

# **Adoption of Internet of Thing (IoT) in Smart Hotels to Increase Supply Efficiency with Hotel Equipment Vendor**

## **Inayatulloh**

Information Systems Department  
School of Information system  
Bina Nusantara University  
Jakarta, Indonesia 11480  
Inay@binus.ac.id

## **Enggal Sriwardiningsih,**

Management Department, Binus Business School,  
Bina Nusantara University,  
Jakarta, Indonesia,  
enggal@binus.ac.id

## **Ade Fadli Fachrul**

STTD Al Hikmah  
Jakarta, Indonesia  
adefadli1987@binus.ac.id

## **Rajiv Dharma Mangruwa**

Communication and Business-Telkom University, Bandung, Indonesia  
Azman Hashim International Business School –  
University of Technology Malaysia, Malaysia  
[rmangruwa@telkomuniversity.ac.id](mailto:rmangruwa@telkomuniversity.ac.id)

## **Muhammad Salman Al Farisi**

Sekolah Tinggi Ekonomi Bisnis Syari'ah Bina Mandiri  
salman@binamandiri.ac.id

## **Rizky Muslim Fadhillah Fachri**

Data Science Cyber Security Swiss German University  
[rizky.fachri@student.sgu.ac.id](mailto:rizky.fachri@student.sgu.ac.id)

## **Reni Nuraeni**

Communication Studies Program,  
Faculty of Communication and Business, Telkom University  
reninuraeni@telkomuniversity.ac.id

## **Rivaldhy N. Muhammad**

Study Program of Law, Faculty of Law, Social and Political Sciences  
Open University, Indonesia [valdhymuhammad1@gmail.com](mailto:valdhymuhammad1@gmail.com)

## Abstract

Many service organizations are for-profit companies such as hotels, restaurants, and retail stores. The hotel and hospitality industry is often considered the most global in the service sector. As a result, large amounts of capital are invested each year in hotel design and improvement to achieve customer satisfaction. One of the biggest investments in hotel equipment such as devices in the living room, bedroom, bathroom and all devices that will be used by customers during their stay in hotels that require investment, monitoring and maintenance with a large budget. Problems arise when the process of supervision, maintenance and replacement is done manually which has an impact on the inefficiency of the hotel equipment supplies process and will indirectly have a negative impact on hotel customer satisfaction. On the other hand, IoT or Internet of Things is a technology that can integrate all types of devices into a computer network. So, the purpose of this research is to help hotel management to monitor hotel equipment and improve the efficiency of hotel equipment supplies by adopting Internet of Things technology. The research method uses a qualitative approach through observations about the inefficient conventional hotel supply chain process which has a negative impact on the overall hotel performance. Literature study is used to identify alternative solutions with information technology.

## Keywords

Internet of Thing, Hotel, Supplies Equipment

## 1. Introduction

The hotel and hospitality industry is a type of accommodation that uses part or all of the building to provide lodging, food and drink services, facilities, other complementary facilities and services for the public that can support and facilitate guests' business activities (such as meeting rooms, business centres, exhibition rooms and so on), which are managed commercially and meet the specified requirements. Various services from hotels require supporting facilities that will aim to provide hotel customer satisfaction (Ampofa 2021) (Dogru et al. 2020) (Denysenko and Budiakova 2020) (Inayatulloh 2021).

Currently, technology has been adopted in many fields, both in the business sector (Ramadhan 2022) and government sector (Ramadhan et al. 2011) (Ramadhan et al. 2021). The hotel as one of the businesses that continues to grow has also used the latest technologies, such as smart door locks, smart TVs, smart kitchens, and all other devices that may be connected to a computer network (Mercan et al. 2020) (Thakur 2022).

Meanwhile, this technology-based sophisticated device has not been integrated with vendors who can monitor in real time if there is damage or if it has to be replaced or other maintenance activities so that the hotel equipment supply process is not efficient (Abou 2021) (Nadkarni et al. 2019). Meanwhile, the Internet of Things is a concept or program where an object has the ability to transmit or transmit data over a network without using the help of computers and humans. The internet of things or often referred to as IoT is currently experiencing many developments (Alam 2018) (Ghosh et al. 2018) (Perwej 2019). The development of IoT can be seen starting from the level of convergence of wireless technology, microelectromechanical (MEMS), internet, and QR (Quick Responses) Code. IoT is also often identified with RFID (Radio Frequency Identification) as a communication method. In addition, it also includes sensor-based technologies, such as wireless technology, QR Code (Cui et al. 2021) (Huang 2020) (Hussain et al. 2020).

Thus, the purpose of this research is to assist hotel management in increasing the efficiency of the supply chain of hotel equipment/equipment with suppliers using Internet of Thing (IoT) technology. The research method uses a qualitative approach through observation to find problems related to the hotel supply chain and literature studies to determine alternative solutions with an information technology approach.

## 2. Literature Review

### Internet of Thing (IoT)

Internet of things is a concept in which an object or object is implanted with technologies such as sensors and software with the aim of communicating, controlling, connecting, and exchanging data through other devices as long as they are connected to the internet (Khan et al. 2020) (Pramanik et al. 2019) (Al-Turjman et al. 2020).

IoT has a close relationship with the term machine-to-machine or M2M. All tools that have M2M communication capabilities are often referred to as smart devices. This smart device is expected to help human work in completing various existing affairs or tasks. IoT consists of Artificial Intelligence (AI) is an intelligence system owned by humans that is implemented or programmed in machines so that machines can think and act like humans. In IoT, almost any machine or device can become a smart machine. AI is an invention that can give any technology or machine the ability to think "smart" (Mazhar et al. 2022) (Leminen et al. 2020) (Afanasev et al. 2018).

So, AI will collect various data, network installation, and development of algorithms from artificial intelligence. Thus, IoT greatly impacts all aspects of human life. This AI is in charge of collecting data, designing and developing algorithms, and installing networks. The second part of IoT is Sensors, where sensors are the distinguishing element of IoT machines from other sophisticated machines. With this sensor, the machine is able to determine the instrument that can change the IoT machine from a passive one to an active and integrated machine or tool. The last part of IoT is Connectivity or connection between networks. In the IoT world, it is possible to create a new network, namely a network specifically used for IoT devices. (Din et al. 2019) (Al-Garadi et al. 2020) (Adi et al. 2020). Figure 1 describes the parts of IoT:

Object Recognition is the process of recognizing objects that will adopt IoT where each object will use artificial intelligence to connect with parts or processes on the IoT network.

The object censor is part of a smart device that functions as a communication medium with other devices or processes on the IoT network.

Each object or smart device has the ability to transmit data in both directions so that it can interact with the next process. Smart devices also have the ability to communicate and receive/send data, the resulting data is stored and processed in a data center or cloud service. The stored data which is then processed will become information that can be designed according to service needs.

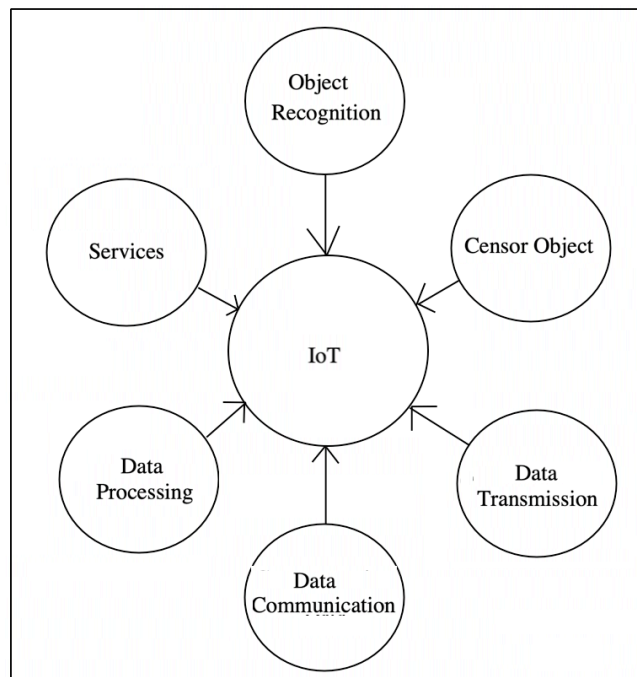


Figure 1. IoT Component

### 3. Methods

Figure 2 describes the research method. The adoption of smart devices in the hotel industry has a direct impact on improving hotel customer service. The convenience and security of smart devices adopted by hotels are the two main reasons for increasing customer satisfaction. The adoption of smart devices in hotels has consequences for the maintenance and supply of these devices that are different from other devices. The conventional process of maintaining smart devices in hotels creates an inefficient process so that a solution is needed to improve the efficiency of the supply process for smart devices in hotels. The next step of this research is to identify alternative solutions for the inefficient supply of smart devices in hotels. After observing and studying literature, IoT becomes the best solution choice with the advantages of IoT. The final stage of research is to build a supply model for smart devices in hotels with IoT technology.

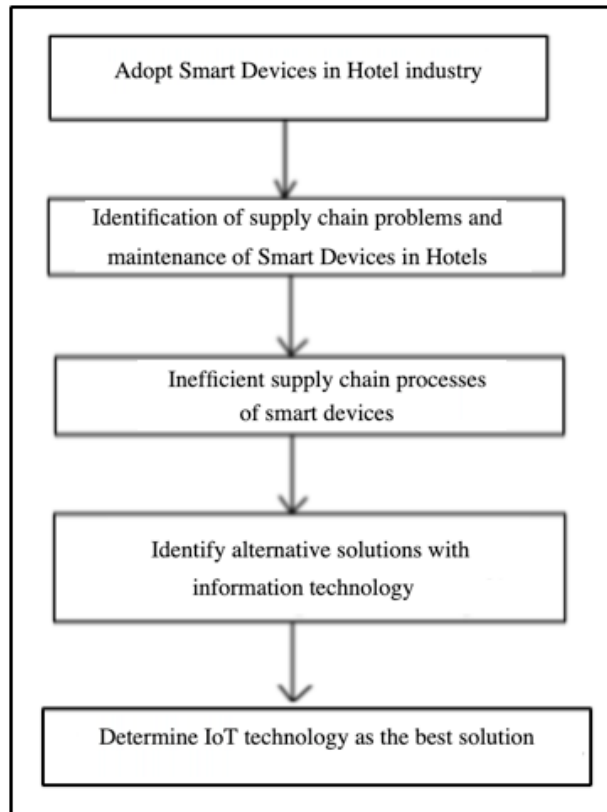


Figure 2. Research Method

#### 4. Results and Discussion

Figure 3 illustrates the proposed model. The first part of the model is a hotel with several smart devices such as smart TVs, smart doors, smart kitchens and others. All Smart devices are connected as IoT. So, the initial stages of the IoT concept are sensor and actuator namely the connected devices that monitor (in the case of sensors) or control (in the case of actuators) some “thing” or physical process. Sensors capture data regarding the status of a process or an environmental condition, such as temperature, Smart TV signal, function of Smart living room etc.

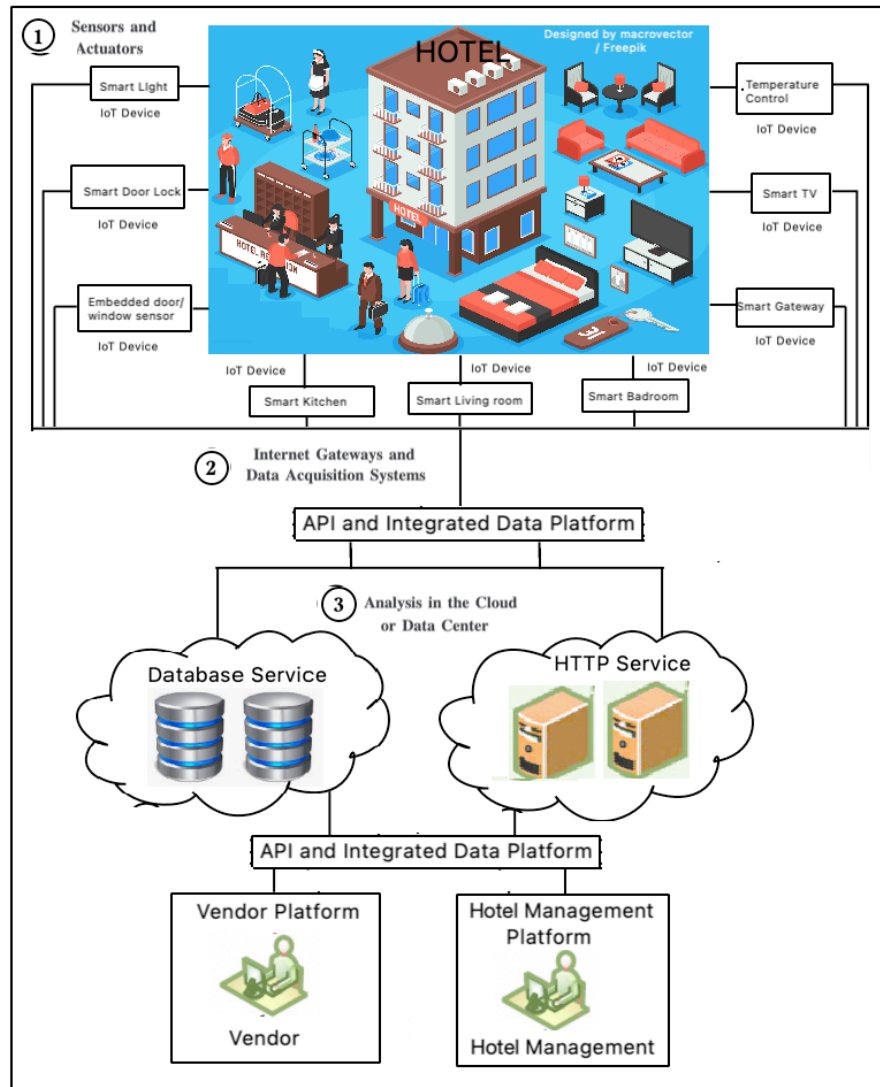


Figure 3. Proposed Model

The second part of this model is the Application Programming Interface (API) and the integrated data platform where in this section all smart devices are connected to various applications and different data in this second part is required. Internet Gateways and Data Acquisition Systems. A data acquisition system (DAS) collects raw data from the sensors and converts it from analogue into digital format. The DAS then aggregates and formats the data before sending it through an Internet gateway via wireless WANs (such as Wi-Fi or Cellular) or wired WANs for the next stage of processing.

The third part of the model describes the process of storing and processing data. Data storage and processing can be cloud-based or data centre where these two services are directly connected to smart device vendors and hotel management. To increase the flexibility of integration between vendors and hotel management, the model proposes the adoption of API and integrated data that is connected to the data centre. Thus, vendors can directly monitor in real time smart devices in hotels and if there is damage, malfunction or replacement of smart devices can be carried out immediately.

## 5. Conclusion

The high investment budget of smart devices is expected to increase hotel customer satisfaction with comfort, security and convenience as a positive impact of smart device adoption in hotels. But the maintenance and supply of smart devices can cause cost problems if the supply and maintenance process is inefficient because of its negative impact on customer satisfaction and hotel performance in general. So the adoption of IoT on smart devices is very effective in helping the effectiveness of monitoring smart devices and supplying smart devices because with the adoption of IoT supervision and maintenance can be carried out in real time. Vendors can directly in real time know when to replace smart devices and management can monitor vendor performance in real time.

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## Biographies

**Inayatulloh SE. MMSI, CDMS. CSCA** is a lecturer at Bina Nusantara University, School of Information System Jakarta Indonesia and also a doctoral candidate of computer science, experienced in managing systems in the retail, automotive, convection and education industries. research domain in e-learning, e-business, e-commerce, cloud computing, IoT and block chain technology.

**Rajiv Dharma Mangruwa** is a candidate doctor in business administration (DBA) at Azman Hashim International Business (AHIBS) school in University Technology Malaysia. He was practically experienced working as country manager in one the largest eCommerce business for Online Travel Agent (OTA). His academic background has obtained a scholarship from The Japan-ASEAN integration fund (JAIF) during his master's study at UTM Malaysia-Japan International Institute of Technology (MJIIT). Rajiv is currently a lecturer at the Faculty of Communication and Business at Telkom University.

**Reni Nuraeni, Ph.D** is a lecturer at Communication Science Study Program, Communication and Business Faculty, experienced in broadcasting and journalism. Research domain in data journalism, broadcasting code of ethics, network and management mass media, media alternative, semiotic and framing analysis.

Dr. Enggal Sriwardiningsih SE. M.Si is a lecturer at Bina Nusantara University. Management Department, Binus Business School, Jakarta, Indonesia. She graduated bachelor and master's degree from Economics department, Gajah Mada University, Yogyakarta. Doctoral degree from Doctoral Research Management, Bina Nusantara University, Jakarta, Indonesia. Her focus in consumer / producer behaviour, SMEs, e-commerce and e-learning.

**Rivaldhy N. Muhammad** is a Lecturer at the Open University which is one of the State Universities in Indonesia. holds a Bachelor of Laws degree at Khairun University Ternate and a master's degree at Janabadra University Yogyakarta. Since becoming a Lecturer in 2018, he has been assigned to Jayapura Papua Open University as a Lecturer in the field of Legal Studies who always provides teaching and guidance to students who need good knowledge. Before becoming a lecturer, Rivaldhy N. Muhammad was a lawyer who always helped people who needed legal aid services.