategic location near Singapore and its status as a growing tourism hub, is positioned to benefit significantly from smart hotel transformation (Batam City Central Statistics Agency, 2024). Yet the majority of its 280 hotels continue to rely on manual processes and fragmented digital solutions, highlighting a widening competitiveness gap with leading Asian destinations (Sinambela et al., 2025).

However, some hotels labelled themselves as smart hotels as they embed various technologies in their hotels simplifying the practical term of smart hotel which should refer to hotels that employ innovative technology and minimising the roles of human employees (Daruni et al., 2026). The first smart hotel was put into service at the beginning of 2010 (Liu et al., 2024). Being one of the world's first popular smart hotels, Hotel Henn-Na in Japan, which opened in 2015, has been particularly interested in the use of robotics and automation, namely robotic receptionists and delivery systems which include performing tasks such as baggage delivery and room cleaning. The hotel also applied facial recognition technology for checking in and has a reservation system (Ivanov et al., 2025).

One of the early studies related to smart hotels which was conducted in 2011 explored the implementation of ICT in hotels, including the use of smart technologies to enhance guest experiences and improve operational efficiency (Sthapit et al., 2024). Since then, more guests are starting to book their rooms online. Hotels are starting to use more integrated systems to manage various aspects of their operations. Mobile

devices are being used to provide additional services to the guests (Fornells Herrera et al., 2024). The implementation of Internet of Things (IoT) in smart hotels has recently attracted a lot of attention (Somera & Petrova, 2024) with the Hilton Group of Hotels announcement in 2017 as well as Marriott International (Abdou, 2025). This also indicates, companies have started to offer IoT-based solutions to the hotel industry, such as interact-lighting, which recently offered an IoT-based solution to manage hotel lighting to save costs and adapt it to guest preferences (Somera & Petrova, 2024).

In Asia, many hotels in countries such as China, South Korea, Singapore and Thailand have been using technology to provide personalised service, simplify operations and improve the guest experience just like Henna Hotel in Japan (Gajić et al., 2024). Meanwhile, located in Jakarta, Indonesia's first smart hotel is Yello Hotel Harmoni, a member of the Tauzia Hotel Management Group, which began its operation in 2013 (Yellohotelharmoni, 2024). The hotel has offered a variety of smart features to enhance guest experience and improve performance including keyless entry via mobile devices, smart room lighting and temperature control. The seamless use of a mobile application enables guests to access hotel information, request services, search for nearby attractions, interact with the hotel and choose their destination (Ku, 2026).

With the launching of Yello Hotel Harmoni, other hotels in Indonesia have begun to introduce various smart features and embrace digital innovations to meet guests' needs. For example, the Andaz Bali Hotel, located in Bali that allow guests to use a smartphone application to unlock their rooms, request room services, and control the air conditioner and lighting in the room (Gajić et al., 2024). Other notable examples include the Everyday Smart Hotel Malang, located in Malang City in East Java and the Dynasty Style Hotel, located in Surakarta City in Central Java. The hotels have also invested in a smartphone application to request room services and control the room temperature (Tripadvisor, 2024). Meanwhile, Harper Malioboro, located in Yogyakarta, allows guests to use the Google Nest Hub in their rooms to control air conditioning, lighting, TV and other devices with their voice (Harianjogja, 2023).

Hotels in the city can attract more tourists by offering smart hotels with cutting-edge technology and customised experiences which can increase their revenue from dining, shopping, hotels, and other tourism-related activities (Herath Mudiyanselage et al., 2026). Furthermore, the expansion of smart hotel concept tourism has the potential to boost employment and the local economy due to the need for experts in fields such as data analysis, technology, and customer support (Akel & Noyan, 2025). This also

includes the need to oversee and maintain the technological infrastructure triggering the hoteliers to hire more workers, which would increase the number of jobs in the hospitality industry (Herath Mudiyanselage et al., 2026). Furthermore, the development of smart hotels can create opportunities for local businesses to provide goods and services including food and drink, electronic devices, and maintenance.

This promotes economic partnerships within the community and helps local businesses (Lee et al., 2025). At the same time, smart hotels offer convenient services and customised experiences to visitors, which may encourage them to spend more money. Visitors might also visit nearby landmarks, eat at local eateries, and take part in other tourism-related activities, which would improve the city's businesses and strengthen the local economy (Näppä et al., 2024). Additionally, as investments in technological infrastructure and innovation are necessary for the implementation of smart hotels, the lure of technological advancements to technology companies, startups, and research and development initiatives within the city can be expected (Ku, 2026). The existence of smart hotels can support an ecosystem that is driven by technology, fostering innovation and stimulating the economy (Lee et al., 2025). Sustainable techniques including resource optimisation, waste management, and energy-efficient technology are frequently included in smart hotels (Cserdi & Kenesei, 2024). These methods can help hotels save money while promoting environmental sustainability (Akel & Noyan, 2026). Implementing sustainable methods can also improve the city's status as an eco-friendly travel destination, enticing eco-aware travellers and enterprises (Wang et al., 2024).

By implementing smart hotels, a city can benefit from an increase in tourism revenue, employment and technological development opportunities as well as sustainable development (Lee et al., 2025). Together, these factors contribute to economic growth and social development, while creating a positive impact on the local economy (Abdou, 2025). One of Indonesia’s cities experiencing a positive economic impact is Batam (Batam City Central Statistics Agency, 2024). Booming from the tourism industry, infrastructure development, competitive advantage, sustainability focus, and government assistance, it has become an ideal location for smart hotels (BP Batam, 2024). The implementation of technologies has the potential to improve visitor experiences, operational efficiency, and the overall development of hospitality business (Anwar et al., 2024).

An increase in tourists and a growing demand for current with technology,

technological hotels are being experienced on Batam, an Indonesian island located near Singapore (Alex & Bell, 2024). Batam, located in the Riau Archipelago, has been recorded as one of the best cities with the highest number of tourists' approximately 1.2 million tourists in 2023. The surge was quite significant from 500 thousand tourists in 2022 to 1.2 million tourists in 2023 (Batam City Central Statistics Agency, 2024). The Room Occupancy Rate (ROR) of star hotels in the Riau Archipelago Province in June 2023 reached an average of 52.54 per cent, an increase of 10.67 points compared to the ROR in May 2023 at 41.87 per cent. This shows that Batam City has become a tourist hub for other parts of Indonesia due to its international access point (Batam City Central Statistics Agency, 2024).

Batam's transportation infrastructure, including its international airport and multiple international ports, strengthens its potential to support smart tourism and smart hotel development by improving international accessibility and regional tourism connectivity. These multiple access points allow passengers from different countries to reach Batam and continue their journey to other parts of Indonesia (Indonesia Ministry of Tourism and Creative Economy, 2024). As a tourist destination, Batam's strategic position is not only as a contributor to regional income or job creation in the tourism and creative economy sectors but also plays an important role in the investment aspect in the Riau Islands Province (BP Batam, 2024). Batam City currently has been boosted with 282 hotels with 36,000 rooms, 1067 cafes and restaurants, and 12 shopping centres. Batam also has a variety of tourist attractions, including natural, cultural, historical and attractions (Batam City Central Statistics Agency, 2024).

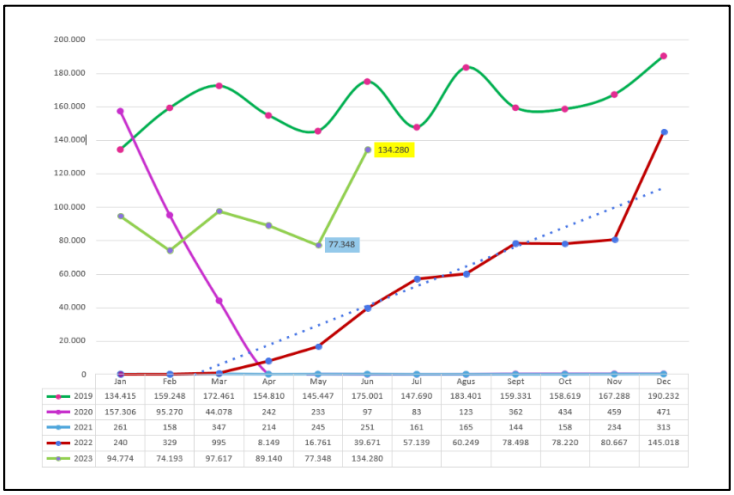


Figure 1.1 Number of Foreign Tourist Visit to Batam City
Source: Batam City Central Statistics Agency, 2024

Meanwhile, tourism statistics data in Batam has continued to show positive findings. Figure 1.1 listed the number of foreign tourist visits to Batam City. Data on the number of foreign tourists visiting Batam City during June 2023 was recorded at 134,280 visits. This has increased by 73.61 per cent compared to the number of foreign tourists in the previous month, when the number of foreign tourists in May 2023 was 77,348 visits. Singaporean foreign tourists were the most frequent foreign tourists visiting Batam City in June 2023. They dominated at 66.80 per cent of the total number of foreign tourists visiting Batam City (Batam City Central Statistics Agency, 2024). Furthermore, the second largest number of foreign tourists was from Malaysia with 15,607 visitors or 11.62 per cent of the total number of foreign tourists during June 2023. Data for June 2023 also shows that the average length of stay for foreign guests was 1.76 days or 0.16 points higher than the average length of stay for Indonesian guests, which was 1.60 days. Meanwhile, the average length of stay for foreign and Indonesian guests at star-rated hotels in the Riau Islands Province during June 2023 was 1.66 days or dropped 0.07 points compared to the average length of stay for foreign guests in May 2023 (Batam City Central Statistics Agency, 2024).

These tourism growth trends demonstrate the increasing importance of Batam as an international tourism gateway and highlight growing pressure on the local hospitality industry to improve service quality, operational efficiency, and destination competitiveness. The increasing volume of international visitors also suggests the need for greater technological readiness and service innovation within the hotel sector, particularly through the implementation of smart hotel technologies capable of supporting more efficient and responsive hospitality services. This also indicates, the government has also taken various steps to encourage the acceleration of the smart hotel program in Batam, starting from the national policy through the Ministry of Tourism and Creative Economy (Kemenparekraf) by establishing Smart Tourism as one of the priorities in the 2020-2024 National Tourism Development Master Plan, which includes the development of smart hotels. The Ministry of Tourism and Creative Economy (2022) stated that this program aims to integrate digital technology in the tourism sector, including hotels, to improve the quality of services and tourist experiences.

The Ministry of Finance reported that the budget allocation for the tourism sector, including the development of smart technology, has been increased to support post-pandemic recovery (Ministry of Finance, 2024). The government provides fiscal incentives and funding for smart tourism projects, including the development of smart

hotels in Batam. Furthermore, the Ministry of Communication and Information (Kemenkominfo) has expanded the internet network in Batam, including in major tourist areas, to support the implementation of smart technology in hotels (Ministry of Communication and Information Technology, 2024). The Central Statistics Agency also noted that training for hotel industry players is an important step to ensure the successful implementation of smart technology in the hotel sector which includes IoT systems, mobile applications, and energy management (Central Statistics Agency, 2024). This smart hotel acceleration program is designed to integrate digital technology and innovation in the tourism sector to improve destination competitiveness, enrich tourist experiences, and drive local economic growth as well as making Batam a modern tourism destination that can compete at regional and global levels, especially considering its strategic location near Singapore and Malaysia.

This smart hotel acceleration program reflects broader institutional efforts to position Batam as a competitive and technologically adaptive tourism destination. However, the effectiveness of this transformation depends not only on technological investment but also on organisational readiness, workforce capability, and policy coordination across the hospitality ecosystem. Through the implementation of smart hotel initiatives, Batam is expected to strengthen its competitiveness as a modern tourism destination within the ASEAN region, particularly in relation to neighbouring destinations such as Singapore and Kuala Lumpur. The integration of smart technologies may enhance service efficiency, guest experience, and destination image, thereby contributing to tourism attractiveness and hospitality innovation. Nevertheless, despite its transformative potential, the smart tourism acceleration program in Batam continues to face various technological, organisational, financial, and governance-related challenges that may constrain effective implementation and long-term sustainability.

The increase in the number of travellers to Batam has instigated rivalries and competition among hoteliers to attract the growing customers. The diversities of accommodation options, including luxury hotels, boutique hotels, affordable hotels, and serviced apartments, are fuelled by the flood of tourists to Batam (Kesumahati et al., 2025). Different pricing tactics, attractive packages, value-added amenities, or competitive rates have been used as the selling points to attract new customers. This benefits tourists as they could choose from a variety of options that suit their budget and preferences. Aside from that, the hotels in Batam also strive to maintain high

standards and provide exceptional services to attract and satisfy guests (Alnawas et al., 2024).

In the last few years, the hotels in Batam started to concentrate on innovation and distinction to obtain a competitive edge (Sinambela et al., 2025). To differentiate themselves from the competition, introducing smart technologies, eco-friendly practices, unique design concepts, or themed experiences may be a way forward for these hoteliers (Herrera et al., 2024). Spending on marketing initiatives, internet facilities, and partnerships can raise awareness and promote their distinct selling qualities. With growing competition, guest reviews and ratings have a considerable impact on travellers' selections (Maharaj, 2024).

As hotels strive to maintain favourable evaluations and ratings on platforms such as TripAdvisor, Booking.com, and Google reviews, they must deliver exceptional services, respond to guest feedback, and continuously upgrade their offerings (Ku, 2026). Smart hotels leverage new technologies to extract valuable insights into consumer behaviour, enabling more personalised service delivery, particularly in guest interactions (Aggarwal & Mittal, 2024). These technologies also support hotels in enhancing operational efficiency and service quality. Furthermore, the effective management of such information allows hotels to improve productivity, identify operational issues, and resolve them in a timely and efficient manner (Herath Mudiyanselage et al., 2026).

The current situation of smart hotel implementation in Batam reflects a transitional stage, where awareness of digital transformation is increasing, yet practical adoption remains limited and uneven. Although some hotels have begun integrating basic technologies such as online booking systems and keyless entry, the use of more advanced smart technologies such as Internet of Things (IoT), automation systems, and artificial intelligence has not been widely implemented. This condition is influenced by several constraints, including high investment costs, limited technological infrastructure, and a lack of skilled human resources. This also indicates, the absence of clear policy direction and industry standards further slows down the adoption process. As a result, many hotels in Batam continue to rely on conventional service models despite the growing need for innovation.

At the same time, changing customer expectations, particularly among digitally oriented travelers, are increasing the demand for more efficient, personalized, and technology-enabled services. This creates a mismatch between what the market expects

and what the industry is currently able to deliver. Despite the growing global interest in smart hotel concepts, their implementation in Batam remains limited and uneven, with insufficient empirical evidence capturing the perspectives of key stakeholders, particularly hotel managers and government authorities. This reflects a gap between the increasing demand for technology-driven services and the actual level of implementation within the local hospitality industry. Therefore, there is a need for a deeper investigation into the current practices, challenges, and enabling factors influencing the implementation of smart hotels in Batam.

## 1.3 Problem Statement

The implementation of smart hotel technology in Indonesia remains uneven and fragmented across regions, with substantial disparities in adoption levels and operational readiness (Chen et al., 2025; Kumar & Sharma, 2026). While major tourism destinations such as Jakarta and Bali have demonstrated more advanced levels of technological integration, smaller yet strategically important destinations continue to lag behind due to structural, organisational, and contextual constraints in technology adoption (López-Bonilla et al., 2025; Ashfaq et al., 2025). This uneven development reflects the absence of context-sensitive implementation frameworks and reveals an insufficient understanding of how local capabilities, institutional readiness, and destination-specific conditions influence smart hotel transformation in emerging tourism destinations. Consequently, the lack of such understanding constrains the ability of hotels and policymakers to implement sustainable and coordinated digital transformation strategies.

In Batam, despite its strategic position as one of Indonesia's major tourism gateways, the adoption of smart hotel technology remains substantially underdeveloped. Recent statistical data show that only 8 out of 282 hotels have implemented smart technologies (Batam City Central Statistics Agency, 2025), indicating a significant gap between tourism growth and technological transformation within the local hospitality sector. Existing studies suggest that high implementation costs, limited technical expertise, and inadequate infrastructure continue to constrain digital transformation efforts in emerging destinations (Kumar & Sharma, 2026; Chen et al., 2025). This also indicates, many hotel systems remain technologically incompatible with advanced

smart applications, creating integration complexities and operational vulnerabilities (López-Bonilla et al., 2025). These conditions indicate that the barriers to smart hotel adoption in Batam are not merely technological, but also organisational and structural, requiring deeper investigation into the factors influencing implementation readiness and sustainability.

Operational barriers are further intensified by organisational and human resource limitations within the hospitality sector. Existing studies indicate that the need for continuous staff training, employee resistance to technological change, and ongoing concerns regarding data security and privacy remain persistent challenges in smart hotel implementation (Ashfaq et al., 2025; Graham & Sasraku-Neequaye, 2026). Simultaneously, varying levels of guest acceptance toward smart technologies create additional uncertainty for hotel operators, particularly in markets where customer technology readiness differs across demographic and behavioural segments (Zhou & Xu, 2026). These interconnected technological, organisational, and behavioural challenges contribute to the slow and cautious adoption of smart hotel systems in Batam, suggesting that smart hotel transformation involves broader socio-technical complexities beyond mere technology deployment.

From a policy and governance perspective, a significant disconnect remains between national tourism digitalisation agendas and their implementation at the regional level. Although government initiatives have increasingly promoted digital transformation within the tourism sector, there is still inadequate evidence of effective policy execution, regulatory facilitation, and incentive mechanisms to support smart hotel adoption in local destinations (Fitriana & Wahyudin, 2025; Kemenparekraf, 2024). The absence of clear operational guidelines, institutional coordination, and collaborative engagement between government agencies and industry stakeholders has contributed to fragmented implementation and limited scalability of smart hotel initiatives (Simatupang et al., 2024). This highlights that the challenges of smart hotel transformation are not solely technological or organisational, but are also closely linked to governance capacity and institutional alignment within emerging tourism destinations. This also indicates, institutional fragmentation and inconsistent governance coordination may further hinder the scalability and sustainability of smart hotel initiatives within emerging tourism destinations. Existing literature suggests that the absence of integrated digital governance frameworks, limited inter-agency collaboration, and unclear implementation standards often create uncertainty among

hospitality stakeholders regarding technology investment and operational direction (Chen et al., 2025; Fitriana & Wahyudin, 2025). These governance-related limitations are particularly significant in secondary tourism destinations, where institutional capability and policy implementation capacity may differ substantially from those of highly developed tourism regions.

In the academic literature, existing studies on smart hotel technology remain predominantly focused on customer perspectives and are largely situated within technologically advanced destinations such as Hong Kong and South Korea (Kong et al., 2025; Wong et al., 2026). Consequently, insufficient empirical attention has been given to managerial, operational, and institutional perspectives within emerging tourism destinations such as Batam (Abdou, 2025; Cheng et al., 2026). This imbalance in the literature has resulted in insufficient understanding of how hotel managers navigate decision-making processes, resource limitations, organisational preparedness, and strategic implementation challenges in adopting smart technologies. As a result, current theoretical and practical knowledge remains inadequate for explaining smart hotel transformation within developing and contextually constrained tourism environments.

At the same time, existing research has provided inadequate integration of government policy, managerial readiness, and technological capability within a unified analytical framework. The absence of such integrative approaches restricts a holistic understanding of the multi-level and interrelated barriers influencing smart hotel implementation (Hassan & Eassa, 2025; Wong & Loo, 2026). Consequently, the complex interactions between governance facilitation, organisational preparedness, and technological adoption remain underexplored, particularly within secondary and emerging tourism destinations. This fragmentation in the literature hinders the development of context-sensitive strategies and theoretical explanations for smart hotel transformation in developing tourism environments. Therefore, existing literature remains insufficient in explaining how technological, organisational, and institutional factors interact dynamically in shaping smart hotel implementation within emerging tourism destinations such as Batam. While previous studies have largely examined these dimensions separately, this study argues that smart hotel transformation is shaped by interconnected socio-technical, organisational, and governance-related processes that cannot be adequately understood through isolated technology adoption perspectives alone. Implementation outcomes are increasingly influenced by the interaction between technological capability, organisational preparedness, stakeholder interpretation,

financial readiness, and institutional environments.

Given these unresolved issues, the low adoption of smart hotel technology in Batam reflects broader systemic challenges involving technological limitations, organisational readiness, and institutional support gaps. The interaction of these factors indicates that smart hotel transformation is influenced not only by technological capability but also by socio-technical and governance-related dynamics. Existing literature remains limited in explaining how these interconnected barriers affect smart hotel implementation in emerging tourism destinations. Without a comprehensive understanding of these challenges, efforts to accelerate smart hotel adoption are likely to remain fragmented, ineffective, and difficult to sustain over the long term (Godolja et al., 2025; Graham & Sasraku-Neequaye, 2026).

This argument contributes to the advancement of smart hospitality research by repositioning smart hotel implementation as a multidimensional socio-technical and governance-related phenomenon rather than a purely technology-driven operational strategy. While previous smart hospitality studies have predominantly emphasized technological capability and operational efficiency, the findings of this study demonstrate that implementation outcomes are equally influenced by organisational readiness, workforce adaptability, financial capacity, stakeholder perceptions, and institutional coordination. These findings extend existing smart hotel literature by conceptualising smart hotel transformation as a broader contextual and organisational process rather than merely isolated technology adoption. Consequently, successful smart hotel transformation requires the integration of technological readiness, organisational capability, and institutional support within the operational realities of emerging tourism destinations. This argument forms the central analytical foundation of the study and guides the interpretation of the findings throughout the thesis.

## 1.4 Research Questions

To achieve the study objectives, the following research questions are proposed:

1.4.1 How do the stakeholders perceive the smart hotel implementation in Batam?

1.4.2 To what extent has smart hotel been implemented in Batam?

1.4.3 What are the factors contributing to the implementation of smart hotels in Batam?

1.4.4 What are the challenges in implementing smart hotels in Batam?

1.4.5 What is the proposed model of smart hotels implementation in Batam?

## 1.5 Research Objectives

Based on the research question above, the research objective of the study is as follows:

1.5.1 To understand the stakeholders' perception towards smart hotel implementation in Batam.

1.5.2 To explore the extent of smart hotel implementation in Batam.

1.5.3 To analyse the factors contributing to the implementation of smart hotels in Batam.

1.5.4 To identify the challenges in implementing smart hotels in Batam.

1.5.5 To propose a model for the smart hotel implementation in Batam.

## 1.6 Scope of the Study

The scope of the study is an important strategy to ensure the focus, depth, and clarity of research objectives (Naeem et al., 2023). This allows researchers to produce a more comprehensive analysis and provide more specific recommendations related to smart hotel implementation in Batam. This study specifically focuses on the implementation of smart hotels in Batam, Indonesia, particularly from the perspective of stakeholders involved in the hospitality industry. In other words, this study does not aim to investigate all aspects of smart hotels, such as economic benefits, financial performance, or their impact on guest satisfaction. Instead, the study concentrates on understanding the factors influencing smart hotel implementation within the specific context of Batam.

Previous studies on smart hotels have largely focused on technological adoption, operational efficiency, customer satisfaction, and technology acceptance in developed countries and major tourism destinations. However, limited attention has been given to how technological, organisational, and institutional factors interact in shaping smart hotel implementation in emerging tourism destinations such as Batam. Existing studies also tend to emphasise quantitative measurements of technology acceptance, while insufficient research has explored stakeholders' perceptions, implementation challenges,

and contextual barriers through qualitative inquiry. Therefore, this study addresses the theoretical and contextual research gap by examining smart hotel implementation from a human perception and contextual perspective within the hospitality industry in Batam.

In line with the objectives of the study, this study investigates participants' perceptions regarding the implementation of smart technologies, including their expectations of the benefits and challenges associated with smart hotel implementation in Batam. The study also explores the current use of selected smart technologies in hotels in Batam and identifies factors that facilitate or hinder implementation, such as organisational readiness, resource availability, technological capability, and government support. This also indicates, this study identifies the challenges and barriers faced during the smart hotel implementation process.

Simultaneously, this study proposes a smart hotel implementation model tailored to the Batam hospitality context. The proposed model is developed based on the findings related to implementation factors, stakeholder perceptions, and contextual challenges faced by hotels in Batam. This may include a more effective and efficient smart hotel implementation model based on the analysis of contributing factors and challenges while considering the unique characteristics and requirements of the Batam hospitality industry.

Apart from that, this study provides deeper insights into stakeholders' experiences and interactions with smart hotel technologies by focusing on human perceptions and contextual realities. Understanding these perceptions may help identify potential challenges or barriers in implementing and accepting smart hotel technologies in Batam. The findings are expected to contribute to the advancement of smart hospitality knowledge by providing context-sensitive theoretical and empirical insights that may support future scholarly research and academic publication while also informing policy development related to smart hotel transformation within emerging tourism destinations.

## 1.7 Significance of the Study

In the subsections that follow, the significance of this study is presented in terms of its theoretical and practical relevance.

### 1.7.1 Theoretical Significance

This study advances the body of knowledge in smart hospitality and tourism studies by reconceptualising smart hotel implementation as a multidimensional socio-technical and governance-oriented transformation process within emerging tourism destinations. The findings demonstrate that implementation outcomes are shaped not only by technological capability, but also by organisational readiness, stakeholder interpretation, institutional coordination, workforce adaptability, and contextual operational realities. Unlike previous studies that predominantly focused on technology adoption and operational efficiency, this study highlights the dynamic interaction between organisational, technological, and governance-related dimensions in shaping hospitality digital transformation processes. Consequently, the study provides a more integrated and context-sensitive understanding of smart hotel implementation within developing tourism environments, thereby contributing original theoretical insights that may support future scholarly discussions and academic publication within smart hospitality and tourism digital transformation research.

The study further contributes theoretically by discussing socio-technical systems theory, service-dominant logic, and the Technology-Organisation-Environmental (TOE) framework through the integration of organisational, institutional, and contextual dimensions that remain insufficiently explored within existing smart hospitality literature. The findings challenge technology-deterministic assumptions by demonstrating that successful smart hotel transformation depends on governance facilitation, stakeholder coordination, organisational preparedness, and destination-specific implementation conditions rather than technological innovation alone. The study also provides deeper theoretical insights into how contextual and institutional realities influence hospitality digital transformation processes within emerging tourism destinations. Therefore, this study contributes to future smart hospitality research by strengthening the importance of integrated socio-technical and context-sensitive perspectives in understanding smart hotel implementation.

Simultaneously, the study broadens theoretical discussions concerning the relationship between smart technologies, operational efficiency, service differentiation, and destination competitiveness from a managerial perspective. Rather than viewing technology solely as an operational instrument, the findings highlight how strategic interpretation, organisational adaptation, and institutional coordination

collectively shape implementation effectiveness and long-term sustainability within hospitality organisations. The study further contributes to smart hospitality literature by demonstrating that adoption challenges and transformation processes vary significantly across tourism destinations and are highly dependent on destination-specific organisational, institutional, and socio-economic conditions. Unlike studies conducted in technologically mature tourism destinations, the Batam context reveals that transformation limitations emerge not only from technological capability gaps but also from fragmented governance coordination, financial uncertainty, workforce adaptability constraints, and uneven organisational preparedness. Collectively, these findings advance smart hospitality scholarship by establishing that smart hotel implementation represents a complex and interdependent socio-technical transformation process in which technological capability, organisational preparedness, institutional governance, stakeholder interpretation, and contextual destination realities continuously interact in shaping implementation outcomes and long-term sustainability. The study further contributes to future research development through the proposed Smart Hotel Implementation Model, which provides a context-sensitive analytical framework that may support future empirical and conceptual investigations of smart hospitality transformation across different organisational, institutional, and destination contexts. The originality and interdisciplinary nature of the framework further strengthen the study's scholarly publication potential within smart hospitality, tourism digitalisation, hospitality innovation, and emerging tourism destination research.

### 1.7.2 Practical Significance

This study provides practical insights for hospitality stakeholders by offering recommendations that may support strategic planning, policy development, and collaborative implementation of smart hotel initiatives in Batam. The findings indicate that successful smart hotel transformation requires not only technological investment, but also organisational preparedness, stakeholder coordination, and governance facilitation. The study further demonstrates that sustainable implementation outcomes depend on the alignment between technological capability and organisational readiness. Consequently, the findings provide a more comprehensive practical understanding of

smart hotel transformation within emerging tourism destinations.

For hotel management, the study provides practical understanding regarding the implementation of smart technologies within local hospitality contexts. The findings assist hotel operators in identifying important considerations related to technology selection, operational integration, employee readiness, and implementation sustainability. The study also highlights that technological adoption should be aligned with organisational capability, service objectives, and workforce adaptation to maximise operational efficiency and enhance guest experiences. This may support hotel organisations in developing more adaptive and sustainable digital transformation strategies.

From a policy perspective, the study contributes to government efforts aimed at supporting smart tourism and digital transformation within the hospitality sector. The findings emphasise the importance of regulatory facilitation, infrastructure readiness, financial support mechanisms, and inter-agency coordination in accelerating smart hotel implementation. The study therefore provides practical reference points for national and regional authorities in formulating more effective tourism digitalisation strategies and implementation frameworks. These findings may also assist policymakers in strengthening institutional support for smart hospitality development in Indonesia.

The study is also significant for regional development stakeholders in Batam, particularly local authorities and institutional bodies involved in tourism and smart city planning. The findings demonstrate that smart hotel implementation should be integrated into broader destination development strategies through collaborative planning, infrastructure support, and long-term digital ecosystem development. The study further indicates that destination competitiveness increasingly depends on the integration of technology, governance capability, and stakeholder collaboration. This may strengthen Batam's competitiveness as a regional tourism destination within the ASEAN tourism market.

Furthermore, the study provides useful insights for industry stakeholders such as technology providers, consultants, and hospitality service partners by identifying implementation challenges, operational needs, and collaboration opportunities within the hospitality sector. Understanding these contextual realities may support the development of more adaptive, practical, and market-sensitive smart hospitality solutions. The study also bridges the gap between theoretical smart hospitality discussions and practical implementation realities within emerging tourism destinations

in Indonesia. As a result, the findings contribute to a more context-sensitive understanding of smart hotel implementation within developing tourism environments.

Overall, the practical contributions of this study demonstrate that smart hotel transformation requires integrated collaboration between hospitality organisations, government institutions, and supporting industry stakeholders. The findings reveal that implementation effectiveness is shaped by the interaction between technological, organisational, and institutional dimensions. The study therefore provides a more comprehensive practical foundation for developing sustainable and contextually appropriate smart hotel implementation strategies in emerging tourism destinations such as Batam. Collectively, these contributions may support future smart hospitality development and tourism digitalisation initiatives within Indonesia.

## 1.8 Definition of Key Terms

The following are the key terms used in the study and their definitions within the context of the study:

Table 1.1
Definition of Key Terms

| Terms | Conceptual Definition | Operational Definition |
|---|---|---|
| Smart Hotel | Smart hotels is dynamic hospitality ecosystems that rely on IoT-driven technologies to deliver personalized, seamless, and technology-enhanced travel experiences (Riahi et al., 2025). | A smart hotel is a hotel that integrates technology to enhance guest experience, increase efficiency in operations and provide a more personalised and sustainable environment. |
| Perception | Perception is the complex process through which individuals organize, identify, and interpret sensory information obtained from the environment (Keenan, 2024). | The process of understanding things, events, or relationships between symptoms provides stimulation, which is then processed by the brain. |

| | | |
|---|---|---|
| Hotel Management | Hotel management refers to overseeing and coordinating all operations within a hospitality establishment to ensure optimal guest satisfaction, efficient staff performance, and maximum profitability (Hakobyan, 2025). | Hotel management refers to the professional field that encompasses the administration, operation, and coordination of activities within a hotel or hospitality establishment. It involves overseeing various departments such as front office operations, housekeeping, food and beverage management, marketing, human resources, and finance to ensure the efficient and effective functioning of the hotel. |
| Internet of Things | IoT is a network of sensors, actuators, software, and connected devices that gather, exchange, and analyze data through internet connectivity in order to monitor and control environments (Choudhary, 2024). | An interconnected network of physical objects with sensors, software, and other technologies integrated that gather and share data online is known as the IoT. IoT is crucial for real-time automation control and decision-making, with Big Data analytics processing data to enhance efficiency, predict trends, and enable AI-driven automation. |
| Hospitality Industry | The hospitality industry is a group of enterprises that provide accommodation, food, beverage, and related services aimed at satisfying customer needs and creating hospitality experiences (Demchuk et al., 2024). | A business industry that focuses on customer service and experience in various types of businesses such as hotels, restaurants, airlines and tourist attractions. In this industry, high-quality service and a pleasant customer experience are very important to create customer satisfaction and build loyalty. |
| Stakeholders | Stakeholders are groups or individuals who have interests, expectations, and influence over organizational activities and outcomes (Awa et al., 2024). | Stakeholders in smart hotels are people, organizations, or groups with a stake in the development, management, or success of these establishments. They contribute to numerous facets of the smart hotel ecosystem and play a variety of responsibilities. The stakeholders for smart hotels in |

| | | |
|---|---|---|
| | | this study include hotel managers and government representatives in Batam. |
| Hotel Managers | Hotel managers are leaders developed through management training initiatives to support operational effectiveness employee development, and hotel performance (Douglas et al., 2024). | A hotel manager, referred as an hotelier or lodging manager, is a professional responsible for the overall operation of a hotel, motel, resort, or other lodging establishment. They play a crucial role in ensuring the smooth functioning of the hotel and the satisfaction of guests. |
| Governme nt Officers | A government officer is public officials or civil servants who are appointed by the government to carry out administrative functions, implement public policies, manage public resources, and deliver public services to society at local, regional, or national levels (Batara & Prinaldi, 2024). | A government officer is someone employed by a government agency at any level (local, state, or national) in a wide variety of roles. They are responsible for carrying out the functions and services of the government that related to tourism and hospitality development in Batam. |

## 1.9 Organisation of the Thesis

Chapter 1 introduces the study by outlining its rationale and identifying the key issues addressed. This chapter presents the background of the study and the problem statement that underpins the research. It also outlines the research questions and research objectives of the study. Within this context, the chapter defines the scope of the study, highlights its theoretical and practical contributions, and provides definitions of key terms used throughout the research.

Chapter 2 provides an overview of the tourism industry in Batam, with particular emphasis on the development of a smart hotel economy. The chapter begins with a general discussion of the tourism and hospitality industry. It then outlines key indicators of industry development, including trends in tourist arrivals and growth in hospitality infrastructure. Finally, the chapter examines the role and contribution of hotel management's perceptions toward smart hotel implementation in Batam.

Chapter 3 discusses the research methodology used to obtain the research outcomes. The chapter explains the research approach used in the study. It outlines the research design, sources of data, and procedures for data collection. Within this context, the chapter describes the appe selection process and the data analysis methods employed.

Chapter 4 presents the research findings and data analysis based on empirical data collected from hotel managers and government officers involved in smart hotel implementation in Batam. The findings are organised thematically in accordance with the research questions and the qualitative analysis procedures adopted in this study, encompassing participants' perceptions, and the extent of implementation, contributing factors, and implementation challenges. Each theme is substantiated with verbatim quotations from participants, followed by in-depth analysis and thematic synthesis. The chapter then integrates the themes to highlight their interrelationships, culminating in the formulation of the Model of Smart Hotel Implementation in Batam.

Chapter 5 presents the recapitulation of the study, along with its theoretical and practical implications, methodological contributions, limitations, recommendations for future research, and conclusions. The chapter begins by situating the key findings within existing literature and relevant theoretical perspectives, highlighting their contribution to understanding smart hotel implementation in the context of an emerging tourism destination such as Batam. It then elaborates on the theoretical and practical implications derived from the proposed smart hotel implementation model, particularly for hotel practitioners, policymakers, and other relevant stakeholders. Finally, the chapter acknowledges the limitations of the study and provides recommendations for future research directions.

The appendixes contain supplementary materials that support and complement the main text of the thesis. These materials include research instruments, interview protocols, ethics approval documents, participant information sheets, consent forms, coding frameworks, and selected data excerpts. The inclusion of these materials provides detailed methodological and empirical support for the study. Overall, the appendixes enhance the transparency, credibility, and replicability of the research process without disrupting the flow of the main discussion.

## 1.10 Chapter Summary

This chapter has introduced the conceptual and contextual foundation of the research by outlining the study background, problem formulation, research gaps, objectives and research questions, as well as the theoretical and practical significance of the study of smart hotel implementation in Batam. Simultaneously, this chapter also explains the scope of the research and the methodological approach used as a basis for producing systematic and credible findings. The inconsistency between the concept of smart hotels as digital transformation and implementation practices that are still oriented towards facility modernization, as identified in this chapter, emphasizes the importance of a more in-depth study of the local context of Batam. Therefore, chapter two then presents a review of the relevant literature for this research, which will then be discussed through empirical findings and discussions in subsequent chapters.

# CHAPTER 2
# LITERATURE REVIEW

## 2.1 Chapter Overview

This chapter critically reviews the literature related to smart hotel implementation, digital transformation in hospitality, and smart tourism development within both global and emerging destination contexts. The discussion encompasses the conceptualisation of smart hotels, the integration of enabling technologies such as artificial intelligence, Internet of Things, robotics, mobile applications, and smart energy systems, as well as the organisational and institutional challenges associated with implementation. Within this context, the chapter examines the benefits, limitations, and contextual complexities shaping smart hotel transformation across different tourism environments. The literature reviewed in this chapter was primarily derived from peer-reviewed journal articles indexed in Scopus and Web of Science published between 2020 and 2026, with particular emphasis on recent studies from 2024 to 2026 to ensure contemporary relevance and scholarly rigor. Earlier foundational studies were selectively incorporated to establish conceptual and theoretical grounding. Simultaneously, this chapter critically synthesises relevant theoretical perspectives, including socio-technical systems theory, service-dominant logic, and the technology, organisation, environment framework, in order to position smart hotel implementation as a socio-technical, organisational, and contextual phenomenon rather than merely technological adoption. The chapter also identifies significant gaps within existing literature, particularly the limited qualitative and context-sensitive understanding of smart hotel implementation within emerging tourism destinations such as Batam, thereby justifying the need for further qualitative inquiry.

### 2.1.1 Literature Search Strategy

This study employed a structured literature search strategy to ensure that the literature review was comprehensive, systematic, and academically rigorous. The

literature search was conducted using major academic databases, including Scopus, Web of Science, and ScienceDirect, due to their extensive coverage of peer-reviewed studies in hospitality, tourism, digital transformation, and technology management research (Paul & Criado, 2020; Snyder, 2019). Several keywords and search combinations such as "smart hotel", "smart hospitality", "hospitality digital transformation", "smart tourism", "IoT in hotels", and "AI in hospitality" were used to identify relevant literature, while Boolean operators including AND and OR were applied to refine the search process. The inclusion criteria focused on peer-reviewed journal articles published between 2020 and 2026 that discussed technological, organisational, managerial, and institutional aspects of smart hotel implementation, whereas conference papers, duplicated studies, and studies unrelated to the hospitality and tourism context were excluded. Following the screening and relevance assessment process, approximately 95 highly relevant articles were critically reviewed and synthesised to identify key concepts, theoretical perspectives, implementation challenges, and research gaps related to smart hotel implementation in emerging tourism destinations such as Batam.

## 2.2 Definition of Smart Hotel

In the modern hospitality sector, competitiveness is increasingly shaped not only by physical infrastructure or service standardisation, but also by hotels' ability to interpret and integrate technological innovation into operational and strategic processes (Chen et al., 2025; Kumar & Sharma, 2026). While earlier studies primarily associated competitiveness with technological adoption itself, more recent literature increasingly emphasises organisational adaptability, strategic sense-making, and the willingness to rethink traditional hospitality practices as equally important determinants of successful digital transformation (López-Bonilla et al., 2025; Hassan & Eassa, 2025). Within this evolving context, smart hotels are no longer viewed merely as technology-enabled facilities, but as adaptive socio-technical systems responding to dynamic environmental and market pressures (Wong & Loo, 2026; Kim et al., 2025).

Most hotels, regardless of their size, especially small and medium hotels, have been trying to remain competitive. These hotels need to progress and innovate to ensure their competitiveness and survival in the future. Qualitative growth, courage to rethink

existing business models, innovation capability, networking, and online communication have been regarded as important elements to ensure a continuous increase in hotel revenue and long-term sustainability (Liu et al., 2024). Recent studies further suggest that digital transformation in the hospitality industry is no longer optional but has become a strategic necessity driven by changing customer expectations, operational efficiency demands, and increasing market competition (Soliman et al., 2025; Ashfaq et al., 2025). Smart hotels can therefore be viewed as an adaptive response to rapidly changing environmental, technological, and competitive conditions within the global hospitality industry.

A hotel that integrates technology to enhance operational performance and guest experience is commonly referred to as a smart hotel (Han & Lee, 2024). For example, automated check-in and check-out systems allow guests to complete hotel procedures using smartphones without visiting the front desk (Kim & Han, 2024). Smart hotels also include rooms equipped with smart devices that enable guests to control temperature, lighting, and entertainment systems. Within this context, data-driven technologies support personalised services by providing customised recommendations related to dining, tourism activities, and hotel services (Eassa, 2025).

Collectively, existing studies suggest that smart hotels are increasingly evolving beyond simple technology-enabled facilities toward integrated hospitality ecosystems driven by automation, data connectivity, and personalised service delivery. The integration of technologies such as automated check-in systems, smart room controls, and mobile-based services reflects a broader transformation in how hospitality operations are designed and managed. This transformation suggests that smart hotel implementation involves not only technological innovation, but also organisational adaptation, service redesign, and evolving patterns of guest interaction within hospitality environments. While earlier smart hospitality studies predominantly emphasized technological functionality and automation efficiency, recent findings increasingly indicate that successful implementation depends on the interaction between technology, organisational capability, employee adaptation, and governance readiness. This evolving perspective suggests that smart hotel development should be understood as a multidimensional socio-technical transformation process rather than merely the adoption of advanced hospitality technologies. Consequently, implementation outcomes are shaped not only by technological capability, but also by contextual organisational realities and institutional environments that influence long-

term implementation sustainability.

Recent literature increasingly positions AI-driven personalisation and predictive analytics as central components of smart hospitality ecosystems due to their ability to enhance operational responsiveness and customer engagement simultaneously (Hsu, 2025; Kim et al., 2025). Nevertheless, scholars remain divided regarding whether technology-driven personalisation genuinely improves hospitality experiences. While some studies emphasise operational efficiency and service convenience, others argue that excessive automation may reduce opportunities for authentic human interaction and weaken the experiential dimensions traditionally associated with hospitality services (Hassan & Eassa, 2025; Wong & Loo, 2026). This debate suggests that smart hotel implementation involves balancing technological efficiency with the preservation of human-centred service experiences. While digital innovations offer significant operational and service advantages, existing studies increasingly argue that technological integration simultaneously introduces new organisational and governance complexities. As smart hotel systems become more interconnected and data-dependent, concerns regarding privacy, cybersecurity, and digital accountability have emerged as critical dimensions of smart hospitality implementation.

At the same time, the increasing dependence on AI-driven systems, predictive analytics, and interconnected hospitality technologies has intensified concerns regarding cybersecurity, data governance, and guest privacy within smart hospitality environments (Chen et al., 2025; Webster, 2025). Smart hotels routinely collect, process, and store substantial volumes of personal and behavioural data, creating organisational vulnerabilities associated with data breaches, unauthorised access, and cyber threats. Consequently, cybersecurity challenges in smart hotels extend beyond technical protection mechanisms and increasingly involve governance capability, stakeholder trust, regulatory compliance, and organisational accountability (Chen et al., 2025; Webster, 2025). Existing studies further suggest that insufficient data governance structures and limited institutional oversight may undermine guest confidence in smart hospitality systems. These limitations may also constrain the long-term sustainability of smart hotel implementation, particularly within emerging tourism destinations where digital governance frameworks remain underdeveloped (Hassan & Eassa, 2025; Wong & Loo, 2026).

Smart rooms also support cashless services that allow guests to pay for services and order room service without direct interaction with hotel staff (Kim & Han, 2024).

A smart hotel leverages technology to enhance guest experiences and optimise operational performance (Kumar & Sharma, 2026). A smart hotel can also be defined as a hotel operation that actively utilises advanced technologies to interact with guests and deliver services while minimising labour dependency (Soliman et al., 2025). This is achieved through the integration of various technologies, primarily IoT, AI, and big data analytics (Wong & Loo, 2026).

Smart hotels are increasingly transforming hospitality operations through the integration of digital technologies. However, existing studies suggest that the effectiveness of such transformation is strongly influenced by organisational capability, stakeholder adaptation, governance readiness, and contextual implementation conditions rather than technology adoption alone (Hsu, 2025). However, despite the growing adoption of smart technologies, existing literature continues to predominantly conceptualise smart hotels from a technology-oriented perspective, often emphasising operational efficiency and technological functionality while paying comparatively limited attention to organisational preparedness, stakeholder perceptions, and contextual implementation challenges (Negm, 2025; Webster, 2025).

Innovative hotel technologies are integrated to improve guest satisfaction and optimise operations. Key features of smart hotels include voice-activated assistants, connected devices, automated check-in and check-out systems, personalised room settings controlled through smartphone applications, and seamless digital concierge services (Kim et al., 2024). According to Mbarushimana (2024), smart hotels also commonly utilise data analytics to optimise energy consumption, improve operational efficiency, and customise service offerings for specific guests. The hotel can operate more effectively and sustainably through this technological integration, which also enhances guest comfort and convenience.

Recent hospitality studies increasingly conceptualise smart hotels as interconnected components of broader smart tourism ecosystems supported by digital governance, real-time data connectivity, and sustainable destination management practices (Ashfaq et al., 2025; Wong & Loo, 2026). While these developments provide operational and strategic advantages, recent literature simultaneously highlights the emergence of new organisational vulnerabilities associated with cybersecurity exposure, interoperability failures, data dependency, and governance complexity (Chen et al., 2025; Webster, 2025). This suggests that smart hotel transformation should not be interpreted solely as technological progress, but also as the expansion of

organisational and institutional responsibilities related to digital risk management and governance capability. (Chen et al., 2025; Webster, 2025). These risks may become particularly significant in emerging tourism destinations where institutional regulations, technical expertise, and organisational preparedness for cybersecurity management remain comparatively limited.

Smart hotels provide two major benefits to hotel establishments: enhanced operational efficiency and improved guest experience. Technology enhances guest experiences by enabling more personalised services and customised preferences. Nevertheless, existing studies suggest that the operational benefits of smart technologies are often unevenly distributed across hotels due to differences in organisational capability, financial readiness, and technological infrastructure, particularly within emerging tourism destinations (Soliman et al., 2025; Kumar & Sharma, 2026). It can store and retrieve guest preferences such as preferred languages, communication methods, and room settings (Ibrahim & Islam, 2024).

At the same time, technology can simplify check-in and check-out procedures. To avoid queues at the front desk, guests can independently complete hotel procedures using kiosks or mobile check-in applications (Lee et al., 2024). Additionally, technology allows guests to control lighting and room temperature while accessing room service menus and entertainment systems digitally (Negm, 2025). At the same time, recent studies indicate that guest expectations toward smart hospitality services are increasingly shaped by convenience, contactless interaction, digital responsiveness, and personalised experiences, particularly following the acceleration of digital adoption in the post-pandemic hospitality environment (Chen et al., 2025; Hsu, 2025). Mobile technologies have consequently transformed hospitality service delivery by enabling contactless interaction, personalised communication, and real-time service accessibility.

Existing studies collectively indicate that the benefits of smart hospitality technologies are closely associated with operational convenience, service responsiveness, and customer personalisation. Nevertheless, the effectiveness of these technologies remains highly dependent on organisational integration capability, digital infrastructure readiness, and stakeholder adaptability within specific tourism contexts. Recent literature further suggests that the effectiveness of mobile-based hospitality systems is strongly influenced by digital literacy, customer technology readiness, and organisational integration capability (Soliman et al., 2025; Chen et al., 2025). In

emerging tourism destinations, uneven internet infrastructure, inconsistent system integration, and limited technological investment may restrict the effectiveness of mobile technology implementation across different hotel categories. As a result, mobile technology adoption should be understood not merely as digital convenience, but as part of a broader organisational transformation process requiring managerial coordination, employee adaptation, and continuous technological support.

Although smart technologies are frequently associated with operational efficiency and enhanced guest experiences, several studies argue that these benefits are often unevenly distributed across hotel categories and tourism destinations due to disparities in financial capability, technological maturity, and organisational preparedness (Ashfaq et al., 2025; Wong & Loo, 2026). Within this context, excessive reliance on automation may reduce perceived service authenticity and human interaction, both of which remain important dimensions of hospitality experiences in many cultural contexts (Hassan & Eassa, 2025; Webster, 2025). Consequently, the effectiveness of smart hotel technologies cannot be assumed to be universally positive, as implementation outcomes are strongly influenced by contextual, organisational, and socio-cultural conditions.

Nevertheless, integrating technology that automates hotel operations can also benefit hotel owners, managers, and employees in addition to customers. Rather than replacing staff entirely, automation can redirect repetitive manual tasks and allow employees to focus on higher-value service interactions, making automation one of the most significant applications of smart technology in hospitality operations (Aluri et al., 2025). This reflects a broader socio-technical perspective in which smart hotel transformation is shaped not only by technological capability, but also by how employees, managers, and organisations adapt to technological change within specific operational contexts (Wong & Loo, 2026; López-Bonilla et al., 2025). Repetitive tasks such as billing, requesting guest reviews, and sending standardised emails can be automated efficiently. Energy management systems can also improve operational sustainability by automatically regulating lighting and air-conditioning systems when rooms or public spaces are unoccupied. At the same time, work-order systems and preventive maintenance technologies can improve housekeeping efficiency and facility management performance (Webster, 2025).

However, despite these operational advantages, previous studies have also identified challenges related to implementation costs, employee resistance,

technological complexity, cybersecurity concerns, and uneven organisational preparedness, particularly among small and medium-sized hotels operating in developing tourism destinations (Soliman et al., 2025; Hassan & Eassa, 2025). These interconnected technological, organisational, and behavioural challenges contribute to the slow and cautious adoption of smart hotel systems in Batam, particularly among hotels facing resource limitations, workforce adaptation issues, and uncertain implementation readiness.

Beyond operational efficiency considerations, recent literature increasingly positions smart hotel transformation as a broader organisational and socio-technical transition process. This perspective suggests that implementation outcomes are shaped not only by technological systems, but also by employee perceptions, managerial capability, organisational culture, and stakeholder adaptation. Within this context, existing studies indicate that employees may perceive automation technologies as threats to job stability, role relevance, and traditional service interactions, thereby contributing to resistance toward digital transformation initiatives (Hassan & Eassa, 2025; Wong & Loo, 2026). At the managerial level, uncertainty regarding long-term return on investment, technological interoperability, and implementation sustainability further complicates strategic decision-making processes, particularly among small and medium-sized hotels operating within resource-constrained environments (Kumar & Sharma, 2026). These findings suggest that smart hotel transformation involves not only technological readiness, but also organisational culture, leadership capability, and stakeholder acceptance within hospitality organisations.

While these definitions predominantly describe smart hotels through their technological features and functional benefits, they also reveal an implicit assumption that smartness is primarily a technologically driven outcome. From a qualitative perspective, however, such definitions represent only the surface of a more complex socio-technical phenomenon. In practice, the meaning of a smart hotel is shaped not merely by the presence of advanced technologies, but also by how these technologies are perceived, interpreted, negotiated, and enacted by various stakeholders within specific organisational and socio-cultural contexts. This indicates that smart hotel implementation cannot be fully understood through technological determinism alone, as contextual realities, stakeholder perceptions, organisational capability, and institutional environments also play important roles in shaping implementation outcomes (Wong & Loo, 2026; López-Bonilla et al., 2025).

This further indicates that smart hotel transformation requires not only technological capability, but also effective governance structures, stakeholder trust, and organisational accountability to ensure secure, sustainable, and context-sensitive implementation processes. This reflects that smart hotels should not be understood as fixed or universally defined models, but rather as dynamic and context-dependent concepts (Wong & Loo, 2026; López-Bonilla et al., 2025). Collectively, these challenges indicate that smart hotel implementation is not merely constrained by technological limitations, but also by organisational capability, institutional alignment, workforce readiness, governance capacity, and contextual conditions within specific tourism destinations. The interaction of these socio-technical and institutional barriers demonstrates that smart hotel transformation is a multidimensional process shaped by technological, managerial, and environmental dynamics rather than a purely technical undertaking (Ashfaq et al., 2025; Kumar & Sharma, 2026).

Consequently, a deeper qualitative investigation is necessary to understand how stakeholders interpret, negotiate, and respond to these implementation challenges within the specific context of Batam. Accordingly, the following section moves beyond definitional descriptions to explore the broader concept of smart hotels, examining smartness as a socio-technical process involving technological integration, human agency, organisational practices, and contextual influences. Despite the growing conceptualisation of smart hotels within contemporary hospitality literature, existing studies remain predominantly concentrated in technologically advanced destinations and large-scale hospitality environments. Comparatively limited attention has been given to how contextual realities, institutional conditions, and organisational preparedness influence smart hotel implementation within emerging tourism destinations such as Batam (Soliman et al., 2025; Hassan & Eassa, 2025). Simultaneously, current literature continues to be dominated by quantitative and technology-oriented approaches, while qualitative investigations exploring stakeholder perspectives and contextual implementation challenges remain comparatively limited (Wong & Loo, 2026; Webster, 2025). Consequently, there remains insufficient understanding of how technological, organisational, and institutional factors interact in shaping smart hotel transformation within developing hospitality environments.

## 2.3 The Concept of Smart Hotel

### 2.3.1 Evolution of Smart Hotel Concept

The concept of smart hotels has evolved substantially over the past decade. Early definitions focused on discrete technologies such as automated check-in kiosks, mobile keys, and energy management systems, whereas recent literature conceptualizes smart hotels as integrated, data-driven, and ecosystem-connected entities (Hassan & Eassa, 2025). Despite growing scholarly attention, interpretations of smart hotels remain diverse and fragmented across studies (Soliman et al., 2025; López-Bonilla et al., 2025). Consequently, there is a clear need for analytical consolidation (Chen et al., 2025; Ashfaq et al., 2025) to establish a coherent conceptual understanding. This conceptual fragmentation also indicates that the meaning of smartness in hospitality remains theoretically underdeveloped, particularly regarding how technological, organisational, and contextual dimensions interact within different tourism environments. Existing studies frequently emphasise technological functionality while providing comparatively limited explanation of how smart hotel implementation is shaped by organisational capability, stakeholder interpretation, and institutional conditions (Hassan & Eassa, 2025; Wong & Loo, 2026).

Early academic interpretations of the smart hotel concept, particularly those emerging before 2015, predominantly adopted a technology-centric perspective. Within this initial phase, smart hotels were largely conceptualized as hospitality establishments enhanced by the introduction of discrete technological components rather than as integrated service systems (Chen et al., 2025). Scholarly works from this period commonly defined smart hotels as properties equipped with digital check-in kiosks, basic room automation features, or elementary IoT applications such as smart lighting and temperature control (Soliman et al., 2025). Within this context, limited data management functionalities primarily focused on basic guest profiling and operational monitoring were often cited as indicators of smartness (López-Bonilla et al., 2025). This early body of literature was characterized by a form of technological determinism, wherein the presence of advanced devices or automated features was assumed to directly equate to service innovation and organizational intelligence (Ashfaq et al., 2025).

As a result, broader considerations relating to system integration, data-driven

decision-making, organizational readiness, and ecosystem connectivity were largely absent from these early definitions. Consequently, the smart hotel was viewed more as a collection of technological artifacts than as a holistic, digitally enabled service environment, laying the groundwork for subsequent reconceptualization in later scholarly discourse (Hassan & Eassa, 2025). From a theoretical perspective, this stage of literature reflected strong assumptions associated with technological determinism theory, in which technology itself was positioned as the primary driver of organisational transformation. However, such perspectives tended to overlook the socio-technical complexities of implementation, including human agency, managerial interpretation, and contextual readiness within hospitality organisations. However, these early technology-centric perspectives were frequently criticised for oversimplifying smart hotel transformation by assuming that technological adoption alone could automatically improve organisational performance and service innovation, while paying comparatively limited attention to human, organisational, and contextual dimensions of implementation (Ashfaq et al., 2025; Wong & Loo, 2026).

Between 2015 and 2020, scholarly interpretations of smart hotels demonstrated a clear conceptual shift from isolated technological applications toward the integration of multiple digital systems aimed at enhancing both guest experience and operational efficiency. During this period, smart hotels were increasingly conceptualized as digitally integrated environments in which IoT applications, Property Management Systems (PMS), Customer Relationship Management (CRM) platforms, and mobile interfaces converged to support seamless service delivery (Soliman et al., 2025). This phase of the literature also highlighted the emergence of data-driven service models, whereby analytics were employed to enable personalization, improve decision-making, and optimize resource utilization (Chen et al., 2025).

This transition reflected broader theoretical developments associated with Socio-Technical Systems Theory (STS) and service-dominant logic, which emphasise the interdependence between technological systems, organisational processes, and human interactions in value co-creation within service environments (López-Bonilla et al., 2025). Rather than viewing technology as an isolated operational tool, these perspectives conceptualise smart hotels as integrated systems in which technology, employees, management, and guests collectively shape service experiences and operational outcomes. Nevertheless, the extent to which these integrated smart hotel models can be effectively implemented remains highly uneven across destinations,

particularly in secondary and emerging tourism regions where organisational preparedness, digital infrastructure, and institutional coordination remain comparatively underdeveloped (Chen et al., 2025; Kumar & Sharma, 2026). While hotels in technologically advanced destinations increasingly operate within interconnected smart tourism ecosystems supported by advanced digital governance and infrastructure, hotels in emerging destinations often continue to rely on fragmented and incremental technological adoption strategies due to resource limitations and contextual constraints (Soliman et al., 2025; Wong & Loo, 2026). This reveals that smart hotel transformation is not universally linear, but instead shaped by varying socio-technical and institutional conditions across tourism environments.

At the same time, researchers began to emphasize the role of technology-enabled spaces in reducing labour dependency and streamlining hotel operations, reflecting growing concerns over cost efficiency and workforce constraints (Ashfaq et al., 2025). Central to these discussions was a strong emphasis on connectivity and system interoperability, as scholars increasingly recognized that fragmented or standalone technological solutions were insufficient to produce genuinely intelligent service environments (Hassan & Eassa, 2025). Consequently, this period marked a transitional stage in the evolution of the smart hotel concept, laying the foundation for more holistic, ecosystem-oriented perspectives that emerged in subsequent studies. Recent scholarly work increasingly conceptualizes smart hotels as integral components of broader smart tourism ecosystems rather than as standalone technological implementers (Soliman et al., 2025; Wong & Loo, 2026).

Nevertheless, although existing studies increasingly acknowledge integration and ecosystem connectivity, the literature still predominantly focuses on technologically advanced destinations and large-scale hospitality environments. Comparatively limited attention has been given to how resource limitations, institutional environments, and operational preparedness influence smart hotel implementation within emerging tourism destinations such as Batam (Soliman et al., 2025; López-Bonilla et al., 2025). Contemporary literature emphasizes the interconnectivity of smart hotels with smart city infrastructures, transportation systems, and platform-based digital services, positioning hotels within a networked destination environment (Wong & Loo, 2026; Hassan & Eassa, 2025). Within this ecosystem, smart hotels are characterized using artificial intelligence-enabled personalization, allowing guests to receive tailored recommendations, predictive services, and responsive

interactions across multiple touchpoints.

Nevertheless, several scholars argue that excessive reliance on automation and AI-driven interaction may simultaneously reduce perceived human warmth, emotional engagement, and service authenticity within hospitality environments (Ashfaq et al., 2025; Hassan & Eassa, 2025). This indicates that smart hotel implementation involves ongoing tensions between technological efficiency and human-centered hospitality values, particularly in destinations where personalised interpersonal service remains culturally significant. Although artificial intelligence is increasingly embedded within smart hospitality operations, scholarly discussions continue to reveal differing perspectives regarding its broader implications for service delivery and organisational practice (Hassan & Eassa, 2025; Kim et al., 2025). On one hand, AI-enabled systems contribute to faster response times, service customisation, and operational efficiency through predictive analytics, automated interaction, and data-driven decision-making.

Within this context, studies highlight the emergence of hybrid service models in which human service provision is complemented by service robotics, reflecting evolving labour dynamics and service expectations (Ashfaq et al., 2025; Soliman et al., 2025). Simultaneously, sustainability has become a central pillar of recent smart hotel conceptualizations, with digital technologies deployed to monitor and optimize energy consumption, waste management, and broader resource efficiency (López-Bonilla et al., 2025). This evolution is underpinned by a cyber-physical convergence that tightly links physical hotel spaces such as rooms and facilities with digital interfaces, including mobile applications, cloud-based platforms, and sensor networks (Hassan & Eassa, 2025). A unifying theme across these contemporary definitions is the recognition that smart hotels are not primarily defined by the presence of smart devices, but by the intelligence of their integrated systems and the value generated through continuous, real-time data flows across the tourism ecosystem.

Despite these advancements, several studies argue that the benefits of smart hotel integration remain unevenly distributed across hospitality sectors and destinations due to disparities in investment capability, technological maturity, workforce preparedness, and governance effectiveness (Soliman et al., 2025; Hassan & Eassa, 2025). In many emerging tourism destinations, smart hotel implementation continues to rely on selective and isolated technological adoption rather than comprehensive ecosystem integration, thereby limiting the overall transformative potential of smart hospitality systems. Collectively, the evolution of smart hotel literature demonstrates a

gradual transition from technology-centric interpretations toward more integrated socio-technical and ecosystem-oriented perspectives. However, existing scholarship remains disproportionately focused on technologically advanced hospitality environments, while comparatively limited empirical attention has been given to implementation realities within emerging tourism destinations.

As a result, current understanding of smart hotel transformation remains insufficient for explaining how organisational capability, governance facilitation, contextual constraints, and stakeholder perceptions interact in shaping implementation processes within destinations such as Batam. This highlights that smart hotel development is not a universally standardised process, but rather a context-sensitive transformation influenced by varying socio-technical and organisational conditions.

Despite Batam's strategic importance as a tourism gateway and its growing hospitality sector, existing empirical research examining smart hotel implementation within the destination remains extremely limited. Current literature provides insufficient understanding of how technological capability, organisational preparedness, and governance facilitation interact within the local hospitality context, thereby justifying the need for further qualitative exploration. Simultaneously, most existing smart hotel studies remain concentrated within technologically advanced destinations and predominantly employ quantitative approaches focusing on customer acceptance and operational efficiency. Comparatively limited attention has been given to stakeholder perceptions, organisational adaptation, and contextual implementation challenges within emerging tourism destinations such as Batam. Consequently, there remains a significant theoretical and contextual gap regarding how smart hotel transformation occurs within resource-constrained and institutionally evolving hospitality environments.

### 2.3.2 Socio-Technical Perspectives on Smart Hotel Implementation

Beyond technological evolution and ecosystem integration, recent literature increasingly emphasises the importance of theoretical and socio-technical perspectives in explaining smart hotel implementation processes. From a qualitative perspective, this conceptual evolution indicates that smart hotels cannot be understood merely as technological configurations, but as socially constructed and contextually embedded

phenomena. Within the literature, the notion of "smartness" is not presented as a fixed or universally agreed concept, but rather as one that is understood and articulated differently across stakeholder groups, including hotel managers and policymakers, as reflected in their organisational roles and contextual settings. As a result, the smart hotel concept is often described in the literature as dynamic, negotiated, and contingent rather than universally fixed.

This interpretive perspective aligns closely with socio-technical systems theory, which emphasises that technological implementation outcomes are shaped by continuous interactions between technology, human actors, organisational structures, and external environments. Within this context, service-dominant logic further supports this perspective by conceptualising smart hotels as value co-creation environments in which service experiences emerge through interactions between technology, employees, guests, and organisational systems rather than through technology alone (Vargo & Lusch, 2024; Kim et al., 2025). Consequently, smart hotel implementation should not be understood solely through technological capability, but also through stakeholder perceptions, governance facilitation, operational preparedness, and contextual realities within specific tourism destinations. This interpretive lens provides a foundation for examining individual technological domains, including IoT, artificial intelligence, robotics, and other smart systems, not as isolated innovations but as interrelated components of a broader socio-technical transformation.

Collectively, existing theoretical perspectives provide important insights into smart hotel implementation by explaining the relationships between technology, organisational processes, stakeholder interaction, and service value creation. Nevertheless, these perspectives remain insufficient for fully explaining the contextual and institutional complexities shaping smart hotel transformation within emerging tourism destinations such as Batam. Existing studies remain heavily concentrated on technologically advanced hospitality environments and predominantly quantitative approaches, while comparatively limited attention has been given to stakeholder interpretation, organisational adaptation, and contextual implementation realities. Consequently, a more context-sensitive and qualitative approach is required to examine how technological, organisational, institutional, and stakeholder-related factors interact in shaping smart hotel implementation within emerging tourism destinations.

### 2.3.3 Theoretical Perspectives on Smart Hotel Implementation

Smart hotel implementation is a complex phenomenon involving technological, organisational, service, and environmental dimensions. Therefore, a single theoretical perspective may not adequately explain the multifaceted nature of smart hotel transformation. Based on a systematic review of recent literature on smart hospitality, digital transformation, and technology implementation in tourism and hospitality settings, three theoretical perspectives were identified as particularly relevant, namely Socio-Technical Systems Theory (STS), Service-Dominant Logic (SDL), and the TOE Framework. While this study is primarily exploratory and qualitative in nature, these theories are not employed as hypothesis-testing frameworks but rather serve as complementary conceptual lenses to support the interpretation of smart hotel implementation within the context of Batam.

The development of smart hotel discourse within hospitality research suggests that digital transformation in hotels involves far more than the simple installation of automated technologies and smart devices. Earlier literature frequently adopted a technologically deterministic viewpoint, where the introduction of advanced digital systems was assumed to naturally enhance efficiency, service performance, and competitive advantage within hotel operations (Ashfaq et al., 2025; Chen et al., 2025). More recent studies, however, increasingly acknowledge that technological presence alone is insufficient to ensure successful smart hotel implementation. Instead, implementation outcomes are influenced by multiple interrelated factors, including organisational preparedness, employee capability, managerial commitment, stakeholder acceptance, and institutional environments (Soliman et al., 2025; López-Bonilla et al., 2025).

Simultaneously, the expanding use of artificial intelligence, IoT applications, robotics, and integrated digital platforms has increased operational complexity within hospitality organisations, requiring hotels to continuously reconcile technological advancement with personalised service delivery and local operational conditions (Hassan & Eassa, 2025; Wong & Loo, 2026). Accordingly, contemporary scholarship increasingly positions smart hotel implementation as a broader organisational and socio-technical transformation rather than merely a process of technological enhancement. Current hospitality literature increasingly conceptualises smart hotels as digitally interconnected service environments embedded within wider tourism

ecosystems. Nevertheless, explaining smart hotel implementation exclusively through technological perspectives remains inadequate due to the multidimensional nature of implementation processes.

The transformation towards smart hospitality is shaped not only by technological infrastructure but also by managerial readiness, human interaction, institutional support, and destination-specific contextual characteristics (Hassan & Eassa, 2025; Wong & Loo, 2026). As a result, scholars have increasingly utilised multiple theoretical perspectives to examine how smart technologies are introduced, interpreted, and operationalised within hotel environments. Among the most frequently applied theoretical perspectives in smart hospitality research are STS, SDL, and the TOE Framework, each offering a distinct yet complementary lens for understanding the complexities associated with smart hotel implementation. Collectively, these perspectives provide insights into the interactions among technological capabilities, organisational readiness, stakeholder perceptions, service innovation, and environmental influences that shape smart hotel implementation in Batam. The following sections discuss each theoretical perspective and its relevance to the context of smart hotel implementation.

#### *2.3.3.1 Socio-Technical Systems Theory*

The increasing complexity of smart hotel implementation has encouraged hospitality researchers to move beyond purely technology oriented explanations toward perspectives that consider the interaction between technological systems and organisational dynamics. Within contemporary hospitality literature, the implementation of smart technologies is increasingly understood as a multidimensional process shaped not only by digital infrastructure, but also by human behaviour, organisational capability, managerial interpretation, and broader institutional conditions (Kim et al., 2025; Hassan & Eassa, 2025). This shift reflects growing recognition that technology alone cannot automatically produce service innovation or organisational transformation without effective alignment between technological systems and the social environment in which they operate. Consequently, socio-technical perspectives have become increasingly important in explaining how smart hotel technologies are adopted, integrated, and experienced within hospitality

organisations, particularly within destinations characterised by varying levels of digital readiness and organisational capability.

STS Theory has increasingly been recognised as one of the most relevant theoretical perspectives for explaining technology implementation within complex organisational environments such as hospitality operations (Kim et al., 2025; López-Bonilla et al., 2025). The theory argues that organisational performance is not determined solely by digital capability, but rather by the interaction between social systems and technical systems within an organisation (Hassan & Eassa, 2025). Within the context of smart hotels, this perspective suggests that the successful implementation of smart technologies depends not only on the availability of advanced digital infrastructure, but also on employee readiness, managerial interpretation, organisational culture, stakeholder acceptance, and institutional support systems. From a socio technical perspective, technology itself does not automatically generate organisational transformation or operational effectiveness.

Instead, implementation outcomes are shaped by how technologies are integrated into existing organisational practices and how stakeholders interact with technological systems in everyday operational environments (Soliman et al., 2025). This is particularly important within hospitality settings where human interaction, emotional labour, and personalised service remain central components of guest experience. Consequently, smart hotel implementation involves continuous negotiation between automation and human-centred service delivery. Recent studies further indicate that socio-technical alignment remains one of the most critical challenges in smart hotel implementation, particularly within emerging tourism destinations characterised by limited technological infrastructure, uneven digital capability, and organisational resource constraints (Ashfaq et al., 2025; Webster, 2025).

In destinations such as Batam, implementation complexity may be intensified by varying levels of technological readiness, insufficient workforce capability, and limited institutional coordination. This illustrates that smart hotel transformation should be understood as a contextual socio technical process rather than merely technological modernisation. Despite its relevance, existing smart hotel literature has only partially incorporated socio technical perspectives, with many studies continuing to prioritise technological functionality and operational efficiency over organisational and contextual dynamics (Wong & Loo, 2026). Consequently, there remains limited qualitative understanding of how stakeholders interpret, negotiate, and experience smart

hotel implementation within emerging tourism destinations.

#### *2.3.3.2 Service-Dominant Logic*

Service-Dominant Logic (SDL) also provides an important theoretical lens for understanding smart hotel implementation within hospitality environments. SDL conceptualises service as the fundamental basis of exchange and emphasises value co-creation through interactions between service providers, customers, technologies, and other stakeholders (Vargo & Lusch, 2024). Within smart hotel environments, value is not created solely through technological systems themselves, but through the integration of technology with guest experiences, employee interactions, and service processes. From this perspective, smart technologies such as AI-driven recommendation systems, mobile applications, smart room automation, and digital concierge platforms function as enablers of interactive and personalised service experiences rather than merely operational tools (Chen et al., 2025; Hsu, 2025).

Smart hotel implementation therefore involves the co-creation of value through dynamic interactions between digital systems and human actors within the hospitality ecosystem. SDL is particularly relevant in explaining the growing tension between high-tech and high-touch hospitality services. Although automation technologies may improve efficiency and convenience, excessive technological dependence may simultaneously reduce perceived emotional connection and service authenticity within hospitality experiences (Hassan & Eassa, 2025; Wong & Loo, 2026). This indicates that the implementation of smart technologies within hotels requires careful balancing between technological innovation and human-centred service interaction. However, despite its conceptual relevance, SDL has been comparatively underutilised within empirical smart hotel implementation research, particularly within emerging tourism destinations. Existing studies remain predominantly focused on customer satisfaction metrics and technology acceptance variables, while comparatively limited attention has been given to how stakeholders collectively negotiate value creation within resource constrained hospitality environments such as Batam.

#### *2.3.3.3 Technology Organisation Environment Framework*

The Technology Organisation Environment (TOE) Framework has also been widely employed to explain organisational technology adoption and implementation processes within hospitality and tourism research (Tornatzky & Fleischer, 1990). The framework proposes that technology implementation is influenced by three interrelated dimensions, namely technological factors, organisational factors, and environmental conditions. Within the context of smart hotels, technological factors include system compatibility, technological complexity, infrastructure readiness, cybersecurity capability, and perceived technological advantages (Kumar & Sharma, 2026). Organisational factors involve managerial support, financial capability, employee readiness, innovation culture, and organisational size, while environmental factors include competitive pressure, government support, tourism market dynamics, and institutional regulation (Ashfaq et al., 2025; Chen et al., 2025).

The TOE framework is particularly useful in explaining why smart hotel implementation varies significantly across destinations and hotel categories. Hotels operating within emerging tourism destinations may experience greater implementation barriers due to limited digital infrastructure, financial constraints, regulatory uncertainty, and insufficient technological ecosystems. Consequently, TOE provides a useful analytical structure for examining the multi dimensional conditions influencing smart hotel transformation. Nevertheless, despite its analytical usefulness, the TOE framework has also been criticised for being overly operational and predominantly associated with quantitative technology adoption studies (Wong & Loo, 2026).

Existing TOE based research frequently prioritises measurable implementation factors while providing comparatively limited understanding of socio cultural interpretation, stakeholder negotiation, and contextual complexity within real organisational settings. Simultaneously, TOE studies often assume relatively stable organisational environments, which may not fully reflect the dynamic realities of hospitality operations within emerging tourism destinations such as Batam. Therefore, although TOE offers important implementation insights, it remains insufficient as a standalone explanation for the socio technical complexities of smart hotel transformation.

#### *2.3.3.4 Critical Theoretical Synthesis*

Collectively, these theoretical perspectives provide important insights into smart hotel implementation from technological, organisational, and service-oriented viewpoints. However, existing theoretical applications remain fragmented and insufficiently integrated within current smart hotel literature. Many studies continue to emphasise technological functionality, operational efficiency, and customer acceptance while providing comparatively limited attention to organisational interpretation, institutional alignment, stakeholder negotiation, and contextual implementation realities (Soliman et al., 2025; Wong & Loo, 2026). Simultaneously, existing smart hotel research remains heavily concentrated within technologically advanced destinations characterised by stronger digital infrastructure, higher organisational capability, and more mature smart tourism ecosystems.

As a result, theoretical and empirical understanding of smart hotel implementation in emerging tourism destinations remains relatively limited, particularly in contexts where infrastructural limitations, organisational constraints, and institutional uncertainties continue to pose significant challenges (Hassan & Eassa, 2025; López-Bonilla et al., 2025). Existing studies have largely focused on technological adoption from a technical or operational perspective, while giving less attention to the broader socio-technical and contextual dimensions of implementation. This reinforces that smart hotel implementation should be understood not merely as technological adoption, but as a complex transformation shaped by interactions between technology, organisations, stakeholders, and institutional environments. Consequently, more context-sensitive and qualitative investigations are still needed to explain how smart hotel implementation is experienced, interpreted, and operationalised within destinations such as Batam.

### 2.3.4 Internet of Things

The integration of IoT is changing the hotel guest experience by making it more personalised, easier, and automatic (Ibrahim & Islam, 2024). For example, a kiosk is automatic check-in and check-out systems in a hotel. Its main purposes are automation and process optimisation, and for it to work properly, it is also connected to the IoT

(Gajić et al., 2024). By automating the check-in process, kiosks let guests do things like register, choose their preferred room, and even pay for their stay without having to interact with the staff at the hotel (Van der Meulen et al., 2024). Kiosks also improve the check-in process by standardising procedures and reducing human error (Baluyot, 2025). Simultaneously, kiosks are frequently integrated with other IoT devices and linked to the hotel's network. This enables them to accept payments, validate reservations, get guest information, and even communicate with other systems such as security or room management. Hotel leverage the power of the IoT to operate efficiently and integrate with other hotel systems (Gajić et al., 2024).

The food and beverage industry has also seen significant improvements from the IoT, especially in the food and beverage departments of hotels. There are several ways that IoT technology is utilised to boost productivity, enhance customer satisfaction, and guarantee food safety (Gajić et al., 2024). One of those implementations is the integration of IoT sensors into storage spaces to track inventory levels in real-time. As supplies run short, this automatically creates orders, lowers food waste, and helps avoid stockouts (Suanpang & Pothipassa, 2024). To optimise cooking efficiency, guarantee consistent food quality, and notify staff of maintenance issues, IoT enables kitchen appliances such as ovens, refrigerators, and cooking equipment to be controlled (Gajić et al., 2024).

IoT sensors are also able to monitor the temperature in food storage facilities and refrigeration equipment. It can also alert the staff to the deviation from the ideal temperature, regulate food safety procedures, and reduce the likelihood of spoilt food. Tracking food goods' path from supplier to kitchen is another implementation of IoT technology. Enhanced transparency, faster recall in case of contamination, and guaranteed ingredient quality and authenticity are all facilitated by this device (Priya & Khamesra, 2024). Additionally, consumers' eating experiences can be made more unique by using IoT devices via self-service kiosks and smart menus.

Customers will be more satisfied with the technology to recommend menu items based on their tastes, dietary needs, or past orders. IoT sensors can also track food wastage levels in real-time, which gives kitchen workers the ability to spot trends and make data-driven choices (Gajić et al., 2024). This lowers the costs and encourages sustainability. The department's IoT solutions, which automate temperature monitoring, guarantee ideal storage conditions and provide thorough records for audits, also assist in maintaining compliance with food safety regulations (Suanpang & Pothipassa, 2024).

IoT technologies offer substantial operational efficiencies but demand robust infrastructure, high initial investment, and strict cybersecurity governance (Herrera et al., 2024). While IoT technologies enable connectivity, automation, and real-time data collection across hotel operations, the capacity to interpret, learn from, and strategically act upon these data introduces the role of artificial intelligence as a complementary layer that transforms connected systems into adaptive and intelligent service environments. Therefore, IoT effectiveness depends on the interaction between technological infrastructure, managerial readiness, and implementation context.

### 2.3.5 Artificial Intelligence (AI)

Artificial intelligence (AI) functions as a critical enabler of intelligent decision-making in smart hotel environments, supporting personalized service delivery, real-time analytics, and predictive service flows (Tan et al., 2024; Wang et al., 2025). In contemporary hospitality operations, AI applications commonly include chatbots and virtual concierge systems, predictive room pricing algorithms, guest sentiment analysis, behaviour-based recommendation engines, and automated service recovery workflows (Kumawat et al., 2025; Aluri et al., 2025). These capabilities allow hotels to anticipate guest needs, respond dynamically to service disruptions, and enhance overall service consistency, positioning AI-driven personalization as one of the strongest determinants of guest satisfaction in highly competitive hospitality markets (El Hajal & Yeoman, 2024; Wang et al., 2025).

Artificial intelligence is another important aspect of smart hotels which brings automation and intelligence to various aspects of hotel operations. On the other hand, AI is being used in smart hotels through chatbots and virtual assistants to solve guests' problems, provide information about hotel services, make reservations, and tailor recommendations. They can communicate via text message or voice assistants and provide faster services (Tan et al., 2024). Artificial intelligence algorithms can analyse visitors' data and preferences to deliver personalised experiences. This can include customised guest room settings, tailored recommendations for dining and activities, and personalised offers or promotions (Wang et al., 2025). There are also some features such as voice recognition and voice control technology using artificial intelligence, which allows guests to control various aspects of their room, such as lighting, heating

and entertainment systems via voice commands. This hands-free operation increases convenience and comfort (Kumawat et al., 2025).

AI algorithms can also analyse data from sensors and devices to determine maintenance needs and detect potential problems before they occur. These predictive methods help prevent equipment failure and reduce downtime (Artificial Intelligence Technology, Its Applications and the Use of AI Powered Devices in Hospitality Service Experience Creation and Delivery, 2025). The implementation of AI in analysing market trends, competitive data, and historical data contributes significantly to revenue management, particularly in developing pricing strategies and improving occupancy rates (Wang et al., 2025). Aside from revenue management, AI also contributes to security and surveillance.

AI-powered video analytics can monitor security cameras and detect suspicious activities or unauthorised access, thereby improving the safety of guests and staff (Kumawat et al., 2025). In short, artificial intelligence in smart hotels increases operational efficiency, improves the guest experience, enables hotels to provide personalised services, streamlines processes, reduces costs, and provides valuable information to support better decision-making (Tan et al., 2024). Within this context to artificial intelligence, big data is another important element needed to support smart hotel implementation. Together, AI and big data support innovations such as autonomous robots, intelligent assistants, and highly personalised hospitality experiences. Big data continuously feeds AI systems, which in turn improve data analysis capabilities and contribute to smarter hotel operations.

However, the successful implementation and effective utilization of AI technologies are contingent upon several organizational preconditions. These include the availability of skilled human resources, robust and high-quality data infrastructures, seamless integration with existing property management and customer relationship management systems, and an organizational culture that supports experimentation and digital transformation (Aluri et al., 2025). In contexts where these enabling conditions are limited, AI implementation risks becoming superficial or underutilized (Wang et al., 2025; Kumawat et al., 2025). While artificial intelligence primarily enables cognitive and decision-making capabilities within smart hotel systems, its translation into visible and embodied service practices becomes most evident through the deployment of robotics and automation, where algorithmic intelligence is operationalised into physical

interactions and routine service execution. This reveals that AI implementation in hospitality environments is shaped not only by digital capability, but also by organisational, behavioural, and contextual dynamics.

### 2.3.6 Robotics and Automation

Robotics and automation have increasingly been introduced into hotel operations as part of broader smart hotel strategies, with applications extending across both frontline and back-of-house functions (Aluri et al., 2025). Common implementations include automated front-desk check-in systems, robotic luggage delivery, room service robots, and autonomous cleaning technologies. These applications are designed to enhance operational efficiency, reduce labour dependency, and support service continuity, particularly in environments characterized by labour shortages or high service demand variability (Tan et al., 2024; Webster, 2025).

However, the implementation of robotics within the hospitality sector differs significantly across regions. Countries such as Japan, China, and South Korea demonstrate more advanced adoption due to stronger technological ecosystems, government support, and higher acceptance of robot-assisted services among consumers and employees (Zhang & Huang, 2025). In contrast, many Southeast Asian destinations, including Indonesia, continue to adopt robotics cautiously because of substantial investment costs, cultural expectations surrounding personalised hospitality services, and limited employee preparedness to collaborate with robotic systems (Webster, 2025). Recent innovation and technology adoption studies further suggest that hospitality technologies perceived as complex and difficult to experiment with are generally adopted more slowly, particularly in emerging tourism destinations (Godolja et al., 2025).

This perspective reflects Batam's current context, where the use of robotics remains selective and experimental rather than fully integrated across hotel operations. Consequently, recent literature indicates that mobile technologies and smart guest interfaces are often considered more practical and accessible pathways toward smart hotel implementation, particularly in destinations with limited technological readiness and infrastructure. Consequently, robotic implementation in hospitality reflects broader socio-technical and organisational transformation processes rather than purely

operational automation.

### 2.3.7 Mobile Technologies and Smart Guest Interfaces

The hotel, equipped with an advanced and secure wi-fi network, enables guests to stay connected and make use of smart hotel facilities. They can download and use the hotel's mobile application to connect their devices to the network and access the internet. In smart hotel settings, mobile applications and connectivity are essential to improve guest experiences (Tan et al., 2024). To check in and out of the hotel, guests can utilise smartphone applications, doing away with the necking for conventional front desk interaction. At the same time, mobile applications allow guests to access their rooms with their smartphones operating as digital keys. This allows for seamless and secured entrance while doing away with the need for physical key cards (Webster, 2025).

Besides that, to provide personalised services and recommendations, mobile applications can gather information about the interests and behaviours of their users. This can include personalised eating recommendations, specially designed room settings, or activities. An effective mobile application is the central hub of hotel management and communication with the hotel (Aluri et al., 2025). Through smartphone apps, guests can manage the lighting, temperature, and entertainment systems in their rooms. This gives guests convenience and gives them control back into their hands (Tan et al., 2024).

The application can assist guests to request amenities, book restaurants, and ask for help or assistance from the concierge. Such are the examples of efficiency and convenience of the applications. Direct contact between hotel staff and guests is made possible via mobile applications. Using the chat or in-app messaging facilities, guests may report problems, make requests, and ask for help, guaranteeing quick and efficient service (Webster, 2025). Within this context, guests can quickly settle their bills through the smartphone application, which is a feature that many smart hotels offer. Doing away with the necking of actual cash or credit card transactions improves efficiency and security (Aluri et al., 2025).

Smart hotels can offer a smooth and customised experience for guests, optimise operations, and enhance overall guest satisfaction using mobile connectivity and applications. It facilitates effective communication and service delivery between guests

and hotel staff while giving guests control and convenience (Tan et al., 2024). Numerous hotels are utilising mobile applications in their smart hotels, such as Hilton Honors, which offers mobile key access, room control, and customised recommendations. Moreover, the Marriott Bonvoy application allows mobile room service requests, mobile check-in, and staff communication. Additionally, the IHG Hotels and Resorts application offers travel information, room control, and digital key access (Aluri et al., 2025).

Mobile integration has become a core component of smart hotel implementation and a standard guest expectation, particularly in the post-pandemic hospitality landscape where contactless and self-service interactions are increasingly valued (Tan et al., 2024; Webster, 2025). Key applications include mobile check-in and check-out, mobile key access, in-app room controls, digital concierge services, mobile-based service ordering, and real-time notifications for promotions or operational updates (Aluri et al., 2025; Tan et al., 2024). From a technological and diffusion perspective, mobile systems frequently serve as the primary entry point into a hotel's smart ecosystem, as they exhibit high trialability, strong alignment with existing guest behaviour, and significantly lower investment requirements compared to robotics or fully automated systems (Webster, 2025; Aluri et al., 2025). While mobile applications function as the most visible and guest-facing interface of smart hotel implementation, their effectiveness ultimately depends on the extent to which they are seamlessly integrated with underlying hotel systems, enabling coordinated data flows, cross-functional operations, and consistent service delivery across the organisation. Accordingly, mobile technology implementation should be understood as a contextual and organisational adaptation process rather than merely a digital service enhancement tool.

### 2.3.8 Integrated Systems

Integrated systems play a crucial role in the functioning of a smart hotel (Liu et al., 2024). These systems are designed to seamlessly connect and communicate with each other, enabling efficient operations and enhanced guest experiences. There are some integrated systems commonly found in smart hotel Property Management Systems (PMS) that serve as the central hub integrating various hotel operations,

including front desk operations, reservations, housekeeping, and guest services. It allows real-time data sharing and coordination between different departments, ensuring smooth operations and guest satisfaction (Gajić et al., 2024). The other system is the Energy Management System (EMS) which integrates various energy-consuming devices and systems within the hotel, such as Heating Ventilation and Air-Conditioning (HVAC) systems, lighting, and occupancy sensors. It optimises energy usage by monitoring and controlling energy consumption based on occupancy, guest preferences, and environmental conditions (Adeel et al., 2024).

Guest service platforms are also one of the integrated systems integrating guest-facing systems and applications, such as mobile applications, in-room tablets, and interactive kiosks. They enable guests to access services, control room features, request assistance, make reservations, and provide feedback, enhancing convenience and personalisation. It is not only for the guest, but also for security and access control systems where integrated security systems include video surveillance, access control, and alarm systems. These systems work together to monitor and secure the hotel premises, ensuring the safety of guests and staff (Gajić et al., 2024). Aside from that, environmental monitoring systems can monitor and control environmental conditions within the hotel, such as temperature, humidity, and air quality. They help maintain a comfortable and healthy environment for guests while optimising energy usage (Valett et al., 2024).

Guest experience management systems gather and analyse data to provide personalised experiences. They track guest preferences, behaviour patterns, and feedback to tailor recommendations, customised room settings, and targeted marketing communications. Simultaneously, communication and collaboration systems enable seamless communication between hotel staff, departments, and guests. These include voice communication systems, messaging platforms, and task management tools, ensuring efficient collaboration and prompt response to guest requests (Liu et al., 2024).

By integrating these systems, smart hotels can streamline operations, improve guest satisfaction, optimise resources, and enhance overall efficiency (Gajić et al., 2024). The seamless connectivity and coordination between these systems create a cohesive and technologically advanced environment supporting the delivery of exceptional guest experiences. The integration of the system also creates a holistic environment catering to both guest needs and operational efficiency (Kalefa & Gado, 2024). This paves the way for a future where hotels are not only limited to places to stay but also dynamic and

personalised experiences. Within the literature, the integration of these interconnected systems is not viewed merely as a mechanism for operational efficiency, but as an enabling condition through which guest preferences, interactions, and experiences can be interpreted and continuously shaped, thereby positioning personalization and guest engagement as central dimensions of the smart hotel concept.

### 2.3.9 Personalization and Guest Engagement

Utilising data analytics and guest profiling to gather insights into guest preferences, behaviour patterns, and past interactions, tailored recommendations, customised room settings, and personalised services are offered at smart hotels (Dianawati et al., 2024). For example, a smart hotel may use guest data to personalise welcoming messages, suggest preferred amenities, or offer targeted promotions based on individual preferences (Venturini, 2024). Moreover, personalised menu options are prepared based on guest preferences, dietary restrictions, or cultural preferences. This can be done through pre-arrival surveys or in-room tablets, allowing guests to customise their meals according to their tastes and needs (Ibrahim & Islam, 2024).

Smart hotels also provide multiple communication channels to engage with guests. This includes mobile applications, in-room tablets, or voice-activated assistants allowing guests to request services, make reservations, or communicate with hotel staff. These convenient and accessible communication channels enhance guest engagement and satisfaction (Singh et al., 2024). Smart hotels can also incorporate interactive elements into the dining experience, such as digital tabletops or screens that allow guests to browse menus, view nutritional information, or even engage in interactive games or entertainment while dining (Chen et al., 2025).

With the help of IoT devices and connectivity, smart hotels can offer enhanced room service experiences. Guests can use voice commands or mobile applications to place orders, track their delivery, and provide feedback, ensuring a seamless and personalised room service experience (Gajić et al., 2024). In that way, smart hotels can encourage guest engagement by providing platforms for real-time feedback and reviews of food and beverage experiences. This allows guests to share their opinions, provide suggestions, and contribute to the continuous improvement of food and beverage options (Song et al., 2024).

Smart hotels leverage guest data and AI algorithms to provide personalised recommendations for dining, activities, and local attractions. These recommendations can be delivered through mobile applications, in-room devices, or personalised messages. By offering tailored suggestions based on guest preferences, smart hotels enhance guest engagement and help create memorable experiences (Ibrahim & Islam, 2024). Additionally, smart hotels utilise technology to enhance their loyalty programmes and rewards systems. Guests can earn points, receive personalised offers, and access exclusive benefits based on their preferences and past interactions. This personalised approach to loyalty programmes increases guest engagement and encourages repeat visits (Venturini, 2024).

Smart hotels employ technology to anticipate guest needs and deliver proactive service. For example, sensors in rooms can detect guest occupancy and automatically adjust room settings or alert staff when additional amenities are required (Aggarwal & Mittal, 2024). This proactive service enhances guest engagement by anticipating and fulfilling their needs. By combining data-driven personalisation, seamless communication channels, smart room controls, personalised recommendations, loyalty programmes, and proactive service delivery, smart hotels create a highly engaging and personalised guest experience (Ibrahim & Islam, 2024). These elements contribute to guest satisfaction, loyalty, and positive word-of-mouth, ultimately driving the success of the hotel. While these data-driven and technology-mediated practices enable highly personalised and proactive guest experiences, they simultaneously foreground critical concerns regarding how guest data are collected, managed, protected, and governed within smart hotel environments, thereby necessitating closer examination of cybersecurity and data governance considerations.

### 2.3.10 Cybersecurity and Data Governance

The growing implementation of smart technology in hotels brings undeniable benefits but also raises security concerns. Enhanced security measures in smart hotels are crucial to ensure the safety and privacy of guests and their personal information (Florido-Benítez, 2024). There are some key security measures commonly implemented in smart hotels like access control systems to utilise access control systems in regulating entry and monitoring access to various areas within the hotel. This can include keyless

entry systems using mobile devices or smart cards, biometric authentication, and video surveillance to ensure that only authorised individuals can access restricted areas (Metin et al., 2024).

Video surveillance systems which deploy video surveillance systems with high-definition cameras are strategically placed throughout the premises. These systems provide real-time monitoring and recording of public areas, entrances, and critical locations to deter potential security threats and assist in investigations if needed (Karadayi-Usta, 2024). It is not only that, but secure data management also needs to be done. This includes implementing robust data encryption protocols, secure storage systems, and strict access controls to protect sensitive guest information from unauthorised access or breaches (Florido-Benítez, 2024).

Smart hotels rely on interconnected devices and networks to implement robust network security measures (Karadayi-Usta, 2024). The hotel's network infrastructure is protected against cyber threats and unauthorised access by firewalls, intrusion detection systems, and frequent security assessments. Smart hotels need to ensure guest privacy by implementing privacy policies and procedures that comply with relevant data protection regulations. This includes obtaining consent for data collection, providing transparent information about data usage, and implementing measures to safeguard guest privacy (Metin et al., 2024).

Within this context to digital security measures, smart hotels also employ physical security measures such as secure entrances, surveillance cameras, and trained security personnel to maintain a safe environment for guests and staff (Karadayi-Usta, 2024). Smart hotels also pay attention to staff training to provide comprehensive training programmes to employees on security protocols, data privacy, and emergency response procedures. This ensures that staff members are aware of potential security risks and are equipped to handle security-related incidents effectively (Metin et al., 2024). By implementing these enhanced security measures, smart hotels can create a safe and secure environment for guests, protect their personal information, and maintain the trust and confidence of their customers while building a positive brand reputation (Florido-Benítez, 2024).

This introduction of cutting-edge technologies into hotel operations is causing an evolutionary shift in the hospitality sector. The transition to "smart hotels" offers a multi-layered value proposition appealing to all stakeholders involved, from owners trying to maximise income to guests looking for a seamless experience. There are many

benefits and advantages provided to all stakeholders of smart hotels (Zhang et al., 2024). As smart hotels evolve into highly data-driven service environments, cybersecurity and data governance emerge as critical risk management concerns.

The proliferation of interconnected systems and IoT-enabled devices increases exposure to threats such as data breaches, unauthorized system access, IoT-specific vulnerabilities, and violations of guest privacy. These risks are particularly pronounced in smart hotel contexts, where multiple platforms including mobile applications, property management systems, sensors, and third-party service providers are continuously exchanging sensitive operational and personal data. Effective cybersecurity in smart hotel operations requires a multidimensional approach encompassing data encryption, secure authentication mechanisms, continuous system monitoring, staff awareness and training programs, and strict compliance with data protection regulations (Karadayi-Usta, 2024).

However, in developing tourism destinations such as Batam, cybersecurity implementation is often constrained by incomplete regulatory frameworks, limited technical expertise, and uneven institutional enforcement. These conditions introduce ecosystem-level vulnerabilities that extend beyond individual hotel organizations (Zhang et al., 2024). Consequently, the challenges associated with cybersecurity and data governance underscore the importance of implementing environmental and ecosystem-oriented analytical lenses (Metin et al., 2024; Mo et al., 2024). Beyond concerns of security and data governance, the expanding reliance on interconnected digital infrastructures in smart hotels also draws attention to how technological integration is interpreted and operationalised in the management of physical resources, particularly energy use, thereby positioning Smart Energy Management Systems as a critical domain within the broader socio-technical transformation of hotel operations.

### 2.3.11 Smart Energy Management Systems

Smart hotel implementation enhances energy efficiency, lowers operating costs, and improves sustainability by utilising IoT, automation, and data analytics. IoT, automation, and big data are used by smart hotels to lower operating costs and energy waste, improve the guest experience through intelligent technologies, and support sustainability objectives. The transformation of the hospitality industry, as a result of

smart hotels, instigated changes in communication patterns, energy and sustainability management. To minimise energy wastage, smart hotels use a variety of energy-saving methods and technology (Gajić et al., 2024). These include Light Emitting Diode (LED) lighting, energy-efficient appliances, smart thermostats for temperature management, and occupancy sensors for lighting. Eventually, this can reduce operational costs and lessen environmental impact. Simultaneously, to produce clean, sustainable energy, smart hotels can invest in renewable energy sources like solar or wind turbines, which can reduce carbon emissions and reliance on traditional sources of energy (Valett et al., 2024).

In some smart hotels, smart energy monitoring and management systems are installed to provide an in-depth analysis of energy usage trends (Singh et al., 2024). Hotels can optimise energy usage, identify areas for improvement, and put energy-saving measures into place from the analysis of this data (Karvounidi et al., 2024). On the other side, by encouraging energy efficiency and awareness of the environment, smart hotels include guests in sustainable activities. To make informed decisions, real-time energy usage displays in rooms can contribute to the achievement of this aim. In teaching guests about their environmental impact, hotels might also offer information about other sustainable efforts, such as programmes that reuse towels and linens (Adeel et al., 2024).

Within this context, smart hotels employ effective waste management strategies, such as waste reduction and recycling initiatives. Waste collection schedules can be optimised using smart sensors as well as monitoring systems which can guarantee effective recycling and disposal procedures (Alavi et al., 2024). Simultaneously, green building design principles, such as energy-efficient insulation, sustainable materials, and effective water management systems, are options for smart hotels. Improved indoor air quality, reduced water usage, and energy conservation are some of the benefits of these design decisions. As a result, green certifications and sustainability guidelines like Green Globe or Leadership in Energy and Environmental Design (LEED) may be followed. These certifications indicate the hotel's dedication to sustainability and serve as recommendations for future growth (Akel & Noyan, 2024).

Smart hotels can lessen their environmental effect, cut operating expenses, and give visitors a more environmentally friendly experience by incorporating sustainability and energy management strategies (Gajić et al., 2024). These initiatives support a more responsible and sustainable hospitality sector which is in line with the growing demand

for sustainable tourism. This means that ensuring the smooth integration of new technologies with the current infrastructure is crucial. However, the hotel management needed to reconsider their expenses and budget in this way. Most importantly, smart hotels need to educate guests about the hotel's sustainability initiatives (Adeel et al., 2024). Hence, implementing smart technology and sustainable practices into reality may necessitate an initial economic investment.

Smart energy management systems represent a critical technological pillar within smart tourism and smart hotel development, reflecting the growing integration of sustainability objectives with digital transformation strategies (Gajić et al., 2024). In hotel operations, these systems commonly include occupancy-based heating, ventilation, and air-conditioning (HVAC), smart metering, automated curtain and lighting controls, renewable energy integration, and digital water usage monitoring, all of which contribute to significant reductions in energy consumption and operational costs (Singh et al., 2024). Owing to their potential for cost savings, such technologies are often considered attractive even for hotels with relatively limited financial resources (Karvounidi et al., 2024).

However, effective implementation requires the presence of IoT-enabled infrastructure, seamless integration with existing property and building management systems, and adequately skilled staff capable of system monitoring and maintenance (Gajić et al., 2024). Consequently, as with other smart hotel technologies, technological maturity and organizational readiness remain central determinants shaping the implementation and sustainability of smart energy management systems (Akel & Noyan, 2024). Taken together, these discussions suggest that smart hotel technologies are valued not solely for their technical capabilities, but for the perceived benefits they generate across operational efficiency, sustainability practices, and guest engagement, thereby necessitating a more systematic examination of the benefits associated with smart hotel implementation, as explored in the following section.

## 2.4 The Benefits of Smart Hotel

Smart hotels have become an important trend in the hotel industry, which has seen phenomenal changing in the modern era. Numerous advantages come with smart hotels, which are changing the hotel industry by offering easy, personalised experiences

to guests and enhanced sustainability and operational efficiency. These benefits make the hotel industry more profitable and competitive and the traveller experience more pleasurable and satisfying (Kim & Han, 2020). A description of the main benefits is provided below:

### 2.4.1 Enhanced Guest Experience and Service Personalization

One of the most frequently cited outcomes of smart hotel implementation in the literature is the enhancement of guest experience through increased personalization, convenience, and service seamlessness (Mo et al., 2024). Technology-mediated personalization enables hotels to tailor services based on guest profiles, behavioural data, and real-time preferences, transforming standardized hospitality offerings into adaptive and individualized experiences (Ibrahim & Islam, 2024; Han et al., 2024). This is primarily achieved through data-driven mechanisms, whereby AI-enabled systems analyse guests' historical data, spending patterns, and behavioural cues to personalize room settings, service recommendations, and targeted promotions (Terrah et al., 2024; Guo et al., 2024). Additionally, seamless and contactless service delivery facilitated by mobile check-in and check-out, digital key access, voice-controlled room systems, and intelligent concierge platforms reduces friction points across the guest journey and enhances overall service efficiency (Lee et al., 2024; Zainunnuri, 2026).

Beyond functional convenience, smart hotel technologies contribute to experience augmentation through smart rooms equipped with integrated environmental controls, IoT-enabled entertainment systems, and automated features that enhance guest comfort, autonomy, and perceived control (Diwan, 2025; Gajić et al., 2024). Operational efficiencies, such as reduced waiting times enabled by automated kiosks, service robots, and AI chatbots, further reinforce positive service perceptions (Gajić et al., 2024; Tanuja & Murugesan, 2024). Empirical studies consistently report higher satisfaction levels among Millennials, Generation Z, and business travellers, who value interactivity, responsiveness, and perceived technological modernity (Drivers of Hotel Guests' Choice of Smart Products, 2024).

However, the literature also highlights demographic variability in user responses, with older guests often experiencing higher levels of technological anxiety or perceived complexity, which may negatively affect satisfaction (Rogers, 2003;

Kabadayi et al., 2019). This variability aligns closely with key DOI attributes, particularly complexity and compatibility, which shape user-level acceptance of smart technologies (Drivers of Hotel Guests' Choice of Smart Products, 2024). While existing studies predominantly frame smart hotel technologies as instruments for enhancing guest experience, the same technological configurations are also interpreted within the literature as mechanisms that reshape internal work processes, resource allocation, and service coordination, thereby directing scholarly attention toward their implications for operational efficiency and productivity gains (Gajić et al., 2024; Diwan, 2025).

### 2.4.2 Operational Efficiency and Productivity Gains

Smart hotel technologies have been widely recognized for their potential to enhance organizational efficiency through process automation, workflow optimization, and data enabled decision making (Yadav & Raju, 2025). Efficiency gains are most evident in the automation of routine operations, such as robotic room cleaning, automated check-in and check-out procedures, and predictive maintenance systems that anticipate equipment failures before service disruptions occur (Graham & Sasraku-Neequaye, 2026; Yadav & Raju, 2025). Within this context, staff productivity is improved through digital task management platforms that coordinate housekeeping, engineering, and front-office activities, thereby reducing manual coordination, duplication of effort, and response times (Oliinyk et al., 2024; Graham & Sasraku-Neequaye, 2026).

Smart technologies also contribute to efficiency through energy and resource optimization, with smart energy management systems dynamically regulating lighting, temperature, and equipment usage based on occupancy and real-time conditions (Zhang & Kong, 2025). The standardization of automated processes further reduces human error, leading to greater consistency in service delivery and administrative accuracy (Fornells Herrera et al., 2024). Moreover, real-time data generated through integrated property management systems, revenue management systems (RMS), and customer relationship management platforms enables managers to make informed operational and strategic decisions with greater speed and precision (Zainunnuri, 2025; Liu et al., 2024). However, empirical evidence consistently indicates that such efficiency gains are contingent upon adequate organizational digital readiness, including skilled human

resources, effective system integration, and supportive leadership (Fornells Herrera et al., 2024; Singh et al., 2024).

In contexts where technological infrastructures are fragmented conditions commonly observed in hotels in developing destinations data silos and interoperability challenges often diminish expected efficiency outcomes (Fornells Herrera et al., 2024). Beyond operational efficiency, existing studies increasingly suggest that the deployment of smart hotel technologies also reshapes how environmental sustainability is understood and enacted in hotel operations, as digital systems mediate decisions related to energy use, resource consumption, and environmental responsibility within specific organisational and contextual settings (Wong & Loo, 2026; Kalsi et al., 2025).

### 2.4.3 Sustainability and Environmental Performance

Smart hotels increasingly contribute to environmental sustainability through the application of intelligent energy management systems, optimized resource consumption, and digitally enabled waste reduction practices (Valett et al., 2024). These sustainability-oriented initiatives have gained strategic importance in the hospitality sector due to tightening regulatory requirements and growing consumer demand for environmentally responsible accommodations (Adeel et al., 2024; Veglio & Bartaloni, 2025). Empirical studies indicate that smart hotel technologies enable measurable sustainability outcomes, including energy savings achieved through automated HVAC systems, reductions in water consumption via smart fixtures and monitoring devices, optimized waste management supported by sensor-based tracking, and lower overall carbon footprints resulting from reduced manual operations and improved process efficiency (Wong & Loo, 2025). More importantly, the availability of reliable, data-driven performance indicators facilitates compliance with and certification under international green standards such as LEED and Earth Check (Li et al., 2026).

Beyond their environmental implications, these sustainability-oriented smart hotel practices are increasingly interpreted in the literature as strategic resources that shape hotels' competitive positioning and market differentiation, particularly in destinations where sustainability performance, digital capability, and service innovation are unevenly distributed (Veglio & Bartaloni, 2025; Li et al., 2026). These sustainability outcomes are conceptually aligned with the principles of smart tourism ecosystems,

wherein data driven governance, integrated infrastructure, and cross-sector coordination contribute to minimizing resource strain at the destination level (Abdelmalak, 2024; Ji et al., 2024). However, the literature also underscores persistent challenges faced by hotels in developing-country contexts, where unreliable electricity supply, inconsistent wireless connectivity, and high capital costs inhibit the effective deployment and operation of smart energy systems (Fawzy, 2025; Oprea, 2025). Such constraints often limit the realization of anticipated environmental benefits and result in uneven sustainability performance across destinations. These structural and infrastructural challenges closely mirror the conditions observed in Batam, as outlined in chapter 1, underscoring the importance of contextualizing sustainability outcomes within broader environmental and ecosystem-level constraints.

### 2.4.4 Competitive Advantages and Market Differentiation

Smart hotels frequently identify competitive advantage as a primary motivation for implementing advanced technologies, particularly as digital transformation becomes increasingly intertwined with brand differentiation and market positioning (Degirmen et al., 2024; Song et al., 2024). The literature highlights several competitive mechanisms through which smart hotel technologies generate advantage, including the positioning of hotels as modern, innovative, or future-oriented brands; increased attractiveness to technology-oriented travellers and business tourists; enhanced online reputation and guest ratings; revenue growth enabled by dynamic pricing strategies and targeted, data-driven promotions; and improved operational resilience, such as the ability to deliver seamless contactless services in post-pandemic contexts (Anwar et al., 2024; Jun & Banerjee, 2024; Shiji Group, 2025). Collectively, these factors contribute to both short-term market appeal and longer-term strategic positioning.

However, the competitive value of smart hotels varies significantly across market contexts. In hypercompetitive and technologically advanced destinations such as Singapore, Seoul, and Tokyo, smart hotel readiness has largely become an industry baseline rather than a source of differentiation (Song et al., 2024; Tavitiyaman et al., 2026). In contrast, in developing markets such as Indonesia and Malaysia, where implementation remains uneven, smart technologies continue to function as visible differentiators (Fornells Herrera et al., 2024). This distinction is particularly salient in

the context of Batam, where overall implementation levels remain low and early implementers possess the potential to capture disproportionate competitive advantages.

Paradoxically, despite this opportunity, many hotels in Batam remain hesitant to implement smart technologies due to perceived financial risks, limited local role models, and high-cost sensitivity. These conditions reflect classic DOI constraints, particularly low trialability and weak observability, which collectively slow implementation despite the potential for significant competitive gains (Fornells Herrera et al., 2024). While the literature underscores the strategic and competitive potential of smart hotel technologies, particularly in emerging destinations such as Batam, it simultaneously reveals that the realization of these advantages is neither automatic nor uniform, but mediated by a range of organisational, economic, and contextual constraints that shape how smart technologies are perceived and implemented in practice.

## 2.5 Challenges in Smart Hotel Implementation

Although smart hotel technologies promise increased operational efficiency, enhanced guest experiences, and data-driven managerial capabilities, their implementation still faces complex and interrelated challenges. Previous literature indicates that implementation barriers stem not only from technological aspects. It also from organizational readiness and environmental or ecosystem factors that influence managerial decisions (Fornells Herrera et al., 2024; Somera & Petrova, 2024). The following discussion present three challenges in implementing smart hotel: technological challenges, organizational challenges and environmental challenges.

### 2.5.1 Technological Challenges

Existing literature on smart hotel implementation predominantly emphasises technological complexity and system fragmentation as key structural barriers to adoption (Liu et al., 2024; Gajić et al., 2024). However, these studies remain largely technology-oriented and provide comparatively limited discussion regarding how operational preparedness, managerial capability, and institutional conditions shape implementation processes within emerging tourism destinations such as Batam. Smart

hotel environments typically rely on multiple interdependent systems including IoT networks, PMS, Central Reservation Systems (CRS), robotics, and smart energy management often supplied by different vendors. The absence of standardized interoperability across these platforms frequently results in fragmented system architectures, complicating integration processes, increasing implementation costs, and elevating the risk of operational failure (Liu et al., 2024; Gajić et al., 2024). These challenges are further intensified in secondary or developing destinations such as Batam, where digital infrastructure reliability and technical standardization remain uneven, thereby constraining seamless system integration (Anthony Jr., 2025).

A second major barrier relates to high initial investment requirements and cost uncertainty. Smart hotel implementation entails substantial upfront capital expenditure for hardware, software, and network infrastructure, alongside recurring costs associated with system maintenance, cybersecurity, software licensing, employee training, and periodic technological upgrades. Empirical studies suggest that mid-scale hotels which constitute most properties in destinations like Batam are particularly risk averse, often postponing implementation due to uncertainty surrounding Return on Investment (ROI), limited local observability of successful implementations, and difficulties in estimating long-term financial benefits (Raju, 2024; Alalwan et al., 2024). As a result, even when potential efficiency gains are recognized, financial ambiguity frequently outweighs perceived advantages.

Cybersecurity and data privacy risks represent another significant deterrent to smart hotel implementation. Data driven hotel operations depend heavily on the collection and processing of sensitive guest information, rendering smart systems vulnerable to cyberattacks, data breaches, ransomware incidents, and IoT device exploitation. The literature increasingly highlights cybersecurity risk as a critical factor delaying managerial implementation decisions, particularly in destinations where digital infrastructure is inconsistent and data protection regulations are still evolving (Florido-Benítez, 2024; Karadayi-Usta, 2024). In such environments, inadequate safeguards and weak regulatory enforcement amplify perceived risks, reinforcing managerial caution toward advanced technological systems.

Finally, the dependence on external technology vendors and the scarcity of local technical support further constrain implementation decisions. Many hotels report challenges arising from limited vendor presence, insufficient after sales support, and restricted capabilities for cross platform system integration (Islam & Islam, 2024;

Hertzfeld, 2025). In the context of Batam, these issues are especially pronounced, as the local smart hotel technology ecosystem remains underdeveloped compared to major Indonesian tourism hubs such as Jakarta or Bali. This limited vendor maturity heightens uncertainty and discourages hotels from investing in complex smart technologies without reliable local support.

Collectively, these technological, financial, security, and ecosystem related barriers underscore the multi-dimensional challenges facing smart hotel implementation in Batam, reinforcing the relevance of implementing integrated analytical lenses that combine technological, organizational, and environmental perspectives. While these technological, financial, security, and ecosystem-related constraints shape the structural conditions of smart hotel implementation, existing literature also suggests that their practical impact is mediated by organisational factors, including managerial perceptions, internal capabilities, decision-making processes, and readiness for change, which warrant dedicated examination.

### 2.5.2 Organizational Challenges

The literature consistently identifies human resource readiness as a critical determinant of smart hotel implementation, often outweighing purely technological considerations (Han et al., 2024; Dong & Wang, 2025). Key challenges include low levels of digital literacy, resistance to new technologies, limited access to structured training, and anxiety surrounding automation and potential job displacement (Yang et al., 2024; Yadnya & Khamiliyah, 2024). These limitations are frequently reinforced by organizational cultures that discourage innovation and experimentation. Closely related to human resource issues is the role of organizational culture and resistance to change.

Digital transformation requires an institutional environment that values learning, adaptability, and continuous improvement. However, many hotels particularly those operating under long established management structures or rigid hierarchies exhibit internal resistance manifested through scepticism toward technological benefits, negative perceptions of automation, and a strong reliance on manual procedures (Li et al., 2023; Yang et al., 2024). From a DOI perspective, such resistance reflects compatibility challenges, whereby new technologies are perceived as misaligned with existing values, routines, and service philosophies, leading to rejection or superficial

implementation despite their potential advantages (Zhang et al., 2024).

Financial constraints and budget prioritization further compound these organizational challenges. Hotels in developing tourism destinations typically operate under more volatile cash flow conditions than those in major urban or international markets. Consequently, investments in smart technologies must compete with pressing financial priorities, including physical renovations, marketing expenditures, routine operational costs, and staffing needs (Li et al., 2024; Wang & Zhang, 2024). For many mid-scale hotels in Batam, technology investment is frequently viewed as a discretionary expense rather than a strategic long-term investment, reinforcing implementation delays and incremental, rather than transformative, implementation approaches.

Finally, a lack of strategic vision and digital leadership represents a fundamental organizational barrier to smart hotel development. Empirical studies emphasize that successful digital transformation is strongly associated with leadership commitment, the presence of innovation champions, and clearly articulated digital roadmaps supported by measurable performance indicators (Nasution, 2024; Kane et al., 2024). Conversely, hotels that fail to implement advanced technologies often lack strategic direction, demonstrate limited understanding of data-driven decision-making, and fail to integrate digital objectives into broader organizational strategy. While human resource readiness, organizational culture, financial capacity, and leadership orientation are widely recognised as internal determinants of smart hotel implementation, existing studies also indicate that these challenges are further shaped and constrained by broader environmental conditions, including regulatory frameworks, technological infrastructure, market dynamics, and destination-level ecosystem readiness, which are discussed in the following section.

### 2.5.3 Environmental Challenges

The external environment plays a crucial role in the success of smart hotel implementation, particularly in emerging destinations. Limited digital infrastructure is a fundamental structural challenge. Smart hotels rely heavily on stable internet connectivity, reliable electricity supply, high-speed communication networks, and alignment with smart city standards (World Bank, 2025; UN Tourism, 2024). While

Batam has the advantage of being an industrial city and a border region with relatively better infrastructure compared to many other secondary destinations in Indonesia, its digital capacity has not yet reached the level of maturity seen in cities with established smart tourism ecosystems, such as Singapore, Seoul, or Tokyo. This gap limits the scale and reliability of comprehensive smart hotel technology implementation (OECD, 2024).

Within this context to infrastructure, government policies and regulatory frameworks are also crucial environmental factors. Effective smart hotel implementation requires clear policy support, including incentives for digitalization, regulations on personal data protection, IoT standardization, regulations on the use of robotics and AI, and integration with smart city or smart tourism master plans (OECD, 2024; UN Tourism, 2024). Southeast Asian literature shows that unclear and fragmented policies often hinder technology implementation in the hotel sector. In the context of Batam, the absence of an integrated smart tourism strategy forces hotels to take individual initiatives without consistent policy direction, increasing investment risks and slowing the diffusion of innovation (World Bank, 2025).

Market pressures and tourist expectations also shape the dynamics of technology implementation. In destinations dominated by domestic and price-sensitive tourists, the pressure to provide advanced digital experiences tends to be lower. As a result, competition between hotels is often not based on technological capabilities (UN Tourism, 2024). Batam is in a unique position: geographically very close to Singapore, a global benchmark for smart tourism, yet not fully keeping pace with the pace of digital transformation in that destination. This creates a gap in expectations, especially for international tourists, while also reducing the industry's collective incentive to invest in advanced technology (McKinsey & Company, 2025).

More importantly, a mature ecosystem of vendors and technology enablers is a crucial prerequisite for sustainable smart hotel implementation. Smart technology implementation requires the presence of IoT vendors, system integrators, robotics providers, cybersecurity consultants, and local IT companies capable of providing long-term technical support (Gartner, 2024; World Bank, 2025). In many developing destinations, including Batam, this ecosystem remains limited or concentrated in major national cities. Reliance on external vendors without adequate local support increases operational risks and weakens hotels' confidence in smart technology, thereby reinforcing the environmental barriers identified in this subsection. Within these

environmental constraints and enabling conditions, the ways in which smart hotel technologies are interpreted, adapted, and enacted become evident at the departmental level, where organisational roles, operational practices, and human–technology interactions shape the distinctive characteristics of smartness across core hotel functions, including the front office, housekeeping, food and beverage, security, and engineering and maintenance departments.

## 2.6 The Characteristics of Smart Hotel in Each Department

The era of smart hotels is more than just fancy devices in rooms. Instead, it is a deliberate integration of technology into each department, making the guest's experience perfect and optimising hotel operations. For each department, there are many descriptions of the characteristics of smart hotels (Das & Philosopher, 2024). The characteristics of a smart hotel in each department are broken down as follows:

### 2.6.1 Front Office Department

The Front Office (FO) is one of the key departments in a smart hotel. Being the first and last place a guest interacts with during their stay, the front office is crucial to the operation of a hotel (Deloitte, 2025). The Centre for Hospitality Research at Cornell University reported that when check-in takes more than five minutes, guest satisfaction drops by 47 per cent (Cornell University Center for Hospitality Research, 2024). Thus, the FO must figure out how to give guests a flawless experience, make a good first and lasting impression, and create loyal repeat customers. Therefore, a smart FO must be manpower lean to cut out non-value-adding operations and efficiently and effectively drive the top line (Oracle Hospitality, 2024).

The front desk department of the hotel has implemented several initiatives that demonstrate its smart hotel qualities, such as allowing guests to check in and out using their smartphones reducing waiting time and improving the arrival and departure experiences (Deloitte, 2025). Within this context, visitors can easily access their rooms using their cell phones as room keys. More importantly, digital concierge services which give guests tailored advice, information, and support may be provided by smart hotels via smartphone applications or in-room technology. Chatbots or virtual assistants

driven by AI enable quick and easy communication for requests, questions, or feedback between guests and the front desk. To assign rooms efficiently, staff members can also readily monitor room availability and cleaning status (Oracle Hospitality, 2024).

The reservation section also has many activities that need smart hotels to enhance their value. Like dynamic pricing engines that adjust based on demand, maximising revenue and attracting guests with competitive rates during off-peak times (HVS, 2024). Also, a centralised reservation system manages all bookings across online platforms and phone calls, reducing errors and offering guests a consistent experience. Lastly, guest preference integration which is collected during booking (bed type, floor level) can be pre-programmed for a personalised touch (Oracle Hospitality, 2024). While smart front office practices primarily shape guests' initial perceptions and service encounters through digitally mediated interactions, the effectiveness of these systems is closely intertwined with back-of-house operations, particularly the housekeeping department, where smart technologies play a critical role in translating digital coordination into tangible service quality and operational reliability.

### 2.6.2 Housekeeping Department

To help housekeeping personnel effectively manage room cleaning schedules and prioritise their jobs, smart hotels utilise the internet of things devices to track room occupancy. The guest room's sensors can identify when guests are present and the room's condition (Khan et al., 2024). It can also track the performance of the equipment, allowing preventative maintenance and less disruption. Identification and proactive maintenance need response are made possible by predictive maintenance utilising data analytics (Gajić et al., 2024).

Within this context, radio frequency identification technology is used by smart hotels to track and manage linens and housekeeping supplies (Oluwole & Ayosunkanmi, 2024). Additionally, this system can reduce waste and stockouts. Lastly, to improve communication and response times, guests can use in-room devices or mobile applications to report problems or request housekeeping services (Obioma et al., 2025). While the application of smart technologies in housekeeping primarily focuses on enhancing operational efficiency and service responsiveness within guest rooms, similar digital logics of connectivity, automation, and data-driven coordination are

increasingly being extended to other service domains, most notably the Food and Beverage Department, where service complexity, real-time demand, and guest interaction play an equally critical role.

### 2.6.3 Food and Beverage Department

Implementation of smart technologies is also needed to improve food and beverage department performance. Smart hotels utilize mobile applications and tablets to allow guests to view menus, place orders, and make reservations, offering interactive menus, personalized recommendations, and reduced wait times, thereby enhancing communication and efficiency (Ivanov et al., 2024). Within this context, orders are sent automatically to the culinary staff, who prepares them quickly and accurately while reducing errors. Moreover, IoT-enabled smart kitchens maximise efficiency and minimise waste in food preparation. Besides that, stock levels are optimised and waste is decreased via inventory management systems (Sharma & Kim, 2025).

There are also self-service kiosks which are another feature that smart hotels might include to allow for easy and rapid ordering, cutting down on wait times and increasing productivity during busy periods (Lee et al., 2024). It increases convenience eliminating the need for physical menus by enabling customers to browse menus and place orders straight from tablets or smartphones (Mponela et al., 2024; Wang et al., 2025). While the integration of smart technologies within the food and beverage department primarily aims to enhance service efficiency and guest interaction, the increasing reliance on interconnected digital systems also raises critical considerations related to data protection, system reliability, and guest safety, thereby underscoring the importance of examining how smart technologies are conceptualised and implemented within the security department of smart hotels.

### 2.6.4 Security Department

Security is another department that can benefit from smart technology implementation. Hotels that prioritise security can use mobile access or keyless entry technologies to manage access to guest rooms and restricted areas. Biometric authentication is an example of a sophisticated security system used to ensure exclusive

access to guest rooms and restricted locations to relevant individuals (Rahmawati & Djauhari, 2025). Security cameras equipped with cutting-edge video surveillance systems and live monitoring can be integrated with artificial intelligence to instantly identify suspicious activities to ensure the safety and security of guests and property (Sabit, 2025).

Moreover, cybersecurity and data encryption are required to safeguard visitor data. Finally, to guarantee visitor safety in emergencies, smart hotels may incorporate emergency response systems, such as automated alerts, emergency buttons, or evacuation instructions (Jaya et al., 2025). However, smart security systems enhance safety and risk management through digital surveillance, access control, and data protection, their effective operation ultimately depends on the reliability, integration, and continuous upkeep of the underlying technological infrastructure, thereby positioning the engineering and maintenance function as a critical enabler of smart hotel performance.

### 2.6.5 Engineering and Maintenance Department

Smart hotel characteristics are also inherent in carrying out operations in the engineering and maintenance departments to provide comfort and satisfaction to guests and improve the quality of work. Sensor data, for instance, can be used to anticipate probable equipment breakdowns, enabling advanced maintenance which can reduce downtime (Deloitte, 2024). Maintenance efficiency is improved by using digital technology to create, assign, and track work orders more quickly (McKinsey & Company, 2025). These operational characteristics highlight that smart hotel practices are not merely defined by the implementation of individual technologies within specific departments, but emerge through broader developmental processes and strategic implementation decisions that shape how smart systems are introduced, coordinated, and sustained across the hotel organisation.

## 2.7 Smart Hotel Development

Smart hotel symbolises a new era of hospitality that skilfully combines guest comfort and convenience with technology (Liu et al., 2024). The design and planning

phase of smart hotels includes addressing the various needs of contemporary travellers. Within this context to the physical infrastructure, smart technology should embed the implementation of the internet of things devices, mobile check-in and check-out systems that operate seamlessly, virtual concierge services that are customised, and energy- efficient solutions (Gajić et al., 2024). The objective is to provide an area where guests may enjoy a fusion of elegance, practicality, and sustainability (Liu et al., 2024). The evolution of smart hotels began with some of the early adopters that have become the hallmark of smart hotel technology. The first seeds of automation happened in 1976, when a Scandinavian Hotel, the Sørnes Hotel distinguished itself by launching the world's first magnetic card (Gajić et al., 2024). Tor Sørnes, a Norwegian engineer and businessman, founded VingCard Elsafe, the company that developed the VingCard locking mechanism.

The first hotel in history to have implemented and used the VingCard system was the Scandinavian Hotel Sørnes Hotel in Norway in 1976. The VingCard used a narrow magnetic stripe that was incorporated into a plastic card. The guestroom doors' electronic locks were activated by inserting the magnetic stripe, which then acted as an unlocking mechanism to allow entry into the room. The improved security, ease of use, and operational efficiency provided by the VingCard technology completely transformed the hospitality sector (ASSA ABLOY Global Solutions, 2025; dormakaba Group, 2024). It made physical keys unnecessarily irrelevant. Due to the technology's great success, VingCard Elsafe gained popularity as a leading worldwide supplier of electronic locking systems and hotels around the world have begun to adopt the technology. The launch of the VingCard has become the turning point as the company introduced revolutionary innovations like mobile access via cell phones and radio-frequency identification technology (ASSA ABLOY Global Solutions, 2025; Hotel Technology News, 2024).

As research on smart technology began to soar in the 1980s and 1990s, luxury hotel chains have started to pioneer new smart technology. For example, in 1980, many high-end hotel chains began to provide advanced technology in-room amenities such as minibars with automated billing systems, interactive TVs, and in-room entertainment systems (Oracle Corporation, 2025; Hospitality Net, 2024). To expedite the booking process and improve inventory management, hotels started to implement computerised reservation systems. This included voice-controlled rooms: imagine walking into a

room where you could adjust the temperature with a programmable thermostat, control the lights from the control panel, or open a wardrobe with voice commands (Hospitality Net, 2024; Hotel Technology News, 2024).

While these features may seem commonplace today, they were at the forefront of development at that time (Liu et al., 2024). Apart from this, digital functionality was also added to the in-room experience. Virtual entertainment systems, or digital video services (developed by Lodge Net in 1992), gave guests access to digital entertainment in their rooms. These first steps gave way to the comprehensive entertainment and functional experience found in today's smart hotels (Gajić et al., 2024; Fornells Herrera et al., 2024). Hotels also created loyalty programmes to reward repeat visitors and improve client retention. These programmes used database management systems to keep track of guest preferences and provide personalised services (Liu et al., 2024).

Then, in the 1990s, the rise of the Internet and the digital revolution had a major impact on the food industry (Godolja et al., 2024). At that time, the online booking system emerged as a hallmark of modern travel (Liu et al., 2024). Upscale hotels' understanding of the importance of connectivity began to also provide their guests with high-speed internet connections (Fornells Herrera et al., 2024). Hotels also started adding business centres with computers, printers, and other office supplies to meet the demands of corporate guests (Godolja et al., 2024).

Additionally, hotels began introducing automated guest service systems, such as self-service alternatives for different hotel amenities and automated kiosks for check-in and check-out (Gajić et al., 2024). Additionally, property management systems have also come into play, allowing hotels to manage guest information, reservations and operations (Liu et al., 2024). These improvements simplify the guest experience and manage the fundamentals underlying modern hotel operations. Technology-driven solutions to enhance guest experiences and boost operational efficiency were the main focus during the 1980s and 1990s (Godolja et al., 2024). Since technology continued to advance and guest expectations endlessly changed, these early innovations set the stage for the rapid expansion of smart hotels (Fornells Herrera et al., 2024). While these developments were noteworthy at the time, it is crucial to remember that fully integrated smart hotels which incorporate automation, artificial intelligence, and the internet of things did not come into existence until later in the decades (Gajić et al., 2024; Liu et al., 2024).

Along with this, the term “smart hotel” began to become popular in the 2000s (Deloitte, 2025; McKinsey & Company, 2024). At that point, the widespread use of cell phones has changed the game (World Economic Forum, 2024). Due to the growing demand from travellers for mobile solutions, smartphone applications for room service, check-in, and local recommendations were developed which included mobile key access via smartphones, phone-based lighting and temperature controls (IEEE Access, 2024). Luxury hotels may be the first to change the lighting to suit the guest's style and use voice commands to adjust the temperature, giving guests control over the environment and a unique experience (Deloitte, 2025). Then, the first mobile application was introduced (McKinsey & Company, 2024). Such changes were made not only to improve operational effectiveness using technology but also to enhance guest experiences (UNWTO, 2025).

The hospitality business, especially smart hotels, had a notable advancement in the integration of advanced automation with the internet of things during the 2010s (IEEE Access, 2024; UNWTO, 2025). To improve guest experiences, optimise operations, and boost productivity, IoT devices and advanced automation technologies were quickly implemented during this decade (Deloitte, 2025). Hotels have begun to integrate the internet of things devices, including sensors, lighting controls, and smart thermostats (McKinsey & Company, 2024). Guests can adjust the temperature of their rooms using voice commands or smartphone applications, making their stay more comfortable and easier (World Economic Forum, 2024).

Advanced automation systems have been included in hotel operations to enhance productivity and optimise operations (Deloitte, 2025). Automation was applied to improve service delivery and save costs in areas including maintenance, housekeeping, inventory control, and guest services (McKinsey & Company, 2024). However, at the end of the 20th century, there was a clear trend towards automation, system services and guest functions (UNWTO, 2025). These extraordinary efforts in luxury hotels and technological advances in the industry laid the foundations of the smart hotel (World Economic Forum, 2024).

Meanwhile, for countries in Asia, the history of smart hotels is relatively new, but in the last few years, it has developed quickly (Singapore Tourism Board, 2024; UNWTO, 2025). Two of the first Asian countries to adopt smart hotel technology were Singapore (2010) and Hong Kong (2011), where early adopters included the Marina

Bay Sands and The Ritz-Carlton Hong Kong (Singapore Tourism Board, 2024). Keyless entrance, smartphone check-in, and digital concierge services are just a few of the cutting-edge amenities these luxurious and innovative hotels are implementing, demonstrating how technology may enhance guest experiences (Deloitte, 2025). Guest access to information and services has been facilitated by the increasing use of smartphones and mobile apps (McKinsey & Company, 2024).

Asian countries are likewise concentrating on developing the infrastructure needed for smart tourism (World Economic Forum, 2024). Particularly Singapore has become a leader in the creation of smart hotels through programs like the Singapore Tourism Board's (STB) Smart Tourism program, which promotes technology implementation in the hospitality industry (Singapore Tourism Board, 2024). Asia is currently leading the way in implementing cutting-edge technology, like chatbots driven by AI, robotic butlers, and virtual reality experiences (IEEE Access, 2024). Taken together, this historical and technological evolution suggests that smart hotels should not be understood merely as the outcome of technological advancement, but as a context-dependent implementation process shaped by organisational capabilities, stakeholder interpretations, and strategic decisions through which smart technologies are translated into everyday hotel practices (UNWTO, 2025; McKinsey & Company, 2024).

### 2.7.1 Smart Hotel Implementation

Aside from the fact that putting in place a smart hotel has many advantages such as the potential to improve guest experience, operational effectiveness, and data- driven insights, it also presents certain difficulties for the hospitality sector (Florido-Benítez, 2024). Investing in technology and selecting a particular technological solution have been difficult. Too frequently, hospitality businesses concentrate on cutting-edge technologies that do not benefit their clients but adding to the workload of their staff. The robotised Henn na Hotel in Japan is a prime example. It was hailed as a highly inventive hotel that personified the hospitality of the future when it first opened its doors in March 2015. However, the hotel disabled half of its robots in January 2019 since some of them bothered customers and added workload for staff (Karadayi-Usta, 2024).

Moreover, to guarantee that all parts operate together seamlessly and efficiently,

a strong network infrastructure and meticulous planning are needed (Islam & Islam, 2024). Data security and privacy are another obstacle. Concerns about privacy and safety are significant features of smart technologies. Robots, chatbots, voice- controlled devices, biometrics, facial recognition, and other intelligent technologies typically gather a large deal of user data, including voice recordings, fingerprints, and user faces. The guests, staff, managers, owners, or other stakeholders could be harmed by the data breach. Strong security measures must be implemented to shield sensitive data from cyber threats and breaches as vast amounts of guest data are collected and analysed by smart hotels (Fakfare et al., 2024).

However, management in the hotel industry must approach digital technology from a comprehensive rather than a technical standpoint. They must consider the role of culture, the company's market positioning, its size and service operations, partners' requirements and competitors' actions, and the compatibility and integration of the solution with the company's current technologies, among many other factors in addition to the advantages and disadvantages of technologies (Liu et al., 2024). A hotel organisation needs a defined technology strategy to guide its technology investment decisions to successfully integrate technologies. Otherwise, the organisation can find itself with irrelevant unconnected underutilised technical solutions which only add to the workload of the staff (Islam & Islam, 2024). Collectively, these challenges highlighted in the literature suggest that the successful implementation of smart hotels depends not merely on the implementation of advanced technologies, but on the development of context-sensitive implementation strategies that align technological choices with organisational capabilities, service cultures, and stakeholder expectations.

### 2.7.2 Strategy of Smart Hotel Implementation

The world of smart technology is undergoing a revolutionary change that is affecting the hospitality sector. Smart hotel strategies should not ignore the challenges that exist. Putting in place a smart hotel offers a calculated opportunity to improve guest experiences, streamline processes, and obtain a competitive advantage. But navigating this fascinating transition calls for a professional and well-thought-out strategy (Deloitte, 2025).

Hotel management should determine their vision and goals which will set the direction of their hotels. They should also determine which primary priority of the guest experience should be enhanced like keyless entry and smartphone check-in or in-room entertainment and smart climate control. Likewise, identify important operational issues that need to be resolved, including optimising resource distribution or cutting down on energy usage as well. A clear strategy that takes timeliness and budget into account guarantees that the deployment of smart hotels is in accordance with overarching business goals (McKinsey & Company, 2024).

There are various recommended practices to consider ways to successfully overcome these obstacles and implement smart hotel technologies. This include performing a comprehensive cost-benefit analysis. Hoteliers may use this to prioritise the investments that will have the biggest effects and make well-informed choices (Oracle Hospitality, 2024). Partnering with knowledgeable technology suppliers and consultants can also expedite the implementation process and guarantee that the selected technologies follow the requirements and objectives of the hotel.

Working with professionals in the field can also yield insightful information about new trends and best practices to optimise the advantages of smart hotel technology (Gajić et al., 2024). Smart hotels should look for reputable suppliers who have a track record of success, strong customer service, and solutions that work with both current systems and future scalability requirements. A flexible contract should be negotiated to meet needs and future growth aspirations. This guarantees constant assistance and flexibility during the procedure (Baluyot, 2025).

Hotel management should also give the highest priority to technologies that facilitate guests directly, such as mobile check-in/check-out, keyless entry, in-room tablets for service requests, and personalised recommendations. They may offer personalised experiences, such as personalised room settings, recommended local attractions, and personalised amenities using guest data and preferences (Ashfaq et al., 2025). Based on data insights, hotel management can use AI and machine learning algorithms to predict guest demands, personalise recommendations, and increase operational efficiency. The hotel should have reliable Wi-Fi access, integrate smart devices for simple management over room settings, and offer technologically advanced guest convenience options.

Additionally, customers should be provided with interactive experiences like virtual reality relaxing sessions, augmented reality tours, or interactive displays that highlight nearby attractions (Zhang et al., 2025). They should also enhance communication with guests by taking advantage of digital signage for operating within the hotel, personalised welcome messages, and event notifications (Gajić et al., 2024). Likewise, smart hotels should also integrate eco-friendly facilities, energy-saving solutions, and options for guests to get involved in environmental projects. More importantly, to add comfort to guests, sensory elements such as aromatherapy, soundscapes, and ambient lighting that are designed to create a comfortable and relaxing atmosphere should be used (Baluyot, 2025).Through the implementation of these strategies, smart hotels may establish a seamless, personalised, and unique guest experience that characterises them within the hospitality sector and encourages guest satisfaction and loyalty (Ashfaq et al., 2025).

Finding a balance between the human element of hospitality and technical improvements is crucial for the effective deployment of smart hotels. Aside from investing in equipment that has easy-to-use interfaces and directions, staff should be trained in smart technologies. This includes providing easy-to-understand instructions and easily accessible resources to enhance guest education regarding the use of smart hotel facilities (World Economic Forum, 2024). More importantly, human interaction should be enhanced by technology rather than replaced. Staff should be trained to anticipate the specific needs of guests and deliver excellent personalised service.

Data security and transparency should be prioritised by installing reliable safety procedures, as well as being open and honest with guests about data collection and getting their consent before using their data (IBM Security, 2025). They should prioritise privacy and data security by creating strong protection measures and performing risk assessments (ENISA, 2024). Creating a thorough foundation for data security and privacy is also essential. To secure visitor data and uphold compliance with data protection laws, this entails putting encryption technology, limits on access, and periodical security assessments (OECD, 2024).

Another strategy is to put in place real-time feedback systems so that guests can provide insights, report problems quickly, and have their experiences continuously improved. Staff should be equipped with digital tools and training so that they can meet guests' needs quickly, personalise interactions depending on their preferences, and

provide great service. A smooth guest experience requires empowered employees. Staff must be properly trained to use and troubleshoot the new technology. They must be capable of offering support and giving assured answers to inquiries from guests. Before and after implementation, they must make sure that guests are aware of the changes and the advantages of the smart hotel programmes. To promote comprehension and reduce interruptions, assistance and training materials for individuals who are not familiar with smart technology should be available (Tanuja & Murugesan, 2024). Lastly, continue to concentrate on automating processes that improve productivity without negatively impacting work or guest experience.

Hotels in Batam should prioritise phased and operationally manageable digital transformation strategies rather than large-scale automation projects because the findings indicate that gradual implementation reduces organisational resistance, minimises financial risk, and allows workforce adaptation to occur more sustainably. This recommendation is particularly important considering that many hotels in Batam continue to evaluate smart technology investment through a risk-management perspective shaped by uncertain return on investment, limited managerial readiness, fluctuating tourism demand, and operational survival priorities (Balaguruswamy Naidu, 2024). A phased implementation strategy also enables hotels to evaluate technological effectiveness incrementally while maintaining service stability and organisational flexibility throughout the transformation process. These findings are consistent with participants' emphasis on cautious and incremental implementation approaches due to financial uncertainty, operational risk, and operational preparedness limitations within Batam's hospitality industry (Pratama, 2024).

Keeping in mind that a smart hotel is a living, breathing thing, Key Performance Indicators (KPI) should be enforced to evaluate the effects of efforts on operational effectiveness and guest happiness. Existing hospitality literature increasingly emphasises customer feedback integration and data-driven decision-making as critical components of smart hotel operational strategies and service optimisation processes (Gajić et al., 2024; Soliman et al., 2025). They should also implement a data-driven strategy and modify technological solutions in response to the knowledge acquired. By doing this, hotel management can be confident that smart hotels will always be at the forefront of operational excellence and guest expectations (Gajić et al., 2024).

Smart hotel development is a growing trend in the hotel industry. Key aspects of smart hotel development include using IoT devices for automated processes and personalized services, implementing AI systems for efficient operations and personalized guest experiences, prioritizing sustainability through energy-efficient solutions, optimizing operational costs by reducing manual staff and streamlining processes. While these strategic considerations illustrate how smart hotel initiatives may be operationalised at the organisational level, they are embedded within broader global patterns of technological implementation, policy orientation, and destination readiness, making it necessary to situate smart hotel development within its wider global context (Pratama, 2024). While the global literature highlights the widespread diffusion of smart hotel concepts and the diversity of their technological expressions across regions, existing studies also suggest that the implementation and meaning of smart hotel practices are highly context-dependent, thereby necessitating a closer examination of how these developments are interpreted, implemented, and experienced within specific local hospitality contexts such as the hotel industry in Batam.

## 2.8 Smart Hotel in the Global Context

The smart hotel revolution is a worldwide phenomenon that is transforming the hospitality sector on many continents, driven by numerous variables. First, guests want convenience and customisation. Travellers who are nowadays used to a tech-driven environment would expect similar hotel experiences. Mobile check-in, application-based controls, and personalised recommendations are some of them (Kim & Han, 2024; Zhang et al., 2024).

Second, technological advancements and cost reductions are also important. Smart hotel systems are now more affordable and widely available for hotels of all sizes due to the growth of IoT and cloud-based solutions (Gajić et al., 2024). Third, it is economically driven by market competition. In a highly competitive sector, smart hotels differentiate themselves by providing a more personalised and tech-driven experience, drawing guests looking for a cutting-edge place to stay. Additionally, through better pricing tactics and upselling potential, smart technology may result in higher revenue (Diwan, 2024).

Meanwhile, regional variations in smart hotel implementation also occur. These regions are led by developed countries such as North America, Europe and East Asia. The advanced technology infrastructure and increased concentration of luxury hotel chains in certain locations have propelled them to become the forefront of smart hotel concepts. For example, hotels in North America are using AI-powered chatbots for guest contact, facial recognition for check-in, and virtual reality experiences within the rooms (Luo, 2024). In the meantime, there is a growing emphasis on sustainability in Europe, where smart hotels are incorporating energy-saving measures like climate control and automatic lighting.

In Asia, hotel bookings, room controls, and local suggestions can all be made through hotel applications that are seamlessly integrated with smartphones. Besides that, increased domestic travel, rising disposable income, and a readiness to adopt new technology are propelling the development of smart hotels in fast-developing nations like China and India (Diwan, 2024). Different cultures may have different expectations and degrees of familiarity with technology, which may have an impact on the precise features and functionalities that smart hotels embrace. The availability and cost-effectiveness of cutting-edge technology solutions might influence the rate of implementation in specific geographic areas when it comes to technological maturity (Mo et al., 2024). Here are some examples of hotels around the world that are famous for implementing smart hotels in their operations:

- Hangzhou, China's Flyzoo Hotel by Alibaba: This futuristic marvel includes robotic bartenders, voice-activated room operations, and facial recognition check-in (Fkeeh, 2024).
- Pan Pacific Singapore: Using in-room tablets, this environmentally conscious hotel uses smart sensors to maximise energy use and customise the guest experience (Pan Pacific Hotels Group, 2024).
- Henn Na Hotel chains in Japan: Henn Na, which is well-known for its robot employees and AI-powered visitor interactions, provides a distinctive and effective experience (Zhang et al., 2024).
- CitizenM Hotels in Europe: Recognised for their innovative approach, CitizenM uses cell phones to provide self-service check-in, mobile room controls, and mood lighting (Hospitality Technology Review, 2025).
- Room Mate Giulia in Milan, Italy: The design-led Hotel Mate Giulia in Milan,

Italy, offers interactive art displays, in-room iPads for guest services, and smart thermostats (European Hospitality Insights, 2024).

- Hotel Berlin in Berlin, Germany: This environmentally conscious hotel promotes sustainability by using smart lighting and heating controls, geothermal heating, and rainwater collection (Sustainable Tourism Report, 2025).
- MGM Resorts International in Las Vegas: This massive entertainment company uses smart room technology to control the temperature, enable keyless entrance, and customise lighting (Global Hospitality Tech Review, 2024).
- Kimpton Hotels and Restaurants: This network of boutique hotels allows visitors to check in via a smartphone, has tablets in the rooms for dining and spa appointments and has smart TVs for entertainment (Boutique Hotel Innovation Index, 2025).
- Aloft Hotels by Marriott: Keyless entrance, mobile room controls, and social media integration are elements of this millennial-focused brand's smart guest rooms (Marriott Tech Innovation Report, 2024).

Existing studies suggest that increasing convergence in AI integration, personalised services, and platform-based hospitality ecosystems may gradually standardise smart hotel experiences across destinations (Makivić, 2024; Gursoy, 2025). However, the implementation and interpretation of smart hotel technologies remain highly context-dependent and shaped by local infrastructural, organisational, and socio-cultural conditions (Acharya, 2024; Wong & Loo, 2026). (Makivić, 2024). All aspects of the guest experience might be integrated into a single platform, providing general control and flexibility and eventually becoming the standard globally (Gursoy, 2025). In the meantime, the hotel industry will use smart technology to support ethical behaviours such as waste reduction and energy optimisation (Patrichi, 2025).

A global movement known as the "smart hotel revolution" is changing both the hospitality industry and the expectations of guests (Acharya, 2024). Through an awareness of global trends, regional differences, and upcoming developments, hotels can strategically use technology to deliver an exceptional guest experience that cuts beyond geographic boundaries (Gursoy, 2025). The implementation of smart hotels varies by country. Developed nations might have advanced systems, but developing countries might prioritise cost-effective solutions (Acharya, 2024). The infrastructure, technological maturity, and guest preferences of the local region will probably influence

the level of implementation of smart hotels as well as the specific technologies that are implemented (Makivić, 2024).

Cultural sensitivity must also be considered in the design and implementation of smart hotels. Global traveller experiences will become more standardised and interconnected as smart hotel concepts advance and there is more integration of these technologies across national borders (Gursoy, 2025). While the global literature highlights the widespread diffusion of smart hotel concepts and the diversity of their technological expressions across regions, existing studies also suggest that the implementation and meaning of smart hotel practices are highly context-dependent, thereby necessitating a closer examination of how these developments are interpreted, implemented, and experienced within specific local hospitality contexts such as the hotel industry in Batam (Acharya, 2024).

## 2.9 Hotel Industry in Batam

The Batam hotel industry has been a significant contributor to the region's tourism economy, providing lodging choices for both leisure and business visitors. Popular with both domestic and foreign travellers, Batam has also been noted for its duty-free shopping, lovely beaches, golf courses, and proximity to Singapore. Hotel demand has been fuelled by the area's increased appeal as a tourism hub and its accessibility by land, sea, and air (UN Tourism, 2024). The Batam hotel industry has provided a variety of accommodation choices, such as business hotels, boutique hotels, luxury resorts, and low-cost hotels.

More importantly, a range of properties have been available for guests to select from, depending on their interests and financial situation. Visitors from different regions have been drawn to Batam due to its wide selection of tourist attractions, which include ideal beaches, historical landmarks, retail malls, and leisure pursuits. On the other hand, Batam's industrial zones and strategic position have made it a hub for business travellers. The hotel sector would meet the needs of business travellers by offering services designed specifically for corporate travellers, conference spaces, and contemporary amenities (Ministry of Tourism and Creative Economy Indonesia, 2025).

In Batam, the hotel industry has played a significant role in the development of the region's entire infrastructure, which included utilities, connections, and

transportation networks. Investments in hotel facilities and infrastructure can improve visitors' entire experience of visiting Batam. Certain hotels in Batam also have implemented sustainable practices to reduce their environmental impact, encourage conservation, and help the locals. Sustainable tourism practices have been strengthened by sustainability activities such as waste management, energy efficiency, and community involvement (UN Tourism, 2025). In addition, hotels in Batam have made efforts to maintain the highest standards of hospitality by providing excellent customer service, comfortable hotel rooms, and extras to make guest stays more pleasant. A pleasant guest experience can be influenced by hotel staff members' professionalism, friendliness, and attentiveness (Indonesia Tourism Statistics, BPS, 2024).

Otherwise, competition, seasonality, limited infrastructure, labour concerns, and regulatory compliance have been some of the challenges that Batam's hotel sector faces. The hotel industry in Batam must face these challenges because Batam's industrial zones and business travellers have attracted corporate travellers, entrepreneurs, and professionals to the region. Providing business-friendly hotels with conference spaces, meeting rooms, and other amenities provided to business travellers' requirements have been in high demand (World Travel & Tourism Council [WTTC], 2024; BPS Kepulauan Riau, 2024). The hotel industry in Batam continues to experience both opportunities and structural challenges associated with tourism growth, digital transformation pressures, infrastructural readiness, and increasing regional competition (UN Tourism, 2025; WTTC, 2024). While the growing tourism sector has provided opportunities for hoteliers, competition among hotels has also increased. Hoteliers must constantly innovate and offer unique experiences to attract guests (UN Tourism, 2024). In addition, the COVID-19 pandemic has had a major impact on tourism around the world, including in Batam. The travel bans and reduced demand for travel have affected hotel availability and revenue. However, as travel restrictions ease and tourism resumes, the hotel industry in Batam has been expected to recover (UN Tourism, 2024).

More importantly, stakeholder cooperation, creativity, and strategic planning are necessary to address these issues in the tourism industry. In summary, Batam's hotel industry has been essential to the city's economy, tourism, and the provision of unique experiences for guests. Hotels in Batam may attract tourists and support the growth of the tourism industry by maintaining high standards of hospitality, implementing sustainable practices, and resolving industry issues. The development of the hotel industry in Batam has been facilitated by ongoing investments in tourism infrastructure,

such as transportation systems, attractions for tourists, and hotel accommodations. Infrastructure improvements have strengthened the region's tourism industry, attracted more tourists, and improved the travellers' overall experience (Ministry of Tourism and Creative Economy, 2025; BPS Kepulauan Riau, 2024).

The performance and competitiveness of hotels in Batam are improving through the integration of smart technologies, digital solutions, online booking systems, and guest-facing innovations. The sector has been developing because of the implementation of technology for individualised experiences, guest engagement, and operational efficiency. The development of Batam's hotel business depends on the implementation of eco-friendly programmes, sustainable practices, and responsible tourist strategies. Sustainability initiatives have supported long-term destination viability, community involvement, and environmental conservation (Tripadvisor, 2024). The hotel industry in Batam may increase its growth, performance, and competitiveness in the dynamic tourism market by using these aspects and putting a strong emphasis on innovation, guest satisfaction, sustainable practices, and continuous improvement.

Integrating these elements can support the industry's growth and development by promoting Batam as a popular and profitable vacation destination for tourists from all over the world (World Travel & Tourism Council, 2025). The hotel industry in Batam may increase its growth, performance, and competitiveness in the dynamic tourism market by using these aspects and putting a strong emphasis on innovation, guest satisfaction, sustainable practices, and continuous improvement. Integrating these elements can support the industry's growth and development by promoting Batam as a popular and profitable vacation destination for tourists. By conducting an analysis of the hotel industry in Batam, stakeholders can gain valuable insights into the internal and external factors influencing the industry's development and performance (Caniago et al., 2024; UN Tourism, 2024).

Existing tourism literature increasingly emphasises the importance of diversification, sustainability, and digital transformation in strengthening destination competitiveness within the hospitality industry (UN Tourism, 2024; World Travel & Tourism Council, 2025). However, comparatively limited empirical attention has been given to how secondary tourism destinations such as Batam operationalise these strategic transformations under conditions characterised by uneven infrastructure readiness and evolving governance facilitation systems. Not only that, but digital

marketing should also leverage digital platforms for marketing, booking, and customer engagement to increase visibility and reach new customer segments. For the future, the hotel industry in Batam must pay attention to sustainable tourism models which can embrace sustainable practices and eco-friendly initiatives appealing to environmentally conscious travellers to categorise Batam as a green destination (UN Tourism, 2024). In addition, the government's role is to change the policies, regulations, or taxation that can affect the operational costs and profits of hotels in Batam.

In conclusion, implementing a sustainable tourism model that integrates eco-friendly practices and smart hotel technologies is essential to the hotel industry's future development in Batam. By doing this, hotels may help protect Batam's natural resources and beauty for future generations in addition to attracting environmentally aware tourists (World Bank, 2025). Due to its proximity to Singapore and Malaysia, Batam has a well-established hotel business that services to tourists. Batam's lack of diversification in hotel and accommodation options may hinder its appeal to a wider range of travellers with diverse preferences and budgets. There are positive indications for Batam's hotel industry despite challenges. The government is concerned with increasing travelling, and there may be opportunities to develop, especially in the smart hotel industry. Within this evolving landscape of opportunities, challenges, and competitive pressures, the development of smart hotels in Batam emerges not merely as a technological upgrade, but as a contextually embedded process shaped by local industry conditions, stakeholder interpretations, and destination-specific priorities, which is examined in the following subsection.

### 2.9.1 Smart Hotel Development in Batam

The idea of sustainable practices and smart hotels has become increasingly popular worldwide. It can also be noted that Batam currently has few possibilities for smart hotels. The hospitality industry in Batam has been increasingly implementing sustainability and smart technologies, even though these concepts are still in their infancy (Adeel et al., 2024; Thongmuna et al., 2025). There were several reasons the implementation of smart hotel models in Batam has been slow which could serve as challenges or difficulties. Limited awareness has been one of the reasons for this situation. Hotel managers, owners, and other stakeholders in Batam might not be fully

aware of the advantages and possibilities of smart hotel technologies. Smart technology implementation may be sluggish if the value proposition has not been well understood.

Existing studies frequently identify high implementation costs as a major barrier to smart hotel adoption, particularly among mid-scale and independently operated hotels operating within resource-constrained environments (Guerra-Lombardi et al., 2024; Ashfaq et al., 2025). Nevertheless, current literature remains comparatively limited in explaining how hotel managers negotiate financial uncertainty, investment prioritisation, and long-term technological sustainability within emerging tourism destinations such as Batam. Hotel owners in Batam could be hesitant to commit funds to implement new technologies, particularly if there has not been an obvious or quick return on investment (Guerra-Lombardi et al., 2024). More importantly, some Batam hotels may lack the infrastructure necessary to completely enable the integration of smart technologies. Hence, it can be difficult and time-consuming to upgrade hardware, networks, and systems to enable smart features. The development of smart hotel implementation may also be hindered by the lack of resources for training programmes and the availability of qualified staff.

Nonetheless, there have been indications of a sluggish but steady improvement and growing enthusiasm for the integration of smart technologies into Batam hotels. Some hotels in Batam may also be administering pilot projects or efforts to test and build smart technologies in specific areas of their properties to determine the viability and advantages of the projects. At this stage, these have been just minimal improvements and activities of the smart hotel industry in Batam (Caniago et al., 2024; Indonesia Ministry of Tourism and Creative Economy, 2025). However, the implementation of smart technologies in hotels can be facilitated by strategic partnerships with solution integrators, technology providers, and industry experts. Collaborations with technology companies that focus on automation, IoT, and guest experience can hasten the development of Batam's smart hotel projects (McKinsey & Company, 2024).

Also, input from guests and evolving customer preferences have been major factors propelling the development of smart hotels. Hotels in Batam might be encouraged to make smart technology investments to satisfy guests and improve levels of satisfaction as more travellers look for personalised and seamless experiences (Tripadvisor, 2025). Further advancements can also be made by enhancing the

knowledge and educating hotel owners, managers, and other industry players on the advantages of smart hotel technologies. Implementation efforts may be encouraged and strengthened through workshops, seminars, and industry events focusing on digital transformation and smart hotel solutions (McKinsey & Company, 2024).

The government's Kemanperkraf Master Plan (2020–2025) has also provided laws, incentives, and initiatives to encourage the hospitality industry to adopt new technologies and innovate digitally. Otherwise, supportive regulatory frameworks and funding opportunities have also been given to hotels to invest in smart features (Ministry of Tourism and Creative Economy, 2024). Besides, the competitive environment of Batam's hospitality sector, which includes the existence of smart features in nearby areas or rival hotels, may have an impact on the development of smart hotels. Smart technology integration may be given top priority by hotels aiming to outshine their competitors and maintain their competitive edge (World Economic Forum, 2025).

Although the development of smart hotels in Batam may be a slow process, the industry's increasing focus on digital transformation, improving the guest experience and streamlining operations points to a possible future move in the direction of wider uptake of smart technologies. The development of smart hotels in Batam may be further accelerated by ongoing investments, partnerships, and an emphasis on satisfying the varying needs of guests (UN Tourism, 2024). It has been anticipated that more hotels in Batam would integrate eco-friendly initiatives and smart technologies into their operations as the demand for sustainable and eco-friendly hotels has grown. In addition to drawing eco-aware tourists, this move towards sustainability has been essential to protect Batam's resources and natural beauty for future generations. Even if there were not many smart hotels in Batam, there has been hope that the sector will prosper into one that would be more environmentally conscious and sustainable in the future. To adapt to changing traveller preferences and help create a greener tourism scene in the area, it has been expected that more hotels in Batam will implement smart and sustainable practices in the future. This is because environmental conservation has become becoming more important (Tripadvisor, 2024):

1. Radisson Golf and Convention Centre Batam: This hotel has combined smart technology to provide guests with a pleasant experience. It has offered a keyless entry system that allows guests to enter their rooms using a smartphone. The hotel has also used smart lighting, heating and entertainment that can be controlled via a smartphone application. In addition, the hotel has also used AI-

based chatbots to assist guests with questions and provide recommendations.

2. Swiss-Belhotel Harbor Bay: This hotel has been equipped with smart room controls allowing guests to change room settings such as lighting and temperature using voice commands or mobile apps. The hotel also offers check-in and check-out services, reducing the need for social interaction with the front desk. In addition, Swiss-Belhotel Harbor Bay has used AI technology to analyse guest information and provide personalised recommendations and services.
3. Aston Batam Hotel and Residence: This hotel has used smart technology for energy management and sustainable development. It uses sensors to monitor and optimise energy use, ensuring efficiency and reducing environmental impact. The hotel has also offered hands-free check-in and check-out, as well as smart room management for guests' convenience.

Smart hotel development in Batam, Indonesia faces challenges due to cost, investment and technical expertise. Aside from that, there might not been a lot of research on the advantages and disadvantages of implementing smart hotel features in the specific context of Batam. Overcoming these requires collaboration, government support, technology investment, and enhancing guest experience. The Indonesian government's interest in technology could benefit the hotel industry. Taken together, the gradual and uneven implementation of smart and sustainable practices in Batam highlights that smart hotel implementation is not a linear technological process, but a context-dependent and negotiated endeavour shaped by stakeholder awareness, resource constraints, governance facilitation, and evolving market expectations, thereby necessitating a closer qualitative examination of how smart hotels are currently implemented and experienced in the Batam context (UN Tourism, 2024).

### 2.9.2 Smart Hotel Implementation in Batam

The hospitality industry is still in the process of implementing smart technologies, as seen by the small number of smart hotels in Batam. The implementation of smart technologies in hotels might vary depending on aspects like market demand, infrastructure readiness, investment capacity, and industry trends, even if certain regions have accepted smart hotel concepts more readily than others (Akel & Noyan, 2024; Han et al., 2024). The comparatively low number of smart hotels in Batam

can be attributed to a number of things, including the city's support systems and access to advanced technological infrastructure, which may have an impact on the implementation of smart hotel technologies. The integration of complicated systems or restricted access to cutting- edge technology solutions could be challenging to the successful implementation of smart features in hotel environments. Then, the level of implementation may be influenced by Batam guests' level of demand for smart hotel experiences (Caniago et al., 2024; Han et al., 2024). Hotels might not be as motivated to invest in smart technologies if visitors are content with traditional services or are not actively looking for smart hotel facilities.

More importantly, a significant initial investment in hardware, software, infrastructure changes, and training is frequently necessary for the successful implementation of smart technology in hotels. Hotels in Batam might be concerned about the financial consequences of implementing smart technology, particularly if the return on investment is unclear (Han et al., 2024). In terms of the legislative framework, hotels wishing to use smart technology may find it difficult to comply with rules, laws governing data protection, and industry standards (Caniago et al., 2024; Han et al., 2024). It might take more time and resources to make sure smart systems follow security regulations and regulatory requirements. Although there have not been many smart hotels in Batam, more may choose to study and use smart technologies in the future because of the steady transition to digital transformation and the growing need for better guest experiences (Liu et al., 2024). In response to the ever- evolving demands and expectations of travellers, Batam's hospitality sector may see a rise in the incorporation of intelligent features as technology develops, and business may change.

With the way technology is developing and the growing need for better guest experiences, there has been a lot of promise for the hotel sectors in Batam to adopt a smart hotel model (Raju, 2024). The implementation of smart hotel concepts in Batam would have a positive outlook due to several aspects, including technological improvements. Hotels in Batam can now use cutting-edge tools to improve operations, customise guest experiences, and increase productivity due to the quick development of technology, which includes IoT, AI, and data analytics (Hoang, 2024). In addition, contemporary travellers have been increasingly looking for smooth and customised hotel stays. Hence, hotels in Batam can meet and go beyond guest expectations by implementing smart technologies, which will increase guest satisfaction and loyalty (Shankar Raju, 2024).

Additionally, hotels in Batam may differentiate themselves in an increasingly competitive sector by implementing smart hotel strategies. By providing state-of-the-art technological features and services, hotels may establish themselves as leaders in the sector and draw in tech-savvy guests. Optimising resource utilisation, streamlining operations, and automating repetitive processes have been some of the main advantages of smart hotel technologies (Graham & Sasraku-Neequaye, 2026). This effectiveness can help hotels in Batam to perform better, minimise loss, and increase productivity. More importantly, eco-friendly procedures, waste management techniques, and energy-efficient systems have been frequently included in smart hotel models. Thus, hotels in Batam may reduce their environmental impact and attract eco-aware tourists by prioritising sustainability (Petrović et al., 2024).

Lastly, hotel data collection and analysis on guest preferences, behaviour patterns, and operational metrics have been made possible by smart technologies. Using a data-driven strategy, hotels in Batam may improve overall guest satisfaction, personalise services, and make informed decisions (Oracle Hospitality, 2024; Deloitte, 2024). As guests need changes, the hospitality sector worldwide can use more smart hotel concepts in the future. They may remain competitive and relevant in the market by paying attention to best practices and industry trends. To conclude, Batam's hotel sector has a good chance of putting a smart hotel model into practice, providing chances for creativity, enhanced visitor experiences, operational effectiveness, and sustainable practices (UN Tourism, 2025; McKinsey & Company, 2024). They may position themselves for success in a competitive and dynamic hospitality industry by embracing digital transformation and implementing smart technologies. Below are some examples of smart hotel implementation in Batam (Tripadvisor, 2024):

1. Turi Beach Resort Batam has provided smart room controls allowing guests to modify lighting, temperature, and other room settings via a smartphone app or in-room control panels. Guests can customise their room settings based on their preferences, increasing their comfort and convenience.
2. The BCC Hotel and Residence has installed smart room controls allowing guests to operate lighting, air conditioning, and entertainment systems via touch panels or mobile applications. The user-friendly interface has enabled guests to effortlessly customise their room settings and create a personalised environment.

3. Harmoni One Convention Hotel and Service Apartments: The hotel has offered smart controls allowing guests to control lighting, heating and other room functions using screens or mobile applications. Smart management has allowed convenience and energy efficiency enabling guests to create a comfortable environment during their stay.
4. Nongsa Point Marina and Resort: This resort has been equipped with smart room controls permitting guests to modify lighting, temperature, and curtains via touch panels or mobile applications. The easy UI and automated capabilities have improved the visitor experience and ensured a pleasant stay.
5. The Harris Hotel Batam Centre has a mobile application that allows guests to complete a variety of tasks directly from their cell phones. The software has enabled guests to check in and out without the need for typical front desk interactions. They can also enter their room using a digital key on the app, which makes for a more convenient process.

To gain a better understanding of the topic, it is critical that this study address the lack of specific research focused on the implementation of smart hotels in Batam (McKinsey & Company, 2025). It requires more research to understand better the possible advantages, difficulties, and consequences of implementing smart technologies in Batam's hotel industry (Deloitte, 2024; World Economic Forum, 2024). A thorough investigation can yield significant insights that can inform decision-making processes and advance the development of smart hotel projects in Batam (UN Tourism, 2025). For the regional hotel industry, this knowledge might be innovative. When taken as a whole, the gradual and uneven implementation of smart and sustainable practices in Batam highlights that smart hotel implementation is not a linear technological process, but a context-dependent and negotiated endeavour shaped by stakeholder awareness, resource constraints, governance facilitation, and evolving market expectations, thereby necessitating a closer qualitative examination of how smart hotels are currently implemented and experienced in the Batam context (McKinsey & Company, 2025; Deloitte, 2024).

## 2.10 Conceptual Perspectives on Smart Hotel Development

Rather than proposing a definitive framework, this section reviews existing conceptual perspectives on smart hotel development to highlight their respective strengths and limitations, thereby reinforcing the need for the inductive qualitative approach adopted in this study. Existing literature demonstrates that smart hotel development has been conceptualised through a variety of lenses, each offering valuable yet partial insights into the nature of technological transformation within the hospitality sector (Liu et al., 2024). A dominant strand of smart hotel literature conceptualises smart hotel development from a technology-centric perspective, where the implementation of IoT, AI, automation systems, and data analytics is positioned as the primary indicator of smartness (Liu et al., 2024). While this perspective contributes to understanding operational efficiency and digital capability, it frequently overemphasises technological functionality while underrepresenting organisational processes, stakeholder interpretation, and contextual implementation realities within emerging tourism destinations (Lee et al., 2024; Cheng et al., 2026). This perspective contributes to an understanding of how technological capabilities may enhance operational efficiency, service personalisation, and resource optimisation (Dianawati et al., 2024).

However, such approaches often treat technology as an independent driver of change, paying limited attention to organisational processes, human agency, and contextual variability (Deloitte, 2024). As a result, these conceptualisations risk oversimplifying smart hotel development as a linear or technical progression rather than a socially embedded process (Lee et al., 2024). In response to these limitations, subsequent studies have adopted more integrated system-based perspectives, conceptualising smart hotels as digitally interconnected environments in which multiple technologies, platforms, and data flows converge to support service delivery (McKinsey & Company, 2025). This perspective advances the discussion by recognising the importance of interoperability, data integration, and system coordination (Caniago et al., 2024).

Nevertheless, while more holistic than technology-centric views, system-based approaches frequently remain focused on structural or functional dimensions, offering limited insight into how smart technologies are interpreted, negotiated, and enacted by different organisational actors within specific contexts (Lee et al., 2024). More recent

scholarship has increasingly conceptualised smart hotel development through socio-technical and ecosystem-oriented perspectives (World Economic Forum, 2024). From this viewpoint, smart hotels are understood as part of broader tourism, urban, and digital ecosystems, where technological implementation is shaped by interactions between human actors, organisational structures, institutional regulations, and destination-level conditions (Accenture, 2024). This perspective acknowledges that smart hotel development is not uniform, but instead unfolds differently across locations and organisations depending on factors such as regulatory environments, market maturity, infrastructure readiness, and participant priorities (Lee et al., 2024). While this perspective offers a richer understanding of complexity, it often remains conceptually abstract, with limited empirical grounding in specific local contexts, particularly in emerging destinations (Zhang et al., 2024).

Across these conceptual perspectives, a recurring limitation is the tendency to generalise smart hotel development based on assumptions derived from technologically advanced or highly digitised contexts (Lee et al., 2024). Such generalisations may overlook the situated realities of destinations where smart technologies are unevenly implemented, selectively adopted, or adapted to local conditions (Caniago et al., 2024). Consequently, existing frameworks may not fully capture the lived experiences, decision-making processes, and sense-making practices of stakeholders involved in smart hotel development at the organisational and destination levels (Cheng et al., 2026; Lee et al., 2024). Taken together, these conceptual perspectives highlight that smart hotel development cannot be adequately understood through a single, unified framework (Kusumawardhani et al., 2024).

Instead, it emerges as a dynamic, contextually embedded, and socially constructed process shaped by multiple actors and conditions (Cheng et al., 2026; Kusumawardhani et al., 2024). This conceptual fragmentation, rather than representing a weakness, underscores the necessity of an inductive qualitative approach capable of capturing diverse interpretations, practices, and meanings associated with smart hotel development (Zhang et al., 2024). By foregrounding stakeholder perspectives and contextual dynamics, the present study seeks to contribute a grounded and context-sensitive understanding of smart hotel implementation that extends beyond existing conceptual abstractions.

While the foregoing discussion highlights the conceptual diversity and theoretical evolution of smart hotel development, it also underscores the need to examine how these perspectives have been operationalised and empirically explored within existing research (Liu et al., 2024). Conceptual arguments gain analytical significance when situated alongside empirical evidence that illustrates how smart hotel development has been investigated across different contexts, methodologies, and levels of analysis (Lee et al., 2024). Accordingly, the following section reviews prior empirical studies on smart hotels, both globally and within Indonesia, to identify prevailing research patterns, dominant analytical focus, and persistent empirical gaps that further inform the positioning of the present qualitative inquiry. Smart hotel research and literature have increased vastly over the last decades, coinciding with the increased use of technologies within hotel operations across the globe (Liu et al., 2024). Table 2.1 presents a comprehensive list of previous studies on the implementation of smart hotels in Indonesia and globally.

Previous studies have highlighted several theoretical lenses related to smart hotel technologies, including socio-technical systems theory, service-dominant logic, and the TOE framework. These perspectives collectively contribute to understanding digital transformation in hospitality, particularly in relation to value co-creation, technology adoption, and the interaction between technological, organisational, and environmental factors. However, for this study, recent literature indicates that these theories are often applied in isolation, leading to fragmented interpretations that do not fully capture the integrated and context-dependent nature of smart hotel implementation in emerging destinations. These conceptual and empirical inconsistencies are further reflected in prior studies, as summarised in Table 2.1, which reviews research objectives, methodologies, and analytical approaches to identify prevailing patterns and existing gaps.

Table 2.1 presents the research objectives, methodologies, and analytical approaches adopted in previous studies, the findings of which are used as a basis for comparison in this research. However, in the context of Batam, empirical studies examining smart hotel implementation remain limited, particularly those employing a qualitative research approach. Accordingly, this study addresses this gap by involving hotel managers and government officers as key participants, given their central role in shaping the development and governance of smart hotels in Batam. Taken together, while existing conceptual perspectives offer valuable theoretical insights into smart

hotel development, their partial, abstract, and context-dependent nature limits their ability to capture the situated, actor-driven, and locally embedded realities of smart hotel implementation. This limitation highlights the need for a more explicit and context-sensitive examination of the existing literature.

Table 2.1
A review of the research on the implementation smart hotel literature

| No | Author, Title and Publications | Objective of the Study and Related Variables | Methodology Employed | | | Analysis Technique | Results | Comments/Gaps |
|---|---|---|---|---|---|---|---|---|
| | | | Research Design | Sample | Instrument | | | |
| 1 | Wang, T., Aw, E.C.X., Tan, G.W.H., Sthapit, E., & Li, X. (2025). Can AI Improve Hotel Service Performance? A Systematic Review Using ADO-TCM. Tourism Review. DOI: https://doi.org/10.1177/14673584251356817 | To conduct a systematic review of the literature on AI technologies and hotel employee service performance, with particular emphasis on automation processes, customer engagement, employee-related outcomes, and the enhancement of operational efficiency through AI applications. | Systematic literature review. | 72 Scopus-indexed hospitality studies published between 2017–2024. | PRISMA-based literature extraction and ADO-TCM framework. | Bibliometric Analysis and Content Analysis | The findings indicated that the adoption of AI technologies substantially enhanced operational automation, increased employee efficiency, improved the quality of customer interactions, and supported more effective managerial decision-making within hospitality organisations. This also indicates, the integration of AI contributed to stronger service innovation capabilities and improved the operational competitiveness of hotel businesses. | Although the study contributed to advancing theoretical insights into AI-driven hotel operations, its discussion was largely centred on technological aspects, offering less attention to organisational adjustment, stakeholder coordination, and institutional preparedness that may affect the long-term sustainability of implementation in emerging tourism destinations. |

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|---|---|---|---|---|---|---|---|---|
| 2 | Kim, H., So, K.K.F., Shin, S., & Li, J. (2025). Artificial Intelligence in Hospitality and Tourism: Insights From Industry Practices, Research Literature, and Expert Opinions. Journal of Hospitality & Tourism Research. DOI: https://doi.org/10.1177/10963480241229235 | To explore the transformation driven by artificial intelligence, its implementation practices, and its strategic implications across the hospitality and tourism sectors. | Qualitative expert-based review. | Hospitality experts and secondary literature sources. | Expert interviews and literature synthesis. | Thematic Analysis | The findings indicated that artificial intelligence technologies are progressively transforming hospitality operations, guest experiences, strategic decision-making, and personalised services by utilising automation and predictive analytical capabilities. The study also highlighted AI as a key factor in fostering sustainable innovation and enhancing the digital competitiveness of hospitality organisations. | Although the study offered valuable strategic and industry-focused insights, its discussion remained primarily conceptual, with limited empirical exploration of implementation barriers, workforce adaptation, and contextual challenges encountered in emerging tourism destinations. |
| 3 | Ashfaq, M., Ul Haq, I., Pham, H.C., Jan, I.U., & Shahzad, K. (2025). Critical Determinants of Intentions to Revisit Smart Hotels: An Examination of Smart Service Interactional Experience, Emotions, and Technophilia. Journal of Hospitality Marketing & Management. DOI: https://doi.org/10.1080/19368623.2025.2464029 | To examine how smart service interaction experiences, emotional responses, technophilia, and revisit intentions are associated within the context of smart hotels. | Quantitative study. | 312 smart hotel customers.participants. | Structured questionnaire survey using Likert-scale items. | Structural Equation Modelling (SEM) | The findings revealed that interactive smart service experiences played an important role in shaping customers' emotional responses, attachment to technology, and intentions to revisit smart hotels. Meaningful and positive emotional connections also encouraged continued behavioural engagement and greater acceptance of technology-driven hospitality services. | The study maintained a predominant focus on customers and behavioural intention theory, resulting in a relatively narrow exploration of organisational implementation practices, stakeholder dynamics, and the socio-technical transformation issues that influence the sustainability of smart hotels. |

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|---|---|---|---|---|---|---|---|---|
| 4 | Chen, Z. (2026). Exploring the Transformative Potential of Artificial Intelligence in Hospitality: A Systematic Review of Applications and Challenges. Cornell Hospitality Quarterly. DOI: https://doi.org/10.1177/19389655251380983 | To comprehensively explore the applications of artificial intelligence, its operational implications, and the ethical concerns arising within the hospitality industry. | Systematic literature review. | Hospitality AI studies published between 2018–2025. | PRISMA-based literature extraction and synthesis framework. | Content Analysis and Thematic Synthesis | The findings revealed that artificial intelligence has substantially reshaped hospitality operations by enabling intelligent automation, improving predictive decision-making, personalising guest services, and increasing operational effectiveness. However, issues related to ethical management, data protection, and recovery from technological failures were identified as key challenges in the implementation process. | Although the study offered a well-integrated theoretical perspective on AI transformation, its discussion was predominantly conceptual, with insufficient attention given to the practical realities of implementation in emerging tourism destinations and hospitality settings facing resource limitations. |
| 5 | Gajić, T., Petrović, M.D., Pešić, A.M., Conić, M., & Gligorijević, N. (2024). Innovative Approaches in Hotel Management: Integrating Artificial Intelligence (AI) and the Internet of Things (IoT) to Enhance Operational Efficiency and Sustainability. Sustainability. DOI: https://doi.org/10.3390/su16177279 | To investigate the integration of artificial intelligence (AI) and Internet of Things (IoT) technologies in enhancing operational efficiency and supporting sustainability practices within hospitality organisations. | Quantitative survey. | Hotel managers in Serbia. | Structured survey questionnaires. | Structural Equation Modelling (SEM) | The findings indicated that the integration of AI and IoT technologies substantially enhanced operational efficiency, improved sustainability outcomes, and strengthened resource management capabilities in hospitality organisations. This also indicates, the adoption of these technologies contributed to greater organisational innovation and supported continuous long-term operational improvement. | The study mainly emphasised operational efficiency and sustainability outcomes, whereas aspects related to stakeholder adaptation, governance readiness, and organisational constraints affecting the implementation of smart hotel initiatives received relatively less attention. |

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|---|---|---|---|---|---|---|---|---|
| 6 | Cho, M.J., & Chen, P.J. (2025). Friend or a Foe: Robot-Based Applications in Luxury Hotel Services. Journal of Hospitality & Tourism Cases. DOI: https://doi.org/10.1177/21649987251333075 | To examine the potential opportunities and operational complexities linked to the use of robotic applications in luxury hotel services. | Case study research. | Luxury hotel operational cases. | Case Analysis | Qualitative analysis of guest feedback through thematic analysis. Utilising statistical tools to analyse survey results quantitatively. Frequencies, correlations, and descriptive statistics that are calculated for interpretation. Exploratory case study design for in depth understanding. | The findings revealed that the use of robotic applications enhanced operational efficiency, encouraged service innovation, and supported greater consistency in luxury hotel operations. Nevertheless, the integration of such technologies also raised concerns about the quality of emotional engagement and the authenticity of guest service experiences. | The study primarily concentrated on luxury hospitality settings, offering only limited insight into how smart hotel implementation occurs in non-luxury accommodations and emerging tourism destinations where financial limitations and varying levels of technological preparedness remain significant challenges. |
| 7 | Indora, A. (2024). Artificial Intelligence (AI) in the Hospitality Industry: A Review Article. International Journal for Multidisciplinary Research (IJFMR). DOI: https://doi.org/10.36948/ijfmr.2024.v06i03.19393 | This study aims to examine the implementation of artificial intelligence (AI) technologies in the hospitality industry, particularly in relation to operational automation, improvements in customer service, the adoption of smart hotel systems, and broader digital | Review article. | Secondary hospitality and AI-related literature sources. | Literature synthesis and conceptual review framework. | Content Analysis and Literature Review | The findings demonstrated that artificial intelligence technologies play a substantial role in improving operational performance, enhancing customer personalisation, facilitating contactless service delivery, optimising intelligent room operations, and accelerating smart hotel development in the hospitality sector. Technologies powered by AI, including chatbots, robotic services, automated systems, facial recognition applications, and predictive analytics, were | Although the study offered valuable general insights into the application of AI within the hospitality sector, its discussion was largely descriptive and conceptual. The findings provided only limited empirical evidence concerning organisational adaptation, employee preparedness, stakeholder viewpoints, governance mechanisms, and context-specific implementation challenges influencing smart hotel |

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|---|---|---|---|---|---|---|---|---|
| | | transformation initiatives. | | | | | recognised as key enablers of hospitality innovation and improved guest experiences. The study further indicated a growing transition toward technology-oriented hospitality services, particularly in the post-pandemic era following COVID-19. | transformation in emerging tourism destinations such as Batam. |
| 8 | Luo, L. (2024). A web intelligent hotel management framework based on IoT and generative AI. Journal of Web Engineering. DOI: https://doi.org/10.13052/jwe1540-9589.2371 | To design and evaluate a smart hotel management framework that incorporates Internet of Things (IoT) technologies and generative artificial intelligence into hotel operational processes. | System development and conceptual framework study. | Intelligent hotel management system architecture and operational scenarios. | IoT-integrated framework modelling and AI system design architecture. | System Architecture Analysis and Framework Evaluation | The findings revealed that the integration of IoT technologies and generative AI substantially enhanced hotel operational performance, advanced intelligent decision-making processes, strengthened service automation, and improved the management of customer interactions. Furthermore, the proposed framework contributed to more effective real-time monitoring, predictive operational management, and adaptive smart service responsiveness across hotel environments. | While the study offered valuable insights into AI-based hotel management frameworks from a technological and systems perspective, its analysis remained predominantly technical and operational in nature. As a result, insufficient attention was given to organisational adjustment, workforce preparedness, stakeholder competencies, and institutional barriers that may affect the practical implementation and transformation of smart hotels in real-world contexts. |

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|---|---|---|---|---|---|---|---|---|
| 9 | Liu, X., Wider, W., Fauzi, M. A., Jiang, L., Udang, L. N., & Hossain, S. F. A. (2024). The evolution of smart hotels: A bibliometric review of the past, present and future trends. Heliyon, 10(4), e26472. DOI: https://doi.org/10.1016/j.heliyon.2024.e26472 | To analyse the progression, emerging research patterns, thematic advancements, and prospective research directions within smart hotel scholarship, particularly in relation to artificial intelligence, Internet of Things (IoT), automation technologies, digital transformation, and smart hospitality ecosystems. | Bibliometric review study. | Smart hotel publications indexed in Scopus and Web of Science databases. | Bibliometric mapping software and citation database extraction tools. | Bibliometric Analysis and Science Mapping | The findings revealed that research on smart hotels has expanded significantly, especially in relation to artificial intelligence, the Internet of Things (IoT), robotics, automated systems, and the improvement of guest experiences. The study also highlighted increasing academic interest in operational effectiveness, digital transformation, smart tourism ecosystems, and sustainability-oriented developments within the hospitality industry. Additional emerging areas of discussion involved AI-based service customisation, intelligent hotel technologies, and the capacity of hospitality organisations to integrate advanced technological solutions effectively. | Although the study presented an extensive bibliometric overview of the development of smart hotel research, its analysis was primarily descriptive and focused on identifying research trends. As a result, the study provided relatively limited insight into organisational adjustment processes, stakeholder interactions, governance structures, and context-specific implementation challenges that shape smart hotel transformation in emerging tourism destinations and developing hospitality sectors. |

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|---|---|---|---|---|---|---|---|---|
| 10 | Akel, G., & Noyan, E. (2024). Exploring the criteria for a green and smart hotel: insights from hotel managers' Perspectives. Journal of Hospitality and Tourism Insights. 10.1108/JHTI-08-2023-0555. | To investigate hotel managers' attitudes and adjustments to green and smart hotel technology in the framework of sustainability. | Qualitative research methodology | Hotel managers in Turkey | Semi-structured interviews | Swara Analysis | The report emphasises the significance of smart hotel technologies and green practices in the context of Turkey's operations going forward. Hotel managers prioritise reducing energy and water usage, supporting local businesses, and offering environmental education. To become more efficient and competitive, smart hotels adjust to changes in technology and industry trends. Customer satisfaction and financial value are increased by combining smart and green methods. | Small sample size limits summarised of findings. This study only considers the perspectives of hotel management. |
| **11** | Wang, S., Li, X., Law, R., & Zhang, M. (2025). Artificial Intelligence in Tourism: A Systematic Literature Review and Future Research Agenda. Sustainability. DOI: https://doi.org/10.3390/su17209080 | To critically examine the implementation of artificial intelligence, technological advancements, and emerging research opportunities across the tourism and hospitality sectors. | Systematic literature review. | AI-related tourism and hospitality studies indexed in Scopus and Web of Science databases. | PRISMA-based literature extraction and classification framework. | Bibliometric Analysis and Thematic Analysis | The findings indicated that the integration of AI technologies substantially improves operational performance, smart service provision, customer interaction, and the overall competitiveness of the tourism sector. The study further highlighted the accelerating adoption of AI-driven solutions, particularly in areas such as automation, predictive analytics, robotics, and | While the study offered substantial theoretical and bibliometric insights into the evolving landscape of AI development, its discussion was largely centred on technological dimensions, with comparatively limited empirical exploration of organisational preparedness, employee competencies, governance structures, |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | customised tourism experiences. | and context-specific implementation barriers in developing tourism destinations. |
| **12** | Kim, H., So, K.K.F., Shin, S., & Li, J. (2024). Artificial Intelligence in Hospitality and Tourism: Insights From Industry Practices, Research Literature, and Expert Opinions. Journal of Hospitality & Tourism Research. DOI: https://doi.org/10.1177/10963480241229235 | To explore the transformation driven by artificial intelligence, its implementation strategies, operational innovations, and prospective development trends across the hospitality and tourism sectors. | Qualitative expert-based review. | Hospitality experts and secondary literature sources. | Expert interviews and literature synthesis. | Thematic Analysis | The findings indicated that artificial intelligence technologies are progressively transforming hospitality operations, guest experiences, strategic management practices, and personalised service delivery through the integration of automation, predictive analytics, and intelligent decision-support systems. The adoption of AI was also recognised as a significant strategic enabler that fosters innovation and strengthens long-term digital competitiveness within the hospitality industry. | Although the study offered important strategic and industry-related perspectives on AI transformation, its discussion remained primarily conceptual, with limited empirical exploration of organisational resistance, employee adaptation, institutional preparedness, and context-specific implementation challenges encountered in emerging tourism destinations. |

## 2.11 Limitations of the Current Literature

Existing smart hotel literature provides valuable insights into technological innovation, customer experience enhancement, and digital transformation in hospitality, yet several conceptual, methodological, and contextual limitations remain evident (Ashfaq et al., 2025; Wong et al., 2025). A dominant limitation is the strong emphasis on technology-centric perspectives, where smart hotels are primarily understood through the deployment of digital technologies such as AI, IoT, automation systems, and digital platforms. While these studies highlight improvements in operational efficiency and service quality, they often underrepresent organisational, institutional, and human dimensions of implementation. This results in a predominantly technologically deterministic interpretation of smart hotel transformation.

Theoretical perspectives such as socio-technical systems theory, service-dominant logic, and the TOE framework have been widely adopted in smart hotel research. However, these theories are frequently applied in isolation or operationalised through narrow adoption-focused models, leading to fragmented interpretations that fail to capture the integrated and context-dependent nature of implementation. These conceptual inconsistencies are reflected in prior studies, as summarised in Table 2.1, which reviews research objectives, methodologies, and analytical approaches. The table further highlights prevailing patterns and remaining gaps in smart hotel scholarship.

Smart hotel research is largely concentrated in technologically advanced destinations such as China, Singapore, South Korea, Japan, and several Western countries (Chen, 2026; Luo, 2024). These destinations are characterised by strong digital infrastructure, mature governance systems, and high technological readiness, which differ significantly from emerging tourism destinations. As a result, existing frameworks may not adequately explain implementation challenges in developing contexts. This limits the generalisability of current smart hotel theories.

Current literature also shows a strong customer-centric orientation, with limited attention given to hotel managers, employees, policymakers, and institutional actors involved in implementation processes (López-Bonilla et al., 2025; Kumar & Sharma, 2026). Key organisational and institutional dimensions such as leadership capability, workforce readiness, policy coordination, and infrastructure support remain underexplored. This restricts understanding of how smart hotel transformation is planned, managed, and sustained in practice. Consequently, important socio-technical

dynamics within hospitality organisations are insufficiently captured.

Within Indonesia, particularly in secondary tourism destinations such as Batam, empirical studies on smart hotel implementation remain limited (Fitriana & Wahyudin, 2025; Simatupang et al., 2024). Batam represents a strategically important tourism destination influenced by regional competition and digital transformation pressures. However, implementation across the hospitality sector remains uneven due to infrastructural disparities, organisational constraints, and varying levels of technological readiness. In addition, limited research has examined how local stakeholders interpret and operationalise smart hotel transformation in this context.

Overall, smart hotel transformation can be understood as a multidimensional socio-technical process shaped by the interaction between technological capability, organisational readiness, stakeholder interpretation, and institutional environments (Wong et al., 2025). Current scholarship, however, remains fragmented, technology-oriented, and concentrated in developed tourism destinations. This creates a clear gap in understanding how smart hotel implementation unfolds in emerging destinations such as Batam. Therefore, there is a need for more context-sensitive and qualitative research to capture stakeholder experiences and contextual realities shaping smart hotel transformation.

## 2.12 Chapter Summary

This chapter has reviewed and synthesised key literature on smart hotel development, highlighting its conceptual evolution, technological foundations, organisational and environmental influences, and empirical patterns across global and local contexts. The review demonstrates that smart hotel development is a complex, contextually embedded, and socially mediated process rather than a purely technology-driven phenomenon. It also reveals significant limitations in existing studies, particularly their fragmented conceptualisations and limited attention to stakeholder interpretations and ecosystem dynamics in emerging destinations. These insights directly inform the methodological choices outlined in chapter 3, justifying the adoption of an inductive qualitative approach to capture the situated realities and sense-making practices of participants involved in smart hotel implementation in Batam.

# CHAPTER 3
# RESEARCH METHODOLOGY

## 3.1 Chapter Overview

Chapter 3 outlines the methodological foundation of this study by clarifying the distinction between methodology and methods and situating the research design within a qualitative, exploratory approach. The chapter justifies the selection of qualitative methodology as the most appropriate means of examining smart hotel implementation, given the study's aim to capture in-depth participant perspectives and contextual realities. It then details the research design components, including the interview method, sampling strategy, and data collection procedures, before explaining the application of thematic analysis in interpreting the interview data. Collectively, this chapter demonstrates how methodological choices are aligned with the research objectives and support the inductive development of findings presented in subsequent chapters.

## 3.2 Research Paradigm

The underlying philosophy of a research study is known as the research paradigm. According to Creswell (Creswell & Miller, 1997), a research paradigm is a set of underlying presumptions or convictions that researchers direct during their work. These assumptions affect how scientists see the world, how they collect data, and how they analyse their results (Žukauskas et al., 2018). Research paradigms serve as the foundation of how researchers perceive and study the world around them. These paradigms guide the methods, approaches, and underlying assumptions that shape the research process (Paton, 1982). By gaining an understanding of different research paradigms, researchers can effectively navigate the complexities of conducting meaningful and rigorous research in their respective fields (Hassmén et al., 2016).

There are various prominent categories of research paradigms, each providing a unique viewpoint on the nature of knowledge, reality, and research techniques, such as positivism, interpretivism, critical theory and pragmatism (Farrow et al., 2020). This study's research paradigm is based on interpretivism. The interpretivism

paradigm in research highlights the significance of comprehending and interpreting people's subjective experiences. Researchers working within the interpretivism paradigm frequently employ qualitative techniques such as interviews and reflexive interpretation to understand participants' subjective experiences. Interpretivist researchers try to understand various viewpoints and meanings influencing people's behaviour and interactions by being fully immersed in the context of the research participants (Angen, 2000).

The use of an interpretivist research paradigm is grounded in the ontological and epistemological assumptions of this study, which view reality as socially constructed and knowledge as contextually embedded. Smart hotel implementation in Batam cannot be meaningfully understood through objective measurement alone, as it is shaped by participants' interpretations, organisational cultures, policy environments, and experiential knowledge (Creswell & Poth, 2024; Saunders et al., 2023). Accordingly, this paradigm enables the researcher to explore how hotel managers and government officers perceive, negotiate, and enact smart hotel initiatives within the specific socio-economic and institutional context of Batam (Tribe & Airey, 2020; Sigala, 2020). By privileging participants' subjective meanings and lived experiences, the interpretivist paradigm aligns directly with the study's aim to uncover underlying motivations, constraints, and expectations that influence smart hotel implementation, thereby ensuring consistency between the research problem identified in chapter one and the theoretical perspectives discussed in chapter two (Díaz-Arancibia et al., 2024).

Within an interpretivist paradigm, research designs are typically characterised by reflexive and iterative processes of data collection and analysis, where the researcher's personal biases and interpretations are recognised and considered during the investigation. This self-awareness is crucial in maintaining the integrity and validity of the research findings (Humphreys et al., 2021). For academics looking to delve deeply into the subjective reality of individuals and communities, the interpretivism paradigm provides a comprehensive and in-depth approach to understand the intricacies of human experiences and social events (Smith & Osborn, 2004). The interpretivism paradigm provides a philosophical basis for this research, while interpretive analysis is used to process data and produce research findings. Interpretive analysis seeks to interpret and understand the meaning expressed by participant and not just look for cause-and-effect relationships (Smith & Osborn, 2004).

This research paradigm is often used for qualitative research. One of the hotels'

main priorities is to have a thorough understanding of the hospitality phenomenon. Through this research, a variety of perspectives and experiences including those of hotel managers and government further investigated. This methodology got detailed and accurate data, understand experiences and meaning, and build rapport and trust with the participants. This made it possible for academics to provide important and useful research that serves many hotel industry stakeholders. Qualitative methods can produce richer, more contextualised data than quantitative approaches (Merriam, 2009). Researchers can delve further into participants' experiences and emotions through in-depth interviews in qualitative research. This can aid in the understanding of the implementation of the smart hotel under study by researchers, as well as how participants define it (Silverman, 1999). Consistent with this interpretivist stance, the study is oriented toward inductive theory-building rather than hypothesis testing, aiming to develop a conceptual understanding of smart hotel implementation grounded in participants' lived experiences and contextual realities.

## 3.3 Research Design

Research design plays a crucial role in the success of any study as it provides a systematic plan and structure for collecting, analysing, and interpreting data. A research design refers to the overall plan or structure that guides your research process (Jam & Jamal, 2020). The primary objective of survey design is to identify patterns in a vast populace of individuals to discern trends in the attitudes, opinions, and behaviours of a substantial collective (Creswell, 2008). There are two main categories of research design, there are quantitative and qualitative. Each provides unique methods for gathering and analysing data. The primary goal of quantitative research design is to measure, quantify, and generalise findings through the gathering and analysis of numerical data. On the other hand, the thorough investigation of subjective experiences, viewpoints, and meanings is the main goal of qualitative research design. Understanding phenomena in the context of their surroundings is the goal of qualitative research design.

This research used qualitative methods as its research design. This research is in line with the main objective of qualitative research, namely to find potential or problems, understand the meaning and uniqueness of the objects being studied,

understand social processes and interactions, understand other people's feelings, find hypotheses, and construct data. This method can be a valuable tool in understanding the hotel manager's perceptions, experiences, and expectations of the implementation of smart hotels. Qualitative designs, as described by Creswell (2008), encompass systematic and qualitative methodologies employed by researchers to produce a comprehensive elucidation of a process, action, or interaction within a social context. At the same time, as proposed by Given (2008), qualitative designs are commonly employed to investigate novel phenomena and to capture the subjective experiences, emotions, or interpretations of individuals on meaning and process.

There are many different methodologies available in the field of qualitative research, and each has advantages and disadvantages of its own. Several well-known qualitative techniques, such as ethnography, can offer a comprehensive insight into a group's way of life, highlighting minute cultural differences. Additionally, grounded theory can produce fresh hypotheses based on evidence, enabling the study question to be refined as new information comes to light (Chun et al., 2019). Furthermore, human meaning-making processes can be explored through narrative inquiry, which aims to represent the depth and complexity of individual lives. A case study, on the other hand, offers a thorough and nuanced understanding of a particular example, enabling the exploration of intricacies within a limited system (Turnbull et al., 2021). This study explores the meaning of underlying phenomena and acts by using phenomenology, which can capture the depth and complexity of unique experiences.

There are three main types of phenomenological research, such as transcendental phenomenology, which focuses on the fundamental nature of consciousness common to all humans. It attempts to understand the subjective (suspension of judgment) significance of the visible world and focus on the lived experience itself. There is also a hermeneutic phenomenology that emphasises the role of interpretation in understanding lived experiences which are based on culture, language, and personal history. The goal of hermeneutic phenomenology is to develop a richer and more nuanced understanding of the things described in detail. Finally, there is phenomenological existence, which focuses on individual experience. This study used explore phenomenological existence the depths of what experience with the complex and multifaceted concept. Existential phenomenology often explores themes of freedom, stress, and death (Polkinghorne, 1989).

This study used an existential-phenomenological approach to investigate the

lived experiences of hotel managers managing the transition to the smart hotel industry. This discussion showed how the manager makes decisions, the challenges he faces, and the company's overall capabilities in managing the smart hotel. This research does not only intend to know how hotel managers facilitate technology in their operations but also what technology means to them. Phenomenology focuses on how individuals experience the world directly. This is in line with the focus on hotel managers' subjective experiences of implementing smart hotels. This also indicates, this phenomenology study used interviews to study the hotel managers' and government officers' subjective experiences and perceptions. The study focused primarily on exploring participants' perceptions, experiences, and interpretations regarding smart hotel implementation through semi-structured interviews. This helped in identifying the areas that can be enhanced through smart technology implementation (Zieske, 2020).

The research also focused on analysing the latest trends and advances in smart hotel solutions, including IoT devices, data analytics, AI-driven automation, and mobile application integration. Understanding the capabilities and implications of these technologies be essential in making informed decisions for the smart hotel implementation model. Furthermore, the research design involved gathering insights from the government officers and other hotels that have successfully implemented smart solutions. Best practices analysed to gain a deeper understanding of the challenges and opportunities associated with smart hotel implementation (Infante et al., 2021).

The research design holds immense significance in every study as it establishes the groundwork for the entire research process. It offers a methodical plan to explore a specific problem or issue and directs the researcher in the collection, analysis, and interpretation of data (Rahman, 2015). A research flow chart serves as a visual depiction of the research design, outlining the systematic procedure from identifying the research question to drawing conclusions. It aids in streamlining the research process, ensuring that each stage is clearly defined and logically connected. At the same time, a research flow chart enhances transparency and reproducibility by facilitating the understanding of the research methodology. By presenting a lucid and well-organised overview of the research design, a flow chart contributes to the overall rigour and dependability of the study (Abutabenjeh & Jaradat, 2018). The research flow chart for this study is presented below.

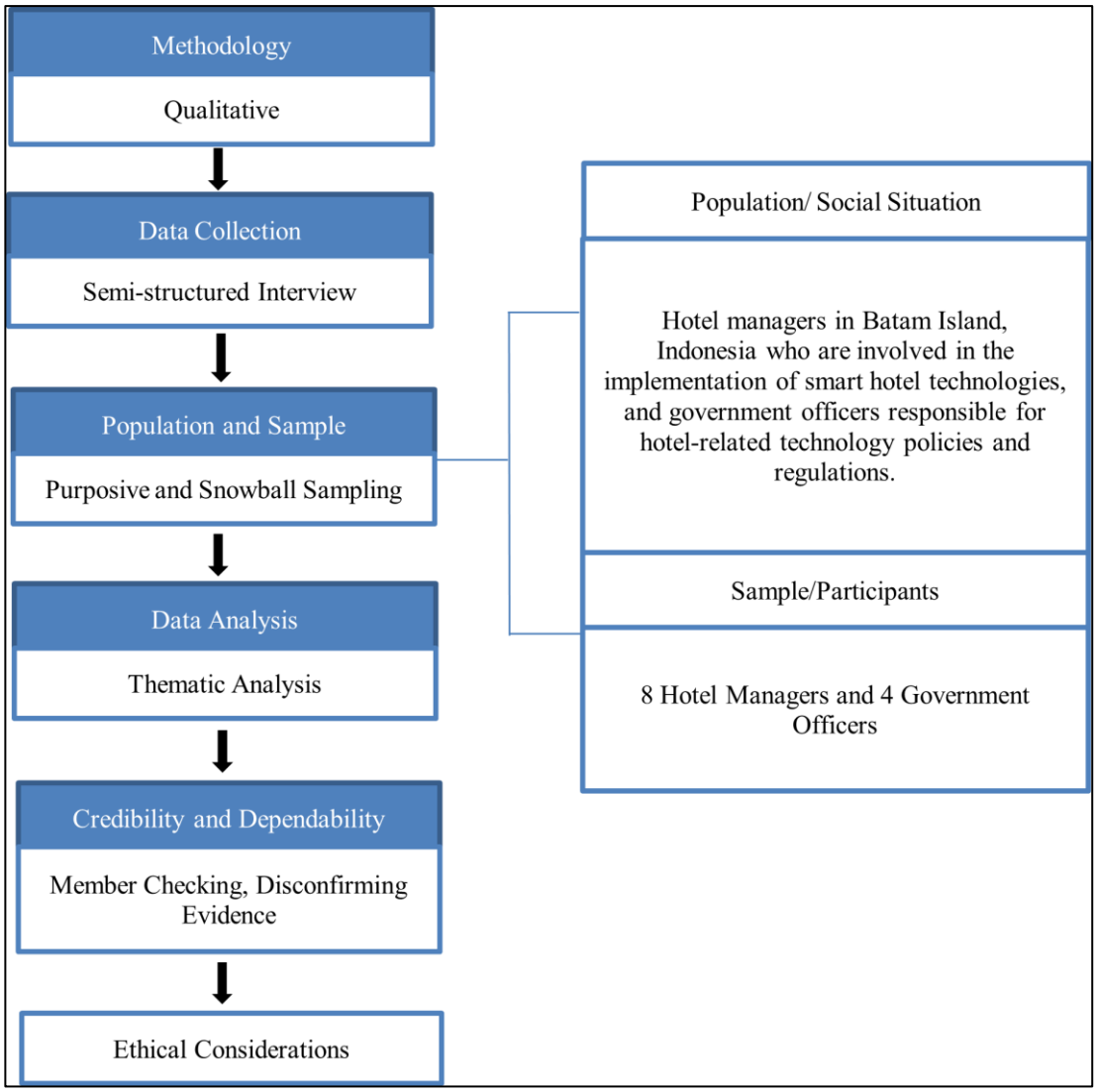


Figure 3.1 Research Design
Source: Developed by the researcher for this Study

The qualitative phenomenological research design used in this study is particularly suited to exploring how participant experience and interpret smart hotel implementation in Batam (Creswell & Poth, 2024; Neubauer et al., 2019). Rather than seeking to test predefined hypotheses, this design allows for the emergence of rich, contextually grounded insights into participants' perceptions and decision-making processes (Guest et al., 2024).

## 3.4 The Role of Researcher

In the study that examined smart hotel implementation in Batam, researchers played an important role by acting as a bridge between various stakeholders and using

various research methods to collect comprehensive data. The researchers acting as a "bridge" between various stakeholders in a smart hotel application study in Batam means they facilitated communication, understanding, and collaboration between different participants involved (Creswell & Poth, 2018; Tracy, 2020). Researchers can help to facilitate communication, gathering diverse perspectives, interpreting data and providing recommendations (Kvale & Brinkmann, 2023). Researchers also conducted semi-structured interviews with hotel managers and key government officials to obtain their viewpoints on the implementation of smart hotels (Braun & Clarke, 2021; Saunders et al., 2023). However, researcher must ensure impartiality and ethical research procedures, such as maintaining a neutral mindset throughout the research process and avoiding prejudice for or against specific technology or implementation tactics (Tracy, 2020).

Furthermore, researcher has gain consent from all interviewees and participants while maintaining data privacy and anonymity (See Appendix 1). In the final report, the researcher must be open about the research methods and study constraints (Saunders et al., 2023). The researcher involved in presenting the findings to stakeholders including hotels, managers and relevant government agencies, clarify the benefits and challenges of smart hotel implementation and facilitate discussions among stakeholders to identify effective strategies for smart hotel implementation in Batam. In general, researchers must play an important role in bridging the gap between theory and practice (Creswell & Poth, 2018). By collecting practical information, analysing different opinions, and facilitating communication, researchers offered useful ideas and tips for the successful implementation of smart hotels in Batam and stimulate the island's hospitality industry towards innovation and guest-centricity (Tracy, 2020).

At the same time, in qualitative research, the researcher plays a central role as both data collection instrument and interpreter of meaning (Braun & Clarke, 2021; Tracy, 2020). In this study, the researcher adopted a reflexive stance by continuously reflecting on personal assumptions, professional background, and potential biases throughout the research process (Saunders et al., 2023; Trainor & Bundon, 2021). Given this central and interpretive role of the researcher in qualitative inquiry, particularly within an interpretivist paradigm, it becomes necessary to explicitly acknowledge and manage the researcher’s subjectivity throughout the research process (Saunders et al., 2023; Trainor & Bundon, 2021). In qualitative research based on an interpretivist paradigm, the researcher is not positioned as a completely neutral party, but rather as

the primary instrument in the data collection and analysis process. Therefore, reflexivity is a crucial methodological aspect for maintaining the integrity of data interpretation. One reflexivity strategy implemented in this study is the use of reflexive memos. Having clarified the researcher's role, positionality, and reflexive stance within this qualitative inquiry, the following subsection outlines the unit of analysis adopted in this study to ensure alignment between the research objectives, data sources, and analytical focus.

## 3.5 Unit of Analysis

Defining the unit of analysis is an important step in designing and conducting effective smart hotel research. By understanding the different levels of analysis and their implications, researchers can ensure their research questions, methodology, and data collection methods are aligned, resulting in valuable insights into the impact of smart technology in the hospitality industry. This research aims to determine the level, scope, factors, and challenges in implementing smart hotels in Batam and to determine the smart hotel model in Batam.

The government, specifically the tourism department in Batam City, and hotel managers in Batam invited to become the participants. The government officers also asked to participate in this study because they can play important roles in planning the future of the hotel industry in Batam. Government officials involved in policy making or supporting initiatives related to smart hotels, they examined the implementation and results of smart hotel technology in the hotel industry itself. They can trigger the implementation of smart hotel developments that benefited the regional economy while addressing potential challenges and strengthening sustainable practices.

There are four government officers who involved as participants in this study include the Batam Tourism Office who studied how their policies and regulations affect the implementation of smart hotel technology in Batam. This also indicates, there is Batam Economic Development Office who studied how they facilitate the implementation of smart hotel technology, provide incentives, and ensure that smart hotel projects are aligned with Batam's smart city vision. Then, there is Ministry of Tourism and Creative Economy who overseed the implementation of smart hotels, ensure compliance with standards and regulations, and encourage responsible technology implementation. Finally, technology regulatory agencies, such as the

Ministry of Communication and Information, who ensured data security and encourage safe and responsible technology implementation.

Furthermore, for the hotel managers, due to the large number of employees working at the upper management level of the hotel, it is impossible to select and interview all managers. Therefore, based on several criteria, 8 participants who are in management level positions in hotels that have implemented smart hotels in Batam selected using purposive sampling technique. In a qualitative study, Berg (2004) claimed that five to twenty participants are considered sufficient to produce reliable and consistent results. The participants came from the category of hotels and resorts that understand and have experience in implementing smart hotels in Batam. The unit of analysis in this study is at the individual and institutional actor level, represented by hotel managers and government officers directly involved in smart hotel and tourism development initiatives (Leonardi, 2021; Orlikowski & Gash, 2022).

## 3.6 Population and Sample

In this study, the population and sample focused on understanding the experiences, perceptions, and challenges of the parties directly involved or affected by the implementation of smart hotel technology. The population for this study includes hotel managers in Batam Island, Indonesia, who are involved in the implementation of smart hotel technologies, as well as government officers responsible for hotel-related technology policies and regulations. A purposive sampling technique used to select participants who are significant to the research objectives. The sample consisted of eight hotel managers from hotels that have implemented or are in the process of implementing smart hotel systems, and four government officers who are directly involved in regulating or setting standards for hotel technologies in Batam.

The terms population and sample are used differently in qualitative research than in quantitative research. In qualitative research, the term population is not used, but is called "social situation" which consists of three elements, namely: place, actor, and activity which interacts synergistically (Spradley, 1980). The purpose of qualitative research is often to gain a deep understanding and precise insights rather than statistical generalisability. As a result, the population definition may be more exact to target a group that may provide valuable and useful information

(Nanjundeswaraswamy & Divakara, 2021). In qualitative research, the sample data sources presented are still temporary.

However, it is necessary to mention who possibly used as a data source. The addition of samples in qualitative stopped when the data is saturated (Saunders et al., 2018).

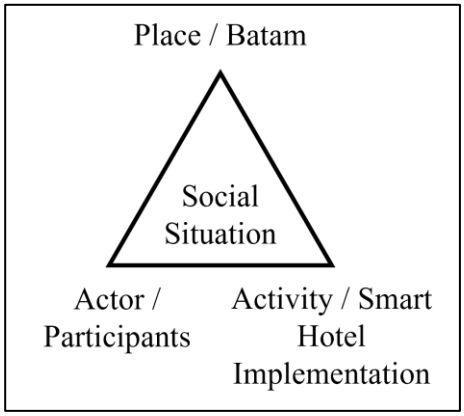


Figure 3.2 Social Situation
Source: Developed by the researcher for this Study

Smart hotels in Batam be the subject of this study while the government representatives and hotel manager are the key stakeholders who invited as participants of this research. Government bodies can affect smart hotel implementation by governing data privacy legislation, energy efficiency, and construction requirements. To encourage hotels to use smart technologies, the government may offer incentives or grants. Hotel manager in Batam be the research's target participants of this study.

Hotel managers who ofter manage certain segments within the hotel, namely housekeeping, food and beverage, or front-of-house operations, are the foundation of the hotel's everyday operations, overseeing the running of their areas (Ladkin, 1999). Hotel managers and government officers are important samples in the study due to their influence on the implementation of smart hotel technologies. Their knowledge of the hotel's budget, target demographic, and general business objectives is critical in assessing the viability and potential ROI of smart hotel technologies. Since they also oversee the hotel's daily operations, their knowledge of workforce requirements, guest preferences, and potential obstacles when integrating technology with current systems is crucial (Hodari & Sturman, 2014).

Hotel managers and government officers were purposively selected due to their strategic roles in planning, decision-making, and policy implementation related to smart hotels in Batam (Vial, 2019; Leonardi, 2021; Sarker et al., 2023). Unlike guests, who primarily experience service outcomes, these participants influence resource allocation, regulatory alignment, and managerial readiness, making their perspectives critical for understanding both enabling factors and structural barriers to implementation (Femenia-Serra & Neuhofer, 2022; Baggio et al., 2020).

Table 3.1
Participants Profile

| Participants | Hotel Managers | Government Officer |
|---|---|---|
| 1 | Batam Marriott Hotel Harbour Bay | |
| 2 | Four Points by Sheraton Batam | |
| 3 | Aston Batam Hotel and Residence | |
| 4 | Batam View Beach Resort | |
| 5 | Santika Hotel Batam | |
| 6 | Alltrue Sydney Hotel Batam | |
| 7 | I Hotel Batam | |
| 8 | Grand Mercure Hotel Batam | |
| 9 | | Batam Tourism Office/Batam Tourism Board |
| 10 | | Economics and Development of the Riau Islands Province |
| 11 | | Business Development of BP Batam |
| 12 | | Area Management and Investment BP Batam |

Consequently, hotel management who have developed and successfully incorporated smart hotel technology into their operations selected as the study's population. Table 3.1 listed the participant profile for this study. Eight of hotel managers and four of government representatives who are operating in Batam hotels provided the data needed for this study. Researchers examined each interview in-depth, focusing on a small, purposeful sample of twelve participants, to better understand the challenges and

opportunities faced by different types of hotels in Batam.

There are eight hotels and resorts be the subject of the research. The criterion involved the implementation of technology. By studying smart hotel implementation in hotels and resorts, researchers can gain valuable insights into the scope, factors, and challenges associated with this technology. This knowledge facilitated the widespread implementation of smart hotels, revolutionising the hospitality industry and enhancing the guest experience, as well as providing input for the proposed model for smart hotel implementation in Batam. To ensure the validity and reliability of the study, the sampling method selection in research needs to be justified. Researchers must choose a sample size that not caused data saturation. Fugard and Potts (2015) explained sample size needed to be sufficient to gather rich data and to approach data saturation.

### 3.6.1 Sampling Technique

In quantitative research, representative samples can be taken from the population randomly. While in qualitative research, sample determination is done purposively, namely with certain considerations and objectives. In this qualitative research, the sampling techniques that used are purposive sampling and snowball sampling. Purposive sampling, which is a non-probability sampling method, employed in this research. Purposive sampling, according to Creswell (2008), is the process by which "researchers intentionally select individuals and sites to learn or understand the central phenomenon". The researcher can communicate with individuals who, via experience or knowledge, can supply appropriate information using the purposeful sampling method (Lewis & Sheppard, 2006). Meanwhile, the snowball technique is a technique for taking samples of data sources that are initially small in number, gradually becoming large.

Lincoln and Guba (1985) stated that qualitative sampling is, then, very different from quantitative sampling. It is based on information, not statistical, considerations. Its purpose is to maximize information, not to facilitate generalisation. The researcher before, in qualitative research, sample specifications cannot be determined beforehand. There are four special characteristics of purposive samples, namely emergent sampling design, serial selection of sample units, continuous adjustment or focusing

of the sample, and selection to the point of redundancy (Lincoln & Guba, 1985). Below are the criteria for hotel managers and government officer representatives who be participants in this research. The criteria of hotel managers as participants are:

1. The hotel manager must at least have five years of working experience.
2. The hotel manager should be quite knowledgeable about a wide range of smart technologies, their features, and how they affect guest experience and hotel operations.
3. Experienced hotel manager with expertise in budgeting, leadership skills and a guest-centric approach.
4. The hotel manager has a thorough awareness of the business, its challenges, and the nuances of effectively managing a hotel.

The criteria for the representative of government officers are:

1. The officers who are directly involved in tourism and technology policy creation.
2. The officers with experience in developing and implementing tourism policies in Batam.
3. The officers who are knowledgeable with the most recent trends and advancements in smart hotel technology in Batam.
4. The officers from relevant departments who are directly involved in the execution of tourism, technology, and smart tourism/city policies in Batam.

Hotel managements and government officers are the specific subjects of this study. The selection of participants guided by the extensive knowledge of long-serving hotel managers in hotel management who should have a great deal of expertise in setting up and running smart hotel technologies. They should be quite knowledgeable about a wide range of smart technologies, their features, and how they affect guest experience and hotel operations. Their perspectives and experiences with smart technology, as well as strategies for effective integration and implementation of smart features within the hotel environment, can offer important insights into the opportunities and challenges related to the implementation of smart hotels.

Finally, hotel managers' operational experience, budgeting expertise, leadership skills, and guest-centric approach make them suitable for research into the implementation of smart hotels in Batam. Their viewpoints are critical for understanding practical issues, decision-making processes, and the possible influence of smart

technology on the Batam hotel business. The hotel manager also must at least have five years of working experience. One important factor is that they have a thorough awareness of the business, its challenges, and the nuances of effectively managing a hotel. Additionally, hotel managers with extensive experience are more likely to have encountered a wide range of situations and scenarios, allowing them to provide valuable insights and perspectives during qualitative research studies.

### 3.6.2 Sample Size

Samples in qualitative research are not called respondents, but participants or participant in the research (Sugiyono, 2010). Samples in qualitative research are called theoretical samples and not statistical samples because the purpose of qualitative research is to produce theories. Samples in qualitative research are also called constructive samples, because the data sources from the samples or participants can be constructed relationships between symptoms so that they become clearer (Jackson et al., 2007). As stated above, the snowball technique is a technique for taking samples of data sources that are initially small, gradually becoming large. This can provide complete and definite data, then look for other people who can be used as data sources. Thus, the number of data source samples increased, like a rolling snowball, gradually becoming large (Biernacki & Waldorf, 1981).

This research interviewed with twelve participants, who are the government officers and hotel managers conducted in Batam. Eight hotel managers of hotels which already implemented smart hotel be the samples in this research and there are four government officials, such as those from municipal governments, be the participants for this study. They included Head of the Batam City Tourism Office who representatives from the Batam Tourism Office which provided insight into the government's overall tourism development strategy in Batam. They shared information about tourist demographics, target markets, and their vision for the role of smart this also indicates hotels in improving the tourist experience.

This also indicates, personnel from the Deputy for Business Development of BP Batam provided insights into government programmes connected to special economic zones, infrastructure development, and incentives for attracting investment in the hotel sector. Their contributions be critical to understand the larger economic context of smart

hotel implementation. Furthermore, officials from the Deputy for Area Management and Investment BP Batam throw light on legislation governing the construction, refurbishment, and integration of new technology into hotel structures. Understanding the process helped detect potential roadblocks and guarantee a smooth implementation timeframe.

Meanwhile, representatives from the national government, such as the Expert Staff for Economics and Development of the Riau Islands Province, provided information on national tourism development plans and standardisation activities that may impact the implementation of smart hotel technology in Batam. They may also provide information on government incentives or subsidies available to hotels implementing sustainable or technology-driven solutions. According to Cresswell (2014), there is a shift in thinking regarding sample size in qualitative research. The emphasis is less on achieving a specific statistical threshold and more on reaching data saturation. Cresswell (2014) offers sample size guidelines in qualitative research as a starting point but emphasises the importance of flexibility and judgment. For phenomenology study, around five to twenty-five participants are suggested, with a focus on rich, detailed experiences. The sample size was determined based on the principle of data saturation rather than statistical representativeness. Saturation was achieved when successive interviews yielded no new codes or conceptual insights, indicating sufficient depth and variation in the data (Saunders et al., 2020; Braun & Clarke, 2021). This approach is consistent with qualitative research best practices and ensures analytical rigor while maintaining contextual richness (Hennink et al., 2020; Guest et al., 2023).

## 3.7 Research Instrumentation

A research instrument is a tool that can be used to gather, quantify, and examine information related to the study subject. It provides a method for obtaining data from selected sources or people, enabling the exploration of research issues and making significant findings (Carole & Almud, 2008). Numerous tools are available for doing research, including questionnaires, focus groups, interviews, examinations, and assessments. In-depth discussions with hotel managers conducted through semi-structured interviews as part of this study to obtain comprehensive data and understand

their viewpoints while probing more deeply into their sentiments, motives, and reasoning (Rowley, 2012). Interviews alone could miss important nonverbal clues and signals, that can be highlighted (Jamshed, 2014).

According to Probst and Berenson (2014), phenomenological study researchers need to be able to take the actual experiences of their subjects and turn them into a written form that gives readers a detailed account of how each participant experienced the phenomena. Phenomenological researchers must convert them into a literary structure that captures the nuances, emotions, and depth of the experience and communicates the essential meaning and experience of living through the topic under study (Groenewald, 2004). This investigation utilised a semi-structured interview, which aligns with the exploratory nature of this study. This corresponds to the argument that "an exploratory interview typically begins with little pre-planned structure" (Kvale, 1996).

Given that this study aims to investigate the implementation of smart hotels in Batam, the use of semi- structured interviews allows the researcher to delve deeper and obtain more comprehensive information (Ruslin et al., 2022). In a semi-structured interview, the wording and order of questions are relatively flexible, and it sometimes allows participant to steer the interviews in unexpected directions (King & Horrocks, 2010). While it does introduce some structure to the interview, the sequence of discussing the issues on the list may differ between interviews (Jennings, 2010). Although semi-structured interviews possess a certain degree of openness and flexibility in their structure (King & Horrocks, 2010; Kvale, 1996), they uphold the element of the researcher's control to ensure that the interview does not cover irrelevant topics (Maryudi & Fisher, 2020).

According to Kvale (1996), an interview guide represents the focal points of the investigation and its sequence during an interview. It consists of fundamental subjects that must be addressed or an extensive set of questions. In a semi-structured interview guide, the subjects to be covered are outlined together with suggested questions (Kvale, 1996). Thematic interview questions revolve around fundamental concepts, theoretical frameworks, and research analysis, while dynamic questions delve into the participant's personal experiences and emotions (Kvale, 1996).

The question of thematic interview in this study is like *"What role does IoT play in your hotel's energy management?"* meanwhile the question of dynamic interview is like *"Can you describe a time when energy-saving technology failed? How did your team react?"* Both thematic and dynamic interview questions are employed in this

study. The interview questions utilised in this investigation are newly created based on the existing literature. Unlike quantitative studies that often employ tested instruments that are currently accessible from previous literature (Silverman, 1999), this approach is not required for qualitative studies, particularly those that are descriptive and exploratory (Miles et al., 2014).

According to Miles et al. (2014), the use of instruments from previous studies is impractical in qualitative studies because "*if you are conducting an exploratory, mostly descriptive research, you do not truly know the parameters. Therefore, extensive initial instrumentation or closed-ended devices are unsuitable*". This is especially relevant to the goals of this investigation, which aims to explore and uncover the implementation of smart hotels in Batam. Furthermore, the interview questions followed by probing questions.

Probing questions are follow-up inquiries used in qualitative research that are intended to elicit more in-depth and perceptive information from participants. A participant asked to extend, clarify, or provide specific examples in response to probing questions that go deeper than their initial response. In qualitative research, there are advantages to asking probing questions, such as getting insight into the participant's true meaning and intention. At the same time, probing questions helped the researcher uncover the motivations, feelings, or thought processes behind a participant's responses.

This also indicates, probing questions sometimes lead to unexpected but valuable information. Researchers gathered more detailed and insightful information from their subjects by skilfully using probing questions. This increases the overall intricate comprehension of the topic under investigation (Mishra & Dey, 2022). The semi-structured interview guide was developed to balance consistency across interviews with flexibility to explore emergent issues (Kallio et al., 2016; Braun & Clarke, 2021). Table 3.2 until Table 3.6 listed and justified the interview questions concerning the research questions and research objectives of the study. The compilation of all the interview questions can be seen in Appendix 3.

Table 3.2
Interview Guide 1

| Research Question 1 | Research Objective 1 | Interview Question | Probing Question |
|---|---|---|---|
| How do the stakeholders perceive the smart hotel in Batam? | To understand the stakeholders' perception towards smart hotel implementation in Batam. | What is your perception towards smart hotel implementation in Batam? | 1. What are the key benefits you see in implementing smart hotel technology in Batam?<br>2. What are the government's goals for the development of the smart hotel sector in Batam?<br>3. How do you view smart hotel development in Batam? |

Table 3.2 presents the interview question for research question number one. In the previous study, the concept of a smart hotel and its impact on guests' satisfaction, privacy and perception of the service quality were asked to the participants (Domanski, 2020; Amer & Alqhtany, 2019), therefore, similar questions asked to the participants. This question asked to learn more about the participants' understanding of the challenges, benefits, and limitations of smart hotel technologies from a practical standpoint. At the same time, this question used to get opinions from numerous stakeholders, such as hotel management and government representatives who act as formulating and enforcing regulations related to smart hotel. This is a part of the research to evaluate the current conditions and prospects of Batam's smart hotel implementation. Research can determine important aspects impacting the implementation of smart technology in hotels, implementation challenges, success factors, and areas for development by gathering a variety of perspectives and opinions.

Table 3.3
Interview Guide 2

| Research Question 2 | Research Objective 2 | Interview Question | Probing Question |
|---|---|---|---|
| To what extent has Smart Hotel been implemented in Batam? | To explore the extent of smart hotel implementation in Batam. | How do you see the progress of smart hotel implementation/ development in Batam? | 1. Are there any differences between the smart hotel implementation/ development in Batam and other tourist |

| | | | |
|---|---|---|---|
| | | | destinations in Indonesia?<br>2. What are the common features/amenities of smart hotels you see in Batam? |

Table 3.3 presents the interview question for research question number two. The question was also used to find out more about the strategies hotel management adopts to develop and integrate IoT systems to increase revenue (Narraido, 2020). The purpose of this question is to get some insight into Batam's smart hotel initiatives, namely existing situations, potential, challenges, and future opportunities. Insights from this question be very helpful for developing policies, making decisions, and planning strategically in the hospitality industry. Furthermore, the participants' responses indicated that tracking the development of smart hotel implementation enables Batam. Hotels to maintain their innovativeness, set themselves apart from rivals, and improve their competitiveness in the market.

Table 3.4
Interview Guide 3

| Research Question 3 | Research Objective 3 | Interview Question | Probing Question |
|---|---|---|---|
| What are the factors that contribute to the implementation of smart hotels in Batam? | To analyse the factors that contribute to the implementation of smart hotels in Batam. | Can you identify the factors that contribute to the smart hotel implementation in Batam? | 1. Can you describe the factors that might influence the implementation of smart hotels in Batam?<br>2. What are your thoughts on the current state of technological infrastructure (e.g., internet connectivity, bandwidth) in Batam, and how does it impact smart hotel implementation?<br>3. In your experience, what are the main factors considered by hotels in Batam when evaluating whether to adopt smart technologies? |

Table 3.4 presents the interview question for research question number three. In the previous study, similar questions were asked to the participants in the study of the use of smart technology in hotels in terms of sustainable development (Erdem et al., 2022). Similarly, this study used this query to clarify the particular elements that affect Batam's implementation of smart hotel models and to offer a comprehensive understanding of the implementation challenges and driving factors. Researchers want to gain knowledge from the examination of these factors that helped stakeholders in the industry, lawmakers, and hotel operators make informed decisions and plans for using smart hotel technology. Researchers can also provide guidance and analysis to help facilitate the successful implementation of smart technologies in Batam's hospitality sector by identifying these aspects.

Table 3.5
Interview Guide 4

| Research Question 4 | Research Objective 4 | Interview Question | Probing Question |
|---|---|---|---|
| What are the challenges in implementing smart hotels in Batam? | To identify the challenges in implementing smart hotels in Batam. | What are the biggest technological challenges hotels in Batam face when implementing smart hotel features, such as compatibility, security, or integration with existing systems? | 1. Can you elaborate on the specific challenges you have encountered in implementing smart hotels in Batam?<br>2. Can you describe the challenges you face in integrating new smart features with your existing hotel systems? Are there concerns about data transfer, functionality, or overall system stability?<br>3. How do you think future advances in technology might impact these challenges and potentially make smart hotel implementation easier in the future? |

Table 3.5 presents the interview question for research question number four. A similar question on hotel management's perspective of challenges faced by smart hotels

was also asked in previous research. This question is asked to identify the specific technological obstacles and challenges that Batam hotels must overcome to convert to smart hotel models. The answers of participants provided evidence-based insights and recommendations for addressing these issues in the hospitality sector.

Table 3.6
Interview Guide 5

| Research Question 5 | Research Objective 5 | Interview Question | Probing Question |
|---|---|---|---|
| What is the proposed model for smart hotels in Batam? | To propose a model for a smart hotel in Batam. | Can you describe your vision for what a 'smart hotel' in Batam would look like, considering the local context and guest needs? | 1. What is the suitable method/approach to implement smart hotels in Batam?<br>2. Referring to the current technological landscape in Batam, which smart hotel features do you think would be most feasible and impactful to implement considering the local infrastructure?<br>3. In your ideal vision, how would a smart hotel in Batam contribute to the overall tourism industry and guest perception of Batam as a destination? |

Table 3.6 presents the interview question for research question number five. A similar subject in question, titled "Modeling tourists' acceptance of hotel experience-enhancement smart technologies," was asked to participants of Han et al.'s (2021) study. The objective of research on the concept of a "smart hotel" is to determine the potential impact, feasibility, and relevance of integrating smart technologies in the hospitality industry. Researchers hope to determine specific needs, challenges, and opportunities for smart hotel models in the regional context of Batam to conceptualise a smart hotel concept in Batam.

Research methodology often involves the utilisation of demographic inquiries in qualitative investigations to acquire information relating to the participants. The inclusion of such inquiries can offer valuable insights into the background and characteristics of the individuals involved in the study. Gaining an understanding of

demographics such as age, gender, ethnicity, education level, and socioeconomic status can aid researchers in contextualising the perspectives and experiences shared by the participants (Frasso et al., 2018). Furthermore, demographic data can also illuminate patterns or trends within a specific group, thus shedding light on how certain factors may influence their behaviour, opinions, and attitudes. This can be particularly crucial in qualitative research, as it enables a more comprehensive grasp of the participants and the context in which the study is conducted (Aspers & Corte, 2019).

Therefore, it is imperative to gather comprehensive demographic information from stakeholders involved in the implementation of the smart hotel system in Batam, such as the hotel manager and government officials. This allowed for an understanding of the specific needs and challenges they face in their particular market. Familiarity with the demographic profile of hotel managers and government officials tailored the implementation of the smart hotel system to best suit the specific requirements of the hotel. Incorporating demographic questions brings depth to the findings and can contribute to a more nuanced analysis of the data. It enables researchers to consider the potential impact of various demographic factors on the perspectives and insights shared by the participants, ultimately enhancing the rigour and depth of the study (Kvale, 1996).

Table 3.7
Items and Sources of Demographic Profile

| No | Items | Source |
|---|---|---|
| 1 | Gender | Researcher |
| 2 | Age | |
| 3 | Marital status | |
| 4 | Education level | |
| 5 | Tenure of service in current hotel/ government office | |
| 6 | Tenure of service in hotel industry/ government office | |
| 7 | Working department | |
| 8 | Salary | |

## 3.8 Data Collection

Data collection techniques are the most important step in research, because the main purpose of this research is to collect data. Data collection itself can be done in

various ways. The primary data collection method employed in this study was semi-structured interviews. Reflexive memos and field notes were used only as supplementary materials to support contextual interpretation during the analytical process. The data collection process was conducted iteratively, allowing preliminary insights from earlier interviews to inform subsequent data collection. This iterative approach enhanced the depth and relevance of the data, enabling the researcher to probe emerging issues and clarify complex responses related to smart hotel implementation challenges.

### 3.8.1 Semi-Structured Interview

Interviews be another method of collecting data for this study. An initial interview, which is also called a screening or first-round interview, is an important part of the selection procedure (Eisenthal & Lazare, 1976). The initial interview aims to gather rich, qualitative data that provides insights into participants' thoughts, feelings, and experiences. It helps researchers understand the context and nuances of the topic being studied. Creating a pleasant environment is important for encouraging participants to freely share their experiences (Merriam & Tisdell, 2015).

Open-ended questions are frequently used in initial interviews to encourage participants to share what they think and have experienced in their own terms and conditions. This method enables a deeper investigation of the subject (Kvale & Brinkmann, 2015). Based on the participants' answers, researchers might modify their questions to delve deeper into topics that are interesting or relevant (Creswell & Poth, 2018). Researchers could know the participants better during the initial interview, which makes the setting more comfortable and open to honest conversation (Merriam & Tisdell, 2015).

Interview is a meeting of two persons to exchange information and idea through question and responses, resulting in communication and joint construction of meaning about a particular topic (Esterberg, 2002). There are several types of interviews that are often used in qualitative research, including:

1. Structured interviews
2. Semi-structured interviews
3. Unstructured interviews

This research used semi-structured interviews to find problems more openly, where the interviewees are asked for their opinions and ideas. A semi-structured interview is a research technique that involves guiding participants' interactions to gather qualitative data. Qualitative research frequently uses semi-structured interviews to gather rich, detailed data that sheds light on participants' viewpoints, attitudes, behaviours, and experiences (Mazhar, 2021). A semi-structured interview involves the researcher having a pre-planned list of questions or themes to help direct the conversation, but there is also room to explore further questions or dive deeper into particular topics depending on the participant's answers.

A semi-structured interview consists of a series of open-ended questions and predetermined themes that serve as a guide for the discussion while allowing flexibility for participants to elaborate on their experiences and perspectives (Ruslin et al., 2022). An interview protocol and interview guide (Appendix 2) were utilised during the interview process to ensure consistency and alignment with the research objectives. The following section outlines the detailed procedures for conducting semi-structured interviews, adapted from Creswell and Poth (2018).

1. Clearly outline the objective of the research and what information collected through the interviews.
2. Create a list of open-ended questions that are relevant to the research objectives. Include clues that encourage elaboration.
3. Identify and attract participants with relevant experience or knowledge about the research problem.
4. Determine an appropriate time and location for the interviews. Begin with an introduction that clarifies the purpose of the interview and guarantees confidentiality. Use the interview guide to help to navigate the interview process while being flexible.
5. Conduct the initial interview
    - Introduction: Begin with a brief introduction that explains the purpose of the interview and the format of the conversation.
    - Ask questions: Ask questions based on the interview guide, but be flexible. Allow participants to freely express their opinions and ask probing questions as needed.
    - Active listening: To fully understand participants' responses, take part in active listening. Show empathy and encourage them to elaborate on their

responses.

6. Conduct the actual interview
    - Recording: With the participants' permission, record the interviews on audio or video. This facilitates accurate data collecting and analysis. Take notes during the interview to record important topics and nonverbal cues.
    - Engagement: Maintain engagement throughout the interview, adapting to the flow of conversation while ensuring that all core questions are addressed.
7. Record the interviews with the participants' consent to ensure reliable data collecting. Transcript the recordings so that they can be analysed.
8. Analyse the transcripts to find themes, patterns, and insights. Use qualitative analytical techniques like thematic analysis.
9. Present the data in a systematic manner, highlighting major themes and participant quotes to support conclusions.

Data collection plays a crucial role in the execution of a research study, providing invaluable assistance to researchers in accomplishing their investigation. At the same time, the data gathered by the investigators must be both trustworthy and relevant to the research, as any deviation from these factors may result in erroneous findings (Sekaran & Bougie, 2013). A semi-structured interview is the ideal method for collecting rich and detailed data from the participants in this phenomenological study. The interview procedure conducted through various means of communication including telephone conversation, Skype video call, and electronic mail. The researcher created an interview procedure that utilised as the data collection method. The interviewer, interviewee, date, time, place, and research questions included in the procedure (Barriball, 1994).

After identifying possible interviewees, the following step is to contact them and organise an interview. A well-written email or phone contact might make a significant difference in obtaining the interview required for the project. Next, compile a list of potential interviews and their contact information. Then, prepare a professional and short email or phone call script to introduce oneself, the research project, and the purpose of the interview.

This is critical to clarify the potential benefits of their participation and provide interview dates and times. Researchers should be flexible and accommodating when

organising appointments because subject availability varies. Once the appointment has been confirmed, a follow-up email to confirm the date, time, and location of the interview should be sent. Meanwhile, the first step in scheduling is to determine the suitable platform.

Considerations should be made on aspects such as geography, participants' availability, and the difficulty of the topic under discussion. Online meetings are useful for long-distance communication, while in-person meetings are useful for in-depth conversations and rapport-building. Online invitations via email properly prepared and clearly state the goal of the correspondence. The email invitation must include brief biographical information about the researcher, the topic of the thesis, and a clear meeting request.

Suggestions of the different interview dates and times be good. If researchers do not receive a response within a few days, another email should be sent. Send a brief confirmation email as a reminder. The participants contacted using phone, email, or Skype for their interviews. The interviews conducted at a hotel/office and the duration of the interviews ranged from forty-five minutes to one hour.

The study used a digital voice recorder and a function on a Samsung Galaxy A52 to verify the authenticity of the information obtained, this also indicates to a diary to keep track of the data gathered. The Skype interview conducted in the researcher's office and at a duration of approximately forty-five minutes to one hour. To record the interview, two audio recorders utilised, namely a digital voice recorder and a Samsung A52. This also indicates, a journal employed to capture data during both the telephone and Skype interviews. Subsequently, participants debriefed to ensure their comfort with their responses, and permission is obtained for potential follow-up telephone calls or emails to review the transcribed interviews.

The commencement of the data collection process ensued after the acquisition of consent from the UiTM Research Ethnic Committee (REC) to engage with the participants. In the realm of qualitative research, it is of utmost importance for researchers to safeguard the anonymity of the participants. To ensure the preservation of confidentiality in this study, thorough measures taken to withhold the identities of the participants. The divulgence of participants' information meticulously avoided and a system of codes used to assign a distinct identification to each participant during the interview proceedings.

As an illustration, participants denoted as Participant 1, Participant 2, and so

forth. Participants sent an email invitation to partake in an interview. Furthermore, they provided with a consent form which they are required to sign and return. Once the aforementioned form has been completed and returned, the subsequent stage involved the finalisation of the interview's time and date, followed by the commencement of the interview itself.

Upon the completion of the interview sessions, the researcher personally transcribed the recorded sessions to uphold and safeguard the confidentiality and identity of the participants. To accomplish this task, the researcher employed a speech-to-text application, which served as a speech-to-text transcription software for recording both vocal and written notes. Where appropriate, the researcher verbally summarised interviewees' comments to confirm the correctness of the data that is transcribed. Data saturation acknowledged due to the largely homogeneous participant pool.

There were twelve participants, so the researcher followed up with each one to get the extra information needed. Upon request, the researcher intends to provide participants with either a summary of the study's findings or specific sections of the final study. However, a successful research study requires careful data collection planning, including the creation of interview guidelines and protocols. An interview guideline is a document that provides a blueprint for conducting interviews.

It describes the important questions that asked, as well as potential follow-up questions, to acquire the necessary information. Using an interview guide effectively resulted in well-organised interviews that produce rich and informative data for research or projects (Kallio et al., 2016). While an interview protocol is a blueprint that guided through the interview process, it ensures a disciplined and consistent strategy to collect data from research participants. The procedure explains how the researcher and study project introduced to the interviewee. It describes the informed consent procedure, which ensures that the participants understand the goal of the interview, how the data used, and their rights to confidentiality and anonymity. The benefits of an interview protocol include ensuring that all participants are asked the same key questions, and allowing comparative analysis of the data (Hunter, 2012).

### 3.8.2 Reflexive Memo as Supplementary Analytical Support

Reflexive memos in this study were not treated as primary empirical data sources. Instead, they functioned as supplementary reflexive materials used to support analytical transparency, contextual interpretation, and researcher reflexivity throughout the thematic analysis process. Researcher maintained reflexive memos throughout the interview and analysis process to support analytical reflection and interpretive transparency. Reflexive memos are analytical and reflective notes systematically compiled by the researcher during the data familiarization and analysis process. These memos serve to document thoughts, initial reactions, assumptions, and the potential influence of the researcher's background on the data interpretation process (Braun & Clarke, 2021; Tracy, 2020). In the context of this research, the researcher's background in hospitality and tourism management has the potential to shape a particular perspective on the phenomenon of smart hotel implementation. Therefore, reflexive memos are used as a conscious mechanism to identify and manage this influence (Trainor & Bundon, 2021).

Each reflexive memo was written after reading the interview transcripts and field notes, focusing on distinguishing between findings that truly emerged from the data (data-driven insights) and interpretations influenced by prior knowledge or experience (theory or experience-driven assumptions) (Saunders et al., 2023). This process helps researchers continually review their epistemological positions and ensures that the development of themes and analytical patterns remains rooted in the empirical data. Thus, the use of reflexive memos not only contributes to increased transparency in the analysis process but also strengthens the trustworthiness of the research, particularly in terms of confirmability and dependability (Lincoln &Guba, 1985; Saunders et al., 2023). This practice allows readers to understand how meaning is constructed reflectively, while demonstrating that the resulting interpretations are the result of a conscious and controlled interaction between the researcher and the data. Although reflexive memos contributed to analytical depth and reflexive engagement, the empirical findings and thematic development in this study were derived primarily from interview transcripts.

#### *3.8.2.1 Reflexive Memoing Process during Data Interpretation*

It is essential to clarify how reflexive memoing, as a key methodological practice for enhancing analytical rigour and researcher reflexivity, was implemented in a systematic and transparent manner. Given the researcher's disciplinary background in hospitality and tourism management and its potential influence on data interpretation, reflexive memoing was conceptualised as a structured and iterative process embedded throughout data familiarisation and analysis. In line with qualitative research standards that position reflexivity as a methodological practice rather than merely a personal reflection (Braun & Clarke, 2021; Tracy, 2020; Trainor & Bundon, 2021), the following subsection details the specific steps and procedures used to generate, document, and integrate reflexive memos in order to strengthen analytic transparency, confirmability, and dependability (Lincoln & Guba, 1985; Saunders et al., 2023). Here are the steps/procedures for making a reflective memo:

1. Post-Interview Reflexive Recording

   Immediately after each interview, the researcher wrote reflexive memos to capture initial impressions, emotional responses, and contextual observations drawn from the interview interaction and field notes, ensuring early sense-making remained closely connected to the empirical data (Braun & Clarke, 2021).

2. Data Familiarisation and Positionality Reflection

   During repeated readings of the interview transcripts, reflexive memos were expanded to document emerging interpretations, assumptions, and reflections on how the researcher's background in hospitality and tourism management might influence data interpretation (Tracy, 2020).

3. Reflexive Engagement During Coding

   Throughout the coding process, reflexive memos were used to distinguish between insights grounded directly in participants' accounts and interpretations informed by theoretical frameworks or prior professional experience, supporting critical interrogation of analytical decisions (Trainor & Bundon, 2021; Saunders et al., 2023).

4. Iterative Review During Theme Development

   Reflexive memos were continuously revisited alongside developing codes and themes to examine shifts in understanding, challenge assumptions, and ensure

that theme construction remained data-driven and analytically coherent (Braun & Clarke, 2021).

5. Integration into the Audit Trail

   Selected reflexive memos were incorporated into the audit trail to document the evolution of interpretations and analytical choices, thereby enhancing transparency and strengthening the confirmability and dependability of the study (Lincoln & Guba, 1985; Saunders et al., 2023).

## 3.9 Data Analysis

Data analysis is the process of evaluating gathered information to draw conclusions that may be assumed to represent the goals, concepts, and ideas that motivated the original research inquiry (Babbie, 2011). Qualitative research yields data that are characterised by ideographic form rather than numerical representation. This is done to preserve consistency with the textual form in which the data are gathered and to produce themes and motives from the data before drawing conclusions (Jennings, 2010). Data analysis in qualitative research is carried out during data collection and after data collection is completed in a certain period.

Activities in qualitative data analysis are carried out interactively and continue continuously until complete, so that the data is saturated. Activities in data analysis are data reduction, data display, and conclusion drawing/verification (Miles & Huberman, 1984). Data collection took a lot of time to obtain a lot of data. In the early stages, the researcher focused primarily on analysing interview transcripts, supported by field notes and reflexive memos to enhance contextual understanding during thematic interpretation.

The varied data studied and detailed, so the next step is that researchers analysed the data through the data reduction process. Reducing data means summarizing, choosing the main things, focusing on important things, looking for themes and patterns (Sugiono, 2002). After the data is reduced, the researcher displayed the data. Data presentation in quantitative research is usually done in the form of tables, graphs, pie charts, pictograms and the like.

However, in this study which uses a qualitative approach, the presentation more frequented and prioritized narrative text (Miles & Huberman, 1984). The fourth step in

qualitative data analysis in this study is drawing conclusions and verification. If no compelling evidence is uncovered to support the next stage of data collecting, the initial conclusions may be transient and subject to change. However, if the initial conclusion has valid and consistent evidence, the conclusion is a credible conclusion. Conclusions in qualitative research may be able to answer the research questions that have been formulated at the beginning, but may not, this can happen because in qualitative research the research questions are still temporary and developed after the research is in the field (Sugiono, 2002). In line with the qualitative research approach and the process of conclusion drawing and verification described above, the data in this study were further analysed using thematic analysis to facilitate the identification and interpretation of meaningful patterns within the data.

Based on the type of data and research questions, there are three types of qualitative data analysis, namely:

1. Thematic analysis
2. Narrative analysis
3. Grounded theory

Data in this study were analysed using thematic analysis. The interview data was identified, analysed, and interpreted to patterns of meaning (themes) within data (Labra et al., 2020). There are six steps involved in thematic analysis consisting of:

1. Familiarization with the data: Start by completely reading and immersing yourself in the information. This may contain interview transcripts, field notes, or other qualitative data sources. Take notes, highlight key points, and obtain a thorough understanding of the material.
2. Generating initial codes: Begin the coding process by identifying and labelling relevant units of data. These codes might be descriptive or interpretative, identifying essential concepts or ideas in the data. Code each relevant data segment regularly to ensure that no vital information is overlooked.
3. Searching for a theme: Once the initial code is completed, start identifying themes. Look for patterns, connections, and repeating concepts among the coded data. Pay attention to the similarities and differences between distinct codes and data segments.
4. Reviewing and Defining Themes: Each theme should represent a consistent pattern or notion that highlights an important feature of the data. Make sure the

themes are internally consistent and unique from one another.

5. Organising and naming themes: Organise topics clearly and consistently. Think about the relationships between the topics and how they help to understand the research question or topic. Give each chapter clear and concise headings that reflect the content.
6. Producing the final analysis: Finally, perform a complete and consistent analysis of the data. This analysis should include a detailed description of each topic, supported by appropriate examples or quotes from the data. Interpret and discuss the results of topics related to a research question or topic.

In this study, Artificial Intelligence (AI) assisted software was also used to improve the efficiency, consistency, and analytical depth of the qualitative data analysis process. Primary data, derived from semi-structured interview transcripts, were initially coded and analysed thematically following the framework proposed by Braun and Clarke (2006). To support this process, several AI-based platforms were used as analysis assistants rather than autonomous decision makers aiming to facilitate the identification of emerging codes, themes, and relationships across the large textual data set. The AI tools were used primarily for text clustering, keyword extraction, sentiment mapping, and semantic similarity checking. However, the researcher retained full interpretive control over the coding and thematic interpretation stages. All AI-generated output was critically reviewed, verified, and refined through repeated manual checks to ensure accuracy, contextual validity, and alignment with the research objectives.

The integration of AI in this study was intended to complement, not replace, the researcher's human analytical judgment. This hybrid approach reflects the evolving methodological landscape in qualitative research, where digital and intelligent systems can contribute to deeper insights while maintaining the rigor and reflexivity underlying human-led interpretation. The use of AI-assisted tools in this study adhered to institutional ethics guidelines and academic integrity standards. The researcher remained the primary author and interpreter of all analyses, ensuring that AI outputs were only supportive and did not replace human scientific judgment. The final stage of data analysis involved integrative abstraction, whereby relationships across themes were examined to identify patterns and interdependencies. This analytical process informed the construction of a contextual Smart Hotel Implementation Model for Batam, as presented in chapter four, ensuring that model development was firmly

grounded in empirical evidence rather than theoretical abstraction.

To further strengthen the interpretive rigor of this AI-supported analytical process, reflexive memos were systematically employed throughout data collection and analysis. These memos functioned as an interpretive bridge between the interview data and the evolving analytical insights, enabling the researcher to document contextual observations, emerging assumptions, analytical decisions, and reflexive positioning in relation to participants' narratives. By capturing how meanings were constructed, questioned, and refined over time, reflexive memos supported a deeper engagement with the interview data beyond surface-level coding, while also mitigating potential bias introduced through AI-assisted pattern recognition. This reflexive practice ensured transparency in the analytical process and reinforced the trustworthiness of interpretations derived from both human judgment and AI-supported analysis. Consequently, the following section discusses how issues of reliability and validity were addressed to ensure the methodological robustness of the qualitative data.

## 3.10 Reliability and Validity of Qualitative Data

Data validity testing in research is often only emphasized on validity and reliability testing. Validity is the degree of accuracy between the data that occurs in the research object and the data that can be reported by the researcher. Reliability concerns the degree of consistency and stability of data or findings. In qualitative research, data is said to be reliable if two or more researchers in the same object produce the same data, or a group of data when divided into two shows data that is not different (Stainback, 1988).

In testing data validity, qualitative research methods use different terms than quantitative research. Data validity testing in qualitative research includes tests, credibility (internal validity), transferability (external validity), confirmability/dependability (objectivity/reliability) (Sugiono, 2002). Three common validity procedures were used by researchers to guarantee the validity of the data in the study on the development of smart hotel implementation in Batam are as follows (Cho & Trent, 2006):

1. Credibility

   This ensures that participant perspectives and personal experiences are

appropriately represented in research. Understanding previous research on the subject and the methodologies used is made easier by the literature review. Interview questions, collecting data methods, and data analysis can all benefit from this information. The study's credibility is increased by adhering to established methods and ensuring the results are consistent with previous studies.

2. Transferability

   This allows readers to find out if findings could be relevant to different demographics or conditions. The literature review facilitates the identification of populations and conditions in which similar research has been conducted. This allows us to compare findings to existing research and discuss the potential transferability of results to other settings. For example, if the study focuses on hotel management' perspective in Batam, it could compare the findings to studies on hotel management' perspective in other tourist destinations.

3. Confirmability

   This reduces the impact of researcher bias and establishes the objectivity of research findings. The literature review helps to identify biases and assumptions about the topic. Acknowledging these biases and how they are mitigated in the research design and analysis increases the confirmability of findings. The literature review, for instance, may point out any cultural variations that might affect hotel management's perspective. It indicates a more neutral approach to acknowledge these differences and make sure interview questions are culturally sensitive.

There is a necessity to emphasise the concepts of reliability and validity when carrying out a qualitative investigation to ensure that the information obtained from the participants can be effectively utilised for this study. Reliability can be defined as an essential factor that guarantees the consistency of the results over a specific period (Afzal et al., 2008). Additionally, according to Cresswell and Miller (2000), validity concerns the accuracy of the statements, thereby reflecting the trustworthiness of the participants. In a study conducted by Riege (2003), it was emphasised that establishing reliability and validity in qualitative research is of utmost importance to ensure that the collected data remains stable and possesses a high level of quality.

According to Creswell and Miller (2000), qualitative research employs a range

of validity procedures that consist of:

1. Disconfirming evidence
2. Researcher reflexivity
3. Member checking
4. The audit trail

This study employed member checking and disconfirming evidence as validity procedures. When combined, these techniques strengthen the rigor of the qualitative inquiry. According to Lincoln and Guba (1985), member checking is a key strategy for establishing credibility, whereby participants are invited to verify the accuracy and resonance of the data and interpretations. Disconfirming evidence, on the other hand, involves the systematic examination of data that challenge or contradict emerging themes or initial interpretations. This process enhances confirmability by ensuring that the findings are not solely shaped by the researcher's assumptions and by accounting for alternative perspectives within the data. By integrating member checking and disconfirming evidence, the researcher demonstrates a commitment to rigorous and reflexive qualitative research, thereby strengthening the trustworthiness of the study. Following the interview sessions, participants were asked to confirm the accuracy of the recorded responses through a review of the interview questions and their corresponding answers.

Validation in qualitative research, according to Creswell (2007), involves a concerted effort to ascertain the accuracy of the findings by relying on both the participants' interviews and the researcher's report. This is achieved using disconfirming evidence and rich descriptions. Disconfirming evidence in qualitative research is information or data that goes in contradiction to the study's emergent themes or conclusions. In essence, its evidence that appears to "disagree" with what the main findings identify. It demonstrates a more objective approach and increases the confirmability of the study by addressing and accepting disconfirming evidence. To guarantee that qualitative research is thorough, objective, and accurately represents the complexity of the social reality being studied, it is necessary to actively seek out and confront disconfirming evidence (Booth et al., 2013). Engaging in discussions with the hotel manager plays a crucial role in member checking, where the hotel manager acted as a validator of the analysis process during the interviews (Yauch & Steudel, 2003). At the same time, member checking also occurs during the transcribing process to

prevent any discrepancies or divergence of understanding between the researcher and their supervisor regarding the recorded audio before the information is documented in text form.

The validity of the study is ensured by the researcher through the inclusion of multiple sources of evidence during the data collection phase. In this phase, the draft emerging themes derived from the previous interview are reviewed by participants, thus reducing bias and enhancing validity. This process allows for a thorough understanding of the top management's perception of the implementation of a smart hotel, enabling the analysis of its significance and underlying assumptions. The works of Yin (2018), Yauch and Steudel (2003), and Wray et al. (2007) provide further support for this approach. Figure 3.3 presenting the process to determine validity.

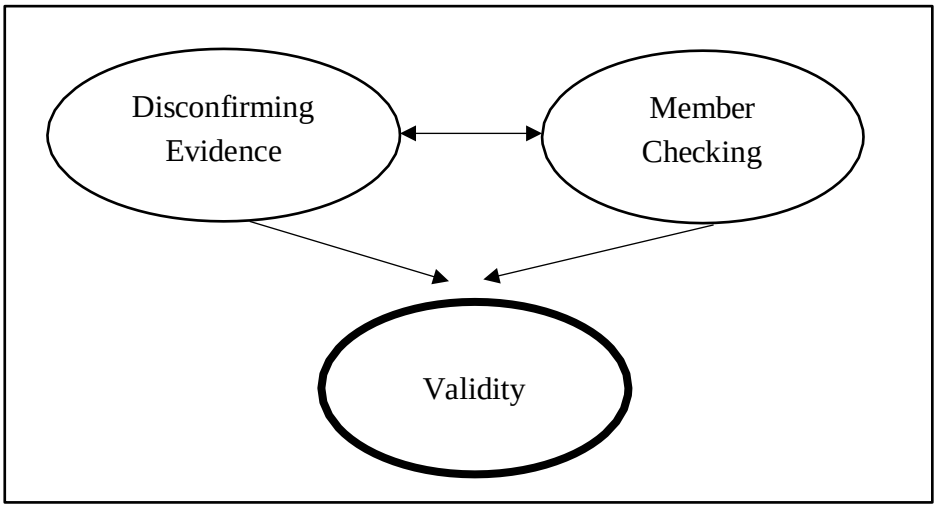


Figure 3.3 Process to Determine Validity
Source: Developed by the researcher for this Study

As shown in figure 3.4 approach to determine reliability, a methodical and transparent analytical approach used to address the reliability of this study, building on the methods employed to demonstrate validity. While validity was strengthened using multiple sources of evidence and participant review of emerging themes (Figure 3.3), reliability was ensured by maintaining consistency and traceability throughout data collection and analysis. As emphasises in figure 3.4, this process involved the use of a clearly defined interview protocol, systematic transcription and coding procedures, and the maintenance of an audit trail documenting analytical decisions and theme development. By applying consistent procedures across interviews and engaging in iterative review of codes and interpretations, the study ensures that the analytical

process is dependable and could be followed by other researchers using the same procedures. This approach aligns with established qualitative research standards that emphasise reliability through procedural transparency and methodological consistency (Yin, 2018; Yauch & Steudel, 2003; Wray et al., 2007).

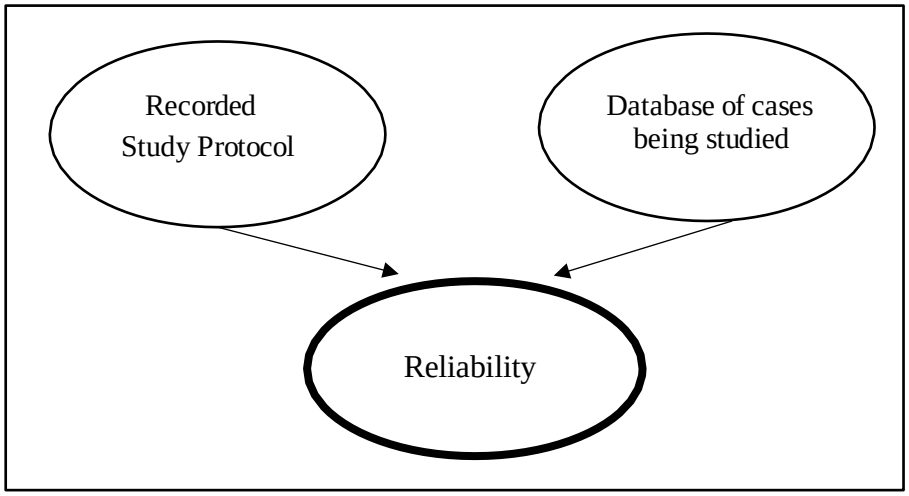


Figure 3.4 Process to Determine Reliability
Source: Developed by the researcher for this Study

## 3.11 Ethical Considerations

Ethical considerations are a fundamental component of qualitative research, particularly when the research involves human participants. As noted by Creswell (2018) and Silverman (2020), researchers must ensure that participants are protected from harm, their identities remain confidential, and the research is conducted with integrity, transparency, and respect for autonomy. In this study, all ethical protocols were meticulously followed throughout the research process, from participant recruitment to data storage and reporting.

Before commencing data collection, ethical clearance was obtained from the Research Ethics Committee (REC) of Universiti Teknologi MARA (UiTM). The research proposal, interview protocol, participant information sheet, and consent form were submitted for review to ensure compliance with institutional and international ethical standards for human subjects' research. Data collection through semi-structured interviews was conducted only after verification and formal approval was granted by the REC. This approval served as confirmation that the study met ethical requirements regarding participant welfare and research integrity.

During the data collection process, each participant was provided with an

information sheet detailing the purpose of the study, its scope, and the voluntary nature of participation. Participants were informed that their participation was entirely voluntary and that they had the right to withdraw from the study or refuse to answer any questions at any stage without consequence. Furthermore, before each interview session, participants were asked to read and sign a consent form, and they were given a copy for their personal records.

Confidentiality and anonymity were strictly maintained throughout the study. No identifiable personal information, such as participants' names, titles, or organizational affiliations, was recorded in the transcripts or reported in the findings. Each participant was assigned a unique code (e.g., P1, P2, P3) to protect their identity. All data, including interview recordings and transcriptions, were securely stored in a password-protected digital folder and accessible only to the researcher. The ethical procedures implemented ensured that the study adhered to internationally recognized standards of academic and professional conduct.

### 3.12 Chapter Summary

This chapter has outlined the methodological foundation of the study, detailing the research design and rationale underpinning the adoption of a qualitative phenomenological approach. The chapter justified the use of phenomenology as an appropriate methodological orientation to explore participants' lived experiences and interpretations of smart hotel implementation within the natural context of Batam. It further described the role of the researcher as the primary instrument of data collection, alongside the procedures for data collection, sampling, and thematic analysis, supported by measures to enhance trustworthiness through credibility and validity. Overall, this chapter demonstrates a methodologically rigorous and theoretically aligned research design that supports the in-depth exploration of smart hotel implementation, thereby providing a robust foundation for the thematic findings presented in chapter 4. Overall, this chapter demonstrates a methodologically rigorous and theoretically aligned research design that supports the in-depth exploration of smart hotel implementation, thereby providing a robust foundation for the thematic findings presented in chapter 4.

# CHAPTER 4
# FINDINGS OF THIS STUDY

## 4.1 Chapter Overview

This chapter presents the empirical findings derived from in-depth interviews with hotel managers and government officers who play central roles in Batam's tourism development and digitalisation agenda. The chapter is structured into three main sections: the demographic profile of the participants, the thematic analysis of the interview data, and the integration of identified themes into an emergent conceptual framework of smart hotel implementation in Batam. Guided by Braun and Clarke's (2006; 2021) reflexive thematic analysis, themes are treated as interpretive constructs developed through sustained and reflexive engagement with the data rather than as passively "emerging" outputs. Interview transcripts were read and re-read, initial codes were generated and iteratively refined, and related categories were subsequently synthesised into five overarching themes that address the study's research questions. To enhance analytical transparency and rigour, this chapter presents the coding scheme and coding tree, tables tracing the development of themes from codes, representative participant quotations, and cross-case comparisons between hotel managers and government officers.

## 4.2 Demographic Profile of Participants

This section provided a concise demographic description of the participants to contextualise the findings, rather than provide a descriptive or statistical comparison. In qualitative study, participant characteristics are stated to clarify variations in perspectives, decision-making roles, and perceptions of smart hotel implementation. The participants comprised hotel managers and government officers involved in the hospitality sector in Batam Island. Their professional position and lengthy experience were considered analytically important attributes, since these factors influenced their exposure to digital systems, strategic responsibilities, and ability to impact

implementing technological decisions.

Participants with senior managerial or policy-level roles frequently indicated a strategic understanding of smart hotel initiatives, often framing implementation in terms of long-term competitiveness, regulatory alignment, and managerial readiness. In contrast, participants in operational or technical roles tended to emphasise practical challenges, such as system usability, staff training, and daily integration with current hotel operations. This distinction informed the analysis of differing perceptions of readiness, risk, and value associated with smart hotel technologies. Other demographic attributes, such as gender, age, marital status, and income level, were not treated as explanatory variables in this study, as no meaningful patterns emerged linking these characteristics to differences in participants' perceptions.

Accordingly, these attributes are reported solely to provide background context and are not foregrounded in the subsequent analysis. The demographic composition of the participants supports a diverse yet analytically coherent sample. These characteristics are presented to contextualise interpretive variation rather than to establish comparative claims. This composition enables the study to capture multiple stakeholder perspectives while maintaining a clear focus on role-based and experiential differences central to understanding smart hotel implementation in Batam Island.

Disclosing their identities and backgrounds is crucial to provide context for the findings discussed below and to demonstrate the credibility of the data collected. Table 4.1 shows 12 participants (P=12), consisting of hotel managers and government representatives. The average number of each interview is about 51 minutes per session. More than half of the interviews (P=9, 75%) were conducted face-to-face at the hotel or the participants' offices, while the remainder (P=3, 25%) were conducted online via Google Meet, primarily during the participants' working hours.

Table 4.1
Demographic Profile for Participants

| No | Demographic Profile | Frequency | Percent (%) |
|---|---|---|---|
| 1 | Gender | Male: 12 | 100 |
| | | Female: 0 | 0 |
| 2 | Age | 26-35 years: 1 | 8.3 |
| | | 36-45 years: 0 | 0 |
| | | 46-55 years: 8 | 66.7 |
| | | Above 55 years: 3 | 25.0 |
| 3 | Marital Status | Single: 0 | 0 |
| | | Married: 12 | 100 |

| | | | |
|---|---|---|---|
| 4 | Education Level | High school: 2<br>Diploma/Degree: 5<br>Master/PhD: 5 | 16.6<br>41.7<br>41.7 |
| 5 | Tenure of Service in Current Hotel Management/Government Office | Less than 5 years: 2<br>Between 5-10 years: 5<br>Between 10-15 years: 3<br>Above 15 years: 2 | 16.6<br>41.8<br>25.0<br>16.6 |
| 6 | Tenure of Service in Hotel Industry/Government Office | Less than 5 years: 0<br>Between 5-10 years: 1<br>Between 10-15 years: 2<br>Above 15 years: 9 | 0<br>8.4<br>16.6<br>75.0 |
| 7 | Working Department/Background | Hotel Management: 1<br>Kitchen: 1<br>Housekeeping: 2<br>Front Office: 3<br>Engineering: 1<br>Tourism: 2<br>Tour and Travel: 1<br>Public Administration: 1 | 8.4<br>8.4<br>16.5<br>25.0<br>8.4<br>16.5<br>8.4<br>8.4 |
| 8 | Salary | Less than RM5063: 5<br>Between RM5063-RM10126: 7<br>Above RM 10126:0 | 41.7<br>58.3 |

### 4.2.1 Gender

All participants in this study were male (100%). This gender composition is reported to contextualise the perspectives represented in the findings rather than as a statistical characteristic. The absence of female participants reflects the gendered structuring of managerial and policy-related roles in Batam's hotel sector, where decision-making positions related to smart hotel initiatives remain predominantly male. Similar patterns have been noted in prior studies of hotel managers and senior executives (Ivanov, Seyitoğlu & Markova, 2020; Yağmur, Demirel & Kılıç, 2024). Accordingly, the findings primarily represent male managerial perspectives, and gender is acknowledged as a contextual factor rather than an explanatory variable.

### 4.2.2 Age

Most participants were aged between 46 and 55 years, with several participants above 55 years, and only one participant in the 26–35 age group. This age distribution

is reported to contextualise the perspectives captured in the study rather than to suggest representativeness or expertise. The predominance of mid- to late-career participants indicates that the findings largely reflect viewpoints shaped by prolonged engagement with the hospitality sector and exposure to successive organisational, technological, and regulatory changes in Batam. As a result, age is not considered an explanatory variable but rather a contextual component that may affect how smart hotel initiatives and regulatory developments are perceived.

### 4.2.3 Marital Status

This also indicates to gender and age, marital status was collected to provide contextual background on the participants. All participants in this study were married. This characteristic is reported descriptively and is not treated as an explanatory factor in the analysis. There were not clear analytical patterns emerged linking marital status to participants' perspectives on job stability, investment decisions, or the implementation of smart hotel technologies. Accordingly, marital status is included solely to contextualise the sample rather than to inform the interpretation of the findings.

### 4.2.4 Education Level

Participants' level of education was recorded to provide contextual background to the perspectives represented in the study. As shown in Table 4.1, most participants held either a Diploma or Bachelor's Degree, or a Master's/PhD qualification, while a smaller proportion had completed high school. It indicates that participants come from diverse educational backgrounds through which managerial, technological, and policy-related issues in smart hotel implementation are interpreted. Accordingly, educational level is understood as a contextual characteristic that may shape participants' frames of reference, rather than as a determinant of analytical capacity or expertise.

### 4.2.5 Tenure of Service in Current Hotel Management/Government Office

Participants were asked about their length of service in their current hotel

management or government positions to provide contextual background to the perspectives represented in the study. As shown in Table 4.1, participants' tenure ranged from less than five years to more than fifteen years, with most having served between five and ten years in their current roles. It indicates that the findings reflect perspectives shaped by different degrees of institutional familiarity and exposure to organisational practices and policy processes related to smart hotel initiatives. Accordingly, tenure is understood as a contextual characteristic that frames how participants interpret smart hotel implementation, rather than as a measure of expertise or understanding.

### 4.2.6 Tenure of Service in Hotel Industry/Government Office

This also indicates to tenure in participants' current positions, total length of service in the hotel industry or government sector was recorded to provide contextual background on participants' longitudinal exposure to sectoral developments. This information was collected to capture perspectives shaped by sustained engagement with organisational, technological, and policy changes over time, particularly in sectors characterised by relatively high staff mobility. As shown in Table 4.1, most participants had more than fifteen years of total service in the hospitality industry or government, while a smaller number had between ten and fifteen years, or five to ten years of experience. It indicates that the findings primarily reflect perspectives informed by long-term involvement in the sector, allowing participants to draw on historical comparisons and accumulated institutional memory when reflecting on smart hotel implementation.

### 4.2.7 Working Department/Background

Participants were drawn from a range of working departments across the hotel industry and related government offices. These included operational areas such as front office and housekeeping, technical and support functions such as engineering and kitchen, as well as managerial, tourism, tour and travel, and public administration roles. This diversity of departmental backgrounds is reported to contextualise the perspectives represented in the study rather than to serve as a measure of coverage or representativeness. Different departmental positions shape how smart hotel initiatives

are experienced and interpreted, particularly in relation to operational practices, technical systems, and administrative coordination. Accordingly, working department is treated as a contextual characteristic that frames participants' viewpoints, rather than as an explanatory variable in the analysis.

### 4.2.8 Salary

Participants' salary ranges were recorded as part of the demographic profile to provide background context on the sample. As shown in Table 4.1, participants reported salaries within lower to middle income ranges, with there is no representation from higher income categories. This information is reported descriptively and is not treated as an explanatory factor in the analysis. No explicit analytical patterns were identified linking individual income levels to participants' perspectives on cost considerations, return on investment, or policy support for smart hotel technologies. Accordingly, salary is included solely to contextualise the sample rather than to inform interpretations of decision-making processes related to smart hotel implementation. These demographic attributes are included to provide contextual grounding for participants' perspectives, not to suggest causal or comparative relationships.

## 4.3 Overview of the Analytical Structure of Findings

The findings presented in this chapter are organised thematically to reflect participants' lived experiences, interpretations, and sense-making regarding smart hotel implementation in Batam. Rather than detailing analytical procedures, this section provides a brief orientation to how the findings are structured to support interpretive clarity. The themes reported in this chapter emerged inductively from participants' narratives and represent recurring patterns of meaning across stakeholder groups. Each theme captures a shared understanding or tension articulated by hotel managers and government officers, while also allowing space for variation and nuance in individual accounts. The analytical emphasis in this chapter is therefore placed on what participants experienced, perceived, and prioritised, rather than on the technical mechanics of data analysis.

## 4.4 Thematic Presentation of Findings

The findings are organised into five interrelated themes that collectively address the research objectives and illuminate the current state of smart hotel implementation in Batam. These themes reflect participants' interpretations of smart hotel concepts, perceived benefits, implementation challenges, institutional roles, and future aspirations. Each theme is presented through:

- A thematic narrative that synthesises shared meanings,
- Illustrative verbatim quotations that ground interpretations in participants' voices, and
- Analytical commentary that highlights convergence and divergence across stakeholder perspectives.

This thematic structure enables an in-depth exploration of smart hotel implementation as a contextually embedded and socially constructed phenomenon, shaped by organisational roles, institutional constraints, and local conditions. The themes are not treated as discrete categories, but as interconnected dimensions that together form an interpretive understanding of smart hotel transformation in Batam.

## 4.5 Data Immersion and Analytical Reflection

The first phase of the thematic analysis involved a systematic process of familiarising researcher with the interview data. As described in chapter 3, this step was crucial for developing a deep understanding of how hotel managers and government officers perceive, experience, and make sense of smart hotel implementation within the Batam context. Familiarisation went beyond simply reading the transcripts; it involved an ongoing analytical engagement that laid the foundation for coding and theme development. Immediately after each interview, researcher reviewed the audio recordings and prepared detailed verbatim transcripts. During transcription, researcher began noting early impressions and ideas that appeared relevant to the research questions.

These preliminary notes were not treated as codes, but rather as initial reflections that guided deeper engagement with the data. Once transcription was completed, researcher re-read each transcript multiple times to immerse myself fully in the

participants' narratives. Through this repeated reading, researcher aimed to understand not only what participants consistently emphasised but also how they expressed their experiences-paying attention to tone, emphasis, contradictions, and contextual cues. This helped to identify recurring concepts such as digital readiness, operational efficiency, infrastructure limitations, and government support. Re-reading also allowed to compare perspectives across different participants, especially between hotel managers and government officers, which later supported the cross-case analysis presented in the thematic sections.

### 4.5.1 Initial Reflection and Immersion

Consistent with the interpretivist position of this study, researcher maintained a reflexive stance throughout the familiarisation process. Reflexivity was essential because researcher background in hospitality and tourism management could influence how to interpret the data. To minimise potential bias, researcher actively recorded reflexive memos after each reading session. These memos helped clarify what insights came directly from the data and which thoughts were influenced by prior knowledge or assumptions. Below is an example of a reflexive memo written during familiarisation: *Memo 1 (Early Impression): Many hotel managers refer to "smart hotel" as improvements in convenience and speed. Only a few connect it to deeper digital transformation. Perhaps this reflects the maturity level of digital implementation in Batam's hospitality sector? Need to confirm through coding later*.

Another memo highlighted a contrast between hotel managers and government officers: *Memo 2 (Comparative Reflection): Government officers talk about smart tourism and smart destinations using national-level frameworks, while hotel managers focus on daily operational challenges. There may be a gap between policy expectations and industry realities*. These memos served two purposes:

1. They encouraged continuous self-awareness, and
2. They helped identify early conceptual patterns that were later confirmed or refined during coding.

### 4.5.2 Initial Analytical Observations

During the familiarisation stage, several early observations began to surface, although they were not yet formalised as codes. These included:

1. Hotels differed significantly in their understanding of what constitutes a “smart hotel”.
2. Managers frequently linked smart hotel implementation to specific operational problems rather than broad strategic goals.
3. Infrastructure readiness was mentioned spontaneously by almost all hotel managers.
4. Government officers often emphasised policy direction and infrastructure development at the macro level.
5. Both groups pointed to long-term potential for smart hotels but highlighted short-term constraints such as budget, skills, and technology integration.

These observations were kept separate from formal coding to avoid forcing any pre-existing structure onto the data. However, they guided researcher attention during the next phase of analysis, ensuring that the coding process remained grounded in the lived experiences of participants.

### 4.5.3 Transition toward Inductive Coding

After completing the familiarisation process, researcher proceeded to generate initial codes using a line-by-line approach. This ensured that each segment of data was considered carefully and that no potentially meaningful insights were overlooked. Codes were created inductively, meaning they originated from the data rather than being predetermined by existing theories or frameworks. The familiarisation stage helped to approach coding with clarity because:

1. Researchers have developed a strong understanding of each participant’s perspective,
2. Researchers were aware of similarities and differences across participant groups,
3. Researchers reflected on own assumptions and how they might shape interpretation.

## 4.6 Codes to Themes: Analysing the Data

The coding process followed the six phases of reflexive thematic analysis as proposed by Braun and Clarke (2006; 2021). This section explains how the raw interview data were transformed into meaningful themes that accurately represent participants' experiences and perspectives on smart hotel implementation in Batam. The aim is to provide analytical transparency and demonstrate how each theme was constructed systematically. The process began with the familiarisation stage described earlier, which involved repeated reading of the interview transcripts and the development of early analytical memos. After this immersion stage, researcher proceeded to generate initial codes. Coding was conducted manually, using Microsoft Word and Excel to allow close engagement with the text. Manual coding also enabled flexibility in reorganising, renaming, and merging codes as patterns became clearer.

### 4.6.1 Generating Initial Codes

Initial coding was done line-by-line, ensuring that meaning units were identified from each segment of the data. Codes were inductive, meaning they were derived directly from what participants frequently highlighted rather than being imposed from pre-existing theories or models. Each piece of meaningful text was assigned a short descriptive label capturing its core idea, such as "limited digital workforce," "smart is modernisation," "investment constraint," or "policy alignment issues." At this stage, researcher generated 178 initial codes across all interviews, approximately 12 to 18 codes per transcript. These codes were descriptive in nature and intentionally kept broad to avoid premature interpretation. Examples of initial codes include:

- "Smart is convenience improvement"
- "Guest expectation for automation"
- "High cost of smart technology"
- "Need training for staff"
- "Government focus on macro-policy"
- "Infrastructure limitation in Batam"
- "Fragmented systems"
- "Technology as competitive advantage"

These early codes captured surface-level meaning, but they also pointed to deeper patterns that were further developed in later phases.

### 4.6.2 Collating Codes into Categories

After initial coding, researcher examined similarities, overlaps, and connections among the codes. Codes that referred to similar ideas were grouped into preliminary categories. This process is known as pattern development, where the analyst begins to identify recurring concepts that cut across different participants. Examples of how codes were grouped into categories:

Table 4.2
Collating Codes into Categories

| Initial Codes | Category |
|---|---|
| Smart is convenience | Understanding smart as modernisation |
| Smart is digital system | Understanding smart as transformation |
| Want to improve service | Service-focused view of smart hotel |
| Staff lack digital skill | Human Resource readiness problems |
| Need more training | Human Resource development issues |
| System not integrated | Technology fragmentation |
| Investment too high | Financial challenge |
| ROI not clear | Technology investment concern |
| Government roadmap unclear | Policy misalignment |
| Internet not stable | Infrastructure reliability |

This step reduced the 178 initial codes into 38 categories, which provided the structural basis for theme development.

### 4.6.3 Developing Themes

The categories were then reviewed to identify broader patterns that captured significant ideas related to the research questions. This involved interpretive thinking and the synthesis of categories that meaningfully related to each other. Categories were merged, expanded, or restructured to form potential themes. After iterative reviewing and refinement, the categories were organised into five themes and 12 subthemes. This

stage required going back and forth between codes, categories, the raw data, and the research questions to ensure coherence and alignment.

### 4.6.4 Coding Tree

Below is the coding tree showing how initial codes developed into categories and eventually into themes:

Theme 1: Stakeholder Perceptions

Subtheme 1: Partial Digitalisation

- Smart is integrated technology
- Data-driven operations
- System synchronization

Subtheme 2: Physical Modernisation

- Smart is convenience
- Basic digital upgrades
- Improving image of hotel
- Guest expectation of "modern"

Subtheme 3: Market Segmentation

- Shaping smart hotel strategy
- Segment-differentiated technology adoption
- Contextual meanings of smartness

Subtheme 4: International Hotel Network

- Network-driven smart hotel implementation
- Digital divide between chain and independent hotels
- Top-down, network-led digitalization

Theme 2: Expected Benefits

Subtheme 1: Operational Efficiency

- Faster processes
- Reduced manual work
- Cost-saving potential

Subtheme 2: Enhanced Guest Experience

- Contactless service
- Personalisation

- Speed and convenience

Theme 3: Implementation Challenges

Subtheme 1: Financial Constraints

- High investment cost
- Unclear ROI
- Budget prioritization

Subtheme 2: Human Resource (HR) Limitations

- Lack of digital skills
- Need for ongoing training
- Resistance to change

Subtheme 3: Infrastructure Limitations

- Unstable internet
- Hardware limitations
- Legacy systems

Theme 4: Role of Government and Institutional Support

Subtheme 1: Policy and Support

- Need clearer roadmap
- Regulatory gaps
- Expectation vs reality mismatch

Subtheme 2: Institutional Readiness

- Internet backbone
- Smart city/smart tourism alignment
- Enabling ecosystem

Subtheme 3: Infrastructure Support

- Digital infrastructure readiness
- Uneven and fragmented infrastructure
- Digital ecosystem support

Theme 5: Future Vision

Subtheme 1: Smart Hotel as a Gradual

- Gradual and staged
- Adaptive implementation aligned
- Learning-oriented and risk-aware digitalisation

Subtheme 2: Market-Oriented Smart Hotel

- Digital positioning
- Technological differentiation
- Strategic readiness

Subtheme 3: Balancing High Tech and High Touch

- Batam-specific design
- Balanced human-technology
- Hybrid model vision

### 4.6.5 Theme Development Table

This table shows how initial codes progressed into categories and then into themes.

Table 4.3
Theme Development

| Initial Codes | Categories | Themes |
|---|---|---|
| Smart is convenience, Smart is basic tech | Understanding smart as modernisation | Theme 1 |
| Smart is integrated system, data-driven | Smart as digital transformation | Theme 1 |
| Selective implementation strategy | Market segmentation shapes implementation strategy | Theme 1 |
| Network-wide system integration | Implementation Led by International Hotel Network | Theme 1 |
| Faster process, reduce manual | Efficiency improvement | Theme 2 |
| Personalised service, guest demand | Enhancing guest experience | Theme 2 |
| High cost, unclear ROI | Financial obstacles | Theme 3 |
| Staff lacking skills, constant training | HR challenges | Theme 3 |
| Weak internet, fragmented systems | Infrastructure issues | Theme 3 |
| No clear roadmap, policy slow | Government support gaps | Theme 4 |
| Need stronger internet, ecosystem | Infrastructure readiness | Theme 4 |
| Limited organisational capacity | Institutional Readiness and Coordination Challenges | Theme 4 |
| Future-proofing, differentiation | Long-term strategy | Theme 5 |
| Unique visitor profile of Batam | Segment-Based Strategy | Theme 5 |
| Hybrid digital-human model | Contextual model vision | Theme 5 |

### 4.6.6 Ensuring Coding Quality and Rigour

To maintain analytic credibility and trustworthiness:

- Coding was revisited three times to ensure consistency.
- Codes were compared across participants (hotel managers and government officers).
- Negative cases (deviant views) were included to avoid overgeneralization.
- Memos were used to track analytical decisions.
- All themes were checked against research questions and conceptual model.

This established a strong foundation for presenting the five major themes in the next sections.

### 4.6.7 Analytical Rigour and Interpretation Consistency

To strengthen the credibility and analytical rigor of this study, the researcher applied repeated cross-participant comparison and iterative thematic verification throughout the analysis process. Perspectives obtained from hotel managers and government officers were continuously compared to identify recurring patterns, convergent viewpoints, and contrasting interpretations regarding smart hotel implementation in Batam. This also indicates, analytical consistency was maintained through repeated movement between interview transcripts, coding categories, reflexive notes, and thematic interpretation. Reflexive observations recorded during and after the interviews assisted the researcher in interpreting contextual meanings, participant emphasis, and implementation concerns beyond the verbatim responses alone.

Themes were retained only when supported by recurring evidence across multiple participants and stakeholder groups. Divergent perspectives were also carefully examined to preserve the complexity and contextual realities of smart hotel implementation in Batam. This analytical process strengthened the trustworthiness of the findings by ensuring that the identified themes reflected consistent stakeholder experiences and interpretive patterns rather than isolated individual opinions.

## 4.7 Theme 1: Stakeholder Perceptions

This theme addresses the first research question concerning stakeholders' perceptions toward smart hotel implementation in Batam. The findings reveal that stakeholders generally perceive smart hotels as technology-enabled hospitality systems that enhance operational efficiency, customer convenience, and service modernisation. However, participants demonstrated varying interpretations regarding the meaning, scope, and strategic purpose of smart hotel transformation, reflecting differences in organisational roles, institutional responsibilities, and operational priorities within the hospitality sector. While both hotel managers and government officers acknowledge the growing importance of digital technologies in hospitality, their interpretations of what constitutes a "smart hotel" differ considerably.

Hotel managers tend to frame smart hotel implementation through a managerial logic focused on operational feasibility, customer service improvement, and immediate business outcomes. In contrast, government officers adopt a broader institutional logic that emphasises long-term tourism development, digital transformation, and policy alignment. These differing perspectives indicate that stakeholder perceptions of smart hotel implementation are shaped not only by technological awareness, but also by organisational experiences, contextual realities, and strategic expectations within the Batam hospitality industry. The findings further suggest that smart hotel transformation in emerging tourism destinations is interpreted through multiple socio-technical and institutional lenses rather than through a single unified understanding.

### 4.7.1 Subtheme 1: Partial Digitalisation

This subtheme conceptualises smart hotel implementation in Batam as a form of symbolic implementation accompanied by partial digitalisation. Rather than reflecting comprehensive technological transformation, implementation is understood as selective and representational. Smart technologies are implemented to convey innovation and competitiveness without fundamentally altering organisational structures. This framing positions digitalisation as performative rather than transformative.

Participants consistently described the use of limited smart technologies, such as online booking platforms, electronic key cards, and basic property management systems. These technologies were predominantly applied to front-end service functions. In contrast, back-end operations, system integration, and data-driven decision-making remained largely manual. This pattern was evident across both international and local hotels, albeit at different levels of sophistication.

This pattern suggests that smart hotel implementation is prioritised where technology is most visible and immediately beneficial. Implementation decisions are guided by reputational considerations and guest-facing outcomes rather than by long-term organisational change. As a result, digitalisation becomes fragmented and uneven across hotel functions. Smartness is therefore measured by presence rather than by depth of integration.

One hotel manager explained that the installation of digital key systems and online booking platforms was sufficient to claim smart hotel status. Another participant noted that advanced systems were not prioritised due to cost and operational complexity. These accounts illustrate how symbolic value influences implementation decisions. Participants evaluated success based on visible outputs rather than systemic capability.

These narratives indicate that symbolic implementation serves as a strategic response to competitive pressure and market expectations. Hotels implement selected technologies to align with industry trends while minimising disruption to existing practices. This approach allows organisations to project innovation without undertaking costly restructuring. Consequently, digitalisation remains partial and functionally bounded.

Conceptually, this subtheme represents symbolic adoption and partial digitalisation, where smart technologies operate as signals of progress rather than drivers of transformation. Implementation is oriented toward legitimacy and appearance rather than institutional change. This explains why smart hotel development progresses slowly and unevenly across Batam. The subtheme highlights the gap between technological symbolism and organisational reality.

Participants consistently described smart hotel implementation in Batam as occurring at an early and uneven stage. Hotel managers and government officers emphasised that full smart transformation would require a long-term timeline due to market characteristics, hotel demographics, capital constraints, and internal capability.

As one hotel manager noted, Batam remains "20–30 years" away from full smart hotel implementation, with international chains leading adoption while most local hotels remain partially or manually operated (P1).

> *"The hotel in Batam… I see this as a technology that will be implemented maybe in 20–30 years. Because we see the demographic of the hotel in Batam. The technology that is running right now, it's only Marriott Group that I see that is very dominant in this smart technology. If I look at it from my perspective, with my experience in Batam for six years, I think it will take a long time to implement up to 100%."*(P1)

This statement reflects a perception that smart hotel transformation in Batam remains structurally premature and highly dependent on organisational capability. The participant associated smart hotel implementation not only with technological availability but also with market readiness, hotel ownership structure, and long-term investment sustainability. The researcher interprets this finding as evidence that stakeholders perceive smart hotel implementation as a gradual organisational transition rather than an immediate technological upgrade. This also suggests that international hotel chains possess stronger institutional and financial capacity to implement smart technologies compared to locally operated hotels.

This finding may be particularly relevant to Batam because the city is characterised by a dual hospitality structure consisting of internationally affiliated hotels and locally owned independent hotels. While international hotel chains often benefit from established digital standards, corporate technology platforms, and stronger financial resources, many local hotels operate with more limited investment capacity and technological expertise. Consequently, stakeholder perceptions of smart hotels in Batam are shaped not only by technological possibilities but also by visible differences in organisational capability across hotel categories. This view is reinforced by perceptions of the current penetration rate. As P1 summarised bluntly:

> *"Currently only about 30% have started implementing smart hotel elements… we need staged implementation. That's by using smart TV, door lock and the system because this will be related to the budget again the owner doesn't want to invest there but with an international brand they have designed so the owner doesn't need to build from zero scratch they just adapt. So they can follow the budget, maybe not as full as the hotel owner himself, then he wants to make the hotel a smart hotel."*(P1)

The emphasis on staged implementation demonstrates that financial rationality strongly shapes smart hotel adoption decisions in Batam. Rather than pursuing full technological integration, many hotels selectively adopt visible technologies that can improve operational image while minimising investment risk. This finding suggests that smart hotel implementation is closely linked to cost management considerations and perceived operational practicality. The researcher interprets this as a form of incremental digitalisation, where hotels attempt to balance technological modernisation with financial sustainability. Government officers echoed this low-level assessment. P9 described the overall progress as fragmented rather than systematic:

> *"The implementation of smart hotel technology in Batam is a transformational step whose benefits are not only economic and technological, but also support sustainable development, encourage the digitalization of the tourism sector, and strengthen Batam's position as a regional smart tourism hub. Batam's smart hotel implementation should align with the city's smart development, but so far, modernization dominates over true digitalization."*(P9)

This statement reflects a structural mismatch between the city's broader smart tourism ambitions and the operational realities faced by hotels in Batam. Although policy narratives promote digital transformation and smart tourism development, implementation at the hotel level remains fragmented and uneven. The researcher interprets this finding as evidence that institutional vision alone is insufficient to accelerate smart hotel transformation without corresponding internal capability, investment capability, and implementation support mechanisms. This also indicates that digital transformation in Batam is shaped by tensions between policy aspiration and operational feasibility. P5 acknowledged that although interest existed, capability lagged:

> *"Local hotels are still learning; they follow the concept, but they don't have the same investment. Well, I see that it's still part of it. Only brands that are able to do it. But unfortunately, if it's a smart hotel, smart hotel that is connected to the technology of the system earlier, maybe the top three star hotels have done that, maybe some. But a hotel like below, like a budget hotel, there is still a manual system. Well, maybe their estimate is about the budget, maybe, yes. That they are still in their way."*(P5)

Government officers further emphasised that full transformation is constrained by readiness gaps across infrastructure, human resources, and hotel ownership. These

findings reveal that smart hotel implementation in Batam remains uneven because international chain hotels possess stronger technological standards, financial resources, organisational systems, and external policy coordination compared to locally operated hotels. As a result, implementation capability is strongly shaped by organisational capacity and ownership structure rather than by technological availability alone. This disparity indicates that smart hotel transformation in Batam is strongly influenced by structural differences in internal capability, investment capability, and managerial adaptability across hotel categories. P12 highlighted staged adaptation as an unavoidable reality:

> *"Hotels that are international, chain hotels or major hotels, they already have a standard. At least they have implemented some smart hotel components in their group. Different from hotels that are usually local or hotels that are usually down. Chain hotels or modern hotels are transforming into smart hotels because the SOP says so, not because of local initiative."*(P12)

Participants also indicated that uneven implementation reflects the heterogeneity of Batam's hotel landscape. P6 summarised the situation succinctly:

> *"If in Batam itself, to be honest, I think it hasn't been there yet. Which is a smart hotel. If we talk about smart hotels, smart hotels are said to have to be really, the process of checking in, he immediately checks in on his own. It's really a real smart hotel. There is no real smart hotel in Batam yet… only those under international chains are close to it."*(P6)

Meanwhile, participants frequently described current implementation practices as partial, fragmented, and largely cosmetic, indicating that many hotels have adopted visible digital technologies without achieving deeper operational integration, automation capability, or data-driven service coordination. This narrative further reinforces the perception that fully integrated smart hotels have not yet materialised in Batam. Participants distinguished between modern hotels and genuinely smart hotels, suggesting that visible modernisation alone is insufficient to represent comprehensive technological transformation. The researcher interprets this finding as evidence that the extent of smart hotel implementation in Batam is constrained not only by technological limitations, but also by differing stakeholder interpretations regarding what constitutes a genuinely "smart" hotel. Consequently, implementation assessment becomes inconsistent because operational modernisation is frequently interpreted as equivalent to comprehensive smart transformation. P12 noted:

*"Many hotels are modern, chain, and networked… but only partially smart because of limited investment and staged adaptation processes. It is still in the process of transforming towards smart hotels. So hopefully the entire hotel industry in Batam, especially to be a smart hotel, a seamless hotel, a sustained hotel, it also needs stages, it needs time, it needs a long process"* (P12)

The emphasis on long-term planning was shared across the participants. The findings suggest that stakeholders perceive smart hotel transformation as a gradual and adaptive process because hotels in Batam must continuously balance technological ambition with financial sustainability, workforce readiness, operational feasibility, and implementation risk. Partial implementation therefore emerges as a strategic adaptation mechanism that allows hotels to minimise investment exposure, maintain operational continuity, and gradually strengthen technological infrastructure within a resource-constrained hospitality environment. The researcher interprets this gradual transformation pattern as a socio-technical response to interconnected structural constraints involving investment limitations, workforce capability gaps, technological adaptation challenges, and institutional uncertainty. These interacting constraints collectively explain why smart hotel implementation in Batam progresses incrementally rather than systematically. These interacting constraints collectively explain why smart hotel implementation in Batam progresses incrementally rather than systematically. P1 stressed the need for rational investment strategies:

*"Full implementation faces significant barriers… it may take 20–30 years to catch up with more advanced markets. For the smart hotel itself, it should be in the current years, it should have started to be implemented in hotels because it answers the challenges of the times that are getting better, and the technology is getting better, maybe like that."* (P1)

These findings are consistent with previous studies suggesting that smart hotel implementation in emerging tourism destinations often occurs incrementally and unevenly due to financial, organisational, and infrastructural limitations (Kumar & Sharma, 2026; Wong & Loo, 2026). Similarly, Hassan and Eassa (2025) argued that many hotels adopt isolated smart technologies primarily for operational visibility and market competitiveness rather than full organisational transformation. However, unlike studies conducted in technologically advanced tourism destinations where smart hotel ecosystems are more integrated and mature, the Batam context demonstrates that implementation remains highly dependent on institutional readiness, ownership

structure, and local investment capability. In summary, Subtheme 1 demonstrates that both hotel managers and government officers perceive smart hotel implementation in Batam as a gradual, uneven, and partially symbolic transformation process shaped by resource disparities, internal capability, and structural constraints. Rather than reflecting comprehensive digital transformation, implementation is largely selective and operationally bounded, particularly among locally operated hotels. The findings suggest that smart hotel adoption in Batam functions more as incremental digital modernisation than as fully integrated technological transformation. This subtheme therefore highlights the gap between smart tourism aspirations and the contextual realities of hospitality digitalisation within emerging tourism destinations.

### 4.7.2 Subtheme 2: Physical Modernisation

This subtheme conceptualises the distinction made by participants between physical modernisation and smart transformation in the hotel sector. Modernisation is understood as visible upgrades in design, facilities, and aesthetics, while smart transformation refers to deeper digital integration and automation. Participants treated these as fundamentally different processes rather than sequential stages. This distinction frames smartness as a systemic quality rather than a visual one.

Throughout the interviews, participants consistently differentiated modern hotels from smart hotels. While many hotels in Batam were described as modern, participants agreed that smart transformation remained limited. Modernisation was associated with physical improvements, whereas smart transformation was linked to integrated systems, automation, and data-driven operations. This pattern appeared across hotel managers and government officers.

This pattern suggests that visible modernisation can create an illusion of technological advancement without substantive digital change. Participants perceived that modern appearances often masked the absence of system-level integration. As a result, hotels could appear technologically advanced while remaining operationally traditional. Smart transformation was therefore interpreted as an unrealised aspiration rather than an achieved state.

*"Everybody goes for modernization. Modern. Modern. But not smart… I don't see much smart. Maybe people here are not ready. So more into modern. But not smart,*

*you know. Not too much. No, I don't see much smart. Not 100% smart. Maybe the people here are not ready for this hand. Or our guests are not ready. Some hotel yes, some hotel still no."* (P2)

This finding suggests that participants perceive modernisation and smart transformation as fundamentally different organisational processes rather than interchangeable concepts. The emphasis on visible physical upgrades indicates that many hotels in Batam prioritise aesthetic competitiveness and customer impressions while deeper digital integration remains limited. The researcher interprets this as evidence that smart hotel implementation in Batam is still largely symbolic and surface-oriented rather than systemically embedded within hotel operations. This finding aligns with Wong and Loo (2026), who argued that hotels in emerging tourism destinations frequently implement fragmented technological improvements without achieving integrated smart hospitality ecosystems. Similarly, Hassan and Eassa (2025) noted that physical modernisation often creates the appearance of innovation despite limited organisational digital transformation. Hotel managers drew a sharp line between visible upgrades (lighting, design, interior styles) and deeper system-level changes. P6 expressed the gap vividly:

*"There is no real smart hotel in Batam yet… a real smart hotel means everything is digitized, from check-in to closing the curtains. Then he uses sound, he's already connected. So if in Batam there is no hotel that implements or a real hotel, there is no smart hotel, there is no good sir."* (P6)

P6's statement reflects a stricter interpretation of smart hotels based on full technological integration and operational automation. Rather than evaluating smartness through isolated technologies, participants associated smart transformation with interconnected systems capable of coordinating guest services, room functions, and operational processes simultaneously. From the researcher's perspective, this indicates that stakeholders conceptualise smart hotels not merely as technologically enhanced buildings but as integrated socio-technical systems. The absence of such integration explains why participants consistently argued that Batam hotels remain "modern" rather than genuinely "smart." This narrative was reinforced by government officers, who observed that many hotels implemented digital features only in isolated departments. P8 explained:

*"As far as I know, there were several hotels that run it, but most of them are in FB. The FB service is more or in the banquet, as far as I know. For the housekeeping department, not yet. There is a little FO, same in marketing."*(P8)

Another recurring idea was that technology was sometimes used for display rather than functional transformation. P10 criticised this trend:

*"Smart hotels shouldn't just show off robots or fancy gadgets; what really matters is making things easier for guests. Simple things like faster check-in/check-out, reliable internet, and well-prepared MICE facilities make a big difference. Well, at least in Haris Barelang, in Turi, in Turi Resort, Nongsa point, Montigo."* (P10)

Participants also recognised that guests still prioritise service quality over automation. This finding demonstrates that participants were sceptical toward technology adoption driven primarily by symbolic value or marketing visibility. Participants repeatedly emphasised that technological implementation should improve operational convenience and guest experience rather than function as superficial indicators of innovation. The researcher interprets this as evidence that stakeholders in Batam evaluate smart technologies pragmatically based on operational usefulness and service effectiveness. This pragmatic orientation may explain why hotels adopt selected technologies incrementally instead of pursuing expensive large-scale automation projects. P3 highlighted this:

*"There are not many in Batam, but if we talk about Indonesia, I think that cabins or box with a capsule, with quite premium locations, for example on the edge of the mountain or something with a good view, because it started like a hotel that is really for the size of one person, like a job. But right now they are expanding to literally building a hotel, meaning a mini hotel or a villa. Many hotels look modern and luxurious, but for guests, service quality is still the main priority, not automation."* (P3)

Government officers provided a broader philosophical angle. P11 emphasized that technology must enhance, not replace, hospitality values:

*"Tourism must still be balanced with the human touch the highest school of thought in tourism. So, there must be, as Mr. Guntur said, because the more diversification, then we just have to choose how we apply it. In the big picture, I can understand that if we apply smart hotel or what is called smart technology for hotels, it's more simplification."* (P11)

The findings further indicate that participants continued to prioritise hospitality values, interpersonal interaction, and service quality over technological automation alone. While participants acknowledged the potential benefits of smart technologies, they consistently argued that technology should complement rather than replace human-centered hospitality experiences. This finding supports Hassan and Eassa (2025), who argued that excessive automation may reduce perceived authenticity and emotional engagement within hospitality environments. Similarly, Webster (2025) noted that successful smart hotel transformation depends on balancing operational efficiency with human interaction and service personalization.

Within the Batam context, this highlights that stakeholder acceptance toward smart hotel transformation remains closely tied to cultural expectations regarding hospitality and personal service. Participants repeatedly warned that visible modernisation can mask the absence of digital integration. P12 described partial adoption:

> *"Hotels are modern… but only partially smart because of limited investment and staged processes. Hotels that are international, chain hotels or major hotels, they already have a standard. At least they have implemented some smart hotel components in their group."* (P12)

And P4 added that many hotels are more focused on modern looks than systemic digital implementation:

> *"Smart hotels should already be implemented… but many still focus on modernization instead. For the smart hotel itself, it should be in the current years, it should have started to be implemented in hotels because it answers the challenges of the times that are getting better, the technology is getting better, maybe like that."* (P4)

These perspectives indicate that smart transformation is evaluated against criteria of integration, coherence, and functionality rather than visual sophistication. Physical modernisation is perceived as insufficient because it does not alter how hotels operate, coordinate, or make decisions. Therefore, participants treated smart transformation as a qualitative shift in organisational logic, not merely an upgrade in facilities. This reinforces the understanding of smart hotels as socio-technical systems.

Conceptually, this subtheme represents a distinction between modernisation and digital transformation, where aesthetic advancement substitutes for systemic change. Smart transformation remains shallow because digital technologies are not embedded

across organisational processes. This distinction helps explain why hotels in Batam are widely perceived as modern but not smart. It also clarifies why progress toward smart hotel is slower than expected.

### 4.7.3 Subtheme 3: Market Segmentation

This subtheme conceptualises smart hotel implementation as a market-segmented strategy rather than a standardised technological approach. Smart technologies are implemented selectively in response to distinct guest expectations, price sensitivities, and service logics. Implementation decisions are therefore shaped by who the hotel serves rather than by a standardised definition of smartness. This framing positions smart hotel development as demand-driven and strategically differentiated.

Throughout the interviews, participants consistently described variation in smart hotel implementation across hotel categories and guest segments. Budget and capsule hotels were associated with higher levels of automation aimed at cost efficiency and reduced labour dependency. In contrast, luxury and upscale hotels prioritised personalised service and human interaction. Business and MICE oriented hotels emphasised digital systems that support speed, connectivity, and operational efficiency.

This pattern suggests that smart hotel implementation is calibrated to align with segment specific value propositions. Technology is not implemented to signal smartness uniformly, but to support the dominant service logic of each market segment. Automation is prioritised where efficiency and affordability are central, while human touch is preserved where experiential value is paramount. Smartness is therefore interpreted relationally rather than universally. These findings indicate that smart hotel implementation in Batam is not perceived as a uniform technological transformation, but as a strategically differentiated process shaped by market orientation and customer expectations. The researcher interprets this as evidence that hotels prioritise technologies according to operational relevance and segment-specific competitive positioning rather than pursuing comprehensive digitalisation. This reinforces that the meaning of "smartness" varies significantly across hospitality segments and is closely linked to service logic, pricing structure, and guest experience expectations.

Participants noted that budget and capsule hotels rely heavily on automation to minimise operational costs and meet guest expectations of efficiency. Conversely,

luxury hotel managers emphasised that sufficient automation could undermine the experiential value of personalised service. Business-oriented hotels highlighted the importance of reliable digital infrastructure over visible technological displays. This perspective demonstrates how technology choices are aligned with segment specific service priorities. P3 explained:

> *"Capsule and budget hotels are more suited to automation… they operate with few humans because they are designed to be economical. From what I see, they operate a little human, but they all have a lot of automation features that they have inside especially the key."* (P3)

In contrast, luxury hotels emphasise the human element. P11 expressed this clearly:

> *"What is called human touch hotel, maybe sometimes we can differentiate it as conventional. The highest sector of tourism is the human touch… we just have to choose how we apply technology. In the big picture, I can understand that if we apply smart hotel or what is called smart technology for hotels, it's more simplification."* (P11)

The contrast between P3 and P11 demonstrates a clear segmentation logic in smart hotel implementation. Budget-oriented hotels appear to associate automation with operational efficiency and labour minimisation, whereas luxury hotels perceive excessive automation as potentially reducing the experiential and emotional dimensions of hospitality services. This finding suggests that technological implementation is not universally perceived as beneficial across all hotel categories. Instead, the value of technology is interpreted differently depending on the dominant service expectations within each market segment. This finding aligns with Hassan and Eassa (2025), who argued that excessive automation may weaken perceived service authenticity in hospitality environments where personalised interaction remains central to customer experience. Similarly, Wong and Loo (2026) noted that smart hotel transformation is often negotiated between technological efficiency and experiential value. Hotel managers also recognised that Batam's tourism market is unique due to the dominance of Singaporean and Malaysian tourists. P7 highlighted this:

> *"The Batam market is unique… we depend on Singapore and Malaysia. As I said earlier, mostly for Malaysia, they are a group. Very sensitive to halal and non-halal food for example, like that. For example, Malaysia. And Singapore is sensitive to hardwares."* (P7)

Government officers reinforced this by noting the expectations of international travellers:

> *"My perception of the implementation of smart hotels in Batam is very positive and strategic, especially when compared to Batam's position as a tourism and industrial hub in the border region and the needs of international tourists (especially from Singapore, Malaysia, and China) for fast, seamless, and digital-based services."* (P9)

The findings further reveal that market segmentation in Batam is strongly influenced by the characteristics of cross-border tourism flows, particularly visitors from Singapore and Malaysia. Stakeholders consistently associated smart hotel implementation with the expectations of international travellers who prioritise speed, digital convenience, and operational efficiency. From the researcher's perspective, this indicates that Batam's geographical position as a border tourism destination significantly shapes the direction of smart hotel development. Unlike studies conducted in highly developed tourism destinations where smart hotel transformation is often driven by technological innovation itself, the Batam context suggests that implementation is more strongly driven by market adaptation and regional tourism dynamics. Managers of MICE-oriented hotels described technology as essential for high-volume business travellers. P10 explained:

> *"Well, for Batam, I rarely go to Batam. In my opinion, smart hotels in Batam shouldn't just focus on showing off technology like robots or fancy gadgets what really matters is making things easier for guests. What really matters is making things easier for guests faster check-in/check-out, reliable internet, and well-prepared MICE facilities."* (P10)

Participants emphasized that for business segments, technology is not about "looking smart" but improving managerial efficiency. P2 noted:

> *"Smart is about full computerization, robotics, artificial intelligence, and now it's going into wired technology, meaning they have no boundaries, meaning they're open. Everything is open, so you can do whatever you want. The system is faster, more accurate, more efficient… but it must be applied correctly by the operator."* (P2)

These narratives suggest that business and MICE-oriented hotels prioritise functional efficiency over symbolic technological sophistication. Participants repeatedly emphasised that guests value practical outcomes such as reliable internet

connectivity, efficient check-in systems, and operational responsiveness more than visible technological displays. The researcher interprets this as evidence that smart hotel implementation in Batam is operationally driven rather than innovation-driven. This finding supports Kumar and Sharma (2026), who found that hotels in emerging tourism destinations frequently adopt technologies selectively based on operational practicality and immediate service value rather than long-term digital transformation ambitions. For economy hotels, digitalisation is driven by cost reduction. P3 mentioned:

> *"From what I see, they operate a little human, but they all have a lot of automation features that they have inside especially the key, they succeed in educating the guests to use the application because they are designed to be economic or budget accommodation that is really efficient does not involve much human contact so the market itself understands if in the conventional hotel market without welcome drinks he knows or just enters, people feel ignored. If they start with an economy brand, it is quite efficient… the price is not too high."* (P3)

P5 confirmed the unevenness across star classifications:

> *"Only brands that are able to do it. Top three-star hotels have some smart systems… but budget hotels are still run manually. That they are still in their way."* (P5)

The findings also reveal uneven implementation capacity across hotel classifications. While larger or branded hotels appear more capable of integrating smart systems, smaller and budget hotels continue to face operational and financial limitations that restrict technological transformation. This indicates that smart hotel implementation in Batam remains closely associated with organisational capability and investment readiness. From the researcher's perspective, the unevenness identified by participants should not necessarily be interpreted as implementation failure, but rather as evidence of differentiated adaptation strategies within a resource-constrained hospitality environment. Interestingly, some market niches deliberately avoid technology as a selling point. P12 stated:

> *"With the advance of information and communication technology, people are more personal, more professional, and more global. So the hotel industry in tourism is not yet complete. Some private islands avoid technology because what they sell is authenticity… the silence is paid high."* (P12)

Interestingly, the findings also demonstrate that certain hospitality segments intentionally resist technological saturation as part of their market positioning strategy. In these cases, authenticity, exclusivity, and disconnection from digital environments

become premium experiential values. These findings imply that smart hotel implementation does not always involve maximising technological visibility, but may also involve strategic limitation of technology to preserve experiential authenticity. This finding challenges technology-deterministic assumptions commonly found in smart hospitality literature, which often equate higher technological integration with superior hospitality innovation. Instead, the Batam context reveals that the perceived value of smartness remains highly dependent on customer expectations and experiential positioning.

These narratives indicate that market segmentation acts as a structuring force in shaping smart hotel strategies. Rather than following a linear or hierarchical model of technological advancement, hotels pursue differentiated digital pathways. Smart technologies are selectively embedded to reinforce brand positioning and competitive advantage within specific segments. This results in uneven but intentional patterns of digital implementation across the hospitality landscape.

Conceptually, this subtheme represents segmented smart implementation, where digitalisation strategies are shaped by market logics rather than by technological determinism. Smart hotel development is therefore plural and context dependent. The meaning of smartness varies across segments, reflecting differing expectations of efficiency, experience, and authenticity. This explains why smart hotel implementation in Batam appears uneven yet strategically coherent. Overall, the findings indicate that smart hotel implementation in Batam follows a differentiated and market-responsive trajectory rather than a standardised digital transformation pathway. The researcher interprets this segmented implementation pattern as evidence that smart hospitality development in emerging tourism destinations is shaped more by contextual business realities and market adaptation than by technological determinism alone. Consequently, smart hotel transformation should be understood as a plural and context-sensitive process rather than a universally uniform model of technological advancement.

### 4.7.4 Subtheme 4: International Hotel Networks

Subtheme 4 examines how international hotel networks lead smart hotel implementation in Batam. Participants consistently perceived global hotel chains as technological leader due to their access to capital, standardised operating procedures,

and global digital ecosystems. In contrast, local and independent hotels were described as facing significant structural and financial constraints. This subtheme highlights how organisational affiliation shapes the pace, depth, and direction of smart hotel transformation.

This subtheme conceptualises smart hotel implementation in Batam as a network-led process dominated by international hotel chains. Rather than emerging from local initiative, digital transformation is largely driven by global brand standards and corporate requirements. International hotel networks function as carriers of technology, standard operating procedures, and digital ecosystems. This positions smart hotel development as externally grounded rather than locally generated.

Participants consistently emphasised that international hotel chains are at the forefront of smart hotel implementation in Batam. Global brands were described as implementing advanced systems such as smart lighting, smart climate control, integrated property management systems, and keyless technologies. In contrast, local and independent hotels were perceived as operating at much earlier stages of digital implementation. This uneven pattern produced a visible gap between network-affiliated and independent hotels.

This pattern suggests that smart hotel implementation is shaped by organisational affiliation rather than by location alone. International networks have the financial capacity, technical expertise, and institutional pressure to implement standardised smart systems. Local hotels, by contrast, face structural constraints related to investment capacity and access to proprietary technologies. As a result, smart transformation progresses unevenly across the local hospitality landscape.

Several participants described international hotel chains as setting the benchmark for smart hotel practices in Batam. One manager noted that only hotels under global brands were close to full digitalisation, while others remained largely manual. Government officers similarly observed that smart transformation often occurred because international SOPs required it, not because of local initiative. These accounts illustrate how global networks act as implementation drivers and reference points. P1 described the dominance of global chains:

> *"For now, the hotel that has just opened or has just been built, using that technology, it's around 30% of the time. Only the Marriott Group is very dominant in this smart technology smart lighting, smart AC, smart TV, keyless system. If I look at it from my perspective, with my experience in Batam for six years, I think it*

*will take a long time to implement up to 100%."* (P1)

Government officers reiterated that smart transformation is driven externally rather than internally. P12 stated:

> *"Chain hotels or modern hotels are transforming into smart hotels because the SOP says so, not because of local initiative. Different from hotels that are usually local or hotels that are usually down. It is still in the process of transforming towards smart hotels."* (P12)

These findings indicate that international hotel networks function not only as technology adopters, but also as institutional drivers shaping the direction of smart hotel transformation in Batam. The researcher interprets this as evidence that digital transformation in Batam is largely externally initiated through global corporate structures rather than internally generated through local innovation capacity. The dominance of international hotel chains also reflects unequal access to financial resources, proprietary systems, and technical expertise. Consequently, smart hotel implementation becomes structurally uneven, where network-affiliated hotels are able to accelerate digital transformation while independent hotels remain constrained by operational and financial limitations. This creates a digital divide between global-network hotels and local independent hotels. P6 noted:

> *"No real smart hotel in Batam yet… When he goes into the room, everything is already digitized. He wants to close the curtains, he already uses a remote. only those under international chains are close to it."* (P6)

Local managers acknowledged that financial capacity is a major differentiator. P5 emphasized:

> *"But unfortunately, if it's a smart hotel, smart hotel that is connected to the technology of the system earlier, maybe the top three star hotels have done that, maybe some. Local hotels follow the concept, but they don't have the same investment."* (P5)

The unequal implementation patterns described by participants align with previous studies suggesting that smart hotel transformation in emerging tourism destinations is strongly influenced by organisational capability and investment readiness. Kumar and Sharma (2026) argued that hotels with stronger institutional backing and financial resources are more capable of implementing integrated smart technologies, while smaller independent hotels often adopt selective and fragmented digital solutions. Similarly, Wong and Loo (2026) noted that smart hotel ecosystems in

developing tourism destinations frequently reproduce structural inequalities between internationally affiliated hotels and locally owned operators. Within the Batam context, these inequalities appear particularly visible due to the dependence on imported technologies and proprietary digital systems. The influence of global networks extends beyond technology implementation. P7 explained their role as accelerators:

> *"So in my opinion, smart hotels can not only follow the digitalization era, but also follow the era of modern development, adjusted to the existing market. Chain hotels in Batam are boosters… international brands set the standard, and others learn from them."* (P7)

International guests further reinforce these standards. P10 observed:

> *"In my opinion, smart hotels in Batam shouldn't just focus on showing off technology like robots or fancy gadgets what really matters is making things easier for guests. Simple things like faster check-in/check-out, reliable internet, and well-prepared MICE facilities make a big difference. Well, at least in Haris Barelang, in Turi, in Turi Resort, Nongsa point, Montigo. International guests expect seamless technology experience."* (P10)

These findings suggest that international hotel networks shape not only technology adoption patterns but also service expectations within the local hospitality industry. International guests indirectly reinforce smart hotel transformation by demanding seamless digital experiences, thereby increasing pressure on hotels to modernise operational systems and service delivery. From the researcher's perspective, this reflects how global tourism flows influence local technological expectations. Smart hotel implementation in Batam therefore becomes connected not only to organisational strategy but also to international market competitiveness and destination image formation. Government officers warned that global standards sometimes clash with local capacity. P8 pointed out:

> *"So you don't have to ask the staff anymore. Sometimes if there are too many guests, one or two staff, can only handle a few people but if the guests are crowded, it automatically needs a lot of employees with smart hotel. Technology from outside is good, but it's expensive and needs skilled people to maintain."* (P8)

Participants also noted dependency on foreign vendors. P2 described high costs imposed by proprietary systems:

> *"Opera is super expensive… controlled by chain hotels… we can't afford them anymore. Their hotel chains use Opera because they invite their American*

*companies. So they don't care; they use it. There are many owners. So we can't compete with them. So we can play in independent hotels."* (P2)

The dependency on foreign technologies and proprietary systems demonstrates that smart hotel implementation in Batam is embedded within broader global technological and economic structures. Existing studies similarly suggest that dependence on external vendors may create long-term operational vulnerabilities, particularly for hotels operating in resource-constrained environments (Chen et al., 2025; Hassan & Eassa, 2025). The researcher interprets these findings as evidence that smart hotel transformation is not merely a technological issue, but also a question of technological control, affordability, and institutional dependency. While international hotel networks accelerate digitalisation, they may simultaneously widen the technological gap between global chains and local independent operators.

Beyond technology implementation, international hotel networks were perceived as shaping expectations of service quality and guest experience. International guests were described as reinforcing these standards by expecting seamless digital services such as fast check-in, reliable connectivity, and integrated facilities. However, participants also highlighted dependency on foreign vendors and the high costs of proprietary systems. This dependency further entrenches inequality between global-network hotels and local operators.

Conceptually, this subtheme represents a form of network-driven and externally governed digitalisation in which international hotel chains function as technological gatekeepers within the hospitality ecosystem in Batam. Smart hotel implementation therefore emerges as a top-down transformation process shaped primarily by global corporate standards, imported technologies, and international market expectations rather than locally generated innovation capacity. The findings further indicate that organisational affiliation significantly determines access to technological infrastructure, operational knowledge, and implementation capability. While international networks accelerate digital transformation for affiliated hotels, they simultaneously reinforce structural inequalities between global chains and local independent operators. Consequently, the smart hotel ecosystem in Batam develops unevenly, reflecting broader socio-technical and institutional asymmetries within emerging tourism destinations.

## 4.8 Theme 2: Expected Benefits

This theme addresses the second research question concerning stakeholders' perceptions of the benefits associated with smart hotel implementation in Batam. Both hotel managers and government officers acknowledge the potential advantages of smart technologies. However, their interpretations differ in terms of scale, strategic orientation, and expected outcomes. These differences reflect distinct managerial and institutional logics that shape how value is constructed and prioritised.

From a managerial logic perspective, the benefits of smart hotel implementation are primarily framed in terms of operational efficiency and enhanced guest satisfaction. Managers emphasise tangible improvements such as faster service delivery, streamlined check-in processes, reduced staff workload, and more efficient energy management. Smart technologies are also associated with improved customer experience through greater convenience and personalisation, responding to guests' rising expectations for technology-enabled services. However, these benefits are largely assessed through a cost benefit lens, prioritising outcomes that directly support revenue generation, cost reduction, and brand competitiveness.

Overall, managers construct smart hotel benefits as firm-level advantages, with limited attention to destination-wide or systemic impacts unless they produce immediate business returns, reflecting a short-term performance and sustainability orientation. In contrast, government officers frame the benefits of smart hotel implementation through an institutional logic that prioritises destination competitiveness, economic development, and governance improvement. Smart hotels are viewed as contributors to a broader tourism ecosystem by enhancing destination attractiveness, enabling data-driven planning, and strengthening Batam's position in regional and international markets. Government participants emphasise spillover effects such as increased tourist arrivals, longer stays, improved destination branding, and better coordination between public and private stakeholders through integrated information sharing.

Adopting a long-term perspective, these benefits are framed as collective and strategic, supporting sustainable tourism growth and institutional capacity building beyond individual hotels. The contrast between managerial and institutional interpretations reveals a divergence between firm-level and system-level constructions of value. While hotel managers prioritise benefits that directly affect operational

performance and guest satisfaction, government officers emphasise collective outcomes related to destination development and economic growth. This divergence shapes expectations regarding investment priorities and success indicators, contributing to differing assessments of smart hotel effectiveness. The different perspectives support the distinct implementation patterns identified in hotels in Batam, which are further detailed in the subsequent subthemes.

### 4.8.1 Subtheme 1: Operational Efficiency

Subtheme 1 examines operational efficiency and cost reduction as the most significant expected benefits of smart hotel implementation in Batam. Participants from both hotel management and government consistently framed efficiency as the primary justification for implementing smart technologies. Automation, system integration, and digital workflows were perceived as mechanisms to streamline operations and reduce human dependency. This subtheme analyses how these expectations shape managerial decision-making and policy perspectives.

This subtheme conceptualises operational efficiency and cost reduction as anticipated managerial benefits of smart hotel implementation rather than purely technical outcomes. Efficiency is understood as the optimisation of workflows, labour deployment, and service coordination through digital systems. Cost reduction is framed as a long-term consequence of sustained efficiency rather than immediate financial savings. These expectations strongly influence how participants justify investment in smart technologies.

Throughout the interviews, participants consistently identified efficiency as the most tangible and immediate benefit of smart hotel technologies. Automation and system integration were described as reducing manual labour, minimising operational errors, and accelerating routine processes. Hotel managers emphasised improvements in speed and accuracy in daily operations. Government officers similarly viewed efficiency as a foundational requirement for tourism sector competitiveness.

This pattern suggests that efficiency is interpreted pragmatically, grounded in everyday operational challenges rather than abstract innovation goals. Smart technologies are perceived as tools that stabilise operations and reduce dependency on human labour for repetitive tasks. Cost reduction is therefore seen as an indirect

outcome of improved efficiency and error minimisation. Efficiency becomes a managerial rationale for incremental digital implementation.

Hotel managers described how integrated systems simplify tasks such as billing, room allocation, and energy management. Participants highlighted that automation allows hotels, particularly budget and capsule hotels, to operate with fewer staff without compromising service quality. Government officers linked operational efficiency to smoother service delivery and improved destination reputation. These accounts illustrate how efficiency is experienced as both operational relief and strategic advantage. P2 explained the functional simplicity that technology provides:

> *"With digital systems, everything becomes faster, more accurate, and more efficient. But the key is that the operator must apply it correctly. They are good, but if you apply it wrong, it will be bad. And that's the system, not human's fault. The system is the system. It's faster, more accurate, faster, it doesn't hurt. No need to rest."* (P2)

This sentiment captures the dual nature of efficiency: technology brings speed, but human competence influences its effectiveness. P5 reinforced this by emphasising that smart systems reduce redundancy:

> *"Smart systems help us avoid repetitive manual work. Once the system is integrated, one action solves many tasks at once. Reduce the feeling of boredom, thirst, wanting to know. Because at the moment, the reception needs. We stand, wait for the room, blah blah blah. But with the smart technology, it's easier, faster. So people are satisfied. So technology actually helps."* (P5)

These findings suggest that participants primarily associate smart hotel implementation with operational practicality rather than technological sophistication. The emphasis on speed, accuracy, and reduction of repetitive tasks indicates that stakeholders value smart technologies mainly for their immediate operational benefits. The researcher interprets this as evidence that hotels in Batam adopt smart technologies cautiously and selectively, prioritising systems that directly improve workflow efficiency and reduce operational burden rather than pursuing comprehensive digital transformation. This finding aligns with Kumar and Sharma (2026), who argued that hotels in emerging tourism destinations tend to implement technologies incrementally due to financial and organisational limitations. Similarly, Wong and Loo (2026) noted that operational efficiency often becomes the primary justification for smart hotel adoption in resource-constrained hospitality environments. Managers also observed that

automation enables hotels to reduce labour requirements without compromising service. P3 provided a clear example based on operational realities:

> *"Capsule and budget hotels are the most suitable for automation because they operate with minimal staff. Efficiency is their core model. But if this is applied from the economic brand's point of view, which is hotels, let's say hotel budget, this can be successful because investment, employees, meaning when he operates it, it should be 20 employees, maybe only 10, so in terms of saving, he is quite high."* (P3)

The findings also reveal that automation is perceived differently across hotel categories. Budget and capsule hotels are viewed as more adaptable to automation due to their operational structure and lower dependency on personalised service interaction. This indicates that implementation readiness is strongly influenced by business model orientation and labour configuration. From the researcher's perspective, this reflects a pragmatic implementation logic in which hotels evaluate smart technologies based on labour efficiency and operational sustainability rather than innovation prestige alone. This finding supports López-Bonilla et al. (2025), who emphasised that organisational structure significantly shapes digital transformation strategies within hospitality businesses. Meanwhile, government officers highlighted the broader implications of efficiency for destination competitiveness. P9 framed efficiency as a strategic necessity:

> *"Efficiency is important for the hospitality sector if Batam wants to compete internationally. Digital processes make operations smoother and more reliable. The implementation of smart hotel technology in Batam is a transformational step whose benefits are not only economic and technological, but also support sustainable development, encourage the digitalization of the tourism sector, and strengthen Batam's position as a regional smart tourism hub."* (P9)

Some participants emphasised that efficiency gains also reduce long-term operational costs. P1 described the financial impact of integrated systems:

> *"When everything is integrated billing, keyless systems, lighting, air conditioning it reduces electricity usage and operational errors. That means real cost savings. And that will be our unique selling point. Operational wise, this will also increase efficiency."* (P1)

Unlike hotel managers who focused on internal operational efficiency, government officers framed efficiency within broader destination competitiveness and tourism development objectives. This divergence indicates that stakeholders interpret smart hotel implementation according to their institutional roles and strategic priorities.

The researcher interprets this as evidence that smart hotel transformation in Batam is not merely an organisational issue but also part of a wider regional development agenda associated with smart tourism positioning and digital competitiveness. P10 strengthened this argument by drawing attention to time efficiency:

> *"Yes, the benefits are the user is easier. So, if from the hotel side it's already helpful. I think the real benefit of smart hotels in Batam is making things simpler for guests. Faster check-in, fewer mistakes, fewer manual entries those are tangible efficiencies that save cost and staff time."* (P10)

Participants consistently linked operational efficiency with long-term financial sustainability rather than immediate profit generation. Cost reduction was described as emerging gradually through energy optimisation, reduced operational errors, and time efficiency. These findings suggest that stakeholders perceive smart hotel investment as a long-term strategic adjustment rather than a short-term technological trend. This finding supports Soliman et al. (2025), who found that hotels frequently justify smart technology investments through anticipated long-term operational savings and service optimisation rather than direct revenue increase. Participants also recognised that smart hotel systems provide deeper managerial control through monitoring and analytics. P7 explained:

> *"Technology gives us visibility. We can monitor energy consumption, staff performance, and occupancy patterns in real time. That helps management make decisions faster. When we have adjusted to the existing market, the existing demand, the existing inquiry, or what can be said about the smart hotel earlier, we don't need to advertise the goods anymore to guide the guests. So it's enough for him to stay here, he feels the experience is good, he will tell his family, his siblings, too."* (P7)

The findings further indicate that participants associate smart technologies with improved managerial visibility and data-driven decision making. Real-time monitoring systems were perceived not only as operational tools but also as mechanisms for enhancing managerial responsiveness and strategic control. From the researcher's perspective, this reflects an emerging transition from reactive management practices toward more data-oriented operational governance within Batam's hospitality sector. However, the findings also imply that the effectiveness of such systems remains dependent on organisational capability and human adaptability. Finally, government officials stressed that efficiency gains will accumulate over time:

*"Smart implementation brings long-term benefits. At the beginning there may be investment costs, but later the operational savings become significant. So if simplified, what is a smart hotel? A smart hotel, a seamless hotel, a sustainable hotel. Smart means that people come before they come, when they come, and when they leave the hotel, everything is personalized."* (P12)

Participants associated efficiency to improved management control and decision-making ability in addition to immediate operational benefits. Real-time monitoring of energy use, occupancy, and staff performance enables faster and more informed decisions. However, it was stated that personnel competency and proper system utilisation were requirements for efficiency benefits. Without adequate human capacity, technology alone does not guarantee cost reduction.

Conceptually, this subtheme represents efficiency-driven managerial rationalisation, where smart technologies are implemented to streamline operations and optimise resource use. Cost reduction is framed as a cumulative effect rather than a primary motivation. This reflects a cautious and pragmatic orientation toward smart hotel implementation. Efficiency thus functions as a foundational, but not transformative, benefit within Batam's smart hotel route. The findings reinforce previous studies suggesting that operational efficiency frequently becomes the initial driver of smart hotel implementation in emerging tourism destinations (Kumar & Sharma, 2026; Wong & Loo, 2026). However, unlike studies conducted in technologically advanced destinations where smart hotels are associated with full digital ecosystem integration, participants in Batam predominantly viewed smart technologies through operational and cost-efficiency perspectives. These findings imply that contextual limitations continue to shape how smart hotel transformation is interpreted and implemented within developing hospitality environments.

### 4.8.2 Subtheme 2: Enhanced Guest Experience

Subtheme 2 examines enhanced guest experience as a key expected benefit of smart hotel implementation in Batam. Participants consistently framed guest satisfaction as the ultimate indicator of successful digitalisation. Faster service, seamless processes, and personalised interactions were perceived as central to meeting the expectations of increasingly tech-savvy and international guests. This subtheme

analyses how technology-mediated experiences shape both managerial strategies and destination competitiveness.

This subtheme conceptualises enhanced guest experience as an experiential and relational outcome of smart hotel implementation rather than a purely technological benefit. Guest experience is understood as the perceived ease, comfort, and responsiveness of service encounters enabled by digital systems. Smart technologies are framed as mediating tools that shape how guests interact with hotel services. These perceptions guide how stakeholders assess the value of smart hotel initiatives.

Throughout the interviews, participants consistently identified guest experience as a central justification for adopting smart technologies. Hotel managers emphasised faster service, smoother processes, and personalised interactions as key benefits. International guests were frequently described as having higher expectations for digital convenience. Government officers similarly linked guest experience to destination competitiveness.

This pattern suggests that enhanced guest experience is interpreted pragmatically through everyday service interactions. Smart technologies are valued for reducing waiting time, repetition, and service friction. Experience improvement is therefore associated with simplicity and reliability rather than technological novelty. Guests perceive value when technology makes their stay easier and more predictable.

Participants described how digital communication before arrival enables hotels to personalise services in advance. Automated check-in, integrated booking systems, and digital room controls were cited as improving comfort and convenience. Managers noted that guests respond positively when systems anticipate their needs. This perspective illustrates how experience enhancement is embedded in service flow rather than isolated features. P1 noted:

> *"One is, the main benefit for us, actually, and for management and for guests. The first is that our service is faster, more practical, and with the presence of communication before they come, we can finally provide personalized service. Guests today expect convenience fast check-in, fast responses, and seamless service. Smart systems help us meet those expectations."* (P1)

These findings suggest that hotel managers in Batam perceive smart technologies primarily as tools for improving service responsiveness and operational convenience rather than as purely technological innovations. The emphasis on faster responses and personalised interactions reflects a practical understanding of

digitalisation that is closely tied to guest expectations and service efficiency. This finding indicates that smart hotel implementation in Batam is strongly shaped by operational pragmatism, where hotels prioritise technologies capable of delivering immediate service improvements, operational efficiency, and customer satisfaction rather than pursuing comprehensive technological transformation requiring substantial organisational restructuring. Hotels appear to prioritise technologies that directly improve guest-facing services and reduce operational friction instead of pursuing complex technological integration for its own sake. This finding aligns with Soliman et al. (2025), who argued that hospitality organisations in emerging tourism destinations tend to adopt smart technologies incrementally based on immediate operational value and customer service outcomes. Managers also observed that international guests, especially from Singapore and Malaysia, demand high service standards. P7 described this market pressure clearly:

> *"The Batam market is unique because many of our guests come from Singapore and Malaysia. They expect everything to be quick and seamless. So, it's enough for him to stay here, he feels the experience is good, he will tell his family, his siblings, too. Well, it's a tradition that finally became a repeater."* (P7)

The findings further indicate that international market expectations significantly influence how hotels in Batam approach service digitalisation. Participants consistently associated smart hotel technologies with competitiveness within the regional tourism market, particularly due to Batam's proximity to Singapore and Malaysia. This reflects that smart hotel implementation in Batam is shaped by the interaction between internal organisational objectives and external market pressures. While hotels pursue smart technologies to improve operational efficiency and service responsiveness, implementation is simultaneously influenced by regional tourism competition, cross-border visitor expectations, and the strategic need to maintain market relevance within an increasingly digital hospitality environment. Batam's geographical position therefore creates a distinctive competitive setting in which hotels are exposed to international service standards and increasing expectations for digitally enabled hospitality experiences.

This contextual dynamic helps explain why operational efficiency and enhanced guest experience emerged as the two dominant expected benefits in this study. Rather than viewing smart technologies primarily as symbols of innovation, stakeholders tend to evaluate them according to their ability to deliver tangible operational improvements

and immediate service value. This finding suggests that the perceived benefits of smart hotel implementation are not universally defined but are shaped by destination-specific market conditions and competitive pressures. In Batam, smart hotel technologies are valued largely because they support organisational competitiveness and service responsiveness within a rapidly evolving regional tourism environment. Government officers shared similar views, highlighting that guest expectations drive hotels to adopt technology. P9 explained:

> *"The implementation of smart hotel technology in Batam is a transformational step whose benefits are not only economic and technological, but also support sustainable development, encourage the digitalization of the tourism sector, and strengthen Batam's position as a regional smart tourism hub. International tourists want services that are fast, seamless, and digital-based. If hotels cannot provide that, guests simply choose other destinations."* (P9)

Government officers framed smart hotel implementation as part of a broader destination competitiveness strategy because digital hospitality services were increasingly perceived as essential components of regional tourism attractiveness, visitor retention, and smart tourism ecosystem development. The findings indicate that digital hospitality services increasingly function as strategic instruments for strengthening destination competitiveness, improving tourist retention, and supporting the broader integration of smart tourism ecosystems within regional tourism markets. This finding supports Ashfaq et al. (2025), who argued that smart hospitality development increasingly functions as part of integrated smart tourism strategies within competitive regional tourism environments. However, the findings also demonstrate that institutional expectations for digital transformation frequently exceed the organisational, financial, and technological capabilities currently available among many hotels in Batam, creating tension between strategic digital ambitions and practical implementation readiness. Participants also emphasised the role of digital features in enhancing comfort and convenience. P6 illustrated this through examples:

> *"Of course, the hotel must be really make sure everything is really integrated or the system that is made will really please the guests. So, when we have booked the hotel, it's already direct. A real smart hotel makes everything easy for the guest from check-in to controlling the room features. That creates a better experience."* (P6)

Some managers emphasised the emotional dimension of guest satisfaction. P3 stated:

*"If we play half and half, the customer will not see it as an edge on service. So for them it's just a part of the facility, part of the property. Smart features improve the guest experience because they feel taken care of even before they ask. That is what creates satisfaction."* (P3)

P10 highlighted the importance of removing friction points:

*"What matters most is removing friction. When guests do not have to wait or repeat information, their satisfaction increases immediately. For me, smart technology should anticipate what guests need, not just look fancy. Yes, the benefits are the user is easier"* (P10)

Across multiple participant accounts, guest satisfaction was consistently associated with the reduction of service friction and the anticipation of guest needs. Participants did not define smartness through technological sophistication alone, but through the extent to which technologies simplified guest experiences and created emotional reassurance. The researcher interprets these findings as indicating that stakeholders in Batam conceptualise smart hospitality relationally rather than technologically. In other words, technology is perceived as valuable only when it strengthens comfort, convenience, and emotional satisfaction during the guest journey. This reflects service-dominant perspectives in hospitality literature, where technological systems are evaluated based on experiential outcomes rather than technological novelty alone (Hassan & Eassa, 2025). However, several participants warned that technology should support, not replace, hospitality values. P11 expressed this with depth:

*"Obviously, with the development of technology like this, using applications that are already available on smartphones or in existing technologies, it will be easier. Technology must strengthen hospitality, not remove it. The human touch is still the highest value in tourism. However, at a certain corner, a certain angle, people are still needed."* (P11)

An important pattern emerging from the interviews is the continued emphasis on human interaction despite increasing support for digitalisation. Several participants expressed concern that excessive automation could weaken the hospitality values traditionally associated with tourism experiences. This demonstrates that stakeholders do not perceive technology and hospitality as mutually exclusive dimensions. Instead, participants viewed successful smart hotel implementation as dependent on balancing digital efficiency with human warmth and personalised interaction. The researcher

interprets this finding as evidence of socio-technical negotiation, where technological transformation remains constrained by cultural expectations surrounding hospitality and service authenticity. This finding also contrasts with highly technology-oriented smart hotel models commonly discussed in technologically advanced destinations, where automation is frequently prioritised over interpersonal interaction (Kim et al., 2025). In the Batam context, however, hospitality remains strongly associated with human presence and emotional connection. Finally, government officials viewed enhanced guest experience as part of a larger strategy to position Batam within the regional tourism market. P12 summarised this vision:

> *"Smart services make guests more comfortable and confident in choosing Batam. That is essential for increasing return visits. Therefore, the need to transform and build smart hotels is not a choice, but a kind of trust supported by the Batam strategy that is very close to the market country, cross-border, whose demography. In 2019, we could already claim that 57% of the wisman population who entered Indonesia were digital savvy."* (P12)

The findings demonstrate that enhanced guest experience is perceived not only as an operational outcome, but also as a strategic mechanism for strengthening Batam's regional tourism competitiveness. Government participants consistently linked guest satisfaction, return visits, and digital convenience with broader tourism positioning strategies. From the researcher's perspective, this indicates that smart hotel implementation in Batam is increasingly embedded within wider smart tourism and destination branding ambitions. Smart hospitality services are therefore interpreted as part of a larger transformation agenda aimed at enhancing Batam's image as a modern and digitally responsive tourism destination.

Participants emphasised the emotional aspect of guest satisfaction in addition to practical convenience. Smart technologies were perceived as creating a sense of being cared for when services feel seamless and anticipatory. However, several participants cautioned that technology should not overshadow human interaction. Experience enhancement depends on technology complementing, rather than replacing, hospitality values.

Conceptually, this subtheme represents experience-oriented digital facilitation, where smart technologies are valued primarily for their ability to simplify service interactions, reduce operational friction, and enhance emotional reassurance during the guest journey. The findings demonstrate that stakeholders in Batam do not interpret

smart hospitality solely through technological sophistication, but through the extent to which technologies improve comfort, convenience, responsiveness, and personalised care. Importantly, the findings also reveal that participants continue to prioritise human interaction as a fundamental component of hospitality experiences. Technology is therefore expected to complement rather than replace interpersonal service values. This indicates that smart hotel implementation in Batam reflects a socio-technical balancing process between digital efficiency and hospitality authenticity. The researcher interprets these findings as evidence that smart hotel transformation in emerging tourism destinations is highly contextual and relational. Rather than pursuing full automation, stakeholders appear to favour pragmatic and guest-centred digitalisation strategies that align with operational realities, cultural expectations, and regional tourism competitiveness.

## 4.9 Theme 3: Implementation Challenges

This theme addresses the fourth research question concerning the challenges associated with smart hotel implementation in Batam. Stakeholders identify a range of constraints that affect the implementation of smart hotel initiatives. However, these challenges are interpreted differently by hotel managers and government officers. Such differences reflect distinct emphases and underlying assumptions shaping their perspectives.

Hotel managers predominantly frame implementation challenges in terms of financial risk, technical complexity, and human resource limitations. High upfront investment costs, maintenance expenses, and uncertainty regarding return on investment are repeatedly highlighted as major barriers. Additionally, limited staff expertise and resistance to change further constrain implementation capacity. Managers often perceive these challenges as immediate and operational, requiring cautious decision-making and incremental implementation strategies. This reinforces an uncertain orientation that prioritises stability over experimentation.

While government officers interpret challenges through an institutional lens, focusing on coordination failures, regulatory gaps, and infrastructure readiness. Challenges are often attributed to fragmented governance structures, limited inter-agency collaboration, and uneven digital infrastructure development. Rather than

viewing financial constraints as primary barriers, government officers emphasise the need for policy alignment, standardisation, and long-term planning to enable effective implementation.

These findings demonstrate that smart hotel implementation challenges in Batam are multidimensional and interconnected across organisational, financial, technological, and institutional dimensions. Managers primarily emphasise operational constraints involving financial risk, workforce limitations, and implementation uncertainty, while government officers focus more strongly on structural barriers involving policy coordination, infrastructure readiness, and governance support. These interconnected barriers collectively slow implementation progress because financial caution, workforce uncertainty, technological adaptation difficulties, and institutional inconsistency reinforce one another throughout the transformation process. The distinct interpretations inform the particular implementation patterns identified in hotels in Batam, which are further detailed in the subsequent subthemes.

### 4.9.1 Subtheme 1: Financial Constraints

Subtheme 1 examines financial constraints as a major challenge to smart hotel implementation in Batam. Participants consistently identified high investment costs and economic risks as the primary barriers to digital transformation. Both hotel managers and government officers emphasised that financial capacity strongly shapes adoption decisions. This subtheme analyses how cost structures and risk perceptions influence uneven implementation.

This subtheme conceptualises financial constraints as a structural barrier to smart hotel implementation rather than a short-term managerial issue. High investment costs and economic risks shape how hotels evaluate the feasibility of digital transformation. Smart hotel technologies are perceived as capital-intensive and financially uncertain. These perceptions significantly influence adoption decisions across hotel categories.

Throughout the interviews, participants consistently identified financial barriers as the most critical implementation challenge. Managers emphasised high upfront costs, long return-on-investment periods, and reliance on expensive foreign technologies. Government officers similarly recognised that financial limitations differentiate

international chain hotels from local independent operators. This pattern highlights unequal access to smart technologies. This pattern suggests that financial risk is interpreted as a deterrent to deep digital transformation. Hotels prioritise financial survival over technological ambition, especially in uncertain market conditions. Smart hotel implementation is therefore evaluated through a risk-management lens rather than innovation-driven logic. Cost considerations become a dominant factor shaping implementation pace and scope.

These findings suggest that financial considerations dominate technological decision-making among hotels in Batam because substantial technological investment is frequently perceived as financially risky within a hospitality environment characterised by uncertain returns, fluctuating tourism demand, and uneven internal capability. Rather than viewing smart hotel implementation as a strategic innovation opportunity, many hotels interpret digital transformation through a risk-management perspective focused on financial sustainability and operational survival. This indicates that smart hotel transformation in Batam remains strongly shaped by economic caution, investment uncertainty, and limited implementation capability across different hotel categories. Hotels appear more inclined to adopt technologies incrementally when immediate operational benefits are visible and financially manageable. This finding supports Kumar and Sharma (2026), who argued that hotels in emerging tourism destinations frequently prioritise short-term operational stability over large-scale technological transformation due to financial uncertainty and resource limitations. Similarly, Wong and Loo (2026) found that smart hotel adoption often develops unevenly because implementation decisions are shaped by cost sensitivity and perceived investment risks.

Participants described smart hotel systems as costly not only in terms of software, but also hardware integration and staff training. Managers noted that technology requires continuous maintenance, upgrades, and skilled personnel. Government officers observed that only hotels with strong financial backing can absorb these costs. This perspective illustrates how investment burdens accumulate beyond initial installation. P2 offered a direct assessment:

> *"Smart hotel systems are very expensive. For example, Opera is extremely costly because only chain hotels control it, and we cannot afford it anymore. It's still very expensive to do this now. It's not cheap. If it were cheap, everyone would do it."* (P2)

P2's statement reflects how smart technologies are perceived not merely as operational tools, but as financially exclusive systems associated with international hotel chains and large-scale capital investment. The emphasis on affordability demonstrates how financial capability determines access to technological transformation within the hospitality industry. This finding indicates that smart hotel implementation in Batam remains structurally unequal, where financially stronger hotels possess greater technological flexibility compared to smaller independent operators. Cost concerns extend beyond software. P1 highlighted the financial burden of integrated hardware:

> *"Smart lighting, automation, keyless systems… Installing the technology isn't enough. You need to spend a lot of money on training employees who might be tech-averse. Everything becomes expensive when you want them integrated."* (P1)

Beyond hardware installation, participants highlighted the hidden organisational costs associated with digital transformation, particularly employee training and technological adaptation. This demonstrates that implementation challenges extend beyond purchasing technology and involve broader organisational transformation processes. The researcher interprets this as evidence that hotels perceive smart hotel implementation as a complex socio-technical transition requiring continuous operational adjustment rather than a one-time technological upgrade. Several managers explained that digital transformation requires investment not only in systems, but also in infrastructure upgrades, maintenance contracts, and skilled IT personnel. P6 framed the challenge holistically:

> *"Because if we really want to, what is it called, to be creative or the hotel that is really a smart hotel must have to have what is the name of support for all of them. Technology is not a one-time purchase. It needs constant updates, maintenance, and people who understand it. That is where the cost becomes overwhelming. Because all smart hotels will be supported by equipment or tools that are really amazing."* (P6)

P6's explanation demonstrates that participants understand smart hotel technologies as ongoing operational commitments involving maintenance, upgrades, and specialised expertise. The recurring emphasis on continuous technological support reflects concerns regarding long-term sustainability rather than initial implementation alone. This finding aligns with Hassan and Eassa (2025), who noted that hospitality organisations frequently underestimate the long-term organisational and technical

demands associated with smart technology ecosystems. Government officers confirmed that financial disparities shape digital adoption across hotel categories. P9 observed:

> *"International hotel chains can invest because they have network support, but local hotels operate on tight budgets. This creates unequal implementation. Implementing a smart hotel requires a significant upfront investment in equipment, systems, training, and maintenance. Small-scale hotels may struggle to finance this transformation without government or private partner support."* (P9)

Government officers consistently recognised that financial disparities contribute to unequal technological development across hotel categories in Batam. International hotel chains are perceived as having stronger policy coordination, broader financial networks, and greater implementation capability compared to local hotels. This highlights that smart hotel transformation in Batam is shaped not only by individual managerial decisions, but also by broader structural inequalities within the hospitality industry ecosystem. Some managers also noted that uncertain tourist demand in Batam increases financial risk. P5 explained:

> *"Investment becomes risky because the tourism market fluctuates, and hotels cannot guarantee a quick return. At present, the adoption of integrated smart hotel technologies remains largely confined to established hotel brands. In practice, only a limited number of higher-tier hotels primarily three-star and above have implemented such system-connected smart hotel features, and even then, adoption is partial rather than comprehensive."* (P5)

The findings indicate that unstable tourism demand intensifies implementation uncertainty among hotel operators. Economic volatility reduces managerial confidence toward large-scale technological investment, particularly when implementation outcomes and financial returns remain unpredictable. From the researcher's perspective, fluctuating tourism conditions reinforce cautious implementation behaviour and encourage hotels to prioritise incremental modernisation rather than comprehensive digital transformation. Several participants emphasised that economic conditions push hotels to prioritise visible modernisation rather than deep digitalisation.

This finding may be particularly relevant to Batam because the city's tourism sector remains highly sensitive to regional economic conditions and cross-border travel flows. Unlike more mature tourism destinations with diversified visitor markets, Batam relies heavily on regional arrivals and short-duration visits. Such market volatility increases uncertainty regarding the long-term financial returns of smart hotel

investments, thereby reinforcing risk-averse decision-making and encouraging hotels to pursue gradual technological upgrades rather than comprehensive digital transformation. P4 captured this pragmatic reasoning:

> *"For the development itself, for now, it is not too significant for Batam. Because it is definitely limited to budget and cost. Most hotels focus on modernization because it is cheaper and more visible. Smart transformation requires long-term investment."* (P4)

P4's statement reveals an important distinction between modernisation and digital transformation. Participants frequently associated visible physical improvements with lower financial risk and faster customer recognition, whereas smart hotel transformation was perceived as more expensive, less visible, and operationally uncertain. This finding suggests that many hotels in Batam continue to prioritise surface-level innovation over deeper technological integration due to practical financial considerations. Government officers highlighted the broader economic risk:

> *"First there is still a stigma that is built in the hotel industry, when it will transform into a smart hotel, it is high cost. The stigma is built, it is still built, it is high cost. Hotels must carefully consider economic volatility before adopting expensive technology. Not all hotels have the resilience for that."* (P12)

Government officers highlighted that perceptions surrounding high implementation costs have become institutionalised within the local hotel industry. This indicates that financial barriers are not only material constraints but also psychological and strategic barriers influencing managerial attitudes toward technological adoption. The persistence of this stigma may contribute to slower digital transformation by reinforcing organisational hesitation and implementation conservatism. Finally, P7 explained that international chains adopt smart systems because headquarters cover implementation costs:

> *"If we don't have revenue, because one small hotel needs funds from several facilities, then the HR, as I said earlier, to be able to operate the small hotel itself. So, the HR, the revenue, facility, are the factors that become the main foundation of how to be. Chain hotels implement smart technology because the brand standard and the financial support come from the network."* (P7)

P7 further reinforces the importance of institutional and financial backing in enabling smart hotel implementation. Chain hotels are perceived as having access to stronger financial ecosystems, implementation guidance, and standardised operational

support systems. This finding reflects how organisational networks and institutional affiliation significantly influence implementation capability within the hospitality sector. Financial constraints were further intensified by shifting tourism demand and economic limitations in Batam. Managers perceived uncertainty in visitor numbers as increasing investment risk and delaying implementation decisions. As a result, hotels often prioritised visible physical modernisation over deep digital integration. Smart transformation was viewed as a long-term commitment with uncertain payoff.

Across participant groups, financial constraints were consistently interpreted as the dominant barrier shaping implementation behaviour in Batam. Although both hotel managers and government officers recognised the importance of technological transformation, participants repeatedly prioritised financial sustainability and operational survival over rapid digitalisation. The convergence of these perspectives suggests that smart hotel implementation in Batam remains strongly conditioned by economic capability, investment confidence, and long-term operational uncertainty. Financial considerations therefore influence not only whether technologies are adopted, but also the scale, pace, and depth of implementation. Conceptually, this subtheme represents capital-intensive and risk-sensitive digital transformation, where financial capacity influences technological progress. High costs and economic uncertainty reinforce structural disparity between international chains and local hotels. Smart hotel implementation thus becomes uneven and selectively implemented. Financial constraints emerge as a systemic barrier delaying comprehensive transformation.

### 4.9.2 Subtheme 2: Human Resource Limitations

Subtheme 2 examines human resource limitations as a major challenge to smart hotel implementation in Batam. Participants consistently emphasised that digital technologies become ineffective without competent, stable, and motivated staff. Both hotel managers and government officers viewed HR readiness as a key determinant of implementation success. This subtheme analyses how competence, consistency, leadership, and training shape operational preparedness.

This subtheme conceptualises human resource limitations as a critical socio-organisational barrier to smart hotel implementation. HR challenges extend beyond staffing numbers to include competence, stability, leadership, and internal capability.

Smart technologies are rendered ineffective without skilled, consistent, and motivated personnel. Human resource readiness therefore becomes central to the success of digital transformation.

Throughout the interviews, participants consistently described HR constraints as more challenging than financial barriers. High staff turnover, uneven digital competence, and resistance to technology were frequently reported. Managers emphasised that digital systems fail when staff lack the skills or motivation to operate them. Government officers similarly viewed HR readiness as uneven across Batam's hotel sector.

This pattern suggests that smart hotel implementation is constrained by human capability rather than technological availability. Digital transformation requires behavioural change, learning continuity, and organisational alignment. Without stable and digitally competent staff, technology implementation becomes fragmented and unsustainable. HR limitations therefore slow down and dilute implementation outcomes. The researcher interprets these findings as evidence that smart hotel implementation in Batam is constrained more by organisational capability than by technological availability alone. Although smart technologies are increasingly accessible, their operational effectiveness depends heavily on the presence of stable, digitally competent, and adaptive employees. This finding reinforces socio-technical perspectives suggesting that technological transformation cannot succeed without parallel human and organisational readiness (Wong & Loo, 2026; Hassan & Eassa, 2025). Within the Batam context, HR instability appears to weaken implementation continuity and reduce the long-term sustainability of digital transformation initiatives.

Participants described frequent staff turnover as disrupting knowledge continuity and increasing training costs. Managers highlighted that new staff often need to relearn systems repeatedly, delaying operational stabilisation. Government officers noted wide disparities in digital readiness between hotels. These perspectives illustrate how instability undermines consistent technology use. P3 captured the instability clearly:

> *"I see only 5-6 years ahead. The emergency in Batam must be fixed in general from the human resources sector. Because it's hard to find a talented person in Batam. Staff turnover is high. We train them, and then they leave. This makes it hard to maintain consistency."* (P3)

P5 echoed this concern:

*"We have good systems, but without stable and competent staff, the system cannot run optimally. Even though someone is changing, but the person who can track the email from the past. Well, that's supporting from a system. If they don't exist, it will repeat again. One problem, again and again. That's the small example of the system."* (P5)

Government officers recognised the same pattern at a structural level. P11 explained:

*"I believe the real drivers for smart hotels in Batam are deep vendor partnerships and relentless staff training, not just the tech itself. The huge financial investment is a given, but the make-or-break factors are often overlooked. Human resource quality in the hospitality sector is still uneven. Digital readiness varies a lot between hotels."* (P11)

P7 emphasised the impact of instability on operations:

*"If we don't have revenue, because one small hotel needs funds from several facilities, then the SDM, as I said earlier, to be able to operate the small hotel itself. Every time there is turnover, the new staff have to relearn everything. That slows down digital adoption."* (P7)

This instability reduces the potential benefits of technology and creates additional training costs. These findings indicate that workforce instability disrupts knowledge continuity and weakens operational consistency during digital transformation processes. The repeated loss of trained employees forces hotels to continuously restart adaptation processes, thereby delaying implementation maturity and increasing organisational inefficiency. The researcher views this as a major structural barrier within Batam's hospitality sector, particularly for hotels operating with limited financial and managerial resources. This finding supports Kumar and Sharma (2026), who argued that high employee turnover significantly reduces technological implementation effectiveness in emerging tourism destinations. Similarly, López-Bonilla et al. (2025) noted that digital transformation requires long-term organisational learning and stable workforce capability to ensure implementation sustainability. Managers highlighted insufficient digital literacy as a major barrier. P2 described the adaptation gap:

*"Digital systems are efficient, but staff must operate them correctly. Without digital competence, the system becomes useless. If we depend on one person, the other person will run away. A lot of systems fail."* (P2)

P6 reinforced this point:

*"The factor that we really want to be a smart hotel, we have to look at the market, right? Our market is the generation, now it's the generation of Z, right? Not all staff understand digital tools. Some even avoid using them because they feel uncomfortable."* (P6)

Government officers also noted that many hotel employees lack exposure to advanced systems. P10 explained:

*"For me, smart hotels should still keep the human touch. The best approach is a balance, using technology where it helps, but keeping good hospitality at the centre. There is still a mindset problem. Some staff resist technology because they fear it will complicate their work."* (P10)

P9 highlighted the need for foundational digital skills:

*"Specific challenges often encountered in implementing smart hotels in Batam is limited human resources with technological skills. Many hotels, especially small to medium-sized ones, still face a shortage of personnel familiar with the operation and maintenance of digital systems. Training must focus on basic digital literacy first before hotels can introduce more advanced systems."* (P9)

P4 summarised the gap between expectations and capability:

*"The high cost of IoT systems, unreliable internet, and a lack of local technical expertise are the three biggest barriers holding back smart hotel development in Batam. We want to digitize, but our human resources are not ready."* (P4)

The convergence of participant views suggests that digital literacy remains uneven across Batam's hospitality sector, particularly among small and medium-sized hotels. Participants consistently associated implementation failure not with technological malfunction, but with insufficient employee competence, technological discomfort, and adaptation resistance. Insufficient employee digital competencies reduced organisational confidence toward large-scale technological transformation because hotels remained concerned about operational disruption, adaptation difficulties, and the long-term sustainability of technology-dependent service systems. This indicates that digital transformation in hospitality environments requires behavioural readiness in addition to technological infrastructure. From the researcher's perspective,

the findings demonstrate that technological investment alone is insufficient to achieve smart hotel transformation. Without foundational digital literacy and continuous employee adaptation, smart systems risk becoming underutilised or operationally ineffective. These findings align with Soliman et al. (2025), who argued that employee digital competence strongly influences implementation sustainability and service quality within smart hospitality environments. Participants emphasized that leadership influences the pace of digital implementation. P7 highlighted the role of vision:

> *"Budget ability of the the hotel or maybe the owner is convinced, that the challenge. As long as we can explain properly to the owner and the owner understands, there is no problem, sir. If the leadership does not have a clear digital vision, the staff will never prioritise technology."* (P7)

P1 added that leaders must also model adaptation:

> *"First, the biggest obstacle is owner buy-in. The second expense is personnel preparedness. Installing the technology isn't enough. You need to spend a lot of money on training employees who might be tech-averse. Managers must be the first to adopt technology. Staff follow what leaders do."* (P1)

Government officers echoed this by linking leadership to policy alignment. P12 noted:

> *"Batam must be brave to show off its smart energy application in the hotel industry. So smart energy may be started later on how the hotel industry begins to have collective enthusiasm from all the hotels in Batam for the application of green tourism by applying smart energy. Organisational culture must support innovation, otherwise digitalisation becomes only cosmetic."* (P12)

These findings suggest that leadership commitment functions as an important mediating factor influencing employee adaptation and internal capability for digital transformation. Participants consistently emphasised that staff motivation and technological prioritisation are strongly shaped by managerial attitudes and organisational culture. Leadership therefore influences not only strategic decision-making, but also the pace of behavioural adaptation within hotel operations. The researcher interprets this as evidence that smart hotel implementation in Batam remains leadership-dependent rather than system-driven. Hotels with proactive leaders appear more capable of encouraging innovation, sustaining training initiatives, and reducing employee resistance toward technology adoption. This finding supports socio-technical perspectives emphasising the importance of managerial alignment and organisational

culture during technological transformation processes (Hassan & Eassa, 2025; Wong & Loo, 2026).

Participants consistently stressed the need for continuous training. P3 said:

*"The service that is seen for the Batam market is still the service. quality, quality does not mean quality of the product, quality of the room, quality of the cleaning, quality of the food, that is still the main priority. Training should be continuous. Technology keeps changing, so training cannot stop."* (P3)

P5 connected training directly to performance:

*"People want to feel what a smart hotel is. Experience. Yes, experience. And also the ease of checking in. People want to know how to check in individually without having to go through a reception. Better training increases confidence, and confident staff provide better service."* (P5)

Government officers strengthened this argument. P11 explained:

*"In my tourism, there are personnel who have to stand at a certain angle to give a touch. This is the challenge. Motivated and well-trained staff innovate more. They find ways to maximise the technology."* (P11)

P10 added:

*"Training must be practical and consistent; otherwise the system becomes underused. Technology should make things easier, not just look fancy. If hotels combine smart features with great service and work with local attractions, Batam can stand out from Singapore and Malaysia as a modern, guest-friendly destination."* (P10)

The recurring emphasis on continuous training demonstrates that participants view learning adaptation as an ongoing organisational process rather than a one-time implementation activity. Rapid technological change requires employees to continuously update operational knowledge and digital competence to maintain service effectiveness. Participants also associated training with confidence, innovation capability, and service quality improvement. From the researcher's perspective, these findings indicate that training functions not merely as technical preparation, but as an organisational mechanism supporting long-term digital transformation sustainability. Continuous learning appears particularly important in emerging tourism destinations such as Batam, where digital capability gaps remain uneven across hotels. This finding is consistent with Chen et al. (2025), who argued that ongoing workforce development is essential for maintaining technological adaptability within smart hospitality

environments. Leadership and organisational culture were identified as key mediating factors shaping HR readiness. Participants emphasised that leaders must demonstrate digital commitment and prioritise training. Continuous learning and motivation were seen as essential for maintaining competence amid technological change. Without supportive leadership, digitalisation risks becoming superficial.

Conceptually, this subtheme represents capability-constrained and organisationally unprepared digital transformation, where human limitations restrict the operational potential of smart technologies. The findings demonstrate that competence, workforce stability, leadership commitment, and continuous training function as interconnected socio-organisational conditions shaping implementation sustainability. Smart hotel transformation therefore cannot be understood solely through technological readiness, as implementation outcomes are heavily influenced by employee adaptation, organisational culture, and managerial support. The researcher interprets these findings as evidence that human capability remains one of the most decisive determinants of smart hotel implementation in Batam. Financial investment and technological infrastructure alone are insufficient without parallel organisational learning and workforce preparedness. This reveals that sustainable smart hotel transformation in emerging tourism destinations requires simultaneous technological, behavioural, and organisational development.

### 4.9.3 Subtheme 3: Infrastructure Limitations

Subtheme 3 examines infrastructure limitations as a systemic challenge to smart hotel implementation in Batam. Participants consistently emphasised that network readiness, connectivity stability, and ecosystem support are critical enabling conditions. Both hotel managers and government officers highlighted that smart technologies fail without reliable infrastructure. This subtheme analyses how infrastructural constraints shape operational reliability and implementation feasibility.

This subtheme conceptualises infrastructure limitations as systemic constraints shaping the feasibility of smart hotel implementation. Infrastructure is understood not only as technological hardware, but also as network stability, digital readiness, and ecosystem support. Smart hotel technologies depend heavily on reliable connectivity

and supportive external systems. Without these conditions, digital transformation becomes unstable and inconsistent.

Throughout the interviews, participants consistently identified internet stability and network readiness as the most critical infrastructural barriers. Managers emphasised that smart systems collapse when connectivity is unreliable. Government officers acknowledged uneven digital infrastructure quality across Batam. These disparities limit the participation of smaller and peripheral hotels in smart transformation.

This pattern suggests that infrastructure functions as an enabling condition rather than a standalone investment. Smart hotel technologies are perceived as highly network-dependent and vulnerable to external disruptions. Connectivity failures undermine both operational reliability and guest experience. Infrastructure limitations therefore constrain the depth and consistency of digital implementation.

These findings suggest that infrastructure readiness is perceived not merely as a technical requirement, but as a foundational condition determining whether smart hotel systems can operate effectively and consistently. The strong emphasis on connectivity stability indicates that participants associate digital transformation with operational reliability rather than technological sophistication alone. The researcher interprets this as evidence that smart hotel implementation in Batam remains highly dependent on external ecosystem readiness, particularly internet quality and network consistency. Hotels may invest in smart technologies, but without stable digital infrastructure, the operational value of such technologies becomes significantly reduced. This finding supports Kumar and Sharma (2026), who argued that technological infrastructure is one of the primary determinants of successful smart hotel transformation in emerging tourism destinations. Similarly, Wong and Loo (2026) highlighted that unstable connectivity and uneven digital ecosystems frequently constrain the sustainability of hospitality digitalisation in developing tourism environments.

This finding may be particularly relevant to Batam because the city is simultaneously pursuing tourism expansion, economic development, and digital transformation. As hotels increasingly adopt technology-enabled services, the effectiveness of smart hotel implementation becomes closely tied to the reliability of supporting digital infrastructure. Participants nevertheless reported variations in connectivity quality and technological readiness across hotels. These conditions suggest that infrastructure challenges in Batam are not solely technical issues but also contextual

factors that influence how effectively hotels can implement and sustain smart technologies.

Participants described how unstable internet disrupts automated systems, slows operations, and frustrates guests. Managers noted that high bandwidth requirements and advanced hardware increase infrastructural costs. Government officers highlighted the need for city-level connectivity support to ensure equal access. These accounts illustrate the dependence of smart hotels on broader digital infrastructure. P1 described the dependency clearly:

> *"We are talking about technology, which is already certain, yes, for First, because we use an online system, the application must be strong with bandwidth. And actually Batam is safe from the internet side. Smart hotels rely on stable internet. If the network drops, everything collapses the system becomes stuck."* (P1)

P6 provided similar insights:

> *"Connectivity is the biggest problem. Without stable internet, digital systems cannot function. And they can also depend on the cost that we will pay to support the internet. Because the guests are also very, very, very high. The internet is now must."* (P6)

Government officers highlighted the wider digital infrastructure gap. P9 stated:

> *"Batam's technological infrastructure is showing positive progress, but equal access and improved connection quality are still needed so that all regions, including new tourist destinations and small and medium-sized hotels in areas far from the city centre, can participate in the transformation towards smart hotels. Hotels cannot be smart if network stability is not guaranteed at the city level."* (P9)

P10 explained how connectivity affects service:

> *"Batam's infrastructure is already strong, with wide roads, plenty of fibre optic networks, and even 5G coverage. This creates a good foundation for smart hotel adoption, the technology side is ready, so it's now up to hotels to invest and use it to improve guest experience. Guests expect fast internet as a basic need. If the network is slow, the whole digital experience is ruined."* (P10)

The convergence of participant views indicates that internet connectivity is no longer perceived as a supplementary hotel facility, but as a core component of guest experience and operational performance. Participants consistently linked network quality with customer satisfaction, automated service reliability, and overall perceptions of hotel quality. From the researcher's perspective, this reflects changing hospitality

expectations within digitally oriented tourism markets, where guests increasingly evaluate hotels based on technological responsiveness and digital convenience. The findings therefore suggest that infrastructure limitations directly influence both operational efficiency and competitive positioning within the hospitality sector. This finding aligns with Hsu (2025), who found that digital responsiveness and seamless connectivity have become critical dimensions of contemporary hospitality experiences. However, unlike highly developed tourism destinations where infrastructure readiness is often assumed, participants in Batam described connectivity as an ongoing operational concern requiring continuous adaptation and investment.

Digital Infrastructure Capacity and Technological Readiness. Several managers commented on the limitations of local technological capacity. P7 explained:

> *"Factor from the facility itself. The facility is in the meaning of the hotel itself. Because if we talk about this smart hotel, there is not a cheap price. All of these are amazing budgets. Some systems require high bandwidth and better hardware. Many hotels do not have that infrastructure."* (P7)

P4 emphasised the dependency on external vendors:

> *"We depend on vendors for upgrades, but sometimes they are slow or too expensive. When the bandwidth is small, it will automatically affect and will be slow, we will slow down the connection. That will also affect the guests later, so the guests will come to us."* (P4)

These findings reveal that technological readiness is influenced not only by internal hotel capability, but also by dependence on external technology providers and vendor responsiveness. Participants described smart hotel implementation as vulnerable to delays, infrastructure incompatibility, and vendor-related limitations. The researcher interprets this dependency as an indication that smaller and medium-sized hotels in Batam may lack sufficient internal technological infrastructure to independently manage digital transformation processes. Consequently, smart hotel implementation becomes heavily reliant on external ecosystem actors, increasing implementation uncertainty and operational vulnerability. This finding supports López-Bonilla et al. (2025), who argued that technological dependency and limited organisational capability frequently constrain hospitality digitalisation in emerging tourism destinations. Government officers connected technological readiness with broader digital transformation efforts. P11 noted:

*"Digital infrastructure in hotels must be aligned with the city's smart ecosystem. Otherwise, adoption remains partial. We risk creating a cold, transactional environment if we automate everything, especially alienating segments like senior travellers who value personal interaction. The most suitable path isn't a full tech overhaul, but a thoughtful, hybrid model."* (P11)

Interestingly, participants did not advocate for complete technological automation. Instead, several stakeholders supported a hybrid implementation approach combining digital efficiency with human interaction. This reinforces that smart hotel transformation in Batam is interpreted as adaptive digital integration rather than technology replacement. From the researcher's perspective, this reflects socio-cultural considerations within hospitality services, where personal interaction continues to represent an important dimension of guest experience. Excessive automation may therefore create perceived risks of reduced hospitality authenticity and weakened emotional engagement. This finding is consistent with Hassan and Eassa (2025), who argued that hospitality organisations must balance technological efficiency with human-centred service experiences to avoid creating overly transactional environments.

Government Role and Ecosystem Support. Government officers acknowledged that the public sector plays a crucial role in enabling digital readiness. P9 explained:

*"Batam's technological infrastructure is showing positive progress, but equal access and improved connection quality are still needed so that all regions, including new tourist destinations and small and medium-sized hotels in areas far from the city centre, can participate in the transformation towards smart hotels. The hospitality sector needs stronger digital infrastructure support from the government, especially in connectivity."* (P9)

P12 added:

*"If the direction is there, the government will definitely give incentives. The government's incentives are the public goods. In short, Telecommunication Electric Railway. Policy clarity and ecosystem development are essential for enabling hotels to adopt smart systems."* (P12)

The findings indicate that participants perceive government involvement as essential for reducing implementation uncertainty and strengthening ecosystem readiness. Government support was not viewed solely in terms of financial incentives, but also in relation to policy coordination, infrastructure development, and institutional integration. The researcher interprets this as evidence that smart hotel implementation

in Batam cannot be driven exclusively by individual hotel initiatives. Instead, successful implementation requires broader institutional alignment involving policymakers, infrastructure providers, and hospitality stakeholders. This finding supports Fitriana and Wahyudin (2025), who emphasised that institutional coordination and governance support are critical enabling factors for tourism digitalisation within developing destinations. Hotel managers also expressed expectations toward policymakers. P5 said:

> *"But, if I see it globally, I see that the government supports the infrastructure. We hope the government provides clearer guidelines and digital infrastructure to support hotel transformation. And the government system must also integrate with each other."* (P5)

Infrastructure–Economic–HR Interdependence. Participants emphasised that infrastructural limitations compound financial and HR constraints. P2 summarised this interdependence:

> *"The government wants to make sure the environment is safe, immigration runs smooth, and the rupiah stays strong, because that's how tourism can grow. They don't really spend big money on hotels, they leave that to the owners and investors. If the infrastructure is weak, investment becomes risky. And if staff are unprepared, the technology also fails."* (P2)

P3 added:

> *"In my opinion, frequent internet outages don't just cause minor inconveniences, they completely undermine the smart hotel experience, frustrate guests, and disrupt core automated operations, making robust and stable connectivity an absolute necessity, not just an optional upgrade. Everything is connected if the internet is unstable, staff performance drops, and guest satisfaction decreases."* (P3)

Participants consistently described infrastructure limitations as interconnected with financial and human resource challenges. Weak connectivity was perceived as increasing operational risk, reducing staff confidence in digital systems, and weakening guest satisfaction simultaneously. This illustrates that infrastructure challenges should not be understood as isolated technical issues, but as systemic constraints affecting broader organisational performance and implementation sustainability. The findings therefore reinforce the argument that smart hotel transformation involves interconnected socio-technical dynamics rather than simple technology adoption processes. This finding aligns with socio-technical perspectives proposed by Wong and Loo (2026), who argued that hospitality digital transformation is shaped by continuous

interaction between technology, organisational capability, employee adaptation, and institutional conditions. Government officers echoed this holistic view. P10 stated:

> *"Digital transformation requires alignment of technology, human resources, and the broader ecosystem. For me, the key is that smart hotels in Batam should improve the overall experience, anticipate guest needs, and create a unique identity that makes Batam more attractive compared to nearby destinations like Singapore or Malaysia."* (P10)

Participants connected infrastructure preparedness to ecosystem alignment and government support in addition to connectivity. Digital transformation was described as requiring coordination between hotels, service providers, and policymakers. Participants also noted that infrastructure constraints amplify financial risks and HR challenges. Weak infrastructure makes investment riskier and reduces staff confidence in technology use.

Conceptually, this subtheme represents ecosystem-dependent and network-sensitive digital transformation, where infrastructure readiness strongly influences implementation feasibility and operational sustainability. The findings demonstrate that smart hotel implementation in Batam cannot be separated from broader digital ecosystem conditions, including connectivity quality, institutional coordination, technological accessibility, and external support systems. The researcher interprets these findings as evidence that infrastructure functions as a systemic enabler of smart hotel transformation rather than merely a technical operational component. Even when hotels demonstrate willingness to adopt smart technologies, implementation effectiveness remains constrained by uneven infrastructure readiness and ecosystem fragmentation. From a theoretical perspective, the findings reinforce socio-technical interpretations of digital transformation by demonstrating that technology adoption outcomes are shaped not only by technological infrastructure, but also by interactions between organisational conditions, infrastructure systems, stakeholder readiness, and institutional environments. Within the Batam context, infrastructure limitations therefore emerge as a critical structural bottleneck influencing the pace, depth, and sustainability of smart hotel implementation.

## 4.10 Theme 4: Role of Government and Institutional Support

This theme addresses the research question concerning the role of government and policy coordination in facilitating smart hotel implementation in Batam. Hotel managers primarily expect government involvement in the form of tangible support, such as financial incentives, tax relief, training programmes, and clear regulatory guidance. Government is viewed as an enabler capable of reducing implementation risks and operational costs. Hotel managers therefore tend to evaluate government effectiveness based on the immediacy, practicality, and accessibility of support mechanisms.

In contrast, government officers conceptualise their role in smart hotel development more broadly. They emphasise policy formulation, facilitation, and strategic coordination rather than direct intervention. Their focus lies in creating enabling environments through regulation, infrastructure investment, and stakeholder collaboration. This reflects an institutional orientation toward long-term governance and ecosystem development rather than short-term assistance. These differing perspectives demonstrate how stakeholder expectations toward government involvement are shaped by distinct operational and institutional priorities. Building on these differing role perceptions, the following subtheme examines how stakeholders translate their respective logics into specific strategies and actions for implementing smart hotel initiatives.

### 4.10.1 Subtheme 1: Policy and Support

Subtheme 3 examines infrastructure readiness as a key dimension of government and policy coordination for smart hotel implementation in Batam. Participants highlighted that while digital and physical infrastructure has improved, its translation into hotel-specific implementation remains limited. Both hotel managers and government officers emphasised the importance of policy clarity and ecosystem alignment. This subtheme analyses how policy coordination shapes infrastructure usability.

This subtheme conceptualises infrastructure readiness as an institutional responsibility that shapes the feasibility of smart hotel implementation. Infrastructure is

understood as a combination of network connectivity, digital ecosystem alignment, and regulatory support. Smart hotel technologies rely on external systems beyond individual hotel control. Government thus plays a pivotal role in enabling or constraining infrastructure readiness.

Participants consistently highlighted that government support for physical and digital infrastructure has improved in Batam. Internet connectivity, broadband expansion, and 5G coverage were perceived as providing a strong foundation for smart hotel implementation. However, these developments were described as unevenly translated into sector-specific implementation. Hotels often navigate infrastructure utilisation independently without clear institutional coordination.

This pattern suggests that infrastructure availability alone is insufficient to drive smart hotel transformation. While connectivity exists, the absence of targeted frameworks limits effective utilisation. Infrastructure readiness is therefore interpreted as a governance issue rather than a purely technical one. Smart hotel implementation depends on how well infrastructure is integrated into sectoral strategies.

Hotel managers noted that although internet infrastructure is available, system integration and alignment remain unclear. Government officers acknowledged that smart city and smart tourism initiatives have not been operationalised into hotel-specific guidelines. Participants emphasised that without a roadmap, hotels implement technology in fragmented ways. These accounts illustrate the gap between infrastructure provision and institutional direction. P5 articulated this expectation clearly:

> *"The government supports infrastructure development well, including permits and health checks, but there is a need for better integration of systems and environmental considerations, such as using sustainable and eco-friendly materials. We hope the government provides clearer guidelines and digital infrastructure to support hotel transformation. Without direction, hotels move individually."* (P5)

Similarly, P4 highlighted the lack of a coordinated framework:

> *"In my opinion, the government's goal for smart hotels in Batam is to position the island as a forward-thinking, sustainable tourism destination by encouraging IoT adoption especially systems that save energy and streamline services like check-in. There is no specific policy that directs smart hotel development. Hotels implement digital systems by themselves, based on their own needs."* (P4)

These findings suggest that stakeholders perceive infrastructure readiness not merely as the availability of digital connectivity, but as the existence of coordinated

institutional direction. Although Batam possesses relatively strong internet infrastructure and smart city aspirations, participants consistently emphasized that the absence of sector-specific implementation frameworks creates uncertainty among hotel operators. The researcher interprets this as evidence that smart hotel implementation in Batam remains institutionally fragmented. Hotels are encouraged to digitalise, yet they continue to operate without clear operational guidance regarding standards, interoperability, or long-term transformation priorities. This condition reflects broader governance challenges commonly observed in emerging tourism destinations, where infrastructure development progresses faster than institutional coordination and policy operationalisation. This finding aligns with Fitriana and Wahyudin (2025), who argued that digital tourism transformation frequently encounters implementation gaps when government strategies are not translated into sector-level operational frameworks. Similarly, Wong and Loo (2026) noted that smart hospitality initiatives in developing tourism environments often remain fragmented due to insufficient institutional integration and policy clarity. This absence of clear guidance creates inconsistency and uneven adoption across hotel categories. Government officers acknowledged these gaps. P12 explained:

> *"Policy clarity is essential. Without a structured roadmap, adoption becomes partial and misaligned with broader digital transformation goals. As a regulation, there is no specific roadmap or a specific policy from the government, whether it is the province or the city, to encourage hotels in Batam to implement smart hotels. None. Until today, none. But without being asked, the government has given incentives for that. What is it? It's the road, infrastructure, communication, and others. The ecosystem is already good."* (P12)

P9 reinforced this point, indicating that existing policies are still general:

> *"Overall, Batam is positioned to enhance its tourism industry through smart hotel development, aiming to increase occupancy and service quality while maintaining environmental sustainability. Smart city and smart tourism frameworks exist, but they are not yet translated into concrete guidelines for hotels. The government supports this through infrastructure development (including 5G and fibre internet), incentives like tax relaxation and free training, and policies promoting sustainable tourism."* (P9)

The convergence between hotel managers and government officers indicates that infrastructure alone is insufficient to accelerate smart hotel transformation.

Participants acknowledged that Batam already possesses relatively favourable digital conditions compared to many emerging destinations; however, implementation remains inconsistent because policy coordination mechanisms are still broad and non-operational. From the researcher's perspective, this reflects a disconnect between macro-level digital transformation agendas and micro-level implementation realities within the hospitality sector. Government initiatives currently function more as enabling signals rather than actionable implementation systems. Consequently, hotels continue to interpret and implement smart technologies independently according to their own organisational capacities and market priorities. This finding supports Simatupang et al. (2024), who argued that fragmented institutional coordination frequently constrains tourism digitalisation initiatives in Indonesia. It also reinforces Chen et al. (2025), who emphasised that smart hospitality implementation depends not only on infrastructure investment but also on governance integration and implementation clarity.

This disconnect appears particularly relevant within the Batam context because the city is simultaneously pursuing tourism expansion, smart city development, and regional economic growth. These overlapping development agendas create institutional complexity, requiring coordination among tourism authorities, infrastructure agencies, digital governance actors, and investment-related institutions. While such ambitions provide opportunities for accelerating digital transformation, they also increase the difficulty of translating broad strategic objectives into sector-specific implementation mechanisms. Consequently, smart hotel development in Batam remains influenced not only by technological readiness but also by the capacity of institutions to coordinate priorities, align policies, and provide coherent implementation pathways for the hospitality sector.

Multiple participants also emphasised the need for stronger cross-sector alignment. P10 stated:

> *"The government is already improving infrastructure, like wider roads, better broadband, and 5G, so hotels can take advantage of it. For me, the key is that smart hotels in Batam should improve the overall experience, anticipate guest needs, and create a unique identity that makes Batam more attractive compared to nearby destinations like Singapore or Malaysia. Tourism digitalization requires collaboration across agencies. Policy cannot stand alone; it must integrate tourism, infrastructure, and digital governance."* (P10)

This statement highlights the multi-sectoral nature of smart hotel transformation. Participants did not perceive digitalisation as an isolated hotel issue, but as part of a broader tourism ecosystem requiring coordination between infrastructure planning, tourism governance, and digital policy. The researcher interprets this as evidence that smart hotel implementation in Batam increasingly reflects a socio-technical governance challenge rather than purely technological adoption. Successful implementation therefore depends on ecosystem alignment involving government agencies, infrastructure providers, tourism stakeholders, and technology vendors. This finding is consistent with socio-technical perspectives proposed by Wong and Loo (2026), who argued that hospitality digitalisation outcomes are strongly influenced by institutional coordination and stakeholder ecosystem integration. Hotel managers also expressed concern that local policies do not sufficiently reflect Batam's unique market dynamics, especially the dependence on Singaporean and Malaysian tourists. P7 argued:

> *"It is importance of adapting smart hotel features to Batam's unique market, primarily Singaporean and Malaysian guests, many of whom prefer halal food and luxury standards. Batam's hotel industry is growing, with 240 registered properties, including international chains, but many hotels lack market-focused strategies. Batam's tourism market is unique. The government's policies should consider the expectations of international guests who are used to high digital standards."* (P7)

P1 added that policy incentives could accelerate implementation:

> *"Batam has good internet infrastructure with multiple vendors and connectivity, making it feasible to implement smart hotel technology from a bandwidth perspective. The government's plan to grow Batam's smart hotel industry is a brilliant strategic move. If the government provided tax incentives or digital grants, more hotels would be willing to adopt smart technologies."* (P1)

These findings demonstrate that hotel managers evaluate government effectiveness primarily through practical and market-oriented support mechanisms. Participants consistently linked smart hotel implementation with financial feasibility, competitive positioning, and customer expectations, particularly regarding Singaporean and Malaysian tourists who are perceived as digitally accustomed consumers. The researcher interprets this as evidence that smart hotel transformation in Batam is highly market-sensitive and externally influenced by regional tourism competition. Unlike highly developed tourism destinations where digital transformation may be

institutionally standardised, hotels in Batam appear to adopt smart technologies strategically in response to perceived market demand and competitive pressure. This finding supports Kumar and Sharma (2026), who found that hotels in emerging tourism destinations frequently adopt digital technologies selectively based on market practicality and operational return expectations. Government officers ultimately agreed that policy frameworks must evolve to support the hotel sector more directly. P11 summarised the issue:

> *"The digital transformation of hotels cannot rely on the industry alone. The government must create a supportive policy environment. This is a challenge If the government provides services, as a collegial partner, maybe from a telecom company or maybe from a vendor that can produce, let's say, the AC, for example, the brand is Samsung Samsung Digital Smart, then Samsung people will come."* (P11)

Government officers ultimately framed smart hotel transformation as a collaborative governance process rather than an industry-driven initiative. Participants acknowledged that sustainable digital transformation requires long-term ecosystem development involving infrastructure providers, regulators, hotels, and technology vendors. This findings imply that smart hotel implementation in Batam cannot be fully understood through technology-centric perspectives alone. Instead, implementation outcomes are shaped by the interaction between institutional capability, internal capability, and stakeholder coordination. The researcher therefore interprets smart hotel transformation in Batam as a context-dependent governance process characterised by gradual adaptation, institutional negotiation, and uneven implementation capacity across the hospitality sector.

Participants also emphasised the need for ecosystem support through cross-sector coordination. Digital transformation was seen to require alignment between tourism policy, infrastructure planning, and digital governance. Government incentives, training, and partnerships with technology providers were viewed as potential accelerators. Without such coordination, infrastructure advantages remain underutilised.

Conceptually, this subtheme represents institutionally mediated infrastructure readiness, where the usability of digital infrastructure is shaped by governance capability, policy clarity, and ecosystem coordination rather than technological availability alone. Although Batam possesses favourable connectivity conditions and

smart city ambitions, participants consistently described implementation as fragmented due to the absence of operationalised hotel-specific frameworks. The findings therefore suggest that infrastructure readiness should be understood as a socio-technical governance issue involving institutional alignment, stakeholder coordination, and contextual policy translation. Smart hotel transformation in Batam is not constrained solely by technology access, but by the extent to which institutional systems are capable of translating digital ambitions into coherent implementation pathways for the hospitality sector.

### 4.10.2 Subtheme 2: Institutional Readiness

Subtheme 2 explores institutional readiness and coordination as key governance challenges affecting smart hotel implementation in Batam. Participants highlighted gaps in inter-agency alignment, communication consistency, and administrative responsiveness. Both hotel managers and government officers acknowledged that institutional fragmentation slows digital transformation. This subtheme analyses how coordination challenges shape implementation outcomes.

This subtheme examines institutional readiness as a critical enabling condition for smart hotel implementation. Institutional readiness is defined as the ability of governmental bodies and inter-agency networks to coordinate policies, communicate clearly, and support industry digitalisation. Participants framed readiness not merely as policy presence but as institutional coherence. Weak coordination was consistently identified as a structural constraint.

Both hotel managers and government officers acknowledged that institutional coordination in Batam remains uneven and fragmented. Participants described inconsistent communication channels, unclear implementation guidance, and limited inter-agency synchronisation regarding smart hotel initiatives. Hotels frequently received partial or informal information without structured operational follow-up, creating uncertainty regarding implementation direction and long-term digital transformation priorities. These findings indicate that fragmented institutional coordination functions as a significant governance-related implementation barrier because inconsistent policy direction, limited cross-sector collaboration, and uneven

infrastructure support reduce implementation clarity and weaken stakeholder confidence toward long-term smart hotel transformation.

These findings suggest that institutional readiness is constrained by siloed governance structures. Different agencies pursue parallel priorities that are not always aligned with smart hotel development. As a result, digital transformation efforts lack synchronisation across tourism, infrastructure, and digital governance sectors. Institutional fragmentation thus translates into fragmented industry implementation. The researcher interprets these findings as evidence that smart hotel implementation in Batam is constrained not only by technological limitations but also by governance fragmentation and institutional inconsistency. The absence of coordinated strategic direction reduces implementation clarity for hotels and weakens the overall momentum of digital transformation. This indicates that institutional readiness functions as a structural enabler of smart hotel implementation rather than merely an administrative support mechanism.

Hotel managers reported confusion due to differing institutional messages regarding digital priorities. Government officers confirmed that coordination across agencies remains complex and time-consuming. Participants emphasised that innovation is often delayed by administrative procedures rather than technological limitations. These accounts illustrate how bureaucratic inertia constrains responsiveness. P6 described institutional readiness as uneven:

> *"Sometimes we receive information, sometimes we do not. There is no structured channel to guide hotels in digital adoption. Batam currently lacks fully smart hotels, with only partial implementations like remote-controlled curtains and digital housekeeping systems. The government is supportive but no comprehensive smart hotel projects exist yet."* (P6)

P2 emphasised that innovation is slowed by bureaucratic processes:

> *"Look, for me, the biggest challenge we face in Batam isn't the tech itself—it's our human resources, our SDM. The readiness, the discipline, the integrity, and the crucial ability to maintain these systems long-term. Even when we want to innovate, the administrative process is long. Coordination among institutions is not always smooth."* (P2)

P2's statement demonstrates that stakeholders perceive institutional readiness as closely connected to human capability and administrative responsiveness rather than technology availability alone. The findings suggest that bureaucratic complexity and

workforce preparedness are perceived as equally important determinants of implementation success. This reflects a broader socio-technical understanding in which digital transformation depends on organisational adaptability as much as technological infrastructure. Government officers provided insight into the internal challenges. P9 noted:

> *"The implementation of smart hotels in Batam is seen as a strategic and transformational step, aligned with Batam's position as a regional tourism hub and the government's smart city vision. Its implementation is driven by factors such as digital infrastructure support (internet networks, 5G), international tourist demand prioritizing digital services, and industry competition that drives innovation. Coordination across agencies is still a challenge. Digital transformation touches many sectors, so alignment takes time."* (P9)

P10 explained that institutional priorities are sometimes misaligned:

> *"Each department has its own priorities. For example, tourism focuses on promotion, while infrastructure focuses on connectivity. Synchronizing these agendas is not easy. Smart hotels should focus on meeting guest needs and improving service efficiency rather than showcasing technology for its own sake. Hopefully, for continued improvement and collaboration to advance smart hotel adoption in Batam."* (P10)

These findings align with Chen et al. (2025) and Fitriana and Wahyudin (2025), who argued that fragmented governance structures and limited inter-agency coordination frequently hinder digital transformation initiatives within emerging tourism destinations. Similarly, Wong and Loo (2026) emphasized that institutional alignment is essential for sustaining smart hospitality ecosystems, particularly in destinations where digital governance systems remain underdeveloped. Within the Batam context, the findings indicate that institutional coordination challenges reduce implementation consistency and create uncertainty among hotel operators regarding long-term digital transformation priorities. The findings further demonstrate that smart hotel implementation challenges in Batam are multidimensional and deeply interconnected across organisational, technological, financial, and institutional dimensions. Financial constraints limited technological investment capability, while insufficient employee readiness reduced organisational confidence toward digital transformation. Simultaneously, fragmented institutional coordination and limited policy clarity created uncertainty regarding implementation direction and long-term

sustainability. These interacting barriers collectively explain why smart hotel transformation in Batam remains gradual, cautious, and uneven despite increasing awareness of digitalisation benefits within the hospitality sector.

Hotel managers also noted that the lack of a unified institutional approach is associated with fragmented support. P3 observed:

> *"While some limited automation exists, such as app-based check-in and energy management systems, full smart hotel adoption is not yet common due to high investment costs, slow ROI, and unreliable internet infrastructure. Different agencies give different messages. Sometimes we do not know which one to follow."* (P3)

The researcher interprets this finding as an indication that inconsistent institutional communication contributes to implementation hesitation among hotel operators. When policy direction and implementation guidance are unclear, hotels tend to adopt a cautious and fragmented approach toward smart technology investment. This may partly explain why smart hotel implementation in Batam remains selective and uneven across hotel categories. Government officers acknowledged that inter-agency coordination requires structural reform. P12 explained:

> *"A key theme is the balance between high-tech efficiency and the traditional human touch essential in hospitality, advocating for a hybrid technology model. Sustainability and green tourism are emphasized, with smart energy applications and eco-friendly practices seen as future priorities. To support smart hotels, institutions must collaborate closely. Digital transformation requires shared goals, not siloed actions."* (P12)

Institutional readiness also involves human capital within government agencies. P11 pointed out:

> *"You need the government to educate people to be able to use technology or to stand up to provide services. This is a challenge if the government provides services, as a collegial partner, maybe from a telecom company or maybe from a vendor that can produce, let's say, the AC, for example, the brand is Samsung Samsung Digital Smart, then Samsung people will come. Government officers themselves must be digitally literate. Otherwise, we cannot fully support hotels in adopting technology."* (P11)

The convergence of participant views indicates that institutional readiness extends beyond policy formulation and includes internal governmental capability,

digital literacy, and collaborative governance capacity. Participants consistently emphasized that without digitally competent institutions, government agencies may struggle to effectively guide and support hospitality digitalisation initiatives. These findings reinforce the argument that smart hotel implementation requires institutional transformation alongside industry transformation. Finally, P7 highlighted the broader consequences of institutional misalignment:

> *"If institutions are not aligned, the whole hospitality ecosystem becomes slower in adopting smart systems. His vision is for Batam to become a leading smart city and hospitality model in Indonesia, leveraging cross-training with international hotels. Overall, smart hotels must align digital innovations with guest needs and market realities to succeed in Batam's competitive tourism sector."* (P7)

Previous studies have similarly highlighted that institutional capability and governance coordination significantly influence the sustainability of digital transformation initiatives within tourism destinations (Hassan & Eassa, 2025; Chen et al., 2025). However, the present findings demonstrate that these governance-related challenges are particularly visible in Batam due to overlapping institutional responsibilities and uneven digital readiness across agencies. From the researcher's perspective, this reflects that smart hotel implementation in Batam requires a more integrated governance approach involving clearer inter-agency coordination, structured communication channels, and long-term strategic alignment between tourism, infrastructure, and digital governance institutions.

Institutional readiness also involves the digital literacy and capacity of government personnel. Participants highlighted that government officers must understand smart technologies to effectively guide and support hotels. Limited internal expertise reduces the ability to engage meaningfully with industry partners and vendors. Capacity gaps within institutions therefore weaken implementation support.

This subtheme conceptualises institutional readiness as a governance capability rather than merely the existence of formal policy initiatives. The findings demonstrate that effective smart hotel implementation requires coordinated institutions, shared strategic priorities, administrative responsiveness, and digitally capable governance structures. Without such alignment, smart hotel transformation remains fragmented, inconsistent, and heavily dependent on individual hotel initiatives rather than systemic ecosystem development. Institutional readiness therefore emerges as a decisive factor

influencing not only the pace of implementation but also the long-term sustainability and coherence of smart hotel transformation in Batam.

### 4.10.3 Subtheme 3: Infrastructure Support

Subtheme 3 examines infrastructure support and digital ecosystem readiness as a critical dimension of government involvement in smart hotel implementation. Participants emphasised that infrastructure quality directly affects operational reliability, investment confidence, and guest experience. Both hotel managers and government officers viewed infrastructure readiness as uneven across Batam. This subtheme analyses how infrastructural and ecosystem factors shape implementation feasibility.

This subtheme analyses infrastructure support as a core component of governmental readiness for smart hotel implementation. Infrastructure is conceptualised not only as physical connectivity but as part of a broader digital ecosystem. Participants consistently framed infrastructure as an enabling or constraining condition rather than a neutral background factor. Government support is therefore central to shaping feasibility and risk perceptions.

Participants repeatedly emphasised internet network quality as the foundational requirement for smart hotel systems. Both hotel managers and government officers highlighted frequent instability and uneven connectivity across Batam. Smart hotel technologies were described as highly sensitive to network disruptions. As a result, unreliable connectivity directly undermines operational continuity.

These perspectives suggest that infrastructure readiness in Batam remains uneven and spatially fragmented. While some areas benefit from strong broadband and emerging 5G networks, others experience frequent disruptions. Due of this disparity, hotels have varying implementation capacities. Infrastructure thus acts as a structural filter shaping who can implement smart technologies effectively.

These findings indicate that infrastructure readiness in Batam is not merely a technical issue but a structural determinant influencing implementation feasibility, operational stability, and investment confidence. The researcher interprets these perspectives as evidence that smart hotel transformation in Batam remains highly dependent on external ecosystem conditions rather than internal internal capability

alone. Hotels located in areas with stronger digital connectivity appear to possess greater implementation flexibility, whereas hotels operating in weaker infrastructure environments face higher operational uncertainty and technological risk. This finding supports Wong and Loo (2026), who argued that smart hotel implementation in emerging tourism destinations is strongly shaped by uneven digital ecosystem development. Similarly, Chen et al. (2025) noted that unstable internet infrastructure significantly constrains the sustainability of smart hospitality systems due to high dependency on real-time connectivity and integrated digital operations.

Beyond connectivity, participants identified limitations in internal digital infrastructure capacity. Many hotels lack sufficient bandwidth, hardware, and system integration to support advanced smart technologies. This gap increases reliance on external vendors for installation and maintenance. Vendor dependency introduces additional cost, delays, and operational vulnerability. P1 articulated this dependency clearly:

> *"Again, in Batam, many electricity, water, or internet are often broken. Because the route is still in development, the width of the road, etc. Smart hotels rely on stable internet. If the network is unstable, the system freezes and the whole operation is affected."* (P1)

P6 echoed this operational vulnerability:

> *"Internet infrastructure in Batam is adequate to support smart hotel needs. Batam's market, mainly tech-savvy Singaporean and Malaysian guests, presents strong potential for smart hotel development, gradually. Connectivity is the biggest challenge. Without stable internet, smart systems simply cannot work."* (P6)

Government officers acknowledged the issue. P9 said:

> *"The implementation of smart hotels in Batam is seen as a strategic and transformational step, aligned with Batam's position as a regional tourism hub and the government's smart city vision. Its implementation is driven by factors such as digital infrastructure support (internet networks, 5G), international tourist demand prioritizing digital services, and industry competition that drives innovation. Network stability must be improved if Batam wants to support smart hotels and smart tourism."* (P9)

The importance of reliable connectivity is also tied to guest expectations. P10 explained:

*"Smart hotels primarily by user experience improvements such as easy check-in/out and internet integration, rather than advanced technology alone. In Batam, smart hotel implementation is limited, with some hotels like Aston showing partial adoption (e.g., self check-in kiosks), but overall technology use is basic and service-oriented." Guests expect fast and reliable internet. If the network is slow, the digital experience collapses.*" (P10)

Hotel managers expressed concern that many hotels do not yet have the technological foundations necessary to support advanced systems. P7 explained:

*"The necessity of integrating technology with local infrastructure, recommending smartphone-based automation and cloud systems. Despite technological advances, it is potential negative impacts like overreliance on AI. Smart systems require strong bandwidth and infrastructure. Many hotels do not have this capacity yet."* (P7)

P4 described dependency on external vendors:

*"Smart hotels, which use IoT technology to provide efficient and modern services, are crucial for keeping up with global advancements. In Batam, however, adoption has been slow due to high costs, budget constraints, and challenges such as a lack of skilled professionals, limited tested solutions, and concerns about internet reliability and system integration. We rely on vendors for upgrades and troubleshooting, but sometimes assistance is slow or costly."* (P4)

The dependence on external vendors reflects limited internal technological infrastructure among hotels in Batam. Rather than functioning as fully autonomous digital organisations, many hotels remain operationally dependent on third-party expertise for system maintenance, troubleshooting, and technological integration. This increases implementation vulnerability because delays in external technical support may directly affect operational continuity and guest experience. The researcher interprets this dependency as a reflection of broader internal capability limitations within emerging tourism destinations. Smart hotel implementation therefore involves not only technology acquisition but also the development of internal technical competence and long-term technological self-sufficiency. This finding aligns with Kumar and Sharma (2026), who found that many hotels in developing tourism destinations struggle with technological dependence due to limited in-house digital expertise and insufficient IT workforce capacity.

Government officers emphasised that broader city-level infrastructure must be strengthened. P11 stated:

*"Hotel infrastructure must align with the city's digital readiness. Otherwise, implementation remains partial. The paradox is that while technology enables efficiency and personalization (high tech), the tourism industry is fundamentally about hospitality and human touch (high touch). Implementing smart hotels must balance these two aspects to maintain service quality and employment."* (P11)

Infrastructure readiness is seen as a shared responsibility. P12 described the role of government in enabling digitalization:

*"The government must develop the digital ecosystem so that hotels can adopt smart systems more easily. A key theme is the balance between high-tech efficiency and the traditional human touch essential in hospitality, advocating for a hybrid technology model. Sustainability and green tourism are emphasized, with smart energy applications and eco-friendly practices seen as future priorities."* (P12)

These findings demonstrate that participants perceive infrastructure readiness as a shared institutional responsibility rather than solely an operational issue for individual hotels. Government support is viewed as essential in reducing implementation risk, strengthening digital ecosystem stability, and encouraging long-term technological investment. From the researcher's perspective, this reflects a broader shift in how smart hotel implementation is conceptualised. Smart hotel transformation in Batam is not perceived as isolated organisational innovation but as part of an interconnected smart tourism ecosystem involving public infrastructure, policy coordination, and institutional collaboration. This finding supports socio-technical perspectives suggesting that technology implementation outcomes are shaped by interactions between organisational systems and external institutional environments (Wong & Loo, 2026; Hassan & Eassa, 2025).

Hotel managers also expressed expectations for public investment. P5 said:

*"We need stronger government support in building digital infrastructure, especially for improving connectivity. Infrastructure in Batam is generally supported by the government, but continuous improvement is needed. The future of smart hotels in Batam is optimistic, with expectations of more advanced automation, robotics, and seamless guest experiences, which will enhance Batam's appeal as a tourist destination."* (P5)

Government officers highlighted the need for strategic coordination. P9 argued:

*"Ecosystem readiness requires collaboration between tourism, ICT, and development agencies. The recommended approach is collaborative and phased,*

*starting with higher-star hotels with priority features such as self-check-in, mobile room keys, and cashless payment integration, while maintaining a balance between automation and human touch to meet the needs of all traveller segments. The successful implementation of smart hotels in Batam is expected to not only improve operational efficiency and guest satisfaction but also strengthen Batam's image as a smart, sustainable, international-class tourism destination."* (P9)

Infrastructure limitations compound other constraints. Participants emphasised how weak connectivity increases operational risk, reduces ROI, and burdens staff. P2 summarised:

*"If the infrastructure is weak, investment becomes risky. Staff also struggle because systems are unstable. Managers must also take note of Batam's increasingly developing technological infrastructure, such as optical systems and data storage in places like Nongsa, which provide the necessary foundation for cloud-based systems that are safe and reduce implementation risks."* (P2)

P3 added:

*"In my view, true smart hotels require 100% automation, using robotics for tasks like controlling showers and curtains. This model is unfit for luxury hotels, where personalized service is key. Everything is connected. When the internet drops, staff performance declines and guest satisfaction drops."* (P3)

Government officers echoed this interdependence. P10 noted:

*"Digital transformation requires alignment between technology, human resources, and the surrounding ecosystem. I think hotels in Batam will invest in smart tech only if it really helps guests. For me, the key is whether the tech improves the experience, not just looks fancy."* (P10)

The convergence of participant views indicates that infrastructure limitations amplify other implementation challenges simultaneously. Weak connectivity not only affects system functionality but also increases employee workload, operational uncertainty, and financial risk. Participants consistently described infrastructure instability as creating cascading effects across organisational performance and guest satisfaction. The researcher interprets these findings as evidence that smart hotel implementation in Batam should be understood as a systemic transformation process rather than simple technology adoption. The effectiveness of smart technologies depends heavily on ecosystem integration, institutional readiness, and infrastructural reliability. This finding reinforces previous studies arguing that smart hospitality

transformation is highly dependent on ecosystem coordination and contextual readiness rather than technological infrastructure alone (Chen et al., 2025; Webster, 2025).

Participants viewed infrastructure readiness as a shared responsibility between government and industry. Government officers emphasised the importance of building an integrated digital ecosystem that aligns tourism, ICT, and sustainability agendas. Hotels expect public investment to reduce infrastructure risks and improve long-term viability. Ecosystem readiness therefore extends beyond individual hotel capacity.

This subtheme conceptualises infrastructure support as a systemic determinant of smart hotel implementation rather than merely a technical operational requirement. The findings reveal that infrastructure readiness influences investment confidence, implementation sustainability, operational continuity, and stakeholder willingness to adopt advanced technologies. Stable connectivity, ecosystem coordination, and digital integration therefore function as foundational enablers of smart hospitality transformation in Batam. The researcher interprets these findings as evidence that smart hotel implementation in emerging tourism destinations cannot be separated from broader ecosystem readiness and institutional development. Infrastructure instability creates cascading organisational risks that extend beyond technology failure alone, affecting employee performance, guest satisfaction, and long-term investment confidence. Consequently, smart hotel transformation in Batam should be understood as a socio-technical and ecosystem-dependent process requiring coordinated collaboration between government agencies, ICT infrastructure providers, tourism stakeholders, and hotel organisations. Government-led ecosystem development is therefore essential for transitioning from fragmented implementation toward sustainable and coordinated smart tourism transformation.

## 4.11 Theme 5: Future Vision

This theme addresses the research question concerning stakeholder visions for the future development of smart hotels in Batam. Hotel managers envision future smart hotel development as a gradual and selective process largely contingent upon market demand, operational practicality, and financial feasibility. Managers tend to prioritise incremental technological upgrades and proven systems that minimise implementation risks while maintaining operational stability. Such preferences reflect a continued

emphasis on risk management, business sustainability, and cautious technological adaptation.

In contrast, government officers articulate a future-oriented vision of integrated and transformative smart tourism development in which smart hotels function as central components within interconnected digital ecosystems. These ecosystems are expected to strengthen coordination among tourism stakeholders, improve destination-level digital integration, and enhance institutional collaboration. This perspective reflects a strategic orientation toward long-term transformation, ecosystem readiness, and sustainable tourism development. This contrast underscores an ongoing tension between pragmatic business considerations and broader strategic policy ambitions. These differing priorities influence stakeholder decision-making processes, implementation expectations, and future development trajectories within the hospitality sector. Together, they shape the evolving direction of smart hotel transformation in Batam. These contrasting future visions set the context for the next subtheme, which further explores how differing expectations influence stakeholder alignment and the configuration of interactions within the smart hotel ecosystem.

### 4.11.1 Subtheme 1: Smart Hotel as a Gradual

Subtheme 1 explores stakeholders' shared vision of smart hotels in Batam as a gradual and adaptive transformation. Participants consistently rejected the complete of rapid or full automation, instead emphasising staged progress aligned with organisational, infrastructural, and market readiness. This future-oriented perspective reflects a pragmatic understanding of Batam's current conditions. Smart hotel development is thus framed as a long-term strategic evolution.

This subtheme conceptualises smart hotel development in Batam as a gradual and adaptive transformation rather than an immediate technological leap. Participants framed digitalisation as a long-term strategic process shaped by readiness, resources, and market dynamics. Smart hotels were not imagined as fully automated systems in the near future. Instead, transformation was seen as evolutionary and context-sensitive.

Participants consistently articulated a long-time horizon for achieving mature smart hotel implementation. Hotel managers emphasised that Batam's transformation would unfold over decades rather than years. This perspective reflects realism regarding

investment capacity, infrastructure development, and workforce readiness. Gradualism was therefore viewed as a necessary condition for sustainability.

These findings suggest that stakeholders perceive smart hotel transformation in Batam as a long-term organisational adaptation process rather than immediate technological disruption. The emphasis on gradualism reflects cautious strategic decision-making shaped by financial limitations, workforce preparedness, and infrastructural uncertainty. The researcher interprets this as evidence that hotels in Batam prioritise implementation sustainability over rapid technological modernisation. Rather than pursuing aggressive digital transformation, stakeholders appear to favour incremental innovation because implementation decisions are strongly shaped by financial uncertainty, workforce preparedness, infrastructural adaptability, and concerns regarding long-term operational sustainability. Incremental implementation is therefore interpreted not merely as a technical strategy, but as a risk-management mechanism that enables hotels to balance innovation goals with organisational stability and market realities within the Batam hospitality context (Kumar & Sharma, 2026). This finding further supports the recommendation that phased implementation strategies are more appropriate for hotels operating within resource-constrained and highly competitive tourism environments (Wong & Loo, 2026).

The data shows that smart hotel implementation is expected to progress in alignment with organisational capacity. Managers emphasised that staff competence, system familiarity, and operational stability must evolve together. Forced or rapid digitalisation was perceived as risky and potentially disruptive. Hotels can adapt to change without sacrificing service quality because to adaptive pacing.

Participants highlighted learning and experimentation as core elements of gradual transformation. A phased approach enables hotels to evaluate technological impacts before scaling implementation. This adaptive process reduces implementation uncertainty by allowing hotels to evaluate operational effectiveness, workforce readiness, guest acceptance, and financial feasibility before committing to broader technological integration. The findings therefore suggest that phased implementation functions as an organisational learning mechanism that supports sustainable smart hotel transformation within resource-constrained hospitality environments. P1 offered a forward-looking yet cautious projection:

*"It may take 20–30 years before Batam reaches full smart hotel implementation. We must follow a staged, realistic timeline based on our current capacity. Now it's*

*time for shift shifting. The change. Now, only PMS, Property Management System, is owned by sellers, they are also designing with cloud."* (P1)

P6 expressed that true smart transformation requires continuous adaptation:

*"Smart hotels must be developed step by step, not all at once. Technology changes quickly, so the transformation must be adaptive. From the security system, it must have been confirmed first. It's not like we make this one by not hiring the right people. It's impossible to hire competent people. It must be considered for the safety and security."* (P6)

The statements from P1 and P6 demonstrate that stakeholders associate successful smart hotel transformation with organisational preparedness rather than technological speed. Participants consistently emphasised the importance of aligning digitalisation with operational capability, employee competence, and security considerations. This indicates that stakeholders in Batam perceive technological transformation as a controlled and adaptive process. The findings also reflect concern regarding the potential negative consequences of premature implementation, including operational instability and inadequate workforce readiness. From the researcher's perspective, these concerns reveal that smart hotel implementation in Batam remains strongly influenced by practical operational realities rather than purely innovation-driven ambitions. Government officers echoed this long-term perspective. P9 noted:

*"Smart hotel development should follow gradual progress, aligned with the city's overall digital transformation. It cannot be instant. In the future, technological advancements will not only remove many of the key barriers to smart hotel implementation but will also transform technology from a niche need into a standard service. This will accelerate the transformation of the hotel industry in Batam toward a smarter, more efficient, and globally competitive future."* (P9)

Hotel managers also highlighted that change must follow operational readiness. P3 explained:

*"Hotels need time to adjust. Staff, budgets, and systems must grow together. Smart transformation cannot be forced. So I don't see this as an urgency in Batam. Actually, outside the chains too, there are many, it can be. But it depends on the owner, the owner perspective. Because there are many places that are actually extraordinarily good, but the owner is quite visionary. Or the owner's background is there."* (P3)

The perspectives of P9 and P3 illustrate differing but interconnected interpretations of gradual transformation. Government stakeholders framed smart hotel development as part of broader city-level digital transformation, while hotel managers focused more directly on operational readiness and owner commitment. These differing perspectives suggest that stakeholder priorities are shaped by institutional roles and strategic responsibilities. Government officers emphasise long-term systemic transformation, whereas hotel managers prioritise operational feasibility and investment practicality. This finding aligns with socio-technical perspectives suggesting that digital transformation is shaped not only by technological infrastructure but also by organisational interests, governance structures, and stakeholder expectations (Hassan & Eassa, 2025; López-Bonilla et al., 2025). Participants further emphasised that gradual progress allows for learning and refinement. P7 argued:

> *"Yes, my goal is to make Batam a place where symbol for the cities in Indonesia. The role model in Batam. So, our view is not to Jakarta, to Bali, but in Batam. Because actually in Batam, as I said earlier, what development property is not in Batam? A phased approach lets us evaluate what works and what doesn't. We can learn from each step before moving forward."* (P7)

Government officers stressed that transformation must be adaptive to evolving infrastructure. P11 stated:

> *"Smart hotel development should adapt to improvements in connectivity and the digital ecosystem. Each stage must match the city's readiness. Our hope in the implementation of smart technology towards all these hotels clearly contributes especially in terms of efficiency which will eventually also provide green tourism or eco-friendly then carbon capture power which will be released later but on the other hand, the hope is maybe the implementation."* (P11)

The findings further reveal that gradual implementation is closely associated with continuous learning and infrastructural adaptation. Participants viewed phased implementation not merely as a financial strategy, but also as an organisational learning mechanism that enables adjustment, evaluation, and refinement over time. This demonstrates that stakeholders perceive smart hotel transformation as an evolving socio-technical process requiring flexibility and long-term adaptation. The emphasis on experimentation and staged implementation reflects uncertainty regarding technological sustainability and future operational impacts. Similar findings were reported by Soliman et al. (2025), who noted that hotels in developing tourism

environments frequently rely on incremental experimentation before committing to large-scale technological integration. Hotels also need flexibility to adjust technology adoption based on performance. P4 said:

> *"In my opinion, for the implementation of smart hotels in Batam, for now it is still 50-50, meaning 50-50 is still conventional, so it is semi-conventional, so that our people are not too familiar with it. with the existing system. So if we now move to a higher system, we are worried that our guests will be uncomfortable there. We implement smart features little by little. When we see the impact, we decide the next step. It must be adaptive."* (P4)

Finally, P12 highlighted the importance of gradual adoption to avoid operational disruption:

> *"Smart transformation must not disrupt service. Gradual implementation ensures stability and prepares staff for new systems. To ensure a successful transformation, the smart hotel concept in Batam must adapt to local context, guest needs and current technology landscape like IoT devices are increasingly affordable, AI chatbots for guest service, platform integrators (Hotel PMS, CRM) are available."* (P12)

The perspectives of P4 and P12 reinforce the importance of balancing technological innovation with guest comfort, operational continuity, and workforce adaptation. Participants consistently expressed concern that rapid digitalisation may negatively affect service experience and employee adjustment processes. The researcher interprets these findings as evidence that hospitality organisations in Batam continue to prioritise human-centred service delivery despite increasing technological adoption. Smart hotel transformation is therefore not perceived as replacing traditional hospitality values, but rather as selectively integrating technology while maintaining service familiarity and customer comfort. This finding contrasts with studies conducted in highly digitalised hospitality environments where automation is often prioritised as a primary strategic objective (Kim et al., 2025; Hsu, 2025). In the Batam context, however, implementation appears more cautious, adaptive, and socially negotiated.

Gradual transformation was also linked to responsiveness toward evolving technology and infrastructure. Participants recognised that digital tools, platforms, and connectivity will continue to improve over time. Adaptive implementation allows hotels to integrate new solutions as they become more affordable and reliable. This flexibility was viewed as critical for long-term competitiveness.

This subtheme positions smart hotel development in Batam as a strategic and adaptive transformation grounded in contextual realities rather than technological imitation. Participants consistently rejected the idea of immediate full automation and instead emphasised gradual implementation aligned with internal capability, infrastructural capability, workforce adaptation, and guest acceptance. The findings suggest that stakeholders perceive smart hotel transformation as a socio-technical evolution requiring continuous learning, flexibility, and contextual adjustment. Rather than replicating highly automated hospitality models commonly associated with advanced tourism destinations, participants prioritised implementation sustainability and operational practicality. From the researcher's perspective, this gradualist orientation reflects the broader realities of emerging tourism destinations, where digital transformation is shaped not only by technological ambition but also by financial capability, institutional readiness, and socio-cultural adaptation. This finding reinforces socio-technical perspectives which argue that technological transformation is inseparable from organisational and contextual dynamics (Wong & Loo, 2026; Hassan & Eassa, 2025).

### 4.11.2 Subtheme 2: Market-Oriented

Subtheme 2 explores how the future of smart hotels in Batam is shaped by market realities rather than technological ambition. Participants consistently emphasised that smart hotel must align with Batam's unique visitor profile, regional travel patterns, and service expectations. Technology implementation is therefore driven by guest demand and competitive positioning. This perspective positions smart hotels as market-responsive service systems.

This subtheme frames the future of smart hotels in Batam as fundamentally market-oriented rather than technology-driven. Participants consistently argued that smart hotel must align with Batam's unique tourism profile, visitor composition, and consumption patterns. Technology implementation was viewed as meaningful only when it responds to concrete market needs. Smart hotels are therefore positioned as demand-responsive service systems.

Participants emphasised that Batam's dependence on Singaporean and Malaysian tourists strongly shapes smart hotel design. These visitors are characterised

as time-sensitive, digitally literate, and value-oriented. Participants highlighted that smart features must prioritise simplicity, speed, and convenience. Market proximity thus directly influences digital service expectations.

The data shows that guest behaviour, rather than technological novelty, drives smart hotel decisions. Managers noted that younger and repeat international visitors expect seamless digital interaction throughout their stay. Features that simplify booking, check-in, and communication were prioritised over complex automation. Smart technology was therefore framed as an enabler of frictionless experiences.

These findings suggest that smart hotel implementation in Batam is shaped more by market practicality than by technological ambition. Participants consistently prioritised technologies that simplify guest interaction and improve convenience rather than sophisticated automation systems. The researcher interprets this as evidence that hotels in Batam adopt technology selectively based on perceived market relevance and operational value. This finding aligns with Wong and Loo (2026), who argued that smart hospitality implementation in emerging tourism destinations is often driven by customer expectations and operational feasibility rather than technological experimentation. Similarly, Kumar and Sharma (2026) found that hotels in developing tourism markets tend to prioritise visible and practical smart features that directly enhance guest experience.

Participants emphasized that smart hotel implementation must vary across hotel segments. Budget and capsule hotels were seen as more suitable for automation-intensive models, while higher-end hotels require technology that enhances personalised service. Segment-specific strategies were viewed as critical to maintaining brand identity. Uniform implementation was perceived as inefficient and misaligned. P7 described Batam's tourism market as structurally distinctive:

> *"In Batam, they see it as a destination that has nature and cheap prices compared to their place. And next, Batam is already a shopping heaven with affordable prices. Batam's market is unique because our main guests come from Singapore and Malaysia. Their expectations shape how we implement technology."* (P7)

Hotel managers emphasised that demand-driven digitalisation is essential. P1 explained:

> *"If we look at the age that often comes to visit relative to nowadays, Singaporean tourists are still young. If they are old, they will just follow the trend. The definition of younger generation is that they are simplifying. They don't want to be*

*complicated. They do everything online. So, if the market has shifted there, we as a product must also be able to follow there. Smart features must follow guest expectations. We cannot copy models from other cities; Batam has its own market behaviour."* (P1)

The findings indicate that market demographics significantly influence technology adoption decisions among hotels in Batam. Younger international visitors were consistently associated with expectations for speed, convenience, and seamless digital interaction. Rather than pursuing technology for symbolic modernisation, hotel managers viewed smart features as tools for maintaining market competitiveness and adapting to changing customer behaviour. From the researcher's perspective, this reflects a context-sensitive approach to digital transformation in which smart hotel implementation is negotiated through local tourism characteristics and consumer expectations rather than global technological trends alone. Government officers reinforced this need for contextual alignment. P9 stated:

*"Smart hotel strategies must align with Batam's tourism profile. Our international guests expect seamless digital experiences. Tourists will see Batam not just as a shopping or transit destination, but also as a city ready to welcome them with modern comforts. With technology like smart rooms, guests feel cared for and served according to their preferences. This will create a positive impression and encourage repeat visits."* (P9)

Several managers stressed that different hotel segments require different technological approaches. P3 noted:

*"Yes, the smart hotel that is close to the resort or resort location, private, affordable, full automation, I think it can be an innovation or a unique characteristic that can be sold to the bottom market and it becomes unique. Capsule and budget hotels need more automation, while higher-end hotels need smarter service quality. The market segment determines the technology."* (P3)

P5 illustrated the strategic importance of tailoring smart features:

*"Digitalization must match what guest value. For some guests, speed matters; for others, comfort matters. This also indicates to the advanced technology used, the advanced system is used, that is the SDM, whether it's from the file ranking or from the leader. The advanced technology we use, as advanced as anything, as smart as the system used, but if it doesn't support the SDM, it will be wasted. The opposite is*

*the same, as smart as the SDM, but not supported by the system, it's the same. It won't work either."* (P5)

Participants also demonstrated that smart hotel implementation is highly dependent on hotel segmentation and organisational capability. Automation-intensive systems were perceived as more suitable for budget and capsule hotels, whereas higher-end hotels were expected to combine technology with personalised hospitality services. These findings suggest that participants do not perceive smart hotel implementation as a uniform strategy applicable across all hotel categories. Instead, implementation is viewed as highly contingent upon brand positioning, guest expectations, workforce readiness, and service orientation. This finding supports Hassan and Eassa (2025), who argued that excessive automation may reduce perceived hospitality authenticity in premium hotel environments. Similarly, López-Bonilla et al. (2025) emphasised that operational preparedness and service identity significantly influence digital transformation strategies within hospitality operations. Government officers also highlighted the need for alignment with the destination's long-term branding. P11 explained:

*"I do not deny that Batam must be a backbone of tourism in Indonesia, that is Batam is also ready for technology, but Batam also provides a kind of sample, etalase for the Indonesian society that we also do not leave what is called hospitality field. Smart hotel must support Batam's branding as a competitive international destination. Technology must reinforce, not contradict, our identity."* (P11)

P10 added that context-oriented digitalisation will help attract higher-value markets:

*"If smart services are designed according to tourist expectations, Batam can attract more high-value visitors. Smart hotels in all of Batam have a different branding. There is a uniqueness. It can be a source of attraction for people who have a meeting in Batam. I think the most important smart features for Batam hotels are the simple, practical ones and reliable MICE facilities."* (P10)

Government officers consistently framed smart hotels as part of Batam's broader tourism branding and destination competitiveness strategy. Smart hotel development was not viewed solely as technological modernisation, but also as an effort to strengthen Batam's image as an internationally competitive and service-oriented tourism destination. The researcher interprets these findings as evidence that smart hotel transformation in Batam is closely connected to regional tourism positioning and

economic development objectives. This reflects broader smart tourism literature which emphasises the integration of hospitality digitalisation within destination branding and urban competitiveness strategies (Ashfaq et al., 2025; Chen et al., 2025). Finally, P4 emphasised that contextual smart design also prevents investment waste:

> *"In my opinion, Batam as a region is said to be a developed region compared to other cities. We really need the implementation of this smart hotel. Because if there is one hotel or several hotels that implement this smart hotel system, it will definitely be supported by local guests or international guests, of course. Especially since we are in Batam, the class is international. We need to adopt the right technology for our guests. If we implement features they don't value, it becomes wasted investment."* (P4)

The findings further reveal that investment efficiency remains a major consideration influencing smart hotel implementation decisions. Participants repeatedly emphasised that technologies perceived as irrelevant to guest expectations may create financial burdens without generating meaningful competitive advantage. This indicates that smart hotel transformation in Batam is approached cautiously and pragmatically. Hotels appear to prioritise technologies with observable operational and market value while avoiding implementation strategies perceived as excessively costly or commercially uncertain. This finding is consistent with Soliman et al. (2025), who found that financial sustainability and implementation practicality remain central concerns among hotels operating in emerging tourism destinations.

Market-oriented smart hotel implementation was consistently associated with operational relevance, investment efficiency, and destination competitiveness. Participants emphasised that technology should not be implemented merely to symbolise modernisation, but must correspond to actual guest expectations, market behaviour, and service priorities within Batam's tourism environment. The findings demonstrate that stakeholders perceive smart hotel transformation as a context-dependent and demand-driven process rather than a purely technology-centred initiative. Smart technologies were valued primarily for their ability to enhance convenience, improve service responsiveness, strengthen destination branding, and support long-term competitiveness. From the researcher's perspective, this subtheme reveals that the future of smart hotel implementation in Batam will likely depend on how effectively hotels balance technological innovation with contextual market realities. This highlights that smart hotel transformation in emerging tourism

destinations should be understood as an adaptive socio-technical process shaped by local tourism characteristics, organisational priorities, and evolving customer expectations.

### 4.11.3 Subtheme 3: Balancing High Tech and High Touch

Subtheme 3 explores how participants envision the future of smart hotels in Batam through a balanced integration of technology and human service. Participants consistently emphasised that digitalisation should enhance efficiency without affecting the emotional and interpersonal dimensions of hospitality. This vision reflects a hybrid philosophy of humanized digitalisation. Smart hotels are therefore imagined as environments where high-tech systems coexist with high-touch service.

This subtheme conceptualises the future of smart hotels in Batam as a hybrid model that balances technological efficiency with human-centred hospitality. Participants consistently rejected fully automated hotel models that eliminate interpersonal interaction. Instead, they articulated a vision of humanized digitalisation, where technology supports rather than replaces service encounters. Thus, rather than being completely technological settings, smart hotels are characterised as socio-technical systems.

Hotel managers emphasised that emotional warmth and personal interaction remain central to guest satisfaction. Participants argued that hospitality loses its essence when automation dominates service delivery. Technology was seen as valuable only when it helps staff focus more on guests rather than administrative tasks. This perspective reinforces the primacy of relational service in Batam's hospitality culture.

Several participants warned that insufficient automation may produce a "cold" or impersonal hotel atmosphere. Full digitalisation was perceived as potentially eliminating certain guest segments, particularly those with complex needs or cultural expectations of personal service. Participants emphasised the need to selectively digitise operational processes. This intentional boundary-setting between high-tech and high-touch functions is reflected in this selected approach.

Rather than replacing employees, smart technology was widely viewed as a tool to empower staff. Automation was expected to reduce routine workload, allowing employees to deliver more attentive and personalised service. Participants described

smart systems as backstage enablers that enhance frontline performance. This framing positions human resources as the core value creators within smart hotels. P3 said:

> *"In my view, building affordable, fully automated smart hotels near Batam's resorts is a strategic opportunity. This model offers a unique, innovative experience that directly appeals to budget-conscious tourists, providing a modern complement to the island's existing attractions and significantly boosting its competitive edge in tourism. Smart features should help guests feel cared for, not replace human interaction. Hospitality must feel personal."* (P3)

P6 explained that excessive automation risks reducing service warmth:

> *"Yes, exactly. We have to select which one can be digitized and which one must be used. For the total, I think it's not yet. Technology can make things efficient, but if everything becomes automated, guests may feel the hotel is cold."* (P6)

These findings suggest that participants do not perceive smart hotel transformation as complete technological substitution, but rather as selective digital enhancement. The emphasis on maintaining emotional warmth indicates that hospitality in Batam continues to be strongly associated with interpersonal interaction and relational service values. The researcher interprets this as evidence that stakeholders prioritise a context-sensitive form of digitalisation in which technology functions as a support mechanism rather than a replacement for human engagement. This finding reflects the socio-technical nature of smart hotel implementation, where operational efficiency must coexist with cultural expectations of personalised hospitality. This finding aligns with Hassan and Eassa (2025), who argued that excessive automation may reduce perceived service authenticity within hospitality environments. Similarly, Wong and Loo (2026) noted that hotels in emerging tourism destinations often favour hybrid implementation approaches that balance technological functionality with human-centred service delivery.

Government officers articulated a philosophical perspective on hospitality. P11 provided one of the clearest statements:

> *"The highest value in tourism is still the human touch. Technology must enhance, not eliminate, that experience. You said that the technology must be hybrid, which means it must be in conjunction with human interactive technology and interactive technology. Because clearly we hope that this development will contribute to efficiency and to more optimal service."* (P11)

The statement from P11 demonstrates that government stakeholders also conceptualise smart hotel development beyond technological modernisation alone. Human interaction was consistently positioned as the core element of tourism experience, while technology was viewed as an enabling mechanism for improving service quality and operational efficiency. From the researcher's perspective, this indicates that institutional stakeholders in Batam support a moderated form of smart tourism development rather than fully automated hospitality ecosystems. This differs from highly technology-driven smart hotel models commonly discussed in studies conducted in technologically advanced destinations such as South Korea and Singapore (Kim et al., 2025; Hsu, 2025). Participants noted that full automation may not suit all guests. P4 explained:

> *"Not all guests want everything automated. Some still prefer speaking to a staff member, especially for complex needs. When implemented, smart technology can improve operational efficiency, elevate the guest experience, and enhance Batam's reputation as an international-class destination. For the future, robust internet, local testing of solutions, and investment in smart infrastructure will be essential for successful implementation."* (P4)

P1 argued that technology should empower staff, not replace them:

> *"Smart hotel technology in Batam is seen as a tool to enhance efficiency and guest satisfaction through mobile check-ins, keyless access, and automated systems. However, full adoption faces significant barriers, including hesitant investment from owners, infrastructure limitations like unstable internet and electricity, and staff readiness. Smart systems should make staff more effective so they can focus on service, not paperwork."* (P1)

The findings further reveal that participants perceive guest preferences as heterogeneous rather than technologically uniform. While some guests may value convenience and automation, others continue to expect direct interpersonal interaction, particularly in situations involving complex requests or personalised assistance. The researcher interprets these findings as evidence that smart hotel implementation in Batam requires adaptive and flexible service design rather than universal automation. This reveals that technological adoption in hospitality should remain responsive to cultural expectations, demographic diversity, and varying levels of customer technology readiness. This finding supports Soliman et al. (2025), who found that customer acceptance of smart hospitality technologies varies significantly across market

segments and tourism contexts. Government officers stressed the need for balance in future development. P10 stated:

> *"Digitalisation must be balanced. Some services should be automated, but others must remain personal to maintain guest comfort. It is importance of combining technology with hospitality and suggests cooperation with travel destinations to enhance guest experience. In the future, Batam will be becoming a data centre hub supporting AI, which could boost smart hotel development."* (P10)

Hotel managers also noted that humanized digitalisation increases guest satisfaction. P5 said:

> *"Guests appreciate technology, but they value personal attention even more. When both are combined, satisfaction is highest. The future of smart hotels in Batam is optimistic, with expectations of more advanced automation, robotics, and seamless guest experiences, which will enhance Batam's appeal as a tourist destination. Ultimately, the integration of technology and smart human resources."* (P5)

Finally, P12 explained that balancing high-tech and high touch creates a competitive advantage:

> *"A hotel becomes successful when it blends technology with hospitality values. That is what differentiates Batam from other destinations. A key theme is the balance between high-tech efficiency and the traditional human touch essential in hospitality, advocating for a hybrid technology model. Sustainability and green tourism are emphasized, with smart energy applications and eco-friendly practices seen as future priorities."* (P12)

Collectively, these findings indicate that participants perceive the balance between high-tech efficiency and high-touch hospitality as a strategic differentiator for Batam's tourism industry. Rather than competing directly through technological sophistication alone, stakeholders envision Batam's smart hotel future through a hybrid hospitality model that integrates automation with personalised human service. The researcher interprets this as a context-sensitive implementation strategy shaped by Batam's regional tourism identity, operational realities, and cultural service expectations. This hybrid orientation also reflects broader concerns regarding sustainability, workforce adaptation, and long-term service quality within digitally transforming hospitality environments. This finding reinforces the argument of socio-technical systems theory, which suggests that technological transformation outcomes are strongly influenced by interactions between technological systems, human actors,

and organisational environments rather than technology alone.

Participants recognised that guest preferences are heterogeneous, requiring flexible service design. Some guests value speed and automation, while others prefer direct interaction with staff. A hybrid smart hotel model allows hotels to accommodate both preferences simultaneously. This adaptability was seen as critical for Batam's diverse international and regional markets.

Balancing high-tech and high-touch was ultimately framed as a strategic differentiator for Batam's hospitality industry. Participants consistently viewed humanised digitalisation as a way to strengthen competitiveness without sacrificing the relational qualities traditionally associated with hospitality services. The hybrid model was therefore positioned not only as a technological strategy, but also as a socio-cultural adaptation to the local tourism environment. The researcher interprets these findings as evidence that smart hotel implementation in Batam is evolving through negotiated interaction between technological innovation and hospitality identity. Rather than pursuing full automation, stakeholders appear to favour selective and contextually appropriate digital transformation aligned with operational practicality, guest expectations, and cultural service norms. Across all themes, the findings consistently demonstrate divergence between managerial and institutional logics in interpreting smart hotel implementation. Hotel managers tended to emphasise operational feasibility, workforce adaptation, and service practicality, whereas government stakeholders focused more strongly on destination competitiveness, digital transformation, and long-term tourism development. This divergence provides an important explanation for the fragmented and uneven implementation of smart hotel initiatives observed in Batam.

## 4.12 Integrating Findings with Aims & Questions

This section integrates the thematic findings with the research aim and research questions of the study. The themes generated through qualitative thematic analysis were systematically interpreted to address the objectives of the research and to explain the complexities surrounding smart hotel implementation in Batam. The integration process demonstrates how the empirical findings collectively explain stakeholders' perceptions, implementation practices, contributing factors, implementation challenges, and the

proposed conceptual understanding of smart hotel transformation within the Batam hospitality context. This analytical alignment strengthens the coherence and interpretive rigor of the study by directly linking the findings to the overall research purpose.

Table 4.4
Research Questions and Related Theme

| Research Question | Related Themes | Key Interpretation |
|---|---|---|
| RQ1: How do stakeholders perceive smart hotel implementation in Batam? | Theme 1 | Stakeholders perceive smart hotels as gradual and selective digital transformation rather than fully integrated automation systems |
| RQ2: To what extent has smart hotel been implemented in Batam? | Theme 1 & Theme 2 | Smart hotel implementation remains limited, uneven, and primarily focused on basic digital technologies |
| RQ3: What factors contribute to smart hotel implementation in Batam? | Theme 2 & Theme 4 | Operational efficiency, competitiveness, customer expectations, and institutional support encourage implementation |
| RQ4: What are the challenges in implementing smart hotels in Batam? | Theme 3 & Theme 4 | Financial limitations, infrastructure readiness, organisational capability, and workforce adaptation constrain implementation |
| RQ5: What is the proposed model of smart hotel implementation in Batam? | Theme 5 & Emergent Framework | Smart hotel transformation in Batam is context-dependent, gradual, and shaped by socio-technical interactions |

The findings demonstrate that smart hotel implementation in Batam cannot be understood solely as a technological issue. Instead, the implementation process reflects interactions between operational preparedness, operational priorities, policy coordination, stakeholder perceptions, and contextual limitations. Across the themes, participants consistently described smart hotel transformation as gradual, selective, and strongly influenced by practical implementation realities within the local hospitality industry. The alignment between the themes and research questions further indicates that smart hotel implementation in emerging tourism destinations differs substantially from the highly integrated models commonly discussed in existing literature. These findings reinforce the importance of understanding smart hotel transformation as a

socio-technical and context-sensitive process rather than a purely technology-driven transition.

This interpretation supports previous studies suggesting that smart hotel transformation should be understood as a socio-technical and contextually embedded process rather than merely technological adoption (Wong & Loo, 2026; López-Bonilla et al., 2025). Existing literature further indicates that implementation outcomes in emerging tourism destinations are frequently shaped by organisational capability, governance structures, and institutional readiness rather than technology availability alone (Hassan & Eassa, 2025; Kumar & Sharma, 2026). However, compared with studies conducted in technologically advanced tourism destinations, the Batam context demonstrates stronger dependence on gradual adaptation, operational practicality, and selective implementation approaches. While highly developed tourism environments often emphasise integrated automation and advanced digital ecosystems, the findings of this study indicate that hotels in Batam continue to prioritise technologies that are financially feasible, operationally relevant, and easier to implement incrementally. From the researcher's perspective, these findings reinforce the importance of developing context-sensitive smart hotel frameworks capable of reflecting the realities experienced by hospitality organisations operating within developing tourism environments. The findings also suggest that smart hotel transformation in Batam should be viewed as an adaptive and evolving process shaped by local operational realities rather than as a universal model of digital transformation.

## 4.13 Saturation as an Analytical Tool

Saturation confirms that the five themes represent stable and shared meanings across participants, providing a robust empirical basis for developing an emergent conceptual framework of smart hotel implementation. In this study, saturation serves not merely as a procedural checkpoint but as a central analytical tool that strengthens the credibility, integrity, and theoretical robustness of the findings presented in chapter 4 and their interpretation in this discussion chapter. Saturation is used here in line with the methodological commitments articulated in chapter 3 particularly the interpretivist orientation, phenomenological emphasis on shared meaning, and Braun and Clarke's (2006; 2021) thematic analysis approach, which defines saturation as the stabilisation

of conceptual insights rather than the mechanical repetition of codes. In this context, saturation provides compelling evidence that the themes derived from the 12 participants' eight hotel managers (P1–P8) and four government officers (P9–P12) represent coherent, consistent, and theoretically meaningful patterns that extend beyond individual subjectivity. The achievement of saturation therefore directly responds to the methodological challenge identified in chapter 1: the absence of an integrated, empirically grounded explanation of smart hotel implementation in Batam. Saturation confirms that the study has captured the full conceptual territory of participants' perceptions, experiences, and expectations, ensuring that the themes are not artefacts of sampling variation but represent the underlying structures of meaning that define the phenomenon.

The value of saturation as an analytical tool becomes especially evident when examining how each of the five themes demonstrates a high degree of stability across diverse participants' hotel managers operating at different organisational scales and government officers representing different institutional divisions. Theme 1, which examines perceptions of smart hotel implementation, achieved saturation through repeated narratives describing the implementation level as low, fragmented, and dominated by physical modernisation rather than integrated digital transformation. This repetition across nearly all participants supports the argument advanced by Domanski (2020) and Menegaki (2019) that emerging destinations frequently confuse digital modernity with true smart system transformation. Without saturation, the interpretive claim that Batam's digital transition is hindered by incomplete conceptualisation of "smartness" would be vulnerable to methodological critique; with saturation, the claim is grounded in stable empirical evidence.

Saturation also reinforces the explanatory power of theme 2, which explores expected benefits. The recurrence of dual expectation (operational efficiency and enhanced guest experience) across all interviews reflects the global logic of digital transformation described by Triantafyllou et al. (2022) and Molina-Castillo et al. (2023). This consistency demonstrates that the motivational structure underpinning digital implementation in Batam is not random but aligns with the dominant value propositions of smart hotel identified in the literature. The saturation of benefit expectations thus reinforces the interpretive claim that hotels in Batam are motivated by the same operational imperatives documented internationally, even though their implementation capacity differs.

Theme 3, which examines financial, human resource, and infrastructural constraints, represents one of the strongest demonstrations of saturation. Every participant, regardless of role, cited financial costs, limited digital competence, and unstable connectivity as core barriers. This convergence mirrors the structural constraints emphasised in the literature reviewed in Chapter 2, including Shani et al. (2023), Sharma and Gupta (2021), and Kim and Han (2020), all of whom argue that digital transformation in hospitality is shaped by intertwined economic, organisational, and technological readiness factors. The saturated recurrence of these three constraints across stakeholder groups confirms the theoretical coherence of the findings and validates their categorisation within the domains of environmental barriers and operational preparedness. The use of saturation here ensures that these constraints are interpreted not as context-specific operational issues but as structural forces that systematically shape digitalisation in Batam, thereby eliminating any methodological weakness that would arise from interpreting isolated responses as sector-wide conditions.

The interpretive strength of theme 4, concerning the role of government and supporting institutions, is also significantly enhanced by saturation. All participants repeatedly described policy ambiguity, fragmented coordination, and infrastructure gaps as systemic issues that influence the direction and pace of smart hotel development. This shared recognition across hotels and government stakeholders aligns with the governance-oriented analyses of smart tourism implementation reviewed in chapter 2, such as Triantafyllou et al. (2022) and Akel and Noyan (2024). Saturation thus provides empirical confirmation that institutional readiness is not merely an environmental factor but a central determinant of smart hotel adoption. The fact that both hotel managers and government officers independently emphasised the same institutional barriers strengthens the argument that Batam requires a more coherent digital policy architecture ensuring that this discussion is not conceptually overstated but empirically grounded.

Theme 5, which explores the future vision of smart hotels, also benefits substantially from saturation. Every participant expressed a similar belief that digital transformation in Batam will be gradual, contextually adaptive, and balanced between high-tech solutions and high-touch service values. This cross-participant consistency confirms the future-oriented logic, which conceptualises strategic direction as emerging from interactions between perceptions, benefits, constraints, and institutional conditions. Saturation also positions this theme within global theoretical debates on

contextual smart tourism (Gretzel et al., 2015; Lei et al., 2023), demonstrating that Batam's stakeholders anticipate a hybrid model of smart hotel that aligns with evolving international standards while recognising local market characteristics. Without saturation, such a forward-looking claim could appear speculative; with saturation, the interpretation is grounded in stable, repeated patterns of expectation and strategic foresight.

Overall, using saturation as an analytical tool reinforces methodological rigour by demonstrating that the themes developed in chapter 4 and interpreted in this discussion are not only internally valid but externally coherent with the theoretical constructs and empirical debates presented in chapter 2. The consistency of the findings across diverse participants confirms that certain refinements particularly concerning market context, human resource capability, and institutional coordination are necessary. By positioning saturation not as a procedural endpoint but as a methodological anchor, this study ensures that the discussion presented in chapter 4 is grounded, credible, and theoretically aligned, thereby avoiding methodological flaws. Because saturation confirms that each theme represents a stable and shared structure of meaning across participants, it provides a sound empirical basis for exploring the dynamic linkages between the five themes as an interconnected system shaping smart hotel implementation in Batam.

## 4.14 Linkages between the Five Themes

This section synthesises the five themes by demonstrating how they collectively address the research aim and research questions. The findings reveal that smart hotel implementation in Batam is shaped by stakeholders' interpretations, expected benefits, structural constraints, institutional conditions, and future aspirations. Together, these elements form a coherent, empirically grounded explanation of how smart hotel practices are understood, negotiated, and implemented within Batam's socio-technical context. The synthesis provides a robust foundation for the development of an emergent conceptual framework and the theoretical and practical implications discussed in the following chapter.

The first link emerges between theme 1 (Perceptions of Smart Hotel Implementation) and theme 2 (Expected Benefits). Participants' perception that smart

hotels in Batam remain at an early, fragmented stage of digital transformation directly influenced the types of benefits they expected from future technological integration. Because participants viewed current implementation as limited mostly to physical modernisation and incremental digital upgrades, they focused on immediate, pragmatic benefits such as operational efficiency and improved guest experience rather than more advanced, analytics-driven or fully autonomous systems. This relationship mirrors arguments in the literature particularly Domanski (2020), Kim and Han (2020), and Wang (2024) which assert that perceptions act as cognitive filters that determine which benefits are seen as attainable and therefore prioritised. The saturation of these patterns across hotel managers and government officers confirms the robustness of this linkage: limited perceptions yield pragmatic expectations. This linkage validates stakeholder perceptions shape the perceived benefits and strategic motivations for smart hotel implementation.

A second analytically significant linkage emerges between theme 2 (Expected Benefits) and theme 3 (Implementation Challenges). While participants consistently articulated optimistic expectations particularly in relation to operational efficiency and enhanced guest experience these anticipated benefits were persistently moderated, constrained, and at times eclipsed by the financial, human resource, and infrastructural barriers foregrounded in theme 3. Participants' limited capacity to fully realise these expectations underscores that perceived benefits do not operate as intrinsic drivers but are contingent upon the presence of adequate organisational capabilities and supportive external conditions. Analytic saturation across the dataset further revealed that financial risk exposure, workforce instability, technical unpreparedness, and infrastructural constraints systematically neutralised or deferred the materialisation of expected benefits.

This relational dynamic shows that themes 2 and 3 form a tension pair: expectations motivate digitalisation, but constraints shape its feasibility. A third linkage is observed between theme 3 (Constraints) and theme 4 (Government and Institutional Support). The saturated data reveal a clear and consistent pattern: the magnitude of financial, HR, and infrastructural constraints cannot be understood solely as internal organisational weaknesses but must be interpreted as consequences of broader institutional readiness and governance coordination. Participants consistently described how unclear policy direction, weak inter-agency coordination, insufficient incentives, and uneven digital infrastructure deepen organisational constraints. This linkage is

strongly supported by the literature review discussed in chapter 2 especially Triantafyllou et al. (2022), and Akel and Noyan (2024) which emphasises that institutional environments shape organisational capabilities and limit or enable the implementation of technological innovations. Saturation across stakeholders indicates that this linkage is not perceived abstractly but experienced concretely and consistently.

A fourth linkage connects theme 4 (Government and Supporting Infrastructure) with theme 5 (Future Vision), where participants' long-term expectations for smart hotel development are directly shaped by their assessment of government readiness, infrastructural strength, and policy clarity. Saturation revealed that participants do not imagine smart hotel transformation as rapid or uniform but as gradual, contextual, and contingent on institutional improvement. The future orientation described in theme 5 emphasising a hybrid high-tech/high-touch model and alignment with Batam's unique market segments, cannot be separated from theme 4's insights about coordination challenges, infrastructural gaps, and policy fragmentation. Participants repeatedly stated that the future trajectory depends on government capacity building, infrastructure expansion, and clearer regulatory frameworks.

This linkage aligns with the socio-technical and smart governance literature in chapter 2, including Gretzel et al. (2015), which emphasises that future smart tourism development is fundamentally dependent on institutional orchestration and ecosystem-level readiness. The fulfilment of future visions (Theme 5) is therefore not merely aspirational but structurally dependent on theme 4. The fifth and overarching linkage integrates theme 1 (Perceptions) and theme 5 (Future Vision), forming a cyclical relationship that ties the initial diagnostic understanding of the present to long-term strategic expectations. Saturation revealed that stakeholders' understanding of smart hotels as incremental, partial, and transitional heavily shapes their expectations for a gradual and realistic future trajectory. This cyclical linkage reflects Rumelt's (2011) strategic logic diagnosis informs future-oriented strategy and aligns with the literature reviewed in chapter 2 that describes smart hotels as evolving systems rather than static endpoints. The saturated patterns across participants confirm that future visions are not disconnected predictions but are extensions of their interpretive understanding of the present. In conclusion, the linkages between the five themes form a coherent, saturated, and theoretically aligned analytical structure that reinforces the systemic nature of smart hotel implementation in Batam.

Through saturation, the methodological strength of these inter-theme linkages is established, ensuring that the discussion remains empirically grounded, theoretically consistent, and methodologically rigorous in line with chapters 1, 2, and 3. The interrelationships between the five themes reveal that smart hotel implementation in Batam follows a gradual, hybrid, and context-dependent pathway rather than a linear technological implementation model. Existing frameworks do not fully capture these dynamics within emerging, border-based tourism destinations. Consequently, the Smart Hotel Implementation Model is required to synthesise the empirical insights and provide a structured representation of how technological infrastructure, operational preparedness, and ecosystem support interact in Batam.

The themes identified in this study should not be interpreted as isolated dimensions of smart hotel implementation. Instead, the findings demonstrate significant interrelationships between stakeholder perceptions, operational preparedness, digital capability, implementation challenges, and regulatory support. Stakeholder perceptions influence implementation priorities, while financial and infrastructural limitations simultaneously shape implementation pace and future technological ambitions. These interconnected findings reinforce the argument that smart hotel implementation in Batam represents a socio-technical and contextually negotiated transformation process.

## 4.15 Emergent Conceptual Framework of Smart Hotel Implementation Model in Batam

This study adopts an interpretive qualitative approach; therefore, the conceptual framework should not be understood as a predictive or normative model. Instead, it represents an emergent synthesis derived from empirical data on how smart hotel implementation is interpreted and enacted by different stakeholder groups. The framework integrates the grounded meanings and implementation dynamics identified across Themes 1 to 5. It is intended to function as an analytical lens rather than an implementation blueprint.

This section presents an emergent conceptual framework developed inductively from the empirical findings of this study to explain how smart hotel implementation unfolds within Batam's specific socio-technical and institutional context. Consistent with the interpretivist paradigm, the framework is grounded in participants' shared meanings rather than imposed in advance from existing models. It synthesises the five

saturated themes into a coherent explanatory structure that reflects smart hotel implementation as a gradual, negotiated, and systemically embedded process, shaped by organisational capacities, institutional readiness, and future-oriented strategic considerations. In doing so, the framework responds directly to the research aim and addresses the conceptual gap identified in chapter 1 regarding the lack of context-sensitive models for smart hotel development in emerging tourism destinations.

Rather than conceptualising smart hotel implementation as a linear or technology-driven transition, the emergent framework captures the dynamic interdependencies between stakeholder perceptions, expected benefits, structural constraints, government and ecosystem support, and long-term strategic vision. It extends the theoretical foundations reviewed in chapter 2 by reassembling them through empirical insights derived from the Batam context, thereby enhancing both analytical coherence and practical relevance. The following sub-section outlines the key components and underlying logic of the framework before examining their interrelationships in detail.

This conceptual interpretation aligns with socio-technical perspectives proposed by Wong and Loo (2026), which emphasise that hospitality digital transformation emerges through interaction between technological systems, organisational behaviour, and institutional environments. Similarly, Hassan and Eassa (2025) argued that smart hotel implementation requires alignment between managerial capability, technological readiness, and governance support. However, unlike many existing frameworks derived from technologically advanced tourism destinations, the present framework demonstrates that smart hotel transformation in Batam evolves through gradual adaptation and selective implementation strategies shaped by contextual operational realities. The researcher interprets this framework as evidence that smart hotel implementation in emerging tourism destinations should be conceptualised as an adaptive and context-sensitive socio-technical transformation process rather than a universal technological progression model.

### 4.15.1 How the Conceptual Framework Emerged from Empirical Themes

The conceptual framework in this study emerged inductively from the empirical findings rather than from a pre-existing theoretical model. Although Themes 1 to 5 were

initially analysed as distinct categories, further interpretation revealed strong empirical interconnections among them. During interviews, hotel managers and government officers articulated overlapping concerns related to readiness, perceived value, implementation constraints, governance support, and future orientation. This indicates that smart hotel implementation in Batam is experienced as a relational and evolving process rather than a set of isolated factors.

The development of the conceptual framework followed an iterative and reflexive analytical process. After the initial thematic analysis was completed, the researcher engaged in constant comparison across themes and stakeholder groups to identify recurring patterns of meaning and interaction. This process involved moving back and forth between first-order codes, thematic categories, and higher-level abstraction, allowing relationships between themes to be progressively identified. Rather than treating themes as discrete outcomes, the analysis focused on how participant interpretations within one theme were frequently shaped by, and referenced to, issues captured in other themes.

During this continuous process, particular attention was paid to differences in interpretation between hotel managers and government officers. These differences revealed the presence of distinct but interacting logics that shaped how smart hotel implementation was understood and implemented in practice. For example, operational considerations discussed in relation to readiness and constraints were often closely linked to how managers evaluated the benefits and risks of smart hotel initiatives. Conversely, institutional perspectives articulated by government officers frequently connected governance mechanisms and future-oriented strategies to broader destination development objectives. These relational patterns across stakeholder groups informed the abstraction of higher-order analytical categories that underpin the conceptual framework.

Importantly, the framework was constructed by abstracting patterns of participant sense-making and implementation dynamics rather than isolating variables or specifying causal relationships. The analysis emphasised how meanings, expectations, and constraints co-evolved within the local context of Batam's hospitality sector. As a result, the framework captures how smart hotel implementation is currently understood and negotiated by participants. It also reflects how such implementation is projected forward, rather than prescribing an idealised or linear pathway.

Accordingly, the conceptual framework should be understood as an emergent

and context-specific analytical synthesis. Its purpose is to integrate empirical insights generated across Themes 1 to 5 and to provide a coherent interpretive lens for understanding the socio-technical and institutional dynamics of smart hotel implementation in Batam. The framework does not claim predictive or universal validity but instead offers a grounded representation of stakeholder interpretations that informs the integrative analysis presented in the following sections.

### 4.15.2 Overview of the Emergent Conceptual Framework

Building on the preceding explanation of how the conceptual framework emerged from empirical themes, this section provides an overview of the emergent conceptual framework of smart hotel implementation in Batam. The framework synthesises the empirical themes into a coherent interpretive explanation of how smart hotel implementation is currently understood, experienced, and projected by key stakeholders in the local hospitality context. The conceptual framework integrates insights derived from interviews with hotel managers and government officers, capturing how different stakeholder groups make sense of smart hotel implementation within Batam. Rather than presenting a linear or prescriptive pathway, the framework reflects the interconnected and evolving nature of smart hotel development as articulated by participants. In this sense, the framework functions as an analytical representation of stakeholder sense-making rather than as an implementation blueprint.

Built upon the themes and sub-themes presented in Chapter 4, the framework captures the dynamic interplay between five major domains identified in the findings: participant perceptions of smart hotel implementation, expected benefits and value constructions, implementation challenges and constraints, government and ecosystem support, and the envisioned future direction of smart hotel in Batam. These domains are not treated as discrete or independent elements, but as interrelated aspects of an ongoing socio-technical and institutional process. Overall, the emergent conceptual framework provides a contextually grounded overview of how smart hotel implementation unfolds in Batam, integrating multiple participant perspectives into a single analytical lens. By consolidating fragmented empirical insights into an integrative structure, the framework sets the foundation for the subsequent sections, which examine the empirical grounding of individual framework components and the stakeholder logics embedded within them.

### 4.15.3 Empirical Grounding of Framework Components

This section explains the empirical grounding of each component of the emergent conceptual framework of smart hotel implementation in Batam. The framework draws directly on interview findings presented in chapter 4. Its components are articulated as analytically abstracted domains reflecting recurring patterns of participant interpretation, motivation, constraints, and future orientation. Each domain is empirically grounded and theoretically sensitised by relevant literature, ensuring the framework remains data-derived rather than conceptually imposed.

1. Stakeholder Perceptions

   Stakeholder perceptions constitute the cognitive and interpretive foundation of the Conceptual Framework of Smart Hotel Implementation in Batam. Interview findings revealed that hotel managers and government officers consistently differentiate between modernization, referring to surface-level upgrades such as digital locks, online check-in, or aesthetic technological enhancements and true digital transformation, which involves integrated systems, automation, data-driven decision-making, and interoperable digital ecosystems. Statements such as "*there is no real smart hotel in Batam yet*", "*most hotels are modern but not smart*", and "*digitalisation remains partial and superficial*" demonstrate the shared belief that Batam's hospitality sector is still far from achieving the level of smart capability seen in more advanced destinations.

   This perceptual distinction is not merely semantic; it is aligned with the digitalisation continuum proposed by Buhalis and Leung (2018) and the smart service experience framework by Kabadayi et al. (2019), both of which emphasise that smart technology implementation is gradual and exists on a spectrum. Stakeholders also expressed that smart transformation may require 20–30 years, reflecting low confidence in current readiness, limited financial appetite for large-scale investments, and uncertainty about technological feasibility. Consequently, the conceptual framework positions stakeholder perceptions as the first and most influential domain, shaping investment decisions, risk tolerance, strategic priorities, and reliance on international hotel chains to introduce advanced technologies. In Batam, perceptions act as a gatekeeping mechanism, filtering what stakeholders consider realistic, necessary, or strategically appropriate.

2. Expected Benefits

The second domain of the Conceptual Framework of Smart Hotel Implementation in Batam reflects the strong motivational role of perceived benefits in driving smart hotel implementation. Interview data in chapter 4 showed consistent emphasis on two areas: operational efficiency and enhanced guest experience. Participants noted that integrated systems reduce manual workloads, minimise human errors, streamline reporting and documentation, accelerate check-in and check-out processes, and create real-time managerial visibility. These accounts mirror findings from global literature such as Yang et al. (2021), who identified perceived usefulness and system efficiency as determinants of smart hotel implementation, and Buhalis and Moldavska (2021), who highlighted that smart technologies enhance service accuracy and responsiveness.

Guest experience improvements were also repeatedly emphasised. Participants described how guest particularly international visitors expect fast, seamless, and digitally enabled services, observing that "guests want everything fast and seamless" and "international tourists expect digital processes by default". These expectations create competitive pressure, especially given Batam's proximity to Singapore and Johor, where hotel technology standards are significantly higher. As shown in chapter 2, the literature consistently frames smart technologies as tools that empower guests through personalisation, convenience, and autonomy. Therefore, the conceptual framework conceptualises expected benefits as pull factors or forces that attract hotels toward technological innovation even when structural constraints are substantial. This domain captures the underlying motivations that sustain interest in smart transformation despite limited readiness across many hotels.

3. Implementation Challenges

Implementation challenges emerged in chapter 4 as the most heavily saturated domain, underscoring the pervasive and multi-layered barriers that hotels face. Financial constraints were repeatedly cited as the primary barrier. Participants described high implementation costs, long return-on-investment periods, dependence on expensive systems such as Opera, and the unstable economic environment of Batam's tourism sector. Statements such as "local hotels follow the concept but cannot afford the systems" and "investment is risky because occupancy

fluctuates" reflect resource scarcity and capital risk aversion. These findings are consistent with Putri et al. (2023), who identified cost as a major inhibitor of robotics adoption in hospitality. Human resource challenges include limited digital literacy, resistance to change, inadequate training, and high staff turnover. Participants emphasised that technological tools fail when staff are not competent or confident in using them, reinforcing the conclusion that HR readiness remains significantly behind technological ambition. This aligns with Yağmur et al. (2024), who argued that smart technology implementation depends heavily on employee competence and organisational digital culture.

Infrastructure limitations including unstable internet connectivity, insufficient bandwidth, fragmented systems, and high dependency on external vendors were also widely reported. Participants noted that "if the internet drops, the entire system freezes", illustrating the fragility of current digital infrastructure. These issues echo Sharma and Gupta (2021), who identified infrastructural readiness as a prerequisite for IoT-based smart solutions. Within the conceptual framework, these challenges serve as structural bottlenecks that slow or restrict progress toward meaningful digital transformation. They moderate the relationship between expected benefits and actual implementation, explaining why stakeholders perceive smart development as slow, uneven, and long-term.

4. Government and Ecosystem Support

The fourth domain recognises the significant role of government and ecosystem actors in shaping the technological trajectory of Batam's hospitality sector. Interview findings showed that, although Batam has smart tourism and smart city initiatives, these frameworks remain broad and do not translate into clear operational guidelines for hotels. Participants frequently observed misalignment between agencies, unclear institutional responsibilities, and fragmented digital infrastructure planning. For example, tourism authorities focus on promotional strategies, whereas infrastructure bodies prioritise connectivity, yet smart hotel development requires coordinated action across these domains.

Government officers themselves acknowledged these gaps, noting that cross-agency coordination is difficult due to differing mandates, budgets, and priorities. This structural fragmentation creates uncertainty for hotels, slowing adoption and reducing confidence in long-term digital investment. These findings

directly align with the Smart Tourism Ecosystem perspective advanced by Gretzel (2018), which positions government coordination, ICT investment, and policy consistency as central pillars of smart destination development. Similarly, Ivanov and Webster (2019) argue that regulatory clarity and supportive policy frameworks accelerate technological implementation in hotels. Within the Conceptual Framework of Smart Hotel Implementation in Batam, government and ecosystem support function as enabling or disabling conditions. When coordination is strong and infrastructure is reliable, hotels are more willing to implement advanced technologies. When these conditions are weak, even highly motivated stakeholders remain constrained by uncertainty and risk.

5. Future Vision

The fifth domain reflects the strategic vision articulated by stakeholders regarding the long-term direction of smart hotel implementation in Batam. Participants envisioned a gradual and adaptive transformation, noting that Batam is unlikely to move toward fully automated hospitality in the near future. Instead, they emphasised a hybrid approach that balances technological efficiency with humanised service. This view is consistent with the concept of humanised digitalisation discussed by Kabadayi et al. (2019) and supported by Triantafyllou et al. (2022), who found that smart systems cannot replace personalised service in culturally rich hospitality environments. Stakeholders also highlighted that the future direction of smart hotels must align with Batam's market characteristics and tourism identity. International tourists may welcome automation, but many regional visitors still value warm interpersonal interactions. Therefore, the conceptual framework positions the future vision domain as a strategic horizon, representing the aspirational yet pragmatic direction of smart transformation-contextual, realistic, and guided by local cultural values and market behaviour.

Together, these five domains form the integrated Conceptual Framework of Smart Hotel Implementation in Batam. The conceptual framework synthesises stakeholder cognition, motivational drivers, structural barriers, institutional influences, and long-term strategic perspectives. Each domain interacts dynamically: perceptions shape expectations, expectations motivate adoption, challenges constrain feasibility, government support enables systemic readiness, and future vision provides strategic alignment. It represents a holistic, context-sensitive, and theoretically coherent

conceptual framework that accurately reflects how smart hotel implementation is unfolding in Batam's complex socio-technical environment. To integrate these domains into an integrated conceptual representation, the next section looks at how they interact and inform one another.

### 4.15.4 Interrelationships between Framework Components

The previous section demonstrated that each component of the conceptual framework is firmly supported in empirical evidence obtained from participant interviews. This section integrates those empirically grounded domains and explains how they relate to one another in shaping the dynamics of smart hotel implementation in Batam. The concept shows a collection of interconnected interpretative and structural factors that collectively affect implementation directions rather than linear or causal pathways. Figure 4.1 presents the emergent conceptual framework of smart hotel implementation in Batam by visually synthesising the five empirically derived domains identified in this study: participant's perceptions, expected benefits, implementation challenges, government and ecosystem support, and future-oriented visions.

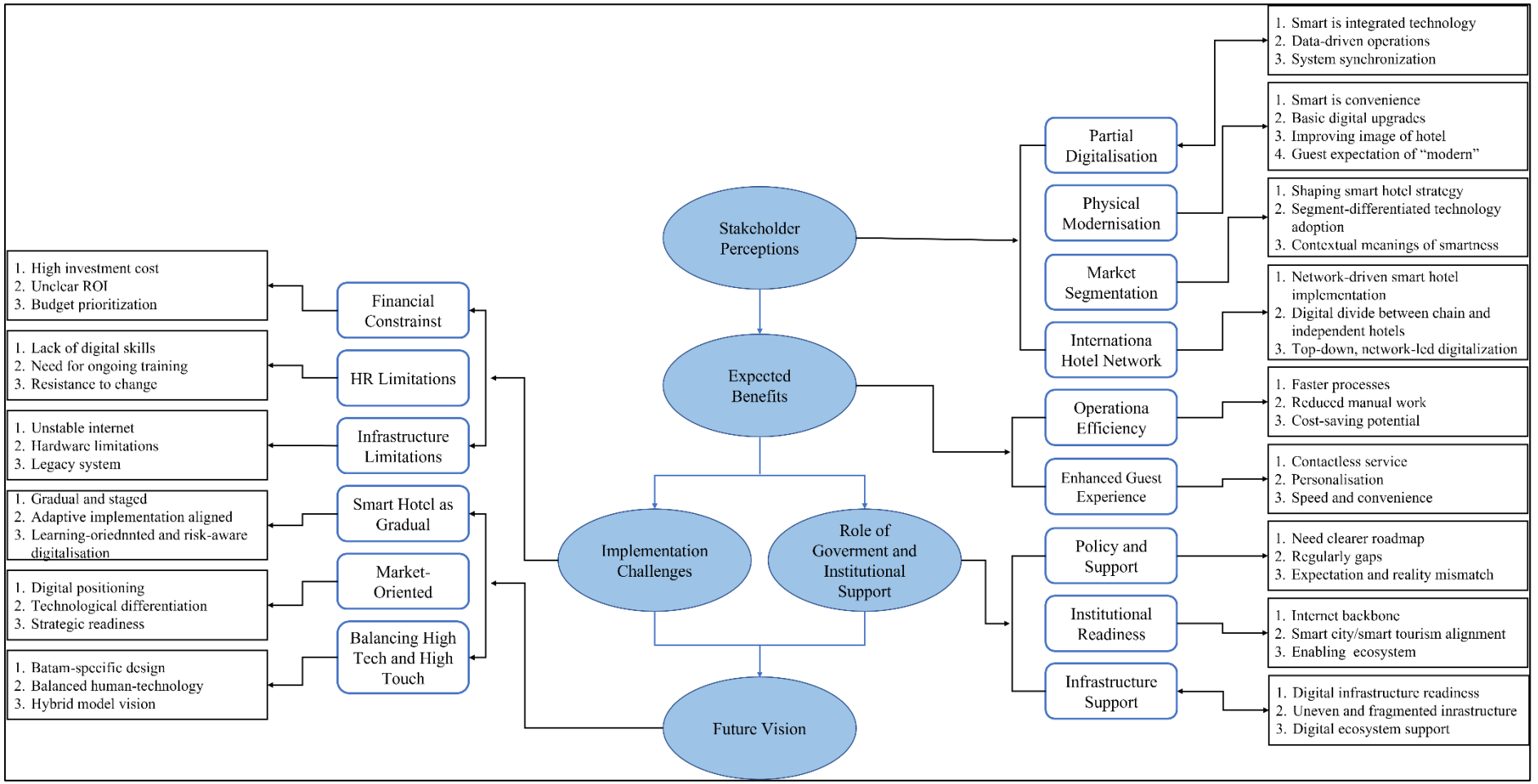


Figure 4.1 Conceptual Framework of Smart Hotel Implementation Model in Batam

Source: Developed by the researcher based on the synthesis of thematic analysis findings

#### *4.15.4.1 Interpreting the Interrelationships*

Within the framework, stakeholder perceptions function as an initial interpretive lens through which smart hotel implementation is evaluated. Empirical findings indicate that distinctions between surface-level modernisation and deeper digital transformation shape how stakeholders assess feasibility, perceived risk, and strategic relevance. These perceptions influence which forms of technology are considered appropriate. They also affect the pace and scope of implementation.

Expected benefits, particularly operational efficiency and enhanced guest experience, interact with participant perceptions by providing motivational justification for implementing smart technologies. These benefits help legitimise engagement with smart initiatives among participants. However, the findings show that perceived benefits are continually assessed against operational preparedness and contextual constraints. As a result, implementation tends to be cautious, selective, and incremental.

Implementation challenges are understood within the framework as constraining conditions that moderate the translation of perceived benefits into practice. Financial limitations, human resource capacity, and infrastructural fragility restrict the depth and consistency of implementation. These constraints do not operate in isolation but interact with one another. Together, they shape fragmented and risk-averse implementation patterns, reinforcing perceptions of smart transformation as a long-term and uneven process.

Government and ecosystem support intersect with all other domains by shaping the institutional and infrastructural environment in which hotel-level decisions are made. Empirical findings indicate that regulatory clarity, inter-agency coordination, and infrastructure planning influence stakeholder confidence and readiness. These forms of support affect how participants interpret risks and opportunities. Within the framework, government and ecosystem support are therefore understood as contextual conditions through which perceptions, motivations, and constraints are negotiated in practice.

Finally, the future vision domain provides a temporal and strategic orientation that links present implementation realities with longer-term aspirations. Stakeholders emphasise gradual, contextual, and hybrid forms of transformation. This emphasis reflects efforts to reconcile anticipated benefits with existing constraints and institutional conditions. As such, the future vision functions as an interpretive horizon

that guides expectation-setting and strategic prioritisation rather than prescribing a fixed pathway.

#### *4.15.4.2 A Relational and Non-Linear Framework*

When considered collectively, the interrelationships shown in Figure 4.1 suggest that the implementation of smart hotels in Batam is best understood as a relational and non-linear process. Rather than progressing through a fixed sequence of stages, implementation emerges through ongoing interactions among participant perceptions, perceived benefits, structural constraints, institutional conditions, and future-oriented aspirations. These elements do not operate independently or in a hierarchical order; instead, they mutually shape how smart hotel initiatives are interpreted, prioritised, and implemented within specific organisational and policy contexts.

The empirical findings suggest that cognitive interpretations play a central role in mediating how other framework components are negotiated. Participant perceptions of what constitutes "smartness" influence how expected benefits are valued, how constraints are assessed, and how risks are tolerated. At the same time, structural limitations such as financial capacity, human resource readiness, and infrastructural reliability continuously reshape these perceptions, often reinforcing cautious and incremental approaches. This interdependent relationship underscores the non-linear nature of implementation, in which progress remains uneven, adaptive, and highly dependent on changing organisational and environmental conditions.

Institutional and ecosystem factors further complicate this relational dynamic. Government policies, regulatory clarity, and inter-agency coordination shape the broader environment in which hotel-level decisions are made, affecting both perceived feasibility and strategic confidence. However, regulatory support does not function as an external driver that automatically enables implementation. Instead, it is interpreted and operationalised through existing organisational capacities, stakeholder expectations, and contextual realities, highlighting the co-constitutive relationship between institutional conditions and local practice.

Lastly, participants' future-oriented visions introduce a temporal dimension that connects present limitations with long-term aspirations. Rather than representing a fixed or idealised end-state, these visions reflect an adaptive orientation toward gradual,

selective, and context-sensitive transformation. Future orientation therefore functions as a sense-making mechanism within the conceptual framework, enabling stakeholders to balance strategic ambition with operational realism.

The proposed framework demonstrates that smart hotel implementation in Batam is not merely a technological adoption process, but a dynamic socio-technical transformation shaped through continuous interaction between operational preparedness, digital capability, regulatory support, and market expectations. Unlike many existing smart hotel models that predominantly emphasise technological integration and operational efficiency, the present framework highlights gradual transformation, contextual adaptability, and stakeholder interpretation within emerging tourism destinations. By capturing these relational and non-linear dynamics, the framework offers an interpretive and context-sensitive explanation of smart hotel implementation in Batam rather than a prescriptive model of best practice.

### 4.15.5 From Empirical Findings to Conceptual Integration

This section synthesises the empirical findings of the study into an emergent conceptual framework capturing how smart hotel implementation is currently understood and enacted in Batam. Based on in-depth interviews with hotel managers and government officers, the analysis progressed from detailed coding and thematic development to higher-level conceptual abstraction. The framework was not imposed a priori but developed through iterative engagement with the data. It reflects recurring patterns of interpretation, motivation, constraints, institutional influence, and future orientation.

The five themes consist of stakeholder perceptions, expected benefits, implementation challenges, government and ecosystem support, and future vision are each grounded in empirical evidence presented in chapter 4. These domains correspond directly to the thematic structure of the findings. They represent analytically abstracted expressions of participants' shared experiences and sense-making processes. By explaining the empirical basis of each component and their interrelationships, this chapter demonstrates how the framework is anchored in the lived realities of smart hotel implementation in Batam.

Importantly, the framework does not present a linear pathway or prescriptive roadmap for smart hotel development. Instead, it conceptualises implementation as a relational and non-linear process. This process is shaped by the interaction of cognitive interpretations, organisational capacities, structural constraints, and institutional contexts. Such an approach acknowledges the fragmented and incremental nature of technological transformation in an emerging tourism destination and avoids reducing complex dynamics to simplified causal relationships.

By tracing the analytical movement from data to conceptual synthesis, this chapter establishes a robust empirical foundation for the discussion that follows. The emergent conceptual framework offers a coherent interpretive lens for examining the study's findings. This lens enables engagement with existing literature, theoretical contributions, and practical considerations. Chapter 5 builds on this foundation by discussing the broader implications for theory, policy, and practice in the context of smart hotel and smart tourism implementation.

## 4.16 Chapter Conclusion

This chapter concludes that smart hotel implementation in Batam remains at an early and incremental stage, where technological adoption largely reflects physical modernisation rather than comprehensive digital transformation. The findings demonstrate that digitalisation in Batam's hospitality sector is shaped by the interaction of technological, organisational, and environmental factors, revealing smart hotel development as a complex and evolving socio-technical process. The five emergent themes: stakeholder perceptions of smart hotel implementation, expected benefits, implementation constraints, the role of government and regulatory support, and future-oriented strategic visions, collectively illustrate that the transition towards smart hotel in a developing destination such as Batam requires a contextual, adaptive, and collaborative approach in which technology adoption must be aligned with human resource readiness, organisational culture, and public policy support. Consistent with qualitative research conventions, this chapter has integrated the presentation of findings with data-driven analytical discussion to explain the relationships between themes and to develop an emergent conceptual framework grounded in participants' lived

experiences, with broader theoretical interpretation and implications addressed in chapter 5.

# CHAPTER 5
# DISCUSSION AND IMPLICATIONS

## 5.1 Chapter Overview

Building on the emergent and empirically grounded conceptual framework of smart hotel implementation developed in Chapter 4, this chapter extends the analysis beyond empirical findings to examine the theoretical, practical, and policy implications of the study within the broader discourse of smart hotel innovation. While Chapter 4 synthesised stakeholder perspectives and contextual conditions into a data-driven explanation of smart hotel implementation in Batam, this chapter interprets the significance of those findings for theory development, industry practice, and public governance. The discussion highlights that smart hotel implementation in Batam is a gradual and context-dependent process shaped by the interaction of technological, organisational, and environmental factors, underscoring the need to integrate institutional and socio-technical perspectives when examining digital transformation in developing destinations. This also indicates, this chapter reflects on the methodological and geographical limitations of the study and proposes directions for future research that are more longitudinal, comparative, and interdisciplinary, concluding that the transition towards smart hotel is not merely a technological exercise but a process of socio-technical evolution grounded in people, collaboration, and local context.

## 5.2 Re-visiting the Research Aim and Research Questions

This study aimed to explore how smart hotel implementation in Batam is perceived, interpreted, and enacted by hotel managers and government stakeholders within the local hospitality ecosystem. In addressing the five research objectives, the findings demonstrate that smart hotel implementation in Batam remains gradual, fragmented, and context-dependent rather than fully integrated or technologically standardised. The study further reveals that smart hotel transformation is shaped not only by digital capability, but also by organisational readiness, stakeholder interpretation, institutional coordination, financial capacity, and local operational

realities. These interconnected factors explain why smart hotel implementation in Batam progresses unevenly across organisations and how socio-technical adaptation influences the pace and direction of digital transformation within the hospitality industry.

The thematic findings generated from Chapter 4 demonstrate that the five research questions are analytically interconnected rather than conceptually isolated. Each theme contributes to explaining how smart hotel implementation unfolds through the interaction between stakeholder perceptions, organisational capability, technological readiness, regulatory support, and contextual operational constraints within Batam's hospitality industry. Stakeholder perceptions illuminate Research Question 1 (RQ1) by revealing how smart hotels are interpreted as both symbols of modernisation and operational transformation rather than fully integrated digital ecosystems. Variations in implementation practices address RQ2 by demonstrating the uneven and incremental nature of smart technology adoption across different hotel categories.

The findings further show that market competition, managerial commitment, and industry collaboration shape implementation trajectories, thereby addressing RQ3. At the same time, financial limitations, workforce readiness gaps, infrastructural inconsistencies, and institutional uncertainty collectively explain the multidimensional barriers identified in RQ4. Finally, the integration of these interconnected themes into an emergent contextual implementation model addresses RQ5 by translating empirical insights into a coherent conceptual explanation of smart hotel transformation within an emerging tourism destination.

Collectively, these findings confirm that the research aim has been achieved not through isolated thematic outcomes, but through an integrated interpretive understanding of how smart hotel implementation evolves as a dynamic and context-dependent socio-technical process in Batam. Having established the empirical alignment between the research questions and thematic findings, the discussion now situates these results within the broader body of smart hotel literature to examine areas of theoretical convergence, contextual adaptation, and conceptual contribution.

The findings reveal that smart hotel implementation in Batam reflects a gradual and context-sensitive transformation process rather than a comprehensive technological transition. While existing smart hospitality literature frequently conceptualises digital transformation as a progression toward integrated technological ecosystems, the Batam

context demonstrates that implementation evolves through selective adaptation, organisational negotiation, and operational pragmatism shaped by institutional and infrastructural realities. This suggests that smart hotel transformation within emerging tourism destinations cannot be adequately explained through linear technology adoption assumptions alone. This finding supports studies by Wong and Loo (2026), who argued that smart hotel implementation in emerging tourism destinations frequently develops incrementally due to organisational and infrastructural limitations.

Similarly, Hassan and Eassa (2025) found that hospitality organisations in developing destinations often prioritise selective and operationally practical technologies over fully integrated smart ecosystems. However, the findings differ from studies conducted in technologically advanced destinations such as South Korea and Singapore, where smart hotels are characterised by integrated AI systems, predictive analytics, and IoT-driven operational ecosystems (Kim et al., 2025; Hsu, 2025). These differences indicate that smart hotel transformation in Batam is strongly shaped by contextual realities including operational preparedness, regulatory support, and implementation practicality.

## 5.3 Discussion of Key Findings in Relation to Existing Literature

This section interprets the five themes presented in chapter 4 by situating them within the research aim articulated in chapter 1, the theoretical foundations reviewed in chapter 2, and the methodological stance outlined in chapter 3. To move beyond descriptive reporting, the following discussion focuses on the mechanisms, tensions, and contradictions shaping smart hotel implementation in Batam. Rather than reiterating the empirical findings, the discussion engages analytically with existing smart hotel and smart tourism literature to examine how the study's insights converge with, extend, or are contextualised by prior research. Saturation is employed here not merely as a procedural checkpoint but as an indicator that the recurring patterns identified across all twelve participants which consist of 8 hotel managers (P1–P8) and 4 government officers (P9–P12) represent stable and credible interpretations that meet the trustworthiness criteria established in chapter 3. Although the findings reflect well-established discussions on technological readiness, organisational capability, regulatory support, and market-driven digital transformation in the hotel sector, their

implementation in Batam is strongly shaped by the city's context as a developing border tourism destination, characterised by financial, institutional, and infrastructural constraints. Accordingly, this section moves beyond descriptive comparison to offer a contextually grounded interpretation of smart hotel implementation, positioning the five themes as interconnected components within a broader socio-technical system. The discussion begins by examining stakeholder perceptions, as these cognitive interpretations form the foundational lens through which smart hotel concepts are understood, evaluated, and translated into digital transformation practices in the Batam context.

The findings further demonstrate that smart hotel implementation in Batam remains uneven and fragmented across hotel categories, primarily due to financial, infrastructural, and operational preparedness limitations. This finding aligns with Kumar and Sharma (2026), who argued that hotels in emerging tourism destinations frequently adopt smart technologies selectively because of uncertain return on investment and operational risk concerns. However, the present study extends this discussion by demonstrating that selective implementation in Batam is shaped not only by financial considerations, but also by institutional uncertainty, uneven workforce readiness, and fragmented governance coordination. These findings indicate that implementation selectivity represents a broader socio-technical adaptation strategy rather than merely an economic response to technological investment risk.

Similarly, Soliman et al. (2025) suggested that smart hospitality transformation in developing environments commonly evolves through incremental adaptation rather than comprehensive technological integration. Nevertheless, unlike highly digitalised tourism destinations where implementation challenges are more strongly associated with optimisation and cybersecurity management, the Batam context reveals more fundamental constraints related to infrastructure readiness, workforce capability, and institutional coordination. Collectively, these findings suggest that smart hotel transformation in Batam is shaped not solely by technological capability, but also by wider socio-technical and governance-related conditions that influence organisational readiness, implementation sustainability, and long-term transformation capacity. This reinforces the argument that smart hotel implementation in emerging tourism destinations cannot be sufficiently understood through technology-centric perspectives alone, but instead requires a more context-sensitive and multidimensional analytical approach.

### 5.3.1 Theme 1: Stakeholder Perception

The findings of this study indicate that stakeholder perceptions constitute the cognitive foundation through which smart hotel implementation in Batam is interpreted, negotiated, and ultimately constrained. Interview data reveal that both hotel managers and government officers consistently frame smart hotel not as a comprehensive digital transformation, but as a gradual process of operational modernisation. This perception is captured in repeated assertions such as *"there is no real smart hotel in Batam yet"* (P2) and *"most hotels are modern, but not smar*t" (P6), signalling a shared understanding that current technological adoption remains partial and surface-level. This perceptual framing strongly resonates with Menegaki's (2019) qualitative findings, which demonstrate that hotel managers tend to favour technologies that are immediately visible, operationally manageable, and financially justifiable. Similar to the Greek hotel managers in Menegaki's study, Batam participants evaluated smart technologies primarily through a lens of feasibility and short-term utility rather than long-term strategic transformation. For instance, P1 emphasised that *"technology must follow guest behaviour and market demand; we cannot jump too far ahead"*, illustrating how managerial perceptions act as a gatekeeping mechanism that filters which technologies are considered realistic or excessive.

At the same time, Batam stakeholders' perceptions diverge from the more future-oriented conceptualisation advanced by Kim and Han (2020), who describe smart hotels as integrated environments combining automation, personalisation, and experiential design. While Kim and Han's respondents associated smart hotels with innovation leadership and emotional engagement, Batam interviewees articulated a markedly cautious stance. P4 explicitly noted that *"full integration sounds good, but the risk and cost are too high for our current market"*, indicating that perceptions of smartness are tightly bound to economic vulnerability and destination maturity. Concerns over service disruption and loss of hospitality values further shaped stakeholder perceptions. Echoing Ivanov et al. (2020), who identified managerial ambivalence toward robots and advanced automation, Batam participants repeatedly stressed the importance of maintaining human-centred service. P5 stated that *"no matter how smart the system is, if it weakens our service quality or staff confidence, it will not work"*, reflecting apprehension that excessive automation could erode relational hospitality. This reinforces Ivanov et al.'s argument that managerial resistance is not

technophobic but value-driven, rooted in concerns over service authenticity and organisational culture.

From the guest perspective, stakeholder perceptions in Batam show a partial alignment with Yang et al. (2021), suggesting that while perceived enjoyment and convenience are relevant, they do not fully account for guest acceptance of smart hotel technologies in this context. While Yang et al. highlight increasing guest readiness for smart environments, Batam managers questioned whether their dominant visitor segments, primarily short-stay tourists from Singapore and Malaysia, demand advanced smart features. P7 described Batam's market as "*price-sensitive and efficiency-oriented rather than experience-seeking",* suggesting that local perceptions of guest expectations temper enthusiasm for more sophisticated smart systems. This market-sensitive perception is further supported by Sykimte's (2023) evaluation of self-service kiosks, which demonstrates that technology acceptance is context-dependent and contingent on guest familiarity and service flow. Batam participants echoed this conditional acceptance. P3 explained that self-service technologies are acceptable "*only when they reduce queues and confusion, not when they complicate the process*". Such statements illustrate that stakeholder perceptions are shaped through lived operational experience rather than abstract technological optimism.

Importantly, Batam stakeholders rejected dichotomous framings of technology versus labour, extending insights from Putri et al. (2023). Rather than positioning smart technologies as substitutes for human workers, interviewees consistently framed them as supportive tools. P5 articulated this balance clearly: "*as smart as the system is, without skilled people it is useless; but skilled people without systems also cannot perform optimally*". This perception reflects a socio-technical understanding that aligns with interpretivist perspectives on technology adoption, emphasising co-dependence rather than replacement. In contrast to sustainability-oriented interpretations found in Bagio and Budidharmanto (2023) and Akel and Noyan (2024), Batam stakeholders rarely associated smart hotel with environmental responsibility. While Akel and Noyan document strong managerial alignment between smart and green practices, Batam participants framed sustainability as a secondary or future concern. P8 acknowledged that "*energy-saving systems are good, but investment priorities still focus on operational survival*", indicating that economic pragmatism currently outweighs sustainability-driven smart adoption.

This finding also nuances Buhalis and Moldavska's (2021) argument that smart

technologies transform on-site service experiences through data-driven personalisation and AI integration. While such transformation is theoretically compelling, Batam stakeholders perceived these innovations as aspirational rather than immediately relevant. Government officer P11 emphasised that "*Batam must be smart, but also realistic; technology should support our identity, not replace it*", underscoring the importance of contextual alignment between innovation narratives and destination branding. Finally, these findings significantly extend Domanski's (2020) conceptualisation of smart hotels by revealing that access to smart technologies is not solely a matter of guest readiness or technological availability. Instead, access is institutionally and cognitively mediated through stakeholder perceptions of risk, value, and appropriateness.

In Batam, perceptions shape not only adoption decisions but also the very definition of what constitutes a "smart hotel." As such, stakeholder perceptions emerge as an active structuring force that conditions the trajectory, scale, and ambition of smart hotel development in emerging destinations. Existing smart hotel literature often assumes that smartness can be objectively defined through the presence of advanced technologies, integrated systems, and digital capabilities. However, the Batam case demonstrates that smartness is socially constructed through stakeholder interpretation. Technologies are not adopted simply because they are available; rather, they are filtered through perceptions of appropriateness, feasibility, and contextual relevance. This reinforces that smart hotel implementation is not solely a technological phenomenon but also a cognitive and interpretive process through which stakeholders determine which forms of innovation are considered desirable, realistic, and strategically valuable. Consequently, the meaning of smartness itself becomes context-dependent, shaped by local market conditions, organisational priorities, and institutional realities rather than universal technological standards. Collectively, theme 1 demonstrates that stakeholder perceptions do not merely reflect attitudes toward technology but actively configure how benefits are anticipated, prioritised, and justified. These perceptions provide the interpretive lens through which expected benefits, operational efficiency, guest satisfaction, and competitive positioning are constructed, a relationship examined in detail in the following discussion of Theme 2: Expected Benefits.

### 5.3.2 Theme 2: Expected Benefits

The findings indicate that stakeholders' expectations of smart hotel implementation in Batam are predominantly structured around instrumental and short-term benefits, rather than transformative or sustainability-driven outcomes. Interview data consistently reveal that hotel managers and government officers frame the value of smart technologies primarily in terms of operational efficiency, service speed, and competitive positioning, rather than experiential innovation or long-term environmental impact. These expectations are closely intertwined with the perceptual framing discussed in theme 1, reinforcing the view that smart hotel in Batam is understood as a pragmatic managerial response to market pressures. Operational efficiency emerged as the most salient expected benefit across interviews. Participants frequently highlighted the role of smart systems in reducing manual workloads, minimising human error, and improving coordination across departments. P2 explained that "*with integrated systems, reporting becomes faster and more accurate; managers can see performance in real time*", while P6 noted that automation helps "*reduce dependency on manual supervision and repetitive tasks*". These accounts align strongly with Sharma and Gupta's (2021) analysis of IoT applications, which identifies efficiency gains and process automation as central drivers of smart technology adoption in hotels.

This emphasis on efficiency is also consistent with Menegaki (2019), who found that hotel managers' support for new technologies is largely contingent on tangible performance improvements. Similar to Menegaki's respondents, Batam managers did not frame efficiency as a secondary benefit but as the primary justification for investment. P5 explicitly stated that "*technology must make operations simpler and cheaper; otherwise, it is not worth implementing*", illustrating how expected benefits are evaluated through cost benefit rationality rather than innovation ambition. Beyond internal efficiency, stakeholders also expected smart technologies to enhance service speed and reliability, particularly in high-volume operational touchpoints such as check-in, billing, and room access. These expectations partially resonate with Sykimte's (2023) evaluation of self-service kiosks, which highlights reduced waiting time and smoother service flow as key benefits perceived by both operators and guests. Batam participants echoed this view but with an important caveat. P3 noted that "*self-service only works if guests understand it immediately; if not, it creates new problems*". This illustrates that while efficiency is desired, its realisation is conditional upon user

readiness and service design quality.

Improved guest experience was also frequently cited as an expected benefit, although stakeholders defined this concept in a relatively narrow and functional manner. Rather than associating guest experience with emotional engagement or personalisation as emphasised in Kim and Han (2020), Batam participants framed experience enhancement in terms of convenience, speed, and reduced friction. P1 explained that "*guests want simple, fast, and hassle-free services; they don't want complicated technology*". This pragmatic interpretation contrasts with Kim and Han's more immersive vision of smart hotels but aligns with the market-specific expectations articulated by Batam stakeholders. The interview data also partially support Yang et al.'s (2021) argument that perceived usefulness is a key determinant of technology acceptance. Batam managers repeatedly emphasised that guests appreciate smart features only when they deliver immediate, visible value. P7 stated that "*if technology shortens waiting time or makes payment easier, guests will accept it; otherwise, they ignore it*". This reinforces Yang et al.'s emphasis on perceived usefulness but challenges the assumption that novelty or enjoyment alone can drive acceptance in emerging destinations.

Another expected benefit articulated by participants was competitive differentiation, particularly in relation to Batam's position as a regional tourism destination competing with Singapore and Malaysia. Several interviewees framed smart technologies as symbolic markers of modernity that help signal competitiveness to international visitors. P9 (government officer) noted that "*smart hotels create an impression that Batam is ready for international tourists and digital lifestyles*". This symbolic dimension of expected benefits extends Domanski's (2020) discussion of smart hotels by highlighting reputational and destination-level value, not merely guest satisfaction. However, this symbolic benefit was often decoupled from expectations of full technological integration. Batam stakeholders appeared satisfied with partial smartness as long as it contributed to a modern image. This finding contrasts with Buhalis and Moldavska's (2021) argument that smart technologies fundamentally transform on-site service encounters through data-driven personalisation and AI integration. In Batam, the expected benefit is not transformation but credibility, appearing modern without overhauling service models.

Cost reduction also featured prominently in stakeholder expectations, particularly through energy efficiency and labour optimisation. Yet, unlike Bagio and

Budidharmanto (2023), who documented strong links between smart key technologies and pro-environmental behaviour, Batam participants framed cost savings primarily in financial rather than environmental terms. P8 acknowledged that "*energy-saving systems help reduce costs, but sustainability is still a bonus, not the main goal*". This reinforces the economically pragmatic orientation of expected benefits and highlights the limited institutionalisation of sustainability logics in Batam. This pragmatic orientation stands in contrast to Akel and Noyan's (2024) findings, where hotel managers explicitly linked smart technologies to green practices and long-term sustainability strategies. The weak articulation of green-smart convergence in Batam suggests that expected benefits are shaped by immediate operational realities rather than strategic environmental positioning. This divergence underscores the importance of contextualising benefit expectations within destination maturity and policy environments.

Importantly, stakeholders did not expect smart technologies to replace human labour. Instead, interviewees consistently articulated expectations of human technology complementarity. P5's assertion that "*systems and human resources must grow together*" reflects a socio-technical understanding that aligns with Putri et al.'s (2023) argument for balancing intelligent technologies with service quality considerations. Expected benefits, therefore, are not framed as labour elimination but as labour augmentation, reinforcing service consistency and staff effectiveness. Finally, the expected benefits articulated by Batam stakeholders appear temporally bounded. Participants frequently framed benefits in terms of short- to medium-term gains, such as faster operations and improved competitiveness, rather than long-term transformation. P11 observed that "*smart hotels will develop slowly; benefits will come step by step, not all at once*". This incremental expectation extends Triantafyllou et al.'s (2022) findings by demonstrating that, unlike luxury hotel contexts where smart technologies support future-oriented differentiation, emerging destinations prioritise survivability and gradual improvement.

This finding suggests that the expected benefits of smart hotel technologies are not universal but contextually constructed. While previous studies frequently associate smart hotels with innovation, personalisation, and transformational service experiences, Batam stakeholders evaluate benefits primarily through operational necessity and market survival. This indicates that perceived benefits function as a strategic filtering mechanism that determines which technologies are considered worthwhile investments.

Consequently, benefit expectations do not merely motivate adoption; they actively shape the direction and scope of digital transformation itself.

In summary, theme 2 reveals that expected benefits serve as a pragmatic justification for selective smart hotel implementation in Batam. These benefits are narrowly defined, operationally grounded, and closely aligned with perceived feasibility and market demand. However, the emphasis on efficiency, cost control, and symbolic competitiveness also exposes the structural and organisational constraints that limit benefit realisation. These tensions between expectation and feasibility are examined in detail in Theme 3: Implementation Challenges.

### 5.3.3 Theme 3: Implementation Challenges

The findings of this study demonstrate that the implementation of smart hotel technologies in Batam is constrained by a constellation of interrelated structural, organisational, and institutional challenges. Interview data indicate that these constraints are not perceived as isolated operational difficulties but as systemic conditions embedded within the local tourism and governance context. Rather than being treated as short-term technical problems, these challenges are understood by stakeholders as shaping the pace, scope, and direction of smart hotel adoption. Consistent with the interpretive framing established in themes 1 and 2, these experiences reinforce the view that smart hotel transformation in Batam is a negotiated, context-dependent, and non-linear process.

Financial constraints emerged as the most frequently cited and structurally significant challenge. Hotel managers consistently emphasised the high capital costs associated with smart technologies, ongoing maintenance expenses, and uncertain return on investment. P4 stated that "*the biggest issue is not technology itself, but whether the investment can be recovered in our market*", while P6 noted that "*smart systems are expensive, and revenue in Batam is still unstable*". These concerns closely align with Menegaki's (2019) findings, which identify financial risk and cost uncertainty as primary barriers to technology adoption in hotels, particularly outside mature tourism destinations. This financial caution is further reinforced by Triantafyllou et al. (2022), who observed that even in luxury hotel contexts, smart technology adoption is often staged and selective due to budgetary considerations. However, Batam

stakeholders face an additional layer of vulnerability associated with destination competitiveness and market volatility. Unlike the South Korean luxury hotels examined by Triantafyllou et al., Batam hotels operate in a price-sensitive environment, making large-scale digital investment particularly risky. This contextual distinction extends existing literature by demonstrating how destination maturity mediates financial risk tolerance.

Human resource limitations constituted a second major challenge, particularly in relation to digital literacy, system integration skills, and change readiness. Participants repeatedly highlighted that advanced systems require staff who are not only technically competent but also willing to adapt to new workflows. P5 observed that "*as smart as the system is, without capable staff, it becomes useless*", while P2 acknowledged that "*training takes time, and staff turnover makes it difficult to maintain consistency*". These accounts resonate strongly with Putri et al. (2023), who emphasise the socio-technical tension between intelligent systems and service quality when human readiness is insufficient. This challenge also echoes Ivanov et al.'s (2020) findings regarding managerial concerns about workforce displacement and resistance. However, Batam stakeholders did not frame staff as resisting technology per se; rather, they emphasised capacity gaps and adaptation fatigue. P1 explained that "*staff are willing to learn, but too many system changes create confusion*". This nuance extends Ivanov et al.'s work by shifting the analytical focus from resistance to readiness, highlighting the importance of gradual implementation aligned with workforce capabilities.

Technological and infrastructural instability further compounded implementation challenges. Despite improvements in digital infrastructure across Batam, participants reported inconsistencies in system reliability, integration difficulties between legacy systems and new technologies, and dependency on external vendors. P3 noted that "*systems often work well individually, but integration is the problem*", while P7 highlighted concerns over "*system downtime and technical support response*". These experiences are consistent with Sharma and Gupta's (2021) identification of interoperability and data management as persistent barriers to IoT implementation in hotels. Such challenges also resonate with Buhalis and Moldavska's (2021) analysis of AI-driven service technologies, which underscores that the transformative potential of smart systems is contingent upon robust digital ecosystems. In Batam, however, the absence of fully integrated ecosystems limits the realisation of such benefits. This reinforces the argument that smart hotel cannot be reduced to

individual technologies but requires systemic alignment a condition not yet fully present in Batam.

Data security and privacy concerns emerged as an additional constraint, particularly among managers responsible for guest data and payment systems. P6 expressed concern that "*any data breach would seriously damage trust and reputation*", while P4 noted uncertainty around compliance standards and data governance. These concerns align with Domanski's (2020) emphasis on privacy and service quality as central tensions. Domanski's (2020) identification of security and ethical risks associated with IoT deployment in hospitality contexts. Institutional and regulatory ambiguity further exacerbated these challenges. Participants repeatedly indicated that the absence of clear guidelines, incentives, and coordinated policies limits their willingness to invest in smart technologies. P5 remarked that "*hotels move individually because there is no clear roadmap from the government*", while government officer P12 acknowledged that "*smart tourism initiatives have not yet translated into sector-specific frameworks for hotels*". This institutional gap reflects what Akel and Noyan (2024) describe as incomplete policy alignment, although in Batam this incompleteness is more pronounced due to the emerging status of smart tourism governance.

In contrast to contexts examined by Bagio and Budidharmanto (2023), where smart technologies were embedded within clear sustainability narratives, Batam stakeholders encountered fragmented policy signals that prioritise infrastructure development without operational integration. This disconnect reinforces the view that institutional readiness is as critical as technological readiness in enabling smart hotel implementation. Market-related uncertainties also shaped implementation challenges. Stakeholders expressed concern that guest demand for advanced smart features remains uneven, making it difficult to justify extensive investment. P7 explained that "*some guests appreciate smart features, others don't notice or don't care*". This finding partially challenges Yang et al.'s (2021) assumption of increasing universal guest acceptance, suggesting instead that demand heterogeneity persists in emerging destinations.

Collectively, these challenges underscore the non-linear and relational nature of smart hotel implementation, extending Domanski's (2020) conceptual framework by demonstrating that barriers operate simultaneously at organisational, technological, and institutional levels. Rather than acting as discrete obstacles, these challenges interact to reinforce cautious managerial behaviour and selective adoption strategies. In Batam,

implementation challenges are not merely problems to be solved but contextual conditions that actively shape the trajectory of smart hotel implementation.

This finding offers an important theoretical insight. Existing smart hotel literature frequently portrays implementation barriers as constraints that can gradually be overcome through technological advancement, increased investment, or improved organisational capability. However, the Batam case suggests a more complex reality. Financial limitations, workforce readiness, infrastructure constraints, and institutional ambiguity are deeply interconnected and mutually reinforcing. These conditions do not simply delay implementation; they influence how stakeholders define realistic innovation pathways and determine which forms of smart technology are considered feasible. Smart hotel adoption therefore emerges as a process of continuous negotiation between aspiration and feasibility rather than a linear progression toward technological sophistication.

In summary, theme 3 reveals that the challenges facing smart hotel implementation in Batam are systemic and deeply embedded within financial structures, human capacity, technological ecosystems, and institutional arrangements. These challenges highlight the critical role of governance and coordinated support in mitigating risk and enabling progression beyond incremental adoption. Accordingly, the following section examines Theme 4: The Role of Government and Regulatory Support, exploring how policy frameworks and ecosystem coordination shape the feasibility of smart hotel transformation.

### 5.3.4 Theme 4: Role of Government and Institutional Support

The findings reveal that government and regulatory support play a pivotal yet underdeveloped role in shaping smart hotel development in Batam. While stakeholders widely acknowledge the strategic importance of public-sector involvement, interview data indicate a significant gap between policy discourse and operational realities. This institutional disconnect reinforces incremental adoption patterns and constrains the emergence of a coherent smart hotel ecosystem. Stakeholders consistently emphasised the absence of a clear, coordinated policy framework specifically targeting smart hotel development. Hotel managers reported that existing smart city or digital tourism initiatives remain largely abstract and insufficiently translated into sector-specific

guidance. P5 noted that "*smart city is often discussed, but for hotels there is no concrete roadmap*", while P2 highlighted that "*each hotel moves on its own because there is no shared direction*". These perceptions underscore a lack of institutional scaffolding, echoing Zencir and Emir's (2019) argument that local governance structures critically shape adoption trajectories.

This finding contrasts with Akel and Noyan's (2024) study, which documents strong policy alignment supporting green-smart convergence in more mature governance contexts. In Batam, however, stakeholders described sustainability-oriented smart policies as fragmented or symbolic. Government officer P11 acknowledged that "*environmental and digital policies exist, but they are not yet integrated at the implementation level*". This institutional fragmentation illustrates what can be conceptualised as policy incompleteness, limiting the strategic integration of smart and sustainable hospitality practices. Financial and incentive-based support mechanisms were also perceived as insufficient. While stakeholders recognised government efforts to improve digital infrastructure, they reported limited access to subsidies, tax incentives, or financing schemes tailored to smart hotel investments. P4 stated that "*if there were incentives or cost-sharing schemes, hotels would be more confident to invest*". This aligns with Menegaki's (2019) findings that financial facilitation significantly influences managerial willingness to adopt new technologies, particularly in risk-sensitive environments.

At the same time, institutional alignment was perceived as uneven across hotel segments. Larger and international-chain hotels were viewed as better positioned to engage with smart initiatives due to greater capital and organisational capacity, while smaller and independent hotels faced disproportionate barriers. P6 observed that "*big hotels can experiment with technology, but smaller hotels struggle to follow*". This reinforces Domanski's (2020) observation regarding access disparities, extending it by demonstrating that institutional alignment or the lack thereof can amplify inequality at the organisational level. Beyond financial considerations, stakeholders emphasised the importance of capacity-building and knowledge transfer as critical yet underdeveloped forms of institutional alignment. Participants expressed the need for training programmes, technical guidance, and best-practice sharing facilitated by government or industry bodies. P3 remarked that "*vendors sell systems, but there is no neutral body to guide hotels strategically*". This finding resonates with Sharma and Gupta's (2021), who argue that successful IoT adoption requires not only technology but also

institutional mechanisms for skills development and system integration.

The role of government as a coordinating actor at the destination level also emerged as a central theme. Stakeholders repeatedly highlighted the absence of destination-wide integration that would align hotels with transportation systems, tourism platforms, and city-level digital services. P9 noted that "*smart hotels cannot stand alone; they must be connected to smart tourism and smart city initiatives*". This supports Buhalis and Moldavska's (2021) assertion that smart hotel functions optimally within integrated digital ecosystems rather than as isolated technological enclaves. However, Batam stakeholders also expressed concern that excessive regulation or top-down mandates could stifle innovation. P1 cautioned that "*policies should guide and support, not force hotels into unrealistic standards*". This reflects a nuanced understanding of institutional roles, aligning with Ivanov et al. (2020), who emphasise the need for balanced governance that encourages experimentation while respecting organisational autonomy.

The institutional dimension also influenced stakeholders' perceptions of legitimacy and risk. Participants suggested that clearer government endorsement of smart hotel standards would reduce uncertainty and signal long-term commitment. P7 stated that "*if the government clearly supports smart hotels, investors and managers will feel more secure*". This legitimacy function extends Triantafyllou et al.'s (2022) insights by highlighting the symbolic and confidence-building role of public institutions in emerging destinations. Notably, sustainability governance remained under-articulated within institutional alignment structures. While Bagio and Budidharmanto (2023) demonstrate how policy frameworks can reinforce pro-environmental behaviour through smart technologies, Batam stakeholders perceived sustainability mandates as weak or secondary. P8 explained that "*there is encouragement to save energy, but no strong system linking it to smart technology adoption*". This further illustrates the gap between policy intent and implementation coherence.

Collectively, these findings support Stephenson and Dobson's (2020) argument that smart tourism development in Southeast Asia is non-linear and highly context-dependent. In Batam, government and institutional alignment function more as enabling rhetoric than as operational infrastructure. Rather than driving transformation, institutions currently shape the pace and limits of smart hotel implementation by influencing risk perception, coordination capacity, and strategic confidence.

This finding is particularly significant because it demonstrates that technological

adoption decisions are influenced not only by organisational capabilities but also by the wider institutional environment within which hotels operate. When governance structures remain fragmented and policy support is unclear, hotels become more cautious in their investment decisions and are more likely to pursue incremental rather than transformative forms of innovation. As a result, institutional conditions indirectly shape both the speed and ambition of smart hotel development.

Theoretically, this finding extends existing smart hotel research by highlighting the institutional dimension of technology adoption. Much of the literature focuses on operational preparedness and digital capability, yet the Batam case demonstrates that institutional readiness is equally important. The absence of clear governance frameworks creates uncertainty that discourages investment and reinforces incremental adoption behaviour. This findings imply that smart hotel transformation should be conceptualised as an ecosystem phenomenon requiring alignment between organisations, technologies, and institutions.

In summary, theme 4 demonstrates that government and institutional alignment are recognised as critical enablers of smart hotel implementation, yet their current limitations reinforce fragmented and incremental adoption. The absence of coherent governance frameworks and integrated policy support shifts the burden of strategic decision-making onto individual hotels. These institutional conditions, in turn, shape how stakeholders imagine the future of smart hotel, which is examined in the following section on Theme 5: Future Vision.

### 5.3.5 Theme 5: Future Vision

The findings indicate that stakeholders' future vision of smart hotel in Batam is characterised by incrementalism, strategic caution, and contextual realism. Rather than articulating a technologically ambitious or disruptive trajectory, interviewees consistently imagined the future of smart hotels as a gradual extension of existing practices, shaped by market survivability, institutional readiness, and destination competitiveness. This future-oriented sensemaking reflects not aspiration deficits, but a pragmatic response to structural and environmental constraints. Stakeholders repeatedly framed the future of smart hotels as evolutionary rather than revolutionary. P11 emphasised that "*Batam will become smart step by step, not by copying Singapore or*

*other advanced destinations*", while P2 remarked that "*the future is about improving what we already have, not starting from zero"*. This vision closely aligns with Zencir and Emir's (2019) finding that smart hotel implementation unfolds selectively and non-linearly, particularly in emerging destinations where resources and capabilities are unevenly distributed.

This incremental future vision stands in contrast to the more aspirational frameworks advanced by Kim and Han (2020) and Buhalis and Moldavska (2021), which conceptualise smart hotels as fully integrated, data-driven service ecosystems. Batam stakeholders perceived such visions as desirable but temporally distant. P4 noted that "*full integration is a long-term dream; right now, we focus on what is feasible*". This divergence illustrates how future visions are shaped not only by technological possibilities but also by perceived institutional and market readiness. Market survival and regional competition emerged as dominant drivers shaping stakeholders' future expectations. Participants repeatedly referenced Batam's position relative to Singapore and Malaysia, framing smart technologies as tools to remain relevant rather than to lead innovation. P7 stated that "*we don't need to be the smartest, but we cannot be left behind*". This framing resonates with Triantafyllou et al.'s (2022) observation that luxury hotels pursue smart technologies to reinforce differentiation; however, Batam's context reframes differentiation as defensive competitiveness rather than prestige-based leadership.

Notably, sustainability played a marginal role in stakeholders' future vision. While Akel and Noyan (2024) emphasise green-smart convergence as a defining feature of future-oriented hotels, Batam participants articulated sustainability as a secondary or conditional goal. P8 explained that "*environmental initiatives will come when the business is stable*". This weak alignment suggests that Batam's future vision remains economically pragmatic, prioritising financial viability over long-term environmental transformation. This pragmatic orientation also contrasts with Bagio and Budidharmanto (2023), who document how smart technologies can actively shape pro-environmental behaviour. In Batam, however, such normative aspirations were largely absent from future narratives. Instead, stakeholders imagined sustainability emerging organically from efficiency improvements rather than as a strategic driver. This finding extends existing literature by demonstrating how sustainability futures are contingent upon destination development stages and policy maturity.

The future role of human resources was another salient element in stakeholders'

vision. Interviewees consistently rejected a fully automated future, instead envisioning a balanced integration of technology and human service. P5 articulated that "*in the future, technology will support staff, not replace them*". This perspective aligns with Putri et al.'s (2023) and Ivanov et al.'s (2020) arguments that human–technology complementarity is central to hospitality's service logic, reinforcing the resilience of relational service even in increasingly smart environments. Stakeholders also envisaged future smart hotel implementation as increasingly institutionally mediated. Several participants emphasised that progress would depend on clearer government direction, incentives, and destination-level coordination. P9 noted that "*without strong coordination, smart hotels will grow unevenly*". This expectation reinforces Domanski's (2020) call for improved access to smart technologies, extending it by demonstrating that access is not only technical but also institutional and strategic.

Importantly, Batam stakeholders conceptualised the future of smart hotel as context-dependent rather than universal. P1 cautioned against adopting global smart hotel models without local adaptation, stating that "Batam has its own market, culture, and limitations". This finding suggests that stakeholders do not perceive smart hotel development as a process of replicating models from technologically advanced destinations. Instead, future smart hotel transformation is expected to reflect Batam's specific tourism characteristics, including its reliance on regional visitor markets, the diversity of hotel ownership structures, and varying levels of technological readiness across organisations. These contextual conditions encourage a development pathway that prioritises selective adoption, operational practicality, and service flexibility over large-scale technological transformation. As a result, the future of smart hotels in Batam is envisioned as an adaptive and locally embedded model rather than a standardised implementation of global smart hotel concepts. This finding further suggests that smart hotel development in emerging destinations may be shaped as much by local contextual realities as by technological innovation itself. This strongly supports Stephenson and Dobson's (2020) argument that Southeast Asian smart tourism trajectories are non-linear and shaped by local socio-economic conditions.

Finally, the future vision articulated by stakeholders reflects a form of adaptive pragmatism, where ambition is tempered by feasibility and learning occurs through gradual experimentation. Rather than aspiring to replicate highly digitalised destinations, stakeholders envision a Batam-specific model of smart hotel development that balances technological innovation with operational practicality, human-centred

service, and local market realities. This reflects that future smart hotel transformation in Batam will be shaped as much by contextual adaptation as by technological advancement itself. Importantly, participants did not interpret incrementalism as a sign of technological backwardness or resistance to innovation.

Instead, gradual implementation was viewed as a deliberate strategy for managing risk, building organisational capability, and aligning innovation with evolving market demand. This perspective challenges dominant narratives of digital transformation that often equate progress with rapid technological adoption. In emerging destinations such as Batam, sustainable transformation may depend less on the speed of implementation and more on the ability to align innovation with local market conditions, institutional capacity, and stakeholder readiness. Consequently, this study contributes theoretically by foregrounding incremental sensemaking as a legitimate pathway toward smart hotel implementation in emerging tourism destinations.

Taken together, the five themes reveal a coherent interpretive logic underpinning smart hotel implementation in Batam. Stakeholder perceptions (Theme 1) shape how benefits are anticipated (Theme 2), which in turn interact with systemic implementation challenges (Theme 3). The role of government and institutional alignment (Theme 4) conditions both feasibility and confidence, ultimately shaping a future vision (Theme 5) characterised by incrementalism, contextual alignment, and strategic caution. This integrated analysis advances smart hotel literature by demonstrating that transformation trajectories are not uniform but socially constructed, institutionally mediated, and destination-specific. Rather than representing a purely technological process, smart hotel implementation emerges as a socio-technical and institutional transformation shaped by the interaction of stakeholder interpretations, organisational capabilities, environmental constraints, and governance support. These interrelated themes provide the analytical foundation for articulating the study's theoretical contributions, which are elaborated in the following section (5.3) to show how smart hotel implementation in Batam reconfigures existing smart hotel frameworks through a context-sensitive, stakeholder-centred, and institutionally grounded perspective.

### 5.3.6 Integrative Discussion across Themes

The five themes identified in this study should not be interpreted as independent dimensions of smart hotel implementation. Rather, they represent an interconnected and dynamic process through which smart hotel transformation is understood, negotiated, and enacted within the specific context of Batam as an emerging tourism destination. Taken together, the findings reveal that smart hotel implementation is not primarily a technological phenomenon. Instead, it is a socio-technical and institutionally embedded process shaped by the interaction between stakeholder perceptions, expected benefits, implementation challenges, governance support, and future aspirations. The Batam case demonstrates that technology adoption trajectories are strongly influenced by local tourism conditions, organisational capacities, and institutional environments, highlighting the importance of contextual adaptation in smart hotel development.

The analysis demonstrates that stakeholder perceptions (Theme 1) serve as the foundational interpretive lens through which smart hotel technologies are evaluated. Participants did not perceive smart hotels as fully integrated digital ecosystems as commonly portrayed in the literature. Instead, smartness was interpreted pragmatically through visible, manageable, and operationally relevant technologies. This perception significantly influenced how stakeholders assessed the value of technological innovation. Consequently, perceptions were not merely passive attitudes toward technology but active cognitive mechanisms that shaped subsequent decision-making processes. The findings therefore suggest that stakeholders' beliefs about what a smart hotel should be directly influence what forms of technological development are considered feasible, desirable, and strategically appropriate.

These perceptions subsequently shaped the expected benefits associated with smart hotel implementation (Theme 2). Rather than emphasising transformational innovation, participants primarily valued operational efficiency, service convenience, cost control, and competitive positioning. This relationship indicates that expected benefits are socially constructed through existing stakeholder perceptions rather than objectively determined by technological capabilities alone. In other words, stakeholders pursued technologies that aligned with their understanding of practical business needs and market realities. As a result, expectations functioned as a strategic filtering mechanism that guided investment priorities and influenced the scope of technology adoption. Technologies perceived as generating immediate and visible benefits were

prioritised, whereas more ambitious innovations associated with long-term transformation received comparatively limited attention.

However, the anticipated benefits of smart hotel technologies did not exist independently of contextual constraints. The findings from Theme 3 demonstrate that implementation challenges continuously moderated and reshaped stakeholder expectations. Financial limitations, workforce readiness issues, technological integration difficulties, and regulatory uncertainty collectively constrained the extent to which expected benefits could be realised. Importantly, these challenges were not perceived as temporary obstacles that would eventually disappear. Instead, stakeholders viewed them as enduring structural conditions that required continuous adaptation and negotiation. This finding reveals a recursive relationship between benefits and challenges. While expected benefits motivate adoption, implementation challenges simultaneously redefine what stakeholders perceive as realistic and achievable outcomes. Consequently, smart hotel transformation in Batam emerges as a process of balancing aspiration with feasibility rather than pursuing technological advancement for its own sake.

The findings further reveal that government and institutional alignment (Theme 4) function as a critical mediating factor within this process. Institutional conditions influence not only the availability of resources and policy support but also stakeholder confidence regarding future investment decisions. The absence of clear governance frameworks, coordinated strategies, and sector-specific incentives contributed to uncertainty among hotel operators. As a result, many stakeholders adopted cautious implementation strategies that prioritised incremental experimentation over large-scale transformation. This demonstrates that institutional readiness is equally important as organisational and technological readiness. While much of the existing smart hotel literature focuses on firm-level adoption factors, the Batam case demonstrates that technology adoption is also significantly shaped by broader ecosystem conditions. Government support therefore operates not merely as an external facilitator but as an integral component of the smart hotel development process.

These interconnected dynamics ultimately shape stakeholders' future vision of smart hotel implementation (Theme 5). Rather than envisioning a future characterised by rapid digital transformation, stakeholders consistently articulated a preference for gradual, adaptive, and context-sensitive development. This future vision reflects the cumulative influence of the preceding themes. Stakeholders' perceptions define what

smartness means, expected benefits determine adoption priorities, implementation challenges establish practical boundaries, and institutional conditions influence confidence and investment willingness. Together, these factors produce a future orientation characterised by incrementalism, strategic caution, and continuous learning. Importantly, participants did not perceive gradual implementation as a weakness or failure. Instead, incremental development was viewed as a rational and sustainable strategy for managing uncertainty, building organisational capabilities, and aligning technological innovation with local conditions. These observations indicate that none of the five themes operates independently. Rather, each theme influences and reinforces the others, collectively shaping the trajectory of smart hotel transformation in Batam.

Technology alone is insufficient to drive transformation because implementation outcomes are continuously negotiated through organisational interpretation, institutional capability, workforce adaptability, and contextual operational realities. This challenges technology-deterministic assumptions commonly embedded within smart hospitality literature, which frequently imply that technological availability naturally leads to digital transformation. Instead, the Batam context demonstrates that smart hotel implementation evolves unevenly through socio-technical negotiation processes shaped by local governance conditions, strategic caution, and organisational readiness. The findings further indicate that smart hotel development is influenced by how stakeholders interpret technological opportunities, evaluate expected benefits, respond to contextual constraints, and interact with institutional environments. Consequently, the transformation process should be understood as socially constructed and continuously negotiated rather than technologically predetermined.

From a broader theoretical perspective, the integrated findings support a socio-technical and institutional interpretation of smart hotel implementation. The findings demonstrate that technological systems, organisational actors, and institutional structures are mutually dependent and co-evolving. Technology adoption cannot be understood solely through technical functionality or economic rationality because stakeholder interpretations and institutional conditions significantly influence implementation outcomes. This perspective extends existing smart hotel literature by highlighting the importance of contextual factors in shaping digital transformation trajectories within emerging tourism destinations. Viewed collectively, these findings suggest that smart hotel transformation is best understood as a negotiated process in which technological possibilities are continuously shaped, constrained, and redefined

through stakeholder interactions and institutional conditions.

Overall, the integrated analysis reveals that smart hotel implementation in Batam is best understood as a context-sensitive process of negotiated transformation. The trajectory of development is shaped not by digital capability alone but by the interaction between stakeholder perceptions, anticipated benefits, implementation constraints, institutional alignment, and future aspirations. Consequently, successful smart hotel transformation requires alignment across these interconnected dimensions rather than isolated technological investment. This integrated understanding provides the foundation for the theoretical contributions discussed in the following section and supports a reconceptualisation of smart hotel implementation as a context-sensitive process of socio-technical transformation rather than a linear pathway of technology adoption.

## 5.4 Theoretical Contributions of the Study

This study makes a substantive theoretical contribution to smart hotel and smart tourism literature by extending predominantly technology-centric explanations of digital transformation toward a more context-sensitive socio-technical interpretation. Existing literature frequently conceptualises smart hotel implementation as a technologically driven progression toward automation and system integration. However, the findings from Batam demonstrate that implementation trajectories are strongly shaped by stakeholder sense-making, organisational negotiation, governance capability, workforce adaptation, and institutional fragmentation. Consequently, the study reconceptualises smart hotel transformation as an evolving and negotiated process rather than a universal technological pathway.

Drawing on an interpretivist qualitative approach, the study demonstrates that smart hotel transformation is not linear or technologically deterministic. Instead, implementation emerges through continuous interaction between technological capability, organisational readiness, institutional environments, and destination-specific conditions. The findings challenge dominant assumptions that equate technological adoption with transformational maturity within hospitality organisations. The study therefore highlights the importance of organisational interpretation and contextual adaptation in shaping how smartness is understood and operationalised within

hospitality settings.

Adopting an inductive and process-oriented analytical approach, this study develops an empirically grounded conceptual framework explaining how smart hotel practices evolve through gradual, hybrid, and context-dependent processes. Positioned within the tradition of middle-range conceptual development, the framework conceptualises implementation as a negotiated socio-technical transformation shaped by market dependency, resource limitations, governance structures, and organisational capability. This perspective moves beyond conventional explanations that primarily interpret smart hotel transformation as a singular technological transition. The framework therefore provides a more integrated explanation of implementation dynamics within emerging tourism destinations.

Grounded in empirical evidence from Batam, the study further refines prevailing smart hospitality assumptions that prioritise technological readiness and system integration over contextual dynamics. The findings demonstrate that smart hotel implementation cannot be adequately understood through a purely technological lens alone. Instead, implementation outcomes are also influenced by organisational realities, institutional capability, stakeholder interpretation, and destination-specific constraints. Consequently, the study offers a contextually embedded and analytically robust explanation that contributes to theory refinement within emerging tourism destinations.

Collectively, this study contributes to academic research by proposing a context-specific Smart Hotel Implementation Model that integrates technological, organisational, and institutional dimensions within a unified socio-technical framework. The findings demonstrate that smart hotel transformation in emerging tourism destinations cannot be sufficiently explained through technology adoption perspectives alone. Instead, smart hotel implementation should be understood as a contextual and governance-oriented transformation process shaped by organisational capability, stakeholder interpretation, institutional readiness, and market realities. Consequently, this study advances current smart hospitality literature by extending existing theoretical perspectives into underexplored emerging tourism contexts such as Batam, Indonesia.

### 5.4.1 Reconceptualising Smart Hotel Implementation as a Gradual and Hybrid Process

This study reconceptualises smart hotel implementation as a gradual and hybrid process, challenging linear and technology-driven models commonly found in existing literature. The findings from Batam indicate that transformation unfolds unevenly and selectively. This process is shaped by contextual, organisational, and institutional conditions rather than digital capability alone. As a result, smart hotel development cannot be fully explained through deterministic or linear perspectives.

The analysis shows that smart hotel implementation does not follow a uniform pathway but reflects a hybrid configuration in which digital and non-digital practices coexist. Technologies are layered onto existing operational routines rather than replacing them. This results in partial integration and fragmented smartness across hotel operations. Such hybridisation represents an adaptive response to environmental uncertainty, market dependency, and limited institutional alignment.

By foregrounding gradualism, the study extends existing conceptualisations of digital transformation that emphasise rapid innovation and system integration. It shows that in resource-constrained and institutionally fragmented contexts, transformation is cumulative and path-dependent. Incremental adoption enables organisations to manage risk while maintaining operational stability. However, this approach also constrains the depth and speed of transformation within shorter timeframes.

This reconceptualisation reframes how smart hotel maturity is understood. Maturity is not assessed solely through technological sophistication. Instead, it is defined by the alignment between technology, organisational cognition, and institutional context. This perspective introduces a more flexible and context-sensitive understanding of smart hotel development.

### 5.4.2 Extending Socio-Technical and Service-Dominant Perspectives in Smart Hotel

This study extends socio-technical and service-dominant perspectives by demonstrating that value creation and technological transformation in smart hotels are socially constructed and contextually mediated. The findings indicate that value creation is shaped by organisational priorities, stakeholder perceptions, and institutional

constraints rather than emerging automatically from technological adoption. From a socio-technical perspective, technological systems operate through processes of social interpretation and organisational meaning-making, where perceptions of smartness influence how technologies are selected, implemented, and utilised. In the absence of alignment between digital capability, organisational understanding, and governance facilitation, smart technologies tend to reinforce existing practices rather than drive transformation.

The study further challenges the assumption that smart technologies inherently promote guest-centred value co-creation. Instead, value creation remains predominantly firm-centric, with technologies primarily deployed to optimise internal operations. Improvements in guest experience emerge as secondary outcomes, indicating that value co-creation depends on strategic intent and organisational capability rather than technology alone. By integrating socio-technical and institutional perspectives, the study provides a contextually grounded explanation of how value creation is shaped in emerging destinations. It highlights how economic pragmatism, risk management, and institutional conditions constrain both technological integration and value co-creation processes.

### 5.4.3 Contextualising Smart Hotel Theory for Emerging and Secondary Destinations

This study contextualises smart hotel theory by situating implementation within the realities of emerging and secondary tourism destinations. It demonstrates that dominant assumptions derived from technologically advanced and institutionally coordinated contexts do not readily apply to destinations characterised by resource constraints, market dependency, and fragmented governance. The findings show that smart hotel implementation in such contexts is shaped by economic pragmatism, organisational risk management, and institutional ambiguity. As a result, hotels prioritise stability and cost control, leading to selective and incremental adoption pathways that diverge from idealised models of full digital integration.

From a theoretical perspective, the study highlights the need for greater sensitivity to destination typologies and stages of development. It shows that multiple pathways to smartness exist, shaped by local conditions and organisational interpretation rather than a single trajectory toward maturity. The study also advances

the notion of analytical transferability by identifying mechanisms such as incremental adoption, symbolic smartness, and institutional misalignment. These mechanisms provide conceptual insights that are applicable to other emerging destinations with similar structural conditions.

By integrating contextual sensitivity into smart hotel theory, the study addresses limitations in existing frameworks that underemphasise institutional and governance dynamics. It demonstrates that policy coherence, infrastructure, and coordination actively shape how smartness is implemented at the organisational level. Overall, this study refines smart hotel theory by positioning emerging and secondary destinations as critical sites for theoretical development. It advances a more inclusive and context-aware understanding of smart hotel implementation as a gradual, hybrid, and negotiated socio-technical process, contributing to theory-building rather than descriptive analysis.

## 5.5 Practical Implications for the Hotel Industry

Building on the process-based conceptual framework developed in this study, the practical implications for hotel operators are articulated as staged and context-sensitive actions that reflect the gradual and hybrid nature of smart hotel implementation. Rather than assuming linear or comprehensive technological transformation, these implications acknowledge variations in organisational preparedness, resource constraints, and managerial sense-making. The recommended actions are therefore organised into short-term, medium-term, and long-term stages. This structure emphasises feasibility, prioritisation, and alignment with the empirical conditions identified in the Batam context.

### 5.5.1 Short-term Actions: Pragmatic and Low-Risk Smart Practices

Given the findings that hotels in Batam prioritise technologies offering immediate operational value with minimal organisational disruption, short-term actions should focus on pragmatic smart practices that enhance efficiency and service visibility. These actions emphasise low-risk and incremental adoption rather than comprehensive system transformation. Examples include the implementation of modular technologies such as energy management systems, basic automation tools, and customer-facing

digital applications. Such technologies can be integrated into existing workflows without requiring significant structural change or large-scale investment.

Such initiatives are prioritised due to their relatively low investment requirements, high feasibility, and compatibility with existing operational structures. These short-term actions enable hotels to engage with smart practices without committing to extensive technological or organisational restructuring. In doing so, they reduce perceived implementation risk while generating visible and immediate benefits. As initial entry points, these initiatives also facilitate managerial learning and support internal sense-making regarding the practical value of smart technologies.

### 5.5.2 Medium-term Actions: Organisational Integration and Capability Development

As smart practices become normalised through initial implementation, medium-term actions should shift toward organisational integration and capability development. The findings indicate that partial adoption often persists due to limited internal coordination and fragmented understanding of smart systems. To address this condition, hotel operators should prioritise cross-departmental integration and structured staff training. These efforts support the gradual alignment of smart technologies with managerial routines, decision-making processes, and service delivery practices. This recommendation is particularly important because the findings indicate that technological investment alone is insufficient to ensure successful smart hotel transformation. Employee resistance limited digital confidence, and uneven technological understanding frequently constrain implementation effectiveness and contribute to fragmented adoption practices.

These actions require moderate investment and a higher level of organisational commitment, particularly in the development of digital competencies and internal coordination mechanisms. Although their outcomes may be less immediately visible than those of short-term initiatives, medium-term actions are critical for moving beyond symbolic or fragmented adoption. This stage marks a transition from experimentation toward consolidation. Through this process, smart technologies become progressively embedded within routine operational and managerial practices.

### 5.5.3 Long-term Actions: Strategic Alignment and Sustainable Transformation

In the long term, smart hotel implementation should be aligned with broader organisational strategy and long-term vision. The findings indicate that sustained smart transformation remains constrained by uncertainty surrounding long-term value, governance facilitation, and market stability. As a result, long-term actions require deliberate strategic planning and selective investment in more integrated smart systems. These efforts should also be aligned with destination-level initiatives to enhance coherence and reduce systemic uncertainty.

These actions are less immediately feasible and depend on stable financial capacity, sustained leadership commitment, and effective external coordination. Despite these challenges, they are essential for achieving deeper technological integration and maintaining long-term competitive advantage. Importantly, the conceptual framework indicates that long-term transformation should not be treated as an inevitable outcome. Instead, it emerges as a contingent process shaped by cumulative organisational learning and broader environmental conditions.

The findings also suggest that long-term smart hotel transformation should increasingly incorporate sustainability-oriented technologies and environmentally responsive operational strategies. Several participants associated future smart hotel competitiveness with green tourism development, energy efficiency, and environmentally responsible innovation. In this context, selective investment in smart energy systems and sustainability-supporting technologies may contribute not only to operational efficiency, but also to Batam's long-term positioning as a modern and environmentally responsive tourism destination.

## 5.6 Policy Implications for Government and Public Institutions

The findings of this study also have important implications for policymakers, destination management organisations, and other stakeholders involved in smart tourism development. Consistent with the proposed conceptual framework, these implications are framed as enabling actions that support staged and context-sensitive implementation. Rather than imposing uniform or technology-driven policy prescriptions, the focus is placed on facilitating readiness and coordination. This

approach recognises variation in organisational capacity and local development conditions. The recommendations proposed in this study are derived directly from the empirical findings and aligned with the research objectives concerning stakeholder perceptions, implementation extent, contributing factors, implementation challenges, and governance facilitation mechanisms. The recommendations are grounded in the finding that smart hotel implementation in Batam remains gradual, uneven, and context-dependent, requiring adaptive implementation strategies that consider organisational capability, financial readiness, workforce preparedness, and governance coordination. These implications particularly address the study objectives related to implementation extent, contributing factors, organisational challenges, and governance facilitation mechanisms within smart hotel development.

### 5.6.1 Short-term Actions: Reducing Uncertainty and Enhancing Guidance

In the short term, policymakers should prioritise reducing institutional uncertainty by providing clear and context-sensitive guidance on smart hotel implementation. This recommendation reflects the findings that fragmented governance structures, inconsistent institutional coordination, and limited operational guidance continue to weaken implementation confidence and contribute to cautious, fragmented, and uneven adoption among hotel operators. Accordingly, practical support mechanisms such as informational platforms, pilot programmes, and structured knowledge-sharing initiatives can play a critical role in improving stakeholder understanding and implementation consistency. These measures enhance stakeholder confidence without requiring immediate large-scale investment or regulatory mandates. These actions are highly feasible and can be implemented within existing governance structures, serving as catalysts for incremental engagement with smart hotel practices. Without clearer institutional guidance, smart hotel implementation may continue to develop unevenly, limiting interoperability, long-term planning confidence, and destination-wide smart tourism integration.

### 5.6.2 Medium-term Actions: Facilitating Coordination and Capacity Building

Medium-term policy actions should prioritise enhanced coordination among stakeholders and capacity-building initiatives that bridge the gap between policy ambition and organisational capability. The findings highlight the absence of effective intermediary mechanisms linking hotels, technology providers, and destination authorities. Addressing this gap requires the development of structured collaboration platforms and targeted training programmes. This also indicates, carefully designed incentives can encourage collective learning and more coherent implementation across the destination. Such actions involve higher coordination costs but are essential for translating smart tourism strategies into operationally meaningful practices at the hotel level. The findings suggest that the absence of collaborative intermediary structures contributes to fragmented implementation practices, uneven technological understanding, and limited knowledge exchange across stakeholders within the Batam hospitality ecosystem.

### 5.6.3 Long-term Actions: Institutional Alignment and Sustainable Smart Destination Development

In the long term, policymakers should work toward aligning smart hotel initiatives with broader destination development strategies. The findings indicate that, in the absence of coherent institutional alignment, smart hotel implementation risks remaining fragmented and largely symbolic. This occurs because isolated organisational initiatives without broader institutional alignment often lack interoperability, long-term sustainability, and destination-wide strategic coherence. Long-term actions therefore include sustained investment in digital infrastructure, improved regulatory coherence, and clearer policy integration across sectors. Equally important is the establishment of durable public–private collaboration mechanisms to support coordinated and context-sensitive smart tourism development. These initiatives require long-term commitment and resource allocation but are necessary to support systemic smart tourism development that extends beyond individual organisational efforts.

By framing practical implications as staged, prioritised, and feasibility-sensitive actions aligned with the proposed conceptual framework, this study moves beyond

generic policy recommendations. The implications explicitly recognise variation in organisational preparedness, resource availability, and institutional conditions. Rather than assuming a uniform pathway to digital maturity, the study conceptualises smart hotel implementation as a negotiated and context-dependent process. This approach ensures that the proposed implications remain both empirically grounded and practically relevant across different stages of implementation. The findings therefore suggest that smart hotel transformation in emerging tourism destinations should be understood not as a purely technological transition, but as a negotiated socio-technical process shaped by organisational adaptation, institutional coordination, and contextual capability constraints. Building on these policy implications, the following section reflects critically on the methodological choices and the researcher's positionality in shaping the study's findings. Section 5.6 therefore turns inward to examine issues of reflexivity, interpretive influence, and the qualitative knowledge-production process underlying this research.

## 5.7 Methodological Reflection and Researcher Reflexivity

Given the qualitative and phenomenological orientation of this study, it is necessary to critically reflect on the role of the researcher in shaping the research process and the knowledge produced. In phenomenological inquiry, meanings are not treated as objective entities to be discovered, but as interpretive constructions co-produced through interaction between participants, context, and researcher. Reflexivity is therefore central to the credibility and analytical integrity of the study. This section reflects on the researcher's positionality, influence on access and data generation, interpretive role in analysis, and the limitations arising from these dynamics.

### 5.7.1 Researcher Positionality

The researcher's positionality inevitably influenced how smart hotel implementation was accessed, interpreted, and represented in this study. Approaching the field as an academic researcher with prior engagement in smart tourism and digital transformation literature shaped the analytical lens through which the phenomenon was examined. At the same time, the absence of direct operational or policy authority

positioned the researcher as an external yet informed observer. This intermediary position influenced both the framing of the inquiry and the nature of participant responses.

Hotel managers frequently articulated their experiences through pragmatic and operational lenses, emphasising feasibility, financial exposure, and organisational constraints. Government officers, by contrast, tended to foreground strategic intentions, policy alignment, and long-term development narratives. The researcher's academic identity may have encouraged participants to articulate rationalised or legitimising accounts, particularly when discussing future visions or institutional roles. Recognising this, the study does not claim interpretive neutrality but explicitly acknowledges positionality as a constitutive element of meaning construction.

### 5.7.2 Researcher Influence on Access and Data Generation

Access to participants was mediated through institutional channels and professional networks, which shaped both the composition of the sample and the perspectives represented. Interview participants were typically actors who were already engaged, to varying degrees, with digitalisation or smart tourism discourse. This pattern of access facilitated in-depth insight into ongoing implementation practices but also introduced a degree of selection bias. Consequently, perspectives from actors who were entirely disengaged from or resistant to smart initiatives may be underrepresented in the dataset.

During data generation, the interactional nature of qualitative interviews further shaped how experiences were narrated. Some participants may have aligned their responses with perceived academic or policy expectations, particularly in discussions of strategic direction or technological aspiration. To mitigate this influence, interviews were designed to privilege open-ended questioning, encouraging participants to describe experiences, uncertainties, and contradictions in their own terms. Nevertheless, the study recognises that interview data reflect situated accounts shaped by relational dynamics rather than unmediated representations of organisational reality.

### 5.7.3 Reflexivity in Interpretation and Analysis

Interpretation in this study was approached as an iterative and reflexive process rather than a linear analytical procedure. While prior theoretical familiarity informed analytical sensitivity, conscious efforts were made to avoid imposing predefined notions of smart hotels or digital maturity. The early stages of analysis prioritised participants' own language and interpretive distinctions. In particular, attention was given to the recurring differentiation articulated by participants between surface-level modernisation and deeper forms of digital transformation.

Throughout the analytical process, constant comparison across stakeholder groups was employed to preserve divergent logics rather than collapsing them into a single explanatory narrative. Managerial and institutional interpretations were maintained as analytically distinct, allowing tensions and misalignments to remain visible. Reflexive memoing was used to document interpretive decisions and moments where analytical emphasis risked being shaped by prior assumptions. This reflexive engagement was particularly important in the abstraction of empirical themes into the conceptual framework, which is presented as an interpretive synthesis rather than an objectively derived model.

### 5.7.4 Limitations of Researcher Perspective and Mitigation Strategies

Despite sustained reflexive engagement, the study remains subject to limitations arising from the researcher's perspective and methodological scope. The analysis primarily reflects managerial and institutional viewpoints. Perspectives from guests, frontline employees, and technology vendors were not directly incorporated. Consequently, the findings offer a partial, though analytically focused, account of smart hotel implementation.

This also indicates, the research was conducted within a specific temporal and contextual setting characterised by post-pandemic recovery and economic uncertainty, which may have influenced participants' cautious orientations toward innovation. By explicitly differentiating stakeholder logics and acknowledging interpretive boundaries, the study enhances transparency and trustworthiness rather than asserting methodological objectivity. Overall, reflexivity in this study functions as a mechanism

for analytical credibility rather than a procedural requirement. The study critically examines how researcher positionality, access, and interpretation shaped the research process. This reflexive engagement strengthens the robustness of both the empirical findings and the conceptual framework developed. In doing so, the study aligns with qualitative and phenomenological standards that regard reflexivity as essential to producing contextually grounded and theoretically meaningful insights.

## 5.8 Limitations of the Study

Despite the theoretical and empirical contributions of this study, several limitations must be acknowledged to ensure an appropriate interpretation of the findings. First, the study is geographically bounded to Batam Island, a developing tourism destination with specific structural, institutional, and market characteristics. While Batam represents a strategically important and theoretically relevant context for examining smart hotel implementation in emerging destinations, its unique proximity to Singapore, special economic zone status, and reliance on short-haul international tourism limit the direct transferability of the findings to other regions with different socio-economic or tourism profiles. Consequently, the insights generated should be understood as context-sensitive rather than universally generalisable, aligning with the interpretivist commitment to situated knowledge.

Second, the study is constrained by the size and scope of its participant sample, which consists of twelve key stakeholders comprising hotel managers and government officers. Although this sample size is methodologically appropriate for an in-depth phenomenological inquiry and saturation was achieved, the perspectives captured reflect primarily strategic and managerial viewpoints. Other stakeholder groups such as frontline employees, technology vendors, tourists, and local communities were not included, which may limit the breadth of perspectives on smart hotel implementation. As such, the findings privilege sense-making at the managerial and institutional level and may not fully capture operational or experiential dimensions of smart hotel implementation.

Third, the cross-sectional design of the study presents an additional limitation. Data were collected at a single point in time, capturing participants' perceptions and experiences during a specific phase of Batam's digital transformation trajectory. Given

that smart hotel implementation is an evolutionary and non-linear process, longitudinal changes in perceptions, strategies, and institutional alignment could not be examined. This temporal limitation restricts the ability to observe how implementation dynamics unfold, stabilise, or transform over time. Nevertheless, within these constraints, the study provides a robust and theoretically grounded snapshot of smart hotel implementation as a socially constructed and contextually embedded phenomenon, offering a foundation for future longitudinal and comparative research. Recognising these geographical, methodological, and temporal limitations, the following section outlines directions for future research that can extend, refine, and build upon the insights generated by this study.

## 5.9 Directions for Future Research

While this study provides a rich, contextually grounded understanding of smart hotel implementation in Batam, it also opens several avenues for future scholarly inquiry. First, future research would benefit from adopting longitudinal research designs to capture the dynamic and evolutionary nature of smart hotel transformation. Given that the findings of this study demonstrate smart hotel implementation as a gradual and adaptive process rather than a discrete event, longitudinal approaches would enable researchers to examine how stakeholder perceptions, organisational preparedness, and governance facilitation evolve over time. Such designs would be particularly valuable for tracing shifts from symbolic modernisation toward more integrated digital transformation, as well as assessing the sustainability of implementation outcomes across different stages of technological maturity.

Second, comparative destination studies offer a promising direction to extend the contextual insights generated in this research. Comparative analyses between Batam and other emerging or more digitally mature destinations such as Bali, Jakarta, or selected ASEAN tourism hubs would allow researchers to examine how variations in institutional arrangements, market structures, and governance models shape smart hotel adoption trajectories. This approach would enhance theoretical refinement by distinguishing context-specific dynamics from more generalisable socio-technical patterns within smart hotel implementation, thereby strengthening cross-contextual understanding in smart tourism literature.

Third, future studies may adopt mixed-method research designs to complement the depth of qualitative insights with broader empirical generalisability. While this study prioritised interpretive depth to uncover shared meanings and sense-making processes among hotel managers and government officers, quantitative or survey-based components could be incorporated to test the prevalence, strength, and interaction of key constructs identified in the emergent framework. Mixed-method approaches would also facilitate the integration of perceptual, behavioural, and performance-related insights, thereby providing a more comprehensive understanding of smart hotel implementation outcomes.

Finally, expanding the range of stakeholder groups included in future research would further enrich the analytical scope of smart hotel studies. Incorporating perspectives from hotel guests, technology vendors, system integrators, and frontline employees would allow researchers to explore how smart hotel technologies are experienced, negotiated, and operationalised across different levels of the hospitality ecosystem. Such inclusion would be particularly valuable in examining gaps between managerial intent, technological design, and actual service encounters, thereby deepening understanding of how smartness is co-produced through interactions between human actors and digital systems.

Collectively, these future research directions highlight the importance of viewing smart hotel implementation as an evolving, multi-actor, and contextually embedded phenomenon. By embracing longitudinal, comparative, mixed-method, and multi-stakeholder approaches, future studies can build upon the contributions of this research to further advance theoretical, methodological, and practical knowledge in smart hotel and smart tourism development. Having outlined these avenues for future scholarly inquiry, the chapter now concludes by synthesising the key insights of the study, reaffirming its contributions, and reflecting on the broader implications of smart hotel implementation in the Batam context.

## 5.10 Chapter Conclusion

This study aimed to explore how smart hotel implementation is perceived, interpreted, and enacted within the hospitality industry in Batam from the perspectives of hotel managers and government stakeholders. The findings demonstrate that smart

hotel transformation in Batam remains gradual, fragmented, and highly context-dependent. Rather than representing a purely technology-driven initiative, implementation is shaped by the interaction between organisational capability, institutional coordination, market readiness, stakeholder interpretation, and operational realities within an emerging tourism destination. Consequently, the study provides a contextually grounded explanation of how digital transformation evolves within hospitality environments characterised by uneven technological readiness and evolving governance structures.

In relation to the first research objective, the findings revealed that stakeholders generally perceived smart hotels as practical instruments for operational modernisation, service efficiency, and market competitiveness rather than as fully integrated digital ecosystems. Hotel operators tended to prioritise technologies that produced immediate operational and customer-service benefits, reflecting a pragmatic implementation approach shaped by financial caution, market competition, and organisational feasibility considerations. This perception emerged because most hospitality organisations in Batam continue to evaluate technological investment through operational feasibility, customer expectations, and short-term business value instead of long-term digital transformation strategies. As a result, stakeholder perceptions significantly influenced implementation priorities, organisational preparedness, and the pace of smart hotel transformation across the local hospitality sector.

Concerning the second research objective, the findings demonstrated that the extent of smart hotel implementation in Batam remains partial and uneven across different hotel categories. Although many hotels have adopted selected digital technologies to improve operational efficiency and customer experience, fully integrated smart hotel ecosystems remain relatively limited. The findings suggest that implementation has progressed incrementally because hotels continue to face financial limitations, technological compatibility issues, workforce capability gaps, and uncertainty regarding long-term returns on investment. Therefore, digital transformation within Batam's hospitality sector reflects a transitional stage between conventional hotel operations and broader smart tourism integration. This transitional condition demonstrates how smart hotel implementation within emerging tourism destinations is constrained by uneven alignment between technological ambition, organisational capability, and institutional ecosystem maturity.

In addressing the third research objective, the study identified that smart hotel

implementation was influenced by multiple interconnected factors, including competitive market pressure, evolving customer expectations, managerial commitment, operational efficiency goals, and wider technological developments within the tourism industry. These findings further indicate that similar technological opportunities may generate different implementation trajectories depending on how organisational actors interpret strategic priorities, manage operational uncertainty, and allocate technological resources within highly competitive hospitality environments. However, the influence of these contributing factors varied substantially across organisations due to differences in resource availability, organisational culture, strategic orientation, and implementation readiness. This demonstrates that smart hotel transformation in Batam cannot be sufficiently explained through technological opportunity alone, but rather through the interaction between external market pressures, managerial interpretation, organisational capability, and governance facilitation structures. This highlights the importance of strategic adaptation and managerial interpretation in shaping technology adoption decisions within hospitality organisations.

Regarding the fourth research objective, the study identified that smart hotel implementation challenges in Batam were multidimensional, systemic, and closely interconnected across organisational, technological, financial, and institutional dimensions. Financial constraints limited technological investment capability and reduced hotels' willingness to pursue large-scale digital transformation, particularly under conditions of uncertain tourism demand and unpredictable return on investment. At the same time, insufficient employee readiness, limited digital competencies, and organisational resistance toward technological change weakened operational confidence and slowed adaptation processes within hotels. Simultaneously, fragmented institutional coordination, inconsistent policy direction, and limited implementation guidance created uncertainty regarding long-term strategic priorities and governance support mechanisms. These interconnected barriers collectively reinforced cautious managerial behaviour, incremental implementation strategies, and uneven transformation patterns across hotel categories. The findings therefore demonstrate that smart hotel transformation in Batam is constrained not only by technological limitations, but also by the interaction between organisational capability, governance readiness, workforce adaptation, and contextual operational realities within an emerging tourism destination.

In relation to the fifth research objective, the study developed an emergent Smart

Hotel Implementation Model grounded in the lived experiences and contextual realities of stakeholders within Batam's hospitality ecosystem. Unlike technology-centric implementation frameworks, the proposed model conceptualises smart hotel transformation as a context-sensitive socio-technical process in which implementation outcomes evolve continuously through the interaction between stakeholder perceptions, implementation motivations, organisational preparedness, governance facilitation, implementation barriers, and long-term strategic adaptation. The model contributes to existing smart hospitality literature by extending predominantly technology-centric perspectives toward a more integrated explanation of digital transformation that incorporates technological capability, organisational adaptation, stakeholder interpretation, and institutional coordination within emerging tourism destinations.

In doing so, the framework demonstrates that successful smart hotel transformation depends not only on technological infrastructure, but also on the continuous alignment between organisational adaptation, governance capability, workforce readiness, stakeholder collaboration, and broader ecosystem development. Overall, this study concludes that smart hotel implementation in Batam should not be understood merely as technological adoption, but as an evolving socio-technical transformation process shaped by organisational capability, stakeholder interpretation, institutional coordination, and local market realities. The findings demonstrate that successful smart hotel transformation requires the continuous alignment of technological capability, organisational adaptation, governance readiness, workforce preparedness, and collaborative ecosystem development.

Consequently, this study extends smart hospitality literature by demonstrating that digital transformation in emerging tourism destinations cannot be explained solely through technology-centric assumptions. Instead, smart hotel implementation is a dynamic socio-technical process shaped by institutional readiness, stakeholder interpretation, organisational capacity, and market realities. The findings challenge technology-deterministic perspectives by showing that digital transformation evolves through ongoing negotiation between technological ambition, operational practicality, governance capability, and ecosystem maturity. This highlights that successful transformation depends not only on technological advancement but also on the collective capacity of institutions, organisations, and stakeholders to address implementation challenges under conditions of uncertainty and resource constraints.

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# APPENDICES

# APPENDIX 1
## Agreement to Participate in Research for Interviews

**Title of Research Project**

Exploring the Implementation of Smart Hotel in Batam Island, Indonesia: A Qualitative Study

**Investigators**

This form describes a research project. It contains information to assist you in making a decision about whether or not to participate. Research studies only include those who agree to participate; your participation is entirely voluntary. Before choosing to join, please ask any questions you may have concerning the study or this form to the project staff.

**Introduction**

The purpose of this study is to understand the participants' perception toward smart hotel implementation in Batam. This study also to explore the extent and the factors that contribute to the implementation of smart hotel in Batam. Besides that, this research also aims to identify the challenges in implementing smart hotel, and the results of the study will propose model for smart hotel implementation in Batam.

**Description of Procedures**

If you agree to participate, you will be asked to participate in a one-time interview between the participants and the researcher. You will be provided with an interview guide and informed consent ahead of time.

For easy note-taking, we would like to record your chats on audio. For more information, only the project researcher will have access to the tapes, which will eventually be destroyed after recording. Your information will be kept private before to, during, and following this study endeavour. You will be recognised by a coding system.

You will be involved for as long as the interview tasks require. After the interview, the audio tape will be transcribed, and you will be given a copy of the transcript for review. The email address you provide will be used to distribute this. That will be the end of your participation.

**Risks or Discomfort**

There are no known or anticipated dangers associated with taking part in this project.

**Benefits**

If you decide to participate, there will be no personal advantages for your participation.

You will get the benefit of sharing your experiences and perspectives in terms of knowledge on implementing smart hotels in Batam. Hopefully, the findings from this project will help other researchers who want to conduct additional research on this topic.

**Cost and Compensation**

There is no cost to participate in this activity.

**Participation Rights**

Participating in this project is completely voluntary. You are free to decide not to participate in the project or to stop at any moment, for any reason, and there will not be any repercussions. You can skip any questions that you don't want to answer.

**Confidentiality**

Information that identifies participants will not be made publicly available and will be kept private to the degree permitted by applicable laws and regulations. The interview will be recorded, but your name will not be on the recording. Your name and identifying information will not be included in any written report of the research. Your information and interview responses will be kept strictly confidential. The researcher will only share your responses with the research supervisor. If you decide to withdraw from the study, all information you supplied (including tapes) will be destroyed and removed from the final report.

**Questions**

You are encouraged to ask questions at any time during this project. For further information about the project, contact Devid Trinaldo Simatupang at devid.simatupang@gmail.com/-

**Consent and Authorization Provisions**

Your signature confirms that you willingly agree to engage in this research study, that the project has been explained to you, that you have had the opportunity to read the material, and that your questions have been appropriately answered. Before participating in this project, you will receive written consent.

**Participant's Name:_____**

**Participant's Signature**: **_____**

**Date**: **_____**

# APPENDIX 2
## Interview Protocol and Guide

| | | |
|---|---|---|
| **Title of Project** | **:** | Exploring the Implementation of Smart Hotel in Batam Island, Indonesia: A Qualitative Study |
| **Date** | **:** | |
| **Time of interview** | **:** | |
| **Platform** | **:** | |
| **Interviewer** | **:** | |
| **Interviewee** | **:** | |

---

**Introduction**

- Thank you for coming today.
- My name is Devid Trinaldo Simatupang
- The purpose of today's discussion is to understand the participants' perception towards smart hotel implementation in Batam. This study also to explore the extent and the factors that contribute to the implementation of smart hotel in Batam. Besides that, this research also aims to identify the challenges in implementing smart hotel, and the results of the study will propose model for smart hotel implementation in Batam.
- Let us look at the Informed consent.

**Key points**

1. The purpose of today's discussion is to understand the participants' perception towards smart hotel implementation in Batam, to explore the extent and the factors that contribute to the implementation of smart hotel in Batam. Besides that, this research also aims to identify the challenges in implementing smart hotel, and the results of the study will propose model for smart hotel implementation in Batam. Your identity will not be linked to your responses. No personal identifiers will be used. We will not report any information that could potentially make you identifiable, like your name or personal characteristics.
2. The data we will collect and will remain confidential which means that only research team members will have access.

3. You have the right to withdraw from the study at any time. You can choose to leave or not answer any questions asked should you feel uncomfortable at any time during our discussion of your experiences.
    - **Pause:** Are there any questions about the informed consent document?
    - **Collect:** If there are no more questions about the informed consent document, please sign (Ensure participants retain a copy).

**A. Screening Question (5 minutes)**

Screening Question/Criteria

1. Do you know, what is smart hotel?
2. Can you explain about the smart hotel characteristics?
    - If the participant answers "yes", researcher may proceed with the interview
    - If the participant answers "no", researcher must stop the interview and find the other competent participant.

**B. Introduction and Demographic Information (5 minutes)**

1. Please introduce yourself.
    - Full name
    - Gender
    - Age
    - Marital Status
    - Education Level
    - Tenure of service in current hotel/government
    - Tenure of service in hotel industry/government sector
    - Working department and Job Description
2. Participant's categories: Hotel Manager/Government Officers

**C. Interview Question 1 (10 minutes)**

What is your perception towards smart hotel implementation in Batam?

*Probing Q1: What are the key benefits you see in implementing smart hotel technology in Batam?*

*Probing Q2: What are the government's goals for the development of the smart hotel sector in Batam?*

*Probing Q3: How do you view smart hotel development in Batam?*

**D. Interview Question 2 (10 minutes)**

How do you see the progress of smart hotel implementation/development in Batam?

Probing Q1: Are there any differences between the smart hotel implementation/development in Batam and other tourist destination in Indonesia?

Probing Q2: What are the common features/amenities of smart hotel you see in Batam?

**E. Interview Question 3 (10 minutes)**

Can you identify the factors that contribute to the smart hotel implementation in Batam?

Probing Q1: Can you describe the factors that might influence the implementation of smart hotel in Batam?

Probing Q2: What are your thoughts on the current state of technological infrastructure (e.g., internet connectivity, bandwidth) in Batam, and how does it impact smart hotel implementation?

Probing Q3: In your experience, what are the main factors considered by hotels in Batam when evaluating whether to adopt smart technologies?

**F. Interview Question 4 (10 minutes)**

What are the biggest technological challenges hotels in Batam face when implementing smart hotel features, such as compatibility, security, or integration with existing systems?

Probing Q1: Can you elaborate on the specific challenges you have encountered in implementing smart hotel in Batam?

Probing Q2: Can you describe the challenges you face in integrating new smart features with your existing hotel systems? Are there concerns about data transfer, functionality, or overall system stability?

Probing Q3: How do you think future advances in technology might impact these challenges and potentially make smart hotel implementation easier in the future?

**G. Interview Question 5 (10 minutes)**

Can you describe your vision for what a 'smart hotel' in Batam would look like, considering the local context and guest needs?

Probing Q1: What is the suitable method/approach to implement smart hotel in Batam?

Probing Q2: Referring to the current technological landscape in Batam, which

smart hotel features do you think would be most feasible and impactful to implement considering the local infrastructure?

Probing Q3: In your ideal vision, how would a smart hotel in Batam contribute to the overall tourism industry and guest perception of Batam as a destination?

**H. Closing and thank you. (2 minutes)**

Is there anything else that you would like to offer that I did not specifically ask about?

Thank you for your precious time today. As mentioned earlier, I have procedure in place to keep this information confidential and it only will be used for this research project. You will receive a copy of the written transcript from this interview for your review.

**The interview finish at:**

# APPENDIX 3
## Instrumentation Table

| Research Question 1 | Research Objective 1 | Interview Question | Probing Question |
|---|---|---|---|
| How do the stakeholders perceived the smart hotel in Batam? | To understand the stakeholders' perception towards smart hotel implementation in Batam. | What is your perception towards smart hotel implementation in Batam? | 1. What are the key benefits you see in implementing smart hotel technology in Batam?<br>2. What are the government's goals for the development of the smart hotel sector in Batam?<br>3. How do you view smart hotel development in Batam? |
| **Research Question 2** | **Research Objective 2** | **Interview Question** | **Probing Question** |
| To what extent has smart hotel been implemented in Batam? | To explore the extent of smart hotel implementation in Batam. | How do you see the progress of smart hotel implementation/development in Batam? | 1. Are there any differences between the smart hotel implementation/dev elopment in Batam and other tourist destination in Indonesia?<br>2. What are the common features/amenities of smart hotel you see in Batam? |
| **Research Question 3** | **Research Objective 3** | **Interview Question** | **Probing Question** |
| What are the factors that contribute to the implementation of smart hotel in Batam? | To analyse the factors that contribute to the implementation of smart hotel in Batam. | Can you identify the factors that contribute to the smart hotel implementation in Batam? | 1. Can you describe the factors that might influence the implementation of smart hotel in Batam? |

# APPENDIX 4
## STUDY PLAN

| No | Target | 2023 | | | | | | | | | 2024 | | | | | | | | | | | 2025 | | | | | | | | | | | 2026 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| 1 | Problem Statement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Research Objective | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Scope and Limitation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Literature Review | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Research Methodology | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | RSS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | TIE 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | DRP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | REC Application | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Data Collection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Data Analysis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Thesis Reporting & | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | VIVA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fakulti Pengurusan Hotel dan Pelancongan

Our Letter :100-FHOTOUR (PJI 32/3)
Date :1446H شوال 24
:23 April 2025

To Whom It May Concern

السلام عليكم ورحمةالله وبركاتة dan Salam Sejahtera

Sir/Madam,

**VERIFICATION OF RESEARCH PROPOSAL RESULT AND CORRECTION FOR PHD/MSC BY RESEARCH STUDENT OF FACULTY OF HOTEL & TOURISM MANAGEMENT**

The above is referred to.

2. This letter confirms that the student has completed her Defence of Research Proposal and correction of the proposal.

| Student Information | Program | Proposal Title |
|---|---|---|
| 2023315773 - Simatupang Devid Trinaldo | HM950 – Doctor of Philosophy | Exploring The Implementation Of Smart Hotel In Batam Island, Indonesia: A Qualitative Study |

3. The Defence of Research Proposal result, and correction have been endorsed by the Postgraduate Office, UiTM Cawangan Selangor, with approval to proceed with the Research Ethics Application (REC).

Thank you.

**مولیا ،تقوى ،اوسها**
**"MALAYSIA MADANI"**
**"BERKHIDMAT UNTUK NEGARA"**

Saya yang menjalankan amanah,

**(ASSOC PROF. DR. ZURAINI MAT ISSA@ZAKARIA)**
Chairman of Research Ethics Committee (REC)

**Fakulti Pengurusan Hotel dan Pelancongan**
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ISO 9001:2015 No. Sijil: 10120156
UiTM di hatiku

UNIVERSITI TEKNOLOGI MARA
Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : UiTM.800 - 1/1/9
Our reference : REC/09/2025 (PG/MR/539)
Date : 1447H 7 ربيع الأخير
29 September 2025

**Mr Simatupang Devid Trinaldo - 2023315773**
**(Supervisor: Assoc. Prof. Dr. Azila Azmi)**
Faculty of Hotel Tourism and Management
UiTM Pulau Pinang
Permatang Pauh Campus
13500 Permatang Pauh
**PULAU PINANG**

Greetings

**Mr**

**APPROVAL LETTER - UiTM RESEARCH ETHICS COMMITTEE**

Thank you for submitting your research proposal to the Research Ethics Committee (REC). After considering your application, the Committee approved your proposal titled "Exploring the Implementation of Smart Hotels in Batam Island, Indonesia: A Qualitative Study" in Batam Island, Indonesia. Details of the approval are as follows:

| | |
|---|---|
| **Ref. number:** | REC/09/2025 (PG/MR/539) |
| **Approval Period:** | 29 September 2025 until 31 December 2025 |
| **Authorised personnel:** | 1. Simatupang Devid Trinaldo<br>2. Assoc. Prof. Dr. Azila Azmi |

The UiTM Research Ethics Committee operates in accordance with ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The approval of this project is conditional upon your continuing compliance with these guidelines and declaration.

We draw to your attention the requirement that a report on this research, must be submitted every 12 months from the date of the approval or on the completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed. Amendments, if any, to the study documents are to be submitted to the REC for approval.

If you require further information, please contact the REC Secretariat at 03-55442846/03-55442737 or email at recsecretariat@uitm.edu.my.

اوسها، تقوى، موليا
**"MALAYSIA MADANI"**
**"BERKHIDMAT UNTUK NEGARA"**

Yours sincerely,

**(EMERITUS PROFESSOR DATO' DR RAYMOND AZMAN ALI)**
Chairman
UiTM Research Ethics Committee

c.c.: Deputy Rector (RI), UiTM Pulau Pinang

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ISO 9001:2015 No. Sijil: 10120156
UiTM dai hatiku

## SAMPLE OF INTERVIEW TRANSCRIPT

**I : Interviewer**
**P1 : First Participant (General Manager)**

I : Good afternoon sir and thank you very much for your time for today's interview.

P1 : Good afternoon sir

I : My name is Devid Trinaldo Simatupang, and I am conducting this interview as part of my PhD research.

The purpose of today's discussion is to understand participants' perceptions towards smart hotel implementation in Batam. Specifically, this study aims to explore the extent and the factors that contribute to the implementation of smart hotels in Batam. This also indicates, the research seeks to identify the challenges faced in implementing smart hotels, and based on these findings, the study will propose a model for smart hotel implementation in Batam.

Before we begin, I would like to review the Informed Consent form with you. Please take a moment to look at it.

P1 : Oh ok..

I : Alright Sir, actually the purpose of today's discussion is to understand your perceptions towards smart hotel implementation in Batam, explore the extent and factors influencing the implementation, and identify related challenges. The findings will be used to develop a model for smart hotel implementation in Batam.

Your identity will not be linked to your responses. No personal identifiers such as your name, position, or any other identifiable details will be included in the report. All data collected will remain strictly confidential. Only members of the research team will have access to the data.

You have the right to withdraw from this study at any time. You may also decline to answer any question or stop the interview at any point if you feel uncomfortable.

Are there any questions about the informed consent document?

P1 : No.

I : If there are no further questions, may I please ask you to sign the informed consent form?

P1 : Yes, Sure

I : Thank you for signing the informed consent form. Before we move on to the main discussion, I would like to begin with a few general questions about your background. These questions will help me better understand your profile in the context of this study. Let's start with a few basic details:

I : May I ask your age, please?

P1 : Now, I am 52

I : Are you currently single, married, or in another marital status?
P1 : Sure, Married
I : What is your highest level of education completed?
P1 : I am Diploma 4
I : How long have you been working in your current position or organization?
P1 : Actually, it has been 12 years
I : Overall, how many years of experience do you have in the hotel industry or government sector?
P1 : Total is 29 years
I : Could you please tell me which department you are currently working in and briefly describe your main responsibilities or role?
P1 : I start from Front Office and my responsibility is about handling check in, guest complaint and etc
I : Alright. Can you tell us a little bit about the smart technology that has been used in Batam hotels including your hotel?
P1 : Actually, I don't follow the setup at the beginning for your hotel. My background in Starwood is quite long, since 2007 I have been in several Starwood management. And in 2011, at the beginning of 2011, we got information about the Welcome Project, if I'm not mistaken. I forgot the name of the project, I'm afraid I misplaced it with the one that Accor has. But the point is, at the point it's similar, because the hotel has more or less developed it. The project is that they build an app that can make the guest's journey from beginning to end. It fits into one application. That's called the Welcome Project, if I'm not mistaken. So the guest can directly book there. When booking, it will be replied by email.
That's what's intended for reference. So later you will fill in the reference, what it that he is doing is. But more personal, right? For example, he has a habit, for example, with "I want the belt to be 6, then I want the belt to be this much, this much." That is the reverence that is asked. That is in line with confirmation letter for the reservation. From there, many details were entered, if the guest wanted to enter. After that, the reservation process was completed, then the reference was filled, then they came to the hotel, can check in directly from the application. So, they can check in directly. After checking in, the cell phone is currently functioning as a key. So, there is a function of the cell phone that can be from the key. So, the guest can check in directly, then go to the room, only by using that application they can enter their own room. After checking in, if there is a problem with a request, a complaint, for example, there is less water, less hot water, etc. it is directly from the application itself. So they can input and it will be handled by a team. There is one front office team that will read, alert from the notification from the application, enter the system that is in the front office. After that, the front office will decide who will be sent based on the results. Now, there is already tracking, so there is a timer. Actually, here it is to make the guest not be offended and become a complainant. So in the system program, there is an escalating system. If the front office sends it to housekeeping to deliver amenities, within the time frame of the specified minutes, it is not

achieved, the housekeeping does not provide information to the front office, it is overlapping. The system will inform the superior, the front office supervisor. The supervisor of the front office, when busy, is not handled, in a few minutes, it will escalate to the front office manager. It depends on the settings until it enters GM. That's by system for guest request or guest complaint. After that, the guest is also in the application because the hard copy newspaper is no longer used much, there the guest can adjust what language he asked for the newspaper. That's a good thing. Finally, after it's done, the guest can directly check out by himself using the application. So indirectly, the guest can come to the hotel without meeting the receptionist again. So it's automated system. Only indeed, many are in danger with, if in Indonesia, are in danger with the budget, usually. Yes, so actually this application can be complete up to what is it called, setting room temperature in the room, then they can turn on the TV, and then you can actually design a lot, just because the hotel is sometimes not newly built, and sometimes the owner doesn't want to make a change. So, yes, what can be used is not 100% maximum. There are many things like Accor, in the past, in Accor, we also wanted to buy an ATM machine. But the function is just to check-in and check-out. Because when it was running, the hotel, actually like Ibis Budget was designed as a smart hotel. So there was no staff, especially there was only housekeeping staff. The scale is an economy scale, but the guests come, check in, take the keys in the ATM machine. So there is a check-in counter. They also prepare a vending machine, so the guests want to order something, it's through the vending machine for the event. Well, at most just housekeeping, cleaning the room. That's the concept. Smart hotel was in Accord back then.

I : Alright, Sir. So if we ask for a definition of the smart hotel version, Sir, what do you mean by smart hotel? And what are the characteristics of implementing a smart hotel?

P1 : For now, it's more like a hotel which combines technology. The principle is to facilitate service. Because if we are in a hotel, the principle uses three principles. There are human processes and products. Sometimes we see a lot of these three technologies. So, a process that can be simplified and automatic, and also not using humans to eliminate human error. That's what many are chasing. So, the guests are more effective. So, in the old days, hotels were many employees and sometimes communication between one department to another department or even from housekeeping from order taker to runner is sometimes problematic. Well, with the technology, it simplifies and at the end of the day, the customer satisfaction. Well, nowadays, if we follow that development, there are many technologies that eliminate human work, but add guest satisfaction. From me, it's like that. Combine technology with the process for a hotel.

I : Alright, Sir. So, according to Sir, how about the existence of smart technology for hotels today? Will this be a responsibility, a duty, a responsibility that must be implemented? Or maybe Sir has his own view on the implementation of this smart hotel, sir? Especially in Batam, right?

P1 : The hotel in Batam. In Batam, I see this as a technology that will be implemented

maybe in 20-30 years. Because we see the demographic of the hotel in Batam. The technology that is running right now, it's only Marriott Group that I see that is very dominant in this smart technology. For now, the hotel that has just opened or has just been built, using that technology, it's around 30% of the time. That's by using smart TV, door lock and the system because this will be related to the budget again the owner doesn't want to invest there but with an international brand they have designed so the owner doesn't need to build from zero scratch they just adapt. So they can follow the budget, maybe not as full as the hotel owner himself, then he wants to make the hotel a smart hotel. If I look at it from my perspective, with my experience in Batam for six years, I think it will take a long time to implement up to 100%. There will be one or two hotels, but overall, it will be a little longer.

I : Yes, sir. Well, for the benefit, maybe, sir, what you feel, what you get, while applying for a smart hotel in Batam, especially at your hotel, sir, can you explain it, sir?

P1 : One is, the main benefit for us, actually, and for management and for guests. The first is that our service is faster, more practical, and with the presence of communication before they come, we can finally provide personalized service. So that's what will differentiate how we serve and how the guests can get satisfaction differently from other hotels. And that will be our unique selling point. Operational wise, this will also increase efficiency. So, in terms of employees, it will also decrease. Then also check-in and check-out hours, which the guests might have a lot of queues in the front office, they can already go straight. Imagine if all the guests use this application, maybe I only put one front office attendance. That means that's the efficiency financially. If it is used in general, our energy efficiency will also be involved. It will have an impact, such as the use of AC, electricity, they can control from afar, they can control the AC, the lights, or other things that they can use. The last one is to be satisfied with the customer, a good job, and good benefits that we can give to the owner.

I : Alright, Sir. Speaking of features, Sir has mentioned several features at the beginning about smart technology, especially in the under-Marriott, right? So, in your opinion, what are the most common features used in hotels in Batam, sir?

P1 : Not many yet. Yes, at the moment, keyless is already everywhere. Mobile checking and check-out are also not available. Not everything can be im plemented. At least what is currently in Batam is competing with smart TVs. So, smart TVs connect to front office system. So, the front office, when the guests check in through the system, will automatically send data to the TV above to give a welcoming. That's what some hotels did at that time. We had a conversation at the GM meetings, they already had a planning like that. And I think that's the fastest way because some hotels have been long gone, the time has changed, and they want to give the smart TV to their guests.

I : Alright, Sir. If we compare it with other hotels in other cities in Indonesia, what is the difference between the implementation of smart hotels in Batam and cities

outside Batam that are still in Indonesia?

P1 : Probably, if we talk about the international brand, we talk about Indonesia, if we talk about Marriott, they have the same way. With Accor, they have the same way. Most of the local hotels that I have entered are in Jakarta. In Jakarta, which has started start to face this smart system. Because if in the area, it will come back again. So the owner needs to be educated. Educated well, actually, what is the benefit of this smart hotel system that can affect, it will not come back again. That will be a unique selling point that affects profits and revenue. But I think only Jakarta has a lot of it. Labuan Bajo is the same. There is no local hotel. But if we talk about international brands, there is also Marriott, Taktana with the same system. I don't see any exhibition. Only one. I don't ask about the hotel.

I : Alright, sir. If we talk about factors, sir. For Sir's experience, what are the factors that contribute and make the hotel able to implement smart hotel?

P1 : Actually, we have to... I always educate my owner. So if we want to adapt a system, we have to give a plus value, what is the benefit for him? Because the main thing is that he builds a hotel, he wants as much efficiency as possible and can take as much benefit as possible. And usually like that. But if we can educate him well, what is the benefit for him, and we also provide benefits for other stakeholders such as guests, employees, etc. I think that is the main factor that we can gain trust from the owner to be able to implement this smart hotel.

I : That's what we see from Sir's experience. But if Sir looks at the experience of other GM friends, what are the success factors that they can finally implement smart hotels?

P1 : Honestly, from my friends' point of view, there are no ones who implement smart hotels in their hotels to change. But if that's back again, if based on the headquarter, from the head office, they can implement it. The factor is internal from the operator. But if local hotel, at a certain point there is, but that's it. I want to change it to a smart hotel, to a smart TV. So, the TV is already out of stock, if you count the investment. They want to replace the TV. So, they put in a smart TV to replace it. But there is a price difference. Because if Hospitality TV with home standard TV is different, because Hospitality TV uses one system. Well, Hospitality TV with the current smart TV, they are including it. So they are looking for the power to change this to this. So to raise this, with an increase of, for example, Rp 1 million or Rp 2 million, but the owner can get an AB and C. The data is the same.

I : Alright, sir. Now, if we talk about the infrastructure in Batam, which Sir sees, sir, how much influence from the existing infrastructure to be able to make hotels, can apply the smart hotel in Batam, sir?

P1 : We are talking about technology, which is already certain, yes, for First, because we use an online system, the application must be strong with bandwidth. And actually Batam is safe from the internet side. Because there are many internet vendors, and vendors to turn it into a smart TV, from ordinary TV to smart TV, there are also some, so it's easier. And we are also close to Singapore, with Jakarta, the items actually, if you want to look for, add, using this system is

actually very easy.. very easy to come. So, in terms of infrastructure, Batam City can actually be more advanced if the owners can see it with their own eyes.

I : In Sir's experience, what are the important factors that should be considered by hotels in Batam when they have to decide to use smart technology or smart hotel?

P1 : Couple thing is the first factor for hotels that are considered. Yes sir. If right now it's in hotels for the local owner, it's a taboo thing. It's a taboo thing. And these days, these things are not cheap. Because something that is still being developed, it's still expensive. So first, the owner or the management will think about what the ROI is with the investment. And also financially, ROI. Then, can the staff be ready with the technology changes like this? Because if we design this smart hotel system, the staff will definitely be simplified. It will decrease. It will decrease. Then, another factor that needs to be considered is whether all the hotel's data will be in the application. Can the vendor who developed this system keep the secrets or can this data not be breached? Which needs to be considered for the owner and the management because with technology like this, there are a lot of things like hack raps and all kinds of things, then the hotel is hacked, then the data is taken, then it is turned off.

I : Okay sir, we enter the challenge problem, sir. According to Sir, what is the biggest technology challenge that hotels in Batam face when they have to implement the smart hotel feature, sir?

P1 : Yes, the biggest challenge is still the owner. Because they will invest, then they will receive the benefits. The second is still, the challenge is in the employees. That means if we use smart hotels, we must also have smart staff. So it's not broken. Because even though the technology system is as sophisticated as anything, but if it is operated by humans who are not smart, it's the same. In the end, the guests will be disappointed. Again, in Batam, many electricity, water, or internet are often broken. Because the route is still in development, the width of the road, etc. Maybe what is currently being feared is the infrastructure of Batam City, which is still "label" if we say so, because it's not 100% there, it will stay there. Even though the concept is like the internet, the Nagoya area is cut off one, connected directly to one there, it's like electricity. So with several routes, they can use three routes, so if one breaks, they can come straight there, one here, and connect directly to here. In a system way. But in the end, some hotels also feel that with a setup like that, but in the end, it happens several times. If it breaks, it breaks, up to an hour or two. If it's an hour or two, it means that it's also technically influential.

I : Okay sir, so in your experience today sir, in terms of the challenges you face in integrating technology features, sir, there will be concerns about what you mentioned earlier, data transfer, then functionality such as system stability, well, are there any experiences that you directly felt when implementing this, sir?

P1 : The problem is that I never followed. Honestly, I've never followed the opening of the Marriott or anything like that. If for example now, it's already clear when the HMI comes, it's already explained what the investment is like and its use and

benefits and so on. That means the hotel will follow the standardization. What system they will use, what hardware they should use, but then again, I have several times pre-opening hotels, there are owners who are stingy, there are hotels that are not stingy because they don't have money, there are hotels that are not stingy, they have money, but they don't want to, it's like they're not sincere. So it's like this, if you think it's good, so we just follow the standard according to the demography. The system uses H, so use H. Sometimes, like hotel openings, we use computer specs like this so that the technology can enter. Then suddenly, "I don't have to use that, we just sew it." Because in love with sewing, it's almost 500%. So yeah, that's it. Because the function is the same. We follow the specifications of the RAM or anything. Yes, but it's back again. Designed, what is the system like, what is the software like, what is the hardware like, so that it is capable? So, if the problem is rebranding, that's a bit difficult sometimes. If rebranding, it's okay to use the existing system with old hardware. There are many obstacles. It will be a challenge for our difficulties as well.

I : Alright, Sir. Next, how do you think, Sir, technology development in the future, can it affect the challenges we just discussed? And how is the application of smart hotels easier in the future? See the progress of technology in the future, sir?

P1 : Now it's time for shift shifting. The change. Now, only PMS, Property Management System, is owned by sellers, they are also designing with cloud. So here, the owner doesn't need to invest in the beginning. That's when we talk about IT, right? The server space investment can be billions, right? Not cheap stuff. Well, now the hotel system has entered the cloud. So it can for new hotels, it may be easier to inform the owner that just using the cloud is better. The investment doesn't need to be high, and the owner is happier because he doesn't need to pay in advance, but if the monthly payment is more expensive, it will be absorbed by the operation. But it will not be a source of the owner's investment.

I : Okay, sir. Now, if we talk about the vision, sir. How does Sir's vision see the implementation of smart hotels in Batam, sir? By considering the local context and the needs of the guests, sir.

P1 : Yes, actually, the vision is, actually, we are in the same boat. Because Batam is a destination that competes with Thailand, Malaysia, Singapore. Singaporeans will think better of Malaysia and Thailand. Malaysians think between Batam and Thailand. How can we tame people who come to Batam with technology too. Enter Batam, bring Batam, can develop far. Have a system as good as possible for this smart hotel system. So it will add, yes, it's back again. They become a trust guest, then they are happier because the system is automated, they don't interact much, it will be easier for them. For example, every weekend, hotels are a disaster. We talk about hotels in large numbers. Check-in time, check-out time, every weekend, sometimes they want to come. But if it's based on, for example, they can check it themselves, right? On their device. They can know when to come to the hotel. If the room is ready, they just have to come directly to the area. If it's not ready, they can just go to the hotel, just say, "I'm not coming to

check, I'll check the stuff." Because they already know the room is not ready. So, the number of guests has been reduced by the hecticness of the lobby, by the hecticness of the protest FO staff themselves. It's gonna create happiness for the guests. And if a lot of things happen like that in Batam, we can imagine with the Singaporeans who are on the brink, with a system like this implemented in Batam, they will gonna happier and happier. And they will be more, "I prefer to go to Batam than to go to Malaysia or Thailand." So, the hotel's unique selling point will be Batam's unique selling point. You stay in Batam, you get your technology. That's the best. But we're back again. Ownership, ownership, or anything like that. How do they behave? They have to be able to cut the screen to create something like this.

I : Alright, sir. Now, if we talk about the approach method, sir, what approach method or approach is suitable to be able to apply smart hotel in Batam, sir?

P1 : If the method is suitable, it is back to United with the presence of PHRI. Depending on what PHRI in Batam wants. They can provide education, education about the benefits with the presence of this smart hotel technology. What is the benefit for the hotel owners? That in general is the benefit, what can be obtained in Batam itself. With education, meetings, and actually giving the concept of a smart hotel system will be expensive if it is done by itself. Let's say if they are all in one place. For example, let's say they order a TV together, 10 hotels. The number of 10 hotels means there are about 1000, which can be compressed. How much money do they get? Then also, what applications can they use? Well, with the statue, it means it's getting cheaper. Well, maybe from there it can be included. Can enter quickly, with good education, with a system of joint procurement that can reduce prices and that's it.

I : Yes sir, united. Well, referring to the current technology landscape in Batam, sir. Which smart hotel features do you think are most suitable and have an impact on the local infrastructure?

P1 : Which one? Because what I have applied a lot is only at the four-point hotels. Maybe with Marriott, if the group is Marriott. I don't know about Accor in Merkir, but in Bistal it's definitely easy. I don't understand how much of the Merkir has applied smart technology for new hotels. But for the hotels that I know of, they don't have many of them, except for those that use keyless door locks and smart TVs. Other than that, they use manual SIMs. Okay, okay.

I : Next, this may be the last question. In Sir's ideal vision, how will the smart hotel in Batam contribute to tourism, that is, the entire tourism industry, and also affect the customer perception of Batam as a destination?

P1 : Customer perception?

I : Yes sir. How?

P1 : Try again.

I : In your ideal vision, how will this smart hotel in Batam affect the tourism industry as a whole and also affect the customer perception of Batam as a destination?

P1 : Yes, Batam's perception will increase. will be better, of course, in tourism.

Because if we rely on technology, it means that Batam has followed the development of the times. Because it's like us humans, how active are we at what age? If we look at the age that often comes to visit relative to nowadays, Singaporean tourists are still young. If they are old, they will just follow the trend. The definition of younger generation is that they are simplifying. They don't want to be complicated. They do everything online. So, if the market has shifted there, we as a product must also be able to follow there. If we follow there, it means that the direction is good. If other countries or cities do not follow, then in terms of tourism for the hotel itself, it will..will be enjoyed by generations like this. If we are the ones who have lived in hotels for a long time, if there is something simple that makes our lives more comfortable, then that's what we will use. And it's already automatic, the domino effect will go anywhere, so it will also add to the city itself, because they prefer it over the other city, so this city will be more lively and will get more economic progress.

I : Alright, Sir. That's the last question from this interview, sir. Is there anything else that Sir would like to say about your own experience or how you see the role of the implementation of smart hotels in Batam?

P1 : Well, it doesn't come back. We are the managers, if we are GMs, the task is to manage. We are in a position to see the opportunity when we are given the trust by the owner to manage it. We see what opportunities are good for us to develop. The hope is that hotel owners can also follow the times. Building a hotel is sometimes as long as it can be built, as long as it can be done, as long as it can work. The difficulty is also for the property itself. The ability of a GM is not valued like that. So sometimes, if there is no technology, GM will definitely work. But the problem is, with this technology, if everything can be simpler, better, the end of the bomb is also in the profit. That's what will make the owner happy too.

I : Thank you very much for your time and valuable insights, sir. So Sir input is very contributing, especially in understanding how the implementation of smart hotels will run in Batam. So thank you very much, Sir and always successful, sir.

P1 : Thank you, David. So I think for the interview, it's already finished, sir. Thank you very much. Thank you, thank you, Sir. Good afternoon.

I : Good afternoon, sir.

**I : Interviewer**
**P12 : Twelfth Participant (Government Officer)**

I : I put it in the middle so that you can hear it. So before that, thank you Sir for the time and opportunity. So, we just relax, sir. I am very helped because my S3 study is raising about the implementation of smart hotels in Batam. So, I ask these gentlemen, perception and experience of the government's air force in supporting and also see how far the development of the hotel industry in Batam is. So maybe I start Sir, I can ask a little background, sir. Or is it already there?

P12 : I haven't done that yet. Please.

I : Let me ask first, sir. So this will be confidential, sir. We will not include names. It means that we want to see this from the perception of the government and the industry as well. So we take care of the secrets, sir. May I, sir? For the time of Sir2's work, how long has he been in the tourism industry?

P12 : 15 years, sir. Former head of the Provincial Tourism Office of Kepulauan Riau, sir. The city was first. The city was first. In the province. In the province. KemenPar. Back again. Back again. But in total, that's already? In total, the time of the tourism was 15 years. 15 years.

I : For now, sir. More in the position or in the department, what is it called, sir?

P12 : I am now the staff of the governor of the economy sector. The economic sector, sir.

I : And that means for the current period,

P12 : It's only been two months, right?

I : Yes, sir. Two months. Okay. Well, for the short description, sir, for the government staff in the economic section earlier, sir, is this more helpful? What is the position of the governor in the department?

P12 : If the position of the senior staff is in the organizational structure of the government, he has a structural office, which is directly under the governor, but he does not lead the working unit. The task and function give technical considerations to the governor according to his task. So I can give suggestions, considerations, recommendations regarding things related to the economy and agriculture. That's if the initiative comes from me. But we also delegate to carry out all the tasks and directions that are given by the government.

I : Okay, that's it. Okay, let's go to the main question first, Sir. For smart hotel, sir. Can you explain, according to your own understanding, sir, what is the term smart hotel like, sir? What you have heard or what you know, maybe sir?

P12 : Yes, I started with a statement first, okay? Okay. In the digital era, which is marked by the advancement of information technology and communication at the moment. There is something called the more digital, the more personal. The more digital, the more professional. The more digital, the more global. It means that the industry, especially in the tourism sector, whether you like it or not, must transform. Answering this is no longer a choice, but almost a kind of trust. With the advance of information and communication technology, people are more

personal, more professional, and more global. So the hotel industry in tourism is not yet complete. Hotels that are international, chain hotels or major hotels, they already have a standard. At least they have implemented some smart hotel components in their group. Different from hotels that are usually local or hotels that are usually down. It is still in the process of transforming towards smart hotels. So hopefully the entire hotel industry in Batam, especially to be a smart hotel, a seamless hotel, a sustained hotel, it also needs stages, it needs time, it needs a long process. If we talk about what a smart hotel is, it is the hotel industry service that adopts information and communication technology, also adopts the Internet of Things, then there is also the application of AI or Big Data in providing services to its customers. Well, here I actually read that there is a paradox, the tourism industry is identical to the hospitality industry. the community that precedes high touch. But the advancement of information and communication technology now, hospitality is becoming less important, replaced with high-tech technology. So the tourism industry is now facing two sides. One is to prevent high touch in the hospitality industry, one is to transform into high tech. So between high touch and high tech.Well, how is the implementation in Batam in particular? I see hotels that are connected, change hotels or modern hotels, are now transforming into smart hotels. But all the characteristics of smart or smart components in the hotel industry cannot be fulfilled because the investment is not small either. There are some components or characteristics, whether it's a networked hotel or a chain hotel, or local hotels that have begun to transform. Most of all, smart lighting. There are already several hotels that apply smart lighting technology in their hotels. Smart Low, Smart RTI. There are several hotels that we have seen have adjusted, temperature, it uses smart technology because there is also a value in efficiency. For example, a networked hotel in Batam that already exists and this is one of the factors that also encourages enabling factor for the application of smart hotel. Different from other cities in the Riau Islands. hotel chains in Batam are a booster to accelerate the implementation of smart hotels. For example, if you enter the Marriott Hotel, it has already implemented smart lighting technology, smart AC, smart TV, smart cafe. So to open the door, it's already smart. In one panel in the room, we can set various components smart TV, smart AC, sometimes when we go to the toilet, we don't need to turn on the light, the light will only light up if it reads the body sensor and so on. Some modern hotels have been transformed there. And that service, in my opinion, besides meeting the current technology needs. The customer is also digital savvy, between 18 to 45 years old. The most important thing is that there is a mission to save energy. So, green economy. Here there is smart in simplifying services, there is also smart to do efficiency, there is also a smart understanding for sustainable. So if I can simplify, smart hotel is the implementation of information and communication technologies, whether it is the Internet of Things, whether it is big data, including AI use in providing services to guests or doing efficiency and sustainability in hotels. So if simplified, what is a smart hotel? A smart hotel, a

seamless hotel, a sustainable hotel. The meaning is different, I have written it here. Smart means that people come before they come, when they come, and when they leave the hotel, everything is personalized. He can finish it on his device without having to come to the receptionist sometimes without having to ask for service and all kinds he can personalize so the service is more personal that's why I say this is a bit contradictory with the hotel industry which has been facing hospitality human touch. So from high touch to high tech okay seamless seamless is without hindrance from origin to destination, it can manage smart check-in, smart check-out, smart concert, smart complaint, and so on, it's quite well-prepared. Well, the sustain, the sustain has already implemented green economy, efficiency in water use, temperature, electricity, heating, and so on. Well, the hotel industry. But for hotels that I think are modern, chain, and networked hotels, they have international SOP. That's the first category. So if you ask me how my perception is about smart hotels in Batam, there are three groups, three must-haves. One, networked hotels or modern hotels or chain hotels. is indeed transforming into a smart hotel because the SOP says so. The second group is local hotels. Local hotels are examples of what? I-Hotel, it doesn't change the hotel, Holiday Hotel, Local Hotel, Pacific, Planet Holiday, and so on. This is also transforming towards smart because they also need efficiency and provide services to customers personally. The third group is actually small hotels, even sometimes they don't have to adapt to smart hotels because they build their own thematic. For example, there are some private islands in Kepri, who provide the cottage, who provide the villa. It's true, Previous avoids technology because what is sold is authentication. So the silence is also paid high because there is a segment that people want to distance themselves from the noise of technology. So the lights sometimes return to traditional, the floor returns to sand, the place to sleep is not very smart, so people seem to be drawn to the past. Even the bathroom, if you ever go to Nikoi Island, it seems to be brought back to the past. This is authentication, so what is sold is authentication. So if you ask what the development or implementation of the application is, smart hotel in Batam. I divided into three groups. The chain hotel group or networked hotel because it has international standards, they are forced to transform there. Well, how is the opportunity in Batam? The acceleration of smart hotels in Batam is much faster than other hotels in the capital, in the area. What is the comparison? First, he is a border. Second, he is the third largest tourist donor in Indonesia. The average Wisman who comes is a digital savvy. People who are close to technology. So he is more personalized. Well, because we are close to the border, because we have a lot of Wismans, this is also a preference. Third, Batam has a much more advanced digital infrastructure than other cities in the Riau Islands. Even with PR Press No. 1 in 2024 about the Indo-Pacific Plan for the development of the Free Trade Area of Batam, one of the core of Batam's business, outside the trade industry, tourism, shipyard, digital economy, creative economy whose landmark is now standing strong Nongsa Digital Park as a special economic area. So the new BATAM

entity or the new BATAM core business is indeed driving the technology industry or digital technology or digital creative economy as a new direction of policy.So if hotels in Batam want to transform into smart hotels, the ecosystem is already good, the digital infrastructure is very good, especially for the mainland area. We have all 4G now in the mainland. And almost 100% according to my friend's report, Pakandatel Telkom, in Batam, we have fibre optic.So, there is no obstacle for friends in the hotel industry to want to transform their hotel services into smart hotels. Because the digital infrastructure is very good. It's already fibre optic, it's already 4G, even transforming to 5G. Especially mainland. But in the hinterland, which is actually the tourist destination is sometimes much more exotic there, the digital infrastructure is not good, for example, where? Nirup, similar to Galang-Galang Baru and its surroundings, but in business there is demand, there is supply, right? in this tourism industry, supply should create demand.So when the government, what is the government's support? The government support has not been in the form of regulation until today, especially from the local government. Because it is handed over to the market mechanism. How does the market mechanism look at supply and demand? The private sector moves faster than the public sector. What is the example? For example, now Telkom or Telkomsel to install fibre optic to Galangbaru because the demand has been seen or later the government began to see several islands in Batam potential to be a tourist area. Well today BP Batam as a institution that has full authority to manage Batam area as a free and open area is expanding its delineation, which previously the free-ranging area of the free harbour only covers six major islands Batam, Stokho, Nipah, Galang, Galangbaru maybe later the surrounding islands will become free-ranging areas of free harbour. Well, maybe there are among those islands that will later be zoned for development for industrial tourism. If the direction is there, the government will definitely give incentives. The government's incentives are the public goods. In short, JALITA Telecommunication Electric Railway. When it enters, the private sector rarely wants to be in the government. That is the support of the government. The government is also in the government.As a regulation, there is no specific roadmap or a specific policy from the government, whether it is the province or the city, to encourage hotels in Batam to implement smart hotels. None. Until today, none. But without being asked, the government has given incentives for that. What is it? It's the road, infrastructure, communication, and others. The ecosystem is already good. Come on, the government has prepared all this, you will create it. That's for Batam. That's about it, the general picture.

I : You were offended earlier, sir. I'm curious too. Is there any kind of government incentive, sir? I remember about training hotel staff or managers to be more understanding and skilled in using technology in hotels. Are there such incentives from the government or are the government incentives so far, as Sir said earlier, electricity, water, telecommunication, public roads, or are there many kinds of training incentives or maybe more to the capital for this, is that

what it is?

P12 : If capacity building, especially for human resources that work in the tourism sector, especially in the hotel industry, as long as we incentivize capacity building, it is not to increase capacity in smart hotels. As long as we aim for it, it is a certification of competence human resources that work in the hotel industry is usually in F and B then in those that do not touch smart hotels. That's actually a bonus given by the government in terms of capacity building which should be responsible according to the laws of tourism it is in the hands of ownership or tourism industry. So, the APBD money, this people's money, is actually dedicated to increasing human resources. If from us, to whom? The SDM who is in the government, who manages tourism, and the SDM of the people who are at the destination of tourism. Government money actually falls there. To increase its capacity as a device and community that lives in tourist destinations but SDM who works in the tourism industry whether it's in the travel industry, hotel industry, etc. its responsibility is actually the responsibility of the industry itself but not none, there are friends in what is the name of the association? IHGMI? What is it? GM, sir. GM and another one that focuses on SDM development. Well, they also collect hotels, capacity building, and certification improvement. But for smart hotels, from the government, as far as I know, we don't include it. We give it to the industry to increase the capacity of the SDM for smart hotels. That is one of the obstacles to the implementation of smart hotels because the SDM is not yet too clear. And usually that function is attached to vendors that provide facilities. So, the SDM that works in the hotel industry actually he is only an end user after the smart hotel is prepared by Vendor he will operationalize it not create for example smart AC, smart TV, smart lighting, smart curtain, smart whatever smart check-in that provides the technology usually Vendor and that investment is also quite. After the investment is made, the workers in the hotel, the resources in the hotel, are usually the end users, the users who cooperate.

I : In terms of benefits, Sir, it means that you already know that tourists who come to Batam, both from abroad and from their own domestic, have characteristics. So with the presence or implementation of the hotel's use of smart technology, what benefits will be better for the guests? And how should the hotel actually capture this smart technology, based on your opinion sir? Well, it's good that the industry is obliged to implement and adopt that smart by looking at the market that comes to Batam or actually better step by step or maybe see as you said earlier the concept of the destination itself, there is something like the local one, there is even something more authentic. Well, how does Sir see how much the industry is urgent need to implement the technology system with Batam market which is different from other cities?

P12 : Yes, the industry is actually able to read our business market segment, our tourist, both domestic and international. Maybe if I can specifically for Batam, 70% of them are digital savvy, people who have been familiar with technology. Therefore, the need to transform and build smart hotels is not a choice, but a

kind of trust supported by the Batam strategy that is very close to the market country, cross-border, whose demography. In 2019, we could already claim that 57% of the tourist population who entered Indonesia were digital savvy. Millennials. Now, maybe there are only a few millennials left. Gen Z and Alpha are children who have been born with technology. They were born with technology in their stomach. I think industrial friends can read this demographic. 70% of tourist that comes, whether it's from abroad or domestic is the millennial Gen Z Alpha, which is actually very familiar and familiar with technology. So providing facilities and services for smart hotels is not a choice, but a need. But the characteristics of a smart hotel, if it is fully filled in total, in addition to the expensive investment. So it should be done gradually. Which hotels do we hope to be pioneers? I said earlier, the first class is chain hotels. Modern hotels that are international. They are the pioneers. The second is the local hotels that have been pioneers. For example, all hotel resorts in the Nongsa area. We can also make it a showcase. Just look at the key of the door that used to be manual, now it's smart lock. Then enter the bathroom from pressing the button, now it's already live alone. We go out to die alone. But small hotels, hotels that are halfway down, for them maybe the smart hotel issue is too expensive, too far, plus their SDM preparation that is not yet ready. But let it be, because there is a market segment that is also looking for hotels. So the more diversification, the better. But going to smart hotels, in my opinion, is a coincidence. Because there are responsibilities and burdens of the tourism industry, especially hotels, to follow the protocols of the world. What is it about green tourism? Well, the use of fossil energy in the tourism industry will slowly decrease. There will be a kind of regulation, maybe in 2030, or 2045, we don't know. All industries must have left fossil energy and must use renewable energy. We don't know, maybe in 10 years, when we are old, all the hotels have been replaced with solar panels, for example. Because the fossil industry is limited, jet-set still uses oil, PLM still uses diesel, and so on. It's towards green tourism, including the waste management. - The management of waste? - The management of waste. That's also part of smart hotels. If now waste is taken and thrown away, tomorrow maybe waste will be brought home. Well, some hotels that are now smart in terms of chasing sustainability have reduced plastic materials. already goes to eco-friendly materials, for example, we are using pipettes, then the layout is already using paper, eco-friendly, eco-friendly, water use, it's all known, it goes there.

P12 : David must be able to find something that is different in implementing this smart hotel What is the benefit, what is the benefit, that's the good thing The government on the one hand wants to create as many workplaces as possible But don't let technology just destroy it all Because the implementation of this smart hotel or smart technology will give the tendency of services to become more personalized. So, I think the application of smart hotel must be chosen. What features should be in a hotel. Don't replace everything with technology. Room boy replaced with robot. Receptionist replaced with a machine. So almost all

touch points are as if there is no longer interaction between humans and humans. So people to people is no longer there. Finally, People who live in this day and age, their interactions are machine to machine. Even though the industry of tourism is actually a industry of hospitality. An industry that is human touch, not high tech. Well, because the market preferences have changed, we have to follow that change. But where is the corridor? Smart check-in, I think everyone agrees. The queue is decreasing. Yes, the queue is decreasing. So the term is LBP. From his country, before he came to Indonesia, he looked, he booked, he paid from his device. One thing is done. The check-in is done. So until he arrives at the hotel, he just needs to check in. If he sees that there are not many people in the receptionist, that's what we add, a very friendly service. Because of our survey, Indonesia is a very friendly country with a very happy national culture by the people. Please don't replace it with a robot, don't replace it with a chain box, don't replace it with technology. It's enough to go to the receptionist, press the barcode, and leave. Unfortunately, the government has lost its working power. It can't give a job opening. Smart Check-in or Digital Check-out, Digital Check-in, may be a kind of trust now. Because the service from the personnel, limit the long distance and so on. If it is FIT, but if it is GIT, it is group. Another story, right? Second, smart lighting, smart AC, smart temperature, the whole industry must be able to minimize the cost, right? Well, for me it must be there. Smart water, so... How to reduce the use of water that is now more and more regulated from a tap to a touch tap. Now in the mall, people don't open the tap, everyone uses smart. Water is used according to your needs only. In seconds, it dies. If you want to use it again, touch again. Finally we are in the past. The mosque is an example of this. Jabal Arafah. They don't use the rainwater anymore. It's all rainwater. So the water is... Shower. People are going there. They are going to green economy or green tourism. Maybe the government will prepare a regulation.

I : Sir, have you ever seen a smart technology feature outside Batam or maybe abroad that needs to be adopted and suitable for Batam?

P12 : That's why I started from the end, to be honest. The impact of the advance of information technology today will create the more digital, the more personal. The more digital, the more professional. The more digital, the more global. The more digital, the more personal. More professional, more global, and closer. This makes the government be boomerang because the mission of the government, both from the centre to the region, is how to create a working field. This is criticized, don't let one side of us be suspicious, want to be smart technology, but on the other hand we kill the opportunity for the work field. This nation is still an emerging country, not completely dependent on technology. Like the application of smart lighting, smart temperature, smart low. It's actually an automation. Without touching it, it will automatically work on itself. I think that's... It is mandatory to have it now because the cost is very high if we are still dependent on conventional technology. And that is actually not played by a lot of workers. I have been to the hotel chain several times, it's really ambitious. We

enter, the lights are on by themselves. We go out, the lights turn off by themselves. He has been using smart lighting. Even if we don't like the light too bright, we can set it in one control panel. We can set it all from there. That's smart lighting. But to clean the room, it can't be replaced by a robot. Don't be smart, let the housekeeping work because it will open the work area. So don't be replaced by a robot. And they are trained. Starting from shouting, to open the door, to shout, all trained. Can you imagine if we are hungry at midnight in a hotel, then we order a menu, then suddenly the door is knocked with an automation style, the robot comes, there is no human touch. Well, the paradox is actually in the tourism industry, when technology has to be a necessity, it hits it with the industry that is as thick as hospitality. So from high touch to high tech. We still have to look for the red thread. What features should we implement to build a smart home? Maybe a homestay class. There are many. But what kind of smart homestay? There are also times when there are tourists who want to take a shower in the swamp. And homestay provides that. The purpose of the design is to segment the hotel that is ready for this, especially for smart hotels or those that are still in high touch.

I : So, we are in the challenge, sir, the obstacles, difficulties that you see for the industry to implement it, sir. May I ask, sir, what do you see as the biggest challenge of the industry and how can they actually deal with it so that they can still see the characteristics of smart hotels, what they need, even if there are limitations, what are the limitations they should be able to understand.

P12 : Okay, first there is still a stigma that is built in the hotel industry, when it will transform into a smart hotel, it is high cost. The stigma is built, it is still built, it is high cost. Even though when he wants to automate, want to digitize services, actually he will say low cost, high impact. The second is that our digital infrastructure is not even. Especially Mainland, maybe there is no issue. But hotels, resorts, cottages, villas, homestays outside Mainland, maybe it's a bit difficult to transform into smart hotels. But the features that can be developed, actually we are in step. What is the third? SDM. But I said earlier, which SDM? Because for this smart technology, everything is taken over by vendors. The vendor who creates the power of the user, because it has been automated. For Batam, the obstacles are not too heavy, because the digital infrastructure is already good, especially Mainland. But in the Interland there is still a gap.

I : Can you explain a little, sir, if Mainland is an area where, sir?

P12 : The island of Batam is actually very solid infrastructure. What is this Batam city? Batam City. But enter the new Galang-Galang Nipah Contour, there is already, but maybe not as stable as Batam. Well, what about the surrounding islands? Not yet. Because if you want to enter fibre optics, now you have to go offshore. That's why everything is still helped by GPS. But it's not impossible. hotels, resorts, villas, which are located in the islands have already implemented smart hotels. But in which features?

I : That's it. Sir, is there anything you want to add? For factors that can support the hope of the industry to implement this smart hotel?

P12 : I have written it down. The first is the location factor, which is very strategic, close to the market of foreign tourists, where the demographic of the people between 4-5 years old is very inclusive. People who are smart, people who are smart, and people who are very in touch with technology. Whose preferences have been personalized. That's one. The second, the enabling factor of why hotels in Batam need to be more smart because our digital infrastructure is good now, especially in the mainline. Right? It has evolved. The third, In Batam, there are already several modern hotels, networked hotels, hotel-chains that can be a pioneer in the implementation of smart hotels. That is different from other cities in the region. But in Batam, there are chains of hotels that can represent the implementation of smart hotels. But in turn, what features should we apply? So that we don't have to implement technology in this area. One side wants to be efficient, but on the other side, it reduces the workforce. Because the government wants to create a workforce. So, what about smart? That's what will be worked on. So, in the end, this dissertation will be released as an implementation model. which is suitable for Batam, which is suitable for Indonesia, maybe, which is suitable for the local language, what do you think? The implementation of smart mobile in Batam is small. So the questions of the professors are sometimes I don't teach. Who understands it? They don't know actually, but because of the blade angle, there is a chance to attack. I was waiting, sir.

I : Yes, sir. So, there is a final output from this research later, a model will be born. A model. Which is indeed suitable, ideal for Batam. What is the model in Batam like? Like what? That's right, I think. Well, that's the one that I have to come out the most. Especially in the context of Batam's local, right, sir?

P12 : Batam must be brave to show off its smart energy application in the hotel industry. To overcome the world issue, now we are heading to eco green, we are heading to green tourism. So smart energy may be started later on how the hotel industry begins to have collective enthusiasm from all the hotels in Batam for the application of green tourism by applying smart energy. Gradually, hotels have used solar panels to replace diesel or energy fossil. Then smart electrical, it's already automated. No one is lost there. So we have started to have moral responsibility to go to smart energy because one day, the new and innovative energy will no longer be a choice but a kind of prosperity. And even some countries have already made a deadline in some areas there is already a timeline there are countries that 2030 have stopped all energy-intensive transportation but it has already moved to electric motorbikes and so on Oh, the issue is not yet over with electric motorbikes suddenly Toyota has made use of the most environmentally friendly technology by using uranium fuel not to emit smoke but to emit smoke and so on so ideally Because the tourism industry ecosystem in Batam is much more complex than other cities and cities. It has become a pioneer for the application of smart energy, whether it is from the water, electricity, and so on. This must be formulated by the government and all stakeholders, how there is collective enthusiasm regulation, we go there. Green tourism is no longer an option, but it is a need that must be answered. Because

the new and innovative energy will have a lot of potential in the island, but it is not yet empowered. Therefore, the direction of development policies that are organized in the RPJMD (Rencana Pembangunan Jangka Menengah Daerah), Mr. Governor, has also investigated the maritime industry, the blue economy, and the green economy. The blue economy is using the sea as a great potential. The green economy is how to aim for the latest energy. I think, now in the shops, I'm sorry, I've started to replace some lights outside the house, I've used solar lamps, just for example. Because at night he lives, he dies alone there are already 4-5 lights that are outside I don't use electrical anymore I don't use solar panels now we will move there.

I : Okay sir, so more to the question of the last category, the model earlier, this is maybe more to the vision, the vision of Sir to see the implementation of smart hotels in Batam, sir. So the vision for the future, what will the hotel industry be like with this technological advancement, sir? So maybe you can describe

P12 : There are many technologies, but there must be some interactions that we have to pay attention to. On the other hand, there is a category of technology that is more safety-oriented. Because this technology, in addition to robotics, in addition to the Internet of Things, also talks about Big Data. There is a safety there that becomes a concern of guests or tourists who come. Yes, about personal data. Personal data. Well, how do you see the impact of this technological advancement on the comfort of tourists who come to Batam, especially those who live in Batam, see from the side of their information that is in the industry where they live and what are the fears that will be like the impact for tourism in Batam this alone, sir? From this discussion, we want to find the red thread, we take Chinese philosophy only, life must be yin and yang, balance. So how is the implementation of smart hotel in Batam? I think don't be 100% smart. between high-tech and high-tech balance and that can be offered by the hotel industry in Batam.

I : This is the last question, Sir Is there anything else you want to say about your experience or maybe how the role of the implementation of this smart hotel in Batam City, sir? Maybe what hasn't been said earlier, there's something you might want to emphasize to complete our discussion or interview today, sir. Something related to the implementation of the smart hotel in Batam alone.

P12 : From the implementation level, maybe not all of them can automatically go to smart. Step by step, by looking at the classification of hotels. Not all modern hotels are in Batam. That's why I said earlier, we divide it into three groups of hotels. Hotel chains, local hotels, and lower hotels. So the implementation of smart hotels, the implementation of smart hotels, let the hotel chains that are the pioneers not be very good.

I : Thank you very much for your contribution sir, your thoughts, your experience, your insight, Sir.

P12 : You are welcome.

# AUTHOR'S PROFILE



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