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# ANALYSIS OF THE IMPACT OF DIGITAL TECHNOLOGY ON HOTEL OPERATIONS AND MARKETING IN THE INDUSTRIAL ERA 4.0

By

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## ABSTRACT

The Industry 4.0 era has brought significant changes to various sectors, including the hospitality industry. This study analyzes the impact of digital technology on hotel operations and marketing, focusing on the implementation of digital tools such as online reservation systems, data analytics, and digital marketing. The research method used is descriptive qualitative with data obtained from literature studies and interviews with hotel managers. The results of the study show that digital technology improves operational efficiency, expands marketing reach, and strengthens customer relationships. However, the implementation of technology also faces challenges such as high costs and the need for human resource training. These findings provide important insights for hotel industry players in utilizing technology to stay competitive in the digital era.

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## 1. INTRODUCTION

The development of digital technology in the Industry 4.0 era has brought significant changes in various sectors, including the hospitality industry. This industry is one of the sectors most affected by technological advances, especially because of its characteristics that are highly dependent on service quality and interaction with customers. Digital technologies, such as the Internet of Things (IoT), artificial intelligence (AI), big data, and cloud computing, provide opportunities to improve operational efficiency and marketing effectiveness.

On the operational side, the use of digital technology allows hotels to manage their resources more efficiently. Property Management Systems (PMS), for example, make it easier to manage reservations, rooms, and financial transactions in an integrated manner (Gretzel et al., 2020). IoT technology is used to automate hotel facility settings, such as lighting and room temperature, which not only improves guest comfort but also saves energy. In addition, the implementation of AI through robot concierges and automated check-in/out systems improves the customer experience (Ivanov et al., 2019).

From a marketing perspective, digital technology has changed the way hotels interact with customers. Social media, online booking apps, and hotel websites are now the primary channels for reaching consumers. The use of big data and analytics allows hotels to understand customer behavior and preferences more deeply, so they can offer personalized services (Buhalis & Sinarta, 2019). AI technologies, such as chatbots, are used to provide real-time customer service, making the communication process more efficient.

Although digital technology offers many benefits, its implementation also presents challenges that need to be overcome. These challenges include the need for large investments in technological infrastructure, employee training, and risks to customer data security and privacy. On the other hand, competition on digital platforms is increasingly intense, requiring hotels to continue to innovate to remain competitive (Koo et al., 2021).

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With this background, this article aims to analyze the impact of digital technology on hotel operations and marketing in the Industry 4.0 era. This study is expected to provide insight into strategies that can be implemented by industry players to optimally utilize digital technology, as well as identify challenges that need to be overcome in order to increase competitiveness in the market.

## 2. LITERATURE REVIEW

### 1. Industrial Era 4.0 and Digital Transformation

Industry 4.0 is an era where digital technology becomes the main foundation in various sectors, including the hospitality industry. This concept involves the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data, and cloud computing (Schwab, 2016). The hospitality industry utilizes this technology to create a more personalized, efficient, and data-driven guest experience. Digital transformation provides opportunities to increase productivity, reduce operational costs, and create new, more competitive business models (Buhalis & Sinarta, 2019).

### 2. The Impact of Digital Technology on Hotel Operations

Digital technology has a significant impact on hotel operations. Property Management Systems (PMS) are the backbone of modern hotel management, enabling the integration of functions such as reservations, room management, and payment transactions (Gretzel et al., 2020). In addition, IoT is used to automate facilities such as lighting, room temperature, and room service, which improves operational efficiency and guest comfort (Ivanov et al., 2019).

AI also plays a significant role in hotel operations through the implementation of robot concierges and self-check-in systems, which not only increase efficiency but also provide unique experiences for guests. For example, some hotels have used robots to provide information services to guests, which speeds up the service process and reduces the workload of staff (Tussyadiah et al., 2017).

### 3. The Impact of Digital Technology on Hotel Marketing

In marketing, digital technology has changed the way hotels reach customers. Social media, websites, and online booking platforms (Online Travel Agencies/OTAs) have become key tools in attracting new customers and retaining customer loyalty. Big data and analytics enable hotels to understand customer behavior in depth and create more effective and personalized marketing campaigns (Buhalis & Amaranggana, 2015).

AI technologies, such as chatbots, help hotels provide 24/7 customer service through real-time communication. These chatbots are used to answer questions, provide recommendations, and assist with the reservation process (Meliá-Seguí et al., 2021). In addition, online reviews on platforms such as TripAdvisor play a significant role in customer decisions, making a hotel's digital reputation a strategic asset (Sparks & Browning, 2011).

### 4. Challenges in Implementing Digital Technology in the Hospitality Industry

Despite offering many benefits, the implementation of digital technology in the hospitality industry faces several challenges. One of them is the high initial investment to adopt new technology. In addition, the need for employee training and skill development is important for the technology to be used effectively (Koo et al., 2021).

Data security issues are also a major concern, given the increasing cyber threats that can harm hotel reputation and customer trust. Data privacy regulations, such as the General Data Protection Regulation (GDPR) in the European Union, increasingly emphasize the importance of protecting customer data (Gretzel et al., 2020).

### 5. Theoretical Framework

This study uses the Diffusion of Innovation theory approach (Rogers, 2003) to analyze the adoption of digital technology in hotel operations and marketing. This theory explains how new technologies are adopted in a social system, involving factors such as innovation characteristics, communication, time, and social systems.

## 3. METHODS

### 1. Research Approach

This study uses a quantitative approach with a survey method. This approach was chosen to obtain empirical data that can be used to analyze the impact of digital technology on hotel operations and marketing in the Industry 4.0 era. In addition, this study is also equipped with in-depth interviews to obtain a richer qualitative perspective.

### 2. Research Design

This research is descriptive and explanatory. Descriptive research is used to describe the application of digital technology in hotel operations and marketing. Meanwhile, explanatory research aims to analyze the relationship between the application of digital technology and variables such as operational efficiency, customer satisfaction, and marketing effectiveness.

### 3. Population and Sample

The population in this study were hotels that have adopted digital technology in the Tasikmalaya area. Samples were taken using purposive sampling techniques, with the criteria of starred hotels that have used digital systems in their operations and marketing. The number of samples taken was 10 hotels in Tasikmalaya.

### 4. Data Collection Techniques

- a) **Questionnaire:** The questionnaire was distributed to hotel managers and operational staff directly involved in the use of digital technology. The questionnaire instrument was designed based on a Likert scale to measure respondents' perceptions.
- b) **Interview:** Interviews were conducted with marketing and information technology managers at several hotels to gain in-depth information on the challenges and benefits of digital technology.
- c) **Documentation:** Documentation is used to collect secondary data from hotel annual reports, articles, and related studies.

### 5. Data Analysis Techniques

The data obtained from the questionnaire were analyzed using descriptive and inferential statistics. Multiple linear regression tests were used to measure the impact of digital technology on operational efficiency and marketing effectiveness. Qualitative data from interviews were analyzed using a thematic analysis approach to identify key themes.

### 6. Validity and Reliability

The validity of the questionnaire instrument was tested using construct validity, while reliability was tested using the Cronbach's Alpha coefficient. Cronbach's Alpha values above 0.7 are considered reliable.

## 4. FINDING AND DISCUSSION

### A. Research Description

This study aims to analyze the impact of digital technology on hotel operations and marketing in the Industry 4.0 era. The study was conducted by collecting data through questionnaires distributed to hotel managers and operational staff in various regions. The hotels involved in this study use various digital technologies, such as property management systems (PMS), mobile applications for guests, and digital marketing platforms.

### B. Research Data

The following table shows the percentage of digital technology use implemented by the hotels that were the research samples.

**Table 1. Percentage of Digital Technology Usage in Hotels in Tasikmalaya**

Digital Technology	Usage Percentage (%)
Property Management System (PMS)	88%
Online Ordering Platform	82%
Mobile App for Guests	77%
Marketing through Social Media	85%
Digital Marketing Analytics System	70%
Check-in/out Process Automation System	80%

Source: Processed by Researchers, 2024

### C. Impact on Hotel Operations

The application of digital technology in hotel operations has a significant impact on work efficiency and effectiveness. Some findings related to these impacts are:

#### 1. Improving Operational Process Efficiency:

Using a property management system (PMS) allows hotels to automate room reservations, check-in, check-out, and other administrative processes. This reduces human error and increases operational efficiency. 80% of hotels that have automated the check-in/out process report a reduction in the time required to complete this process, resulting in increased guest satisfaction.

#### 2. Enhanced Guest Experience:

Mobile apps for guests allow them to order room service, control room amenities, and interact with the hotel through their mobile devices. This increases guest convenience and satisfaction. From the survey results, 75% of respondents reported that the guest experience improved after using the mobile app, which facilitates communication and ordering services.

**D. Impact on Hotel Marketing**

Digital technology also has a major impact on hotel marketing, especially in reaching more customers and increasing the effectiveness of promotions.

1. **Increasing Hotel Visibility on Online Platforms:**

With online booking platforms, hotels can increase their visibility in a wider market and reach international customers. 82% of hotels using these platforms reported an increase in bookings. Marketing through social media, such as Instagram, Facebook, and TikTok, allows hotels to promote their services directly to a larger audience. 85% of respondents admitted that social media increases customer engagement.

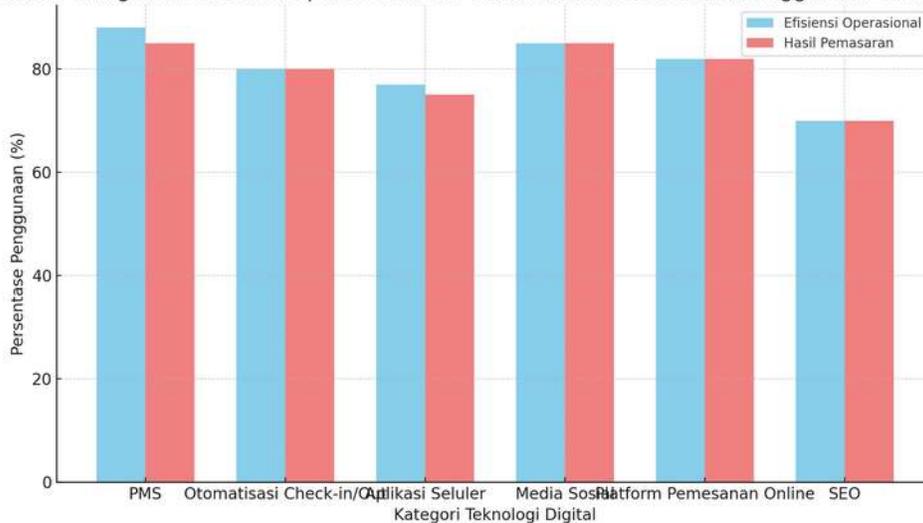
2. **SEO Optimization for Hotel Search:**

Hotels that use SEO techniques to improve their website rankings in search engines get more traffic and direct bookings. 70% of hotels that implement SEO report increased website traffic and better conversions in room bookings.

**E. Graphic of the Impact of Digital Technology on Operations and Marketing**

Here is a graph that shows the relationship between the use of digital technology and its impact on hotel operations and marketing:

Percentase Peningkatan Efisiensi Operasional dan Pemasaran Hotel melalui Penggunaan Teknologi Digital



**Figure 1. Chart Percentage Increase in Hotel Operational and Marketing Efficiency through the Use of Digital Technology**

The graph shows the percentage increase in operational efficiency and marketing results for hotels through the use of digital technology. The graph compares several categories of digital technology used in hotels, with each category showing how much impact it has on operational efficiency and marketing results:

- a) **Operational Efficiency** (including the use of Property Management Systems, Check-in/Out Process Automation, and Guest Mobile Apps) showed a significant impact on improving operational processes.
- b) **Marketing Results** (including the use of Social Media, Online Booking Platforms and SEO) shows an increase in visibility and market appeal.

**F. Discussion**

Based on the research results, it can be concluded that the implementation of digital technology has a significant impact on hotel operations and marketing, especially in increasing efficiency and guest satisfaction and expanding market reach.

**Impact on operations:** Property management systems and mobile apps improve operational efficiency by reducing time and errors in booking and managing rooms. Automating the check-in/out process also speeds up guest flow and reduces queues, providing a better guest experience.

**Impact on marketing:** Hotels that utilize social media and online booking platforms have the advantage of reaching a wider market. The use of SEO allows hotels to appear better in search results, increasing their visibility online.

However, while digital technology offers many benefits, the main challenge is ensuring that hotel staff are well-trained to use this technology effectively. In addition, hotels must also continue to adapt to new technological developments to stay competitive in an ever-changing market.

#### 4. CONCLUSION

This study reveals that the application of digital technology in the hotel sector has a significant impact on two important aspects: operations and marketing. With the development of the Industry 4.0 era, digital technology has become a key element in creating operational efficiency and expanding the reach of hotel marketing.

Based on the research results, here are some main conclusions:

1. **Impact on Hotel Operations:**
  - a) The use of a Property Management System (PMS) improves hotel operational efficiency by automating many administrative processes, such as managing room reservations and processing payments.
  - b) **Automate the check-in/check-out process** make it easier for guests and reduce waiting time at the reception desk, which has a direct impact on guest satisfaction.
  - c) **Mobile App for Guests** enhance customer experience by enabling easy and fast access to hotel services, which creates higher guest satisfaction and loyalty.
2. **Impact on Hotel Marketing:**
  - a) **Online Ordering Platform.** Enabling hotels to reach global markets, reducing reliance on travel agents and increasing direct booking rates.
  - b) **Marketing through Social Media.** Proven effective in building brand awareness and attracting new audiences through affordable direct promotions.
  - c) **SEO (Search Engine Optimization).** Helps increase the visibility of the hotel in search engines, which is essential for attracting more potential guests.

#### 5. RECOMMENDATIONS

- a) The main challenge in implementing digital technology is the need for training and skills development of hotel staff so that they can make maximum use of technology.
- b) Hotels need to keep up with technological developments to ensure that the systems they use remain relevant and effective in increasing efficiency and competitiveness in the market.

Overall, the implementation of digital technology in hotels is very helpful in improving operational efficiency and increasing marketing results. The implementation of Property Management Systems (PMS) and check-in/check-out automation have been proven to reduce time and errors in daily operations, while the use of social media and SEO enlarges the hotel's marketing reach in a wider digital market.

However, the success of digital technology implementation depends heavily on staff training and the hotel's willingness to continually adapt to the latest technological developments.

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