

# Design of Hotel Warehouse Management Information System Based on PIECES Analysis

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**Abstrak** – The hotel warehouse section requires a good information system that can support all warehouse operational processes so that service quality, information accuracy and control of data security can be achieved in accordance with the company's objectives in the hotel warehouse. An information system is built from a design that is based on the needs of users of information systems and an analysis of the operational conditions of the company. Based on this, the purpose of this study is to analyze and design a management information system to be able to support the operational processes of the hotel warehouse. The case study in this study is the warehouse section at the Mercure Bali Nusa Dua Hotel. The system design is described through the stages in the Waterfall method and for the analysis of the system that has been running the PIECES method is used. The conclusion of this study is that users expect management information systems to be able to support processes that currently cannot be overcome using a system that has been running and system design has been made based on user expectations, with the hope that the output of the new system can meet user needs

**Index Term** :Information System, Warehouse Management, Waterfall Method, PIECES Method.

## I. INTRODUCTION

Warehouse section is one of the important parts of a company, not least in hotels. The hotel warehouse section requires a good information system that can support all warehouse operational processes so that service quality, information accuracy and control of data security can be achieved in accordance with the company's objectives in the hotel warehouse. An information system is said to be good if it can produce information to achieve business goals. According to the ITGI (IT Governance Institution), to achieve business goals, information that is in accordance with the following criteria is needed [1]:

- Effectiveness  
Information must be relevant to business processes and provided periodically, consistently, appropriately and can be used
- Efficiency  
Information is obtained with optimal use of resources (productive and economical)
- Confidentiality  
Information must be protected from unauthorized distribution
- Integrity  
Information must be complete and valid for business expectations and values
- Availability  
Information is available when needed by business processes
- Compliance  
Information in accordance with the rules and contract law
  
- Reliability

Information can be used according to its function and can be accounted for.

An information system is built from an information system design, where this design is based on the needs of users of information systems and analysis of the operational conditions of the company, both companies that have implemented a system or are still carrying out operational activities manually. This is needed as a basis for consideration of solutions and recommendations for information systems that are in accordance with the circumstances of the company.

PIECES method is one method that can be used in the process of analysis and evaluation of a system that has been running on a company. This is known from the journal entitled "Evaluation of Application of Information Systems at the Jakarta LP3I Polytechnic with the PIECES Method" [2], and "Analysis and Evaluation of the Application of Web-Based Test Applications with the PIECES Framework Method" [3]. In the PIECES method, there are six variables used to analyze information systems, including [4]

- 1) Performance  
This analysis is carried out to determine the performance of a system. This performance can be measured by the amount and speed of data produced
- 2) Information and Data  
This analysis is used to determine the amount of data and the accuracy of the information generated in a search by an information system.
- 3) Economics  
This analysis was conducted to determine the effect of financial information systems and costs incurred.

4) Control and Security

This analysis is used to determine the supervision and control carried out so that the information system runs well.

5) Efficiency (Efisiensi)

Analysis is done to determine the efficiency of an information system

In terms of designing an information system, the Waterfall method is one of the most commonly used SDLC (System Development Life Cycle) methods, this is known from a journal entitled "Application of Waterfall SDLC Method in Making Web-Based Academic Information System Case Study Al-Islamic Boarding School Habi Sholeh Kubu Raya Regency, West Kalimantan "[5]," Application of Waterfall Methods in Web-Based Furniture Sales Information Systems "[6], and" Implementation of Waterfall Methods in the Design of Industrial Geographic Information Systems in Tegal Regency "[7]. Waterfall method has stages in the development of a system. The stages in the Waterfall method can be seen in Figure 1 as follows:

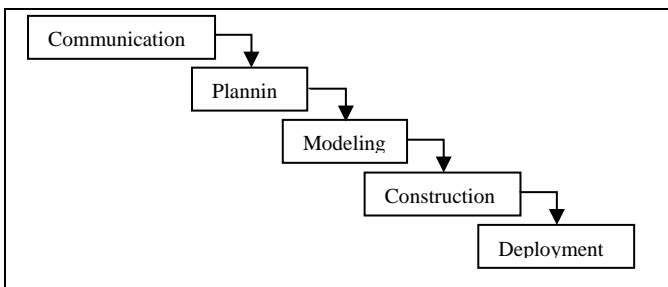


Figure 1. Waterfall Method Sequence

- 1) Communication : Data collection includes supporting information and resources through analysis of the conditions in the field and user needs
- 2) Planning : Planning in system development, including a general description of the system and mechanism for system development
- 3) Modeling : System design based on analysis of user needs and field conditions
- 4) Construction : Development of system testing
- 5) Deployment : System implementation

Based on this, the purpose of this research is to analyze and design a management information system to be able to support the operational processes for hotel warehouses. The scope of this research is as follows:

1. The case study in this study is the warehouse section at the Mercure Bali Nusa Dua Hotel
2. Analysis of management information systems that run in warehouses at Mercure Bali Hotel Nusa Dua is carried out using the PIECES method
3. The system design phase uses the Waterfall method, is from the communication stage to the modeling stage

II. RESEARCH METHODOLOGY

This section discusses data collection methods and stages of conducting research, with details as follows:

A. Data Collection Method

The data collection methods used in this study are as follows:

1. Interview: Interviews were conducted with the warehouse staff of the Mercure Bali Hotel Nusa Dua. Interviews were conducted to determine the capabilities and disadvantages of the system that has been running to be able to meet the needs of IT services in the warehouse according to the user's view.
2. Observation: Observation is carried out on the operational process of the warehouse that is related to the system that has been running.

B. Stages of Conducting research

The stages of conducting research can be seen in Figure 2 as follows:

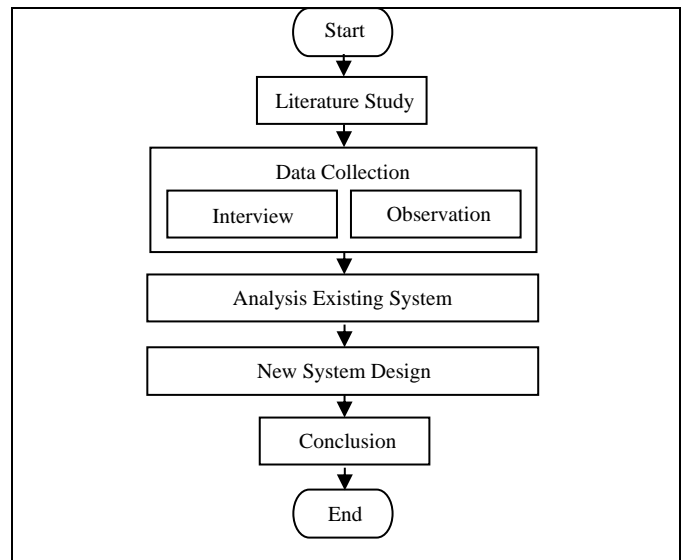


Figure 2. Stage of conducting research

III. DISCUSSION

This section discusses system design which is explained through the stages in the waterfall method with the following details:

A. Communication

Communication with users is done to determine the user's views on the current system performance and user needs for the new system. In this phase two analyzes were carried out, with details as follows:

1. System Analysis

The analysis is based on the results of interviews and observations in the warehouse section of the Mercure

Bali Nusa Dua hotel using the PIECES method with the following analysis results:

TABLE 1  
EXISTING SYSTEM ANALYSIS

No.	Analysis	Findings
1	Performance	The system that has been running has not been able to fully support all warehouse operational processes, it is known from several processes that are still done manually, among others: the process of collecting data when stock taking, the process of tracking the location of goods, the process of collecting goods in and out, checking the expiration date goods and process of setting the minimum / maximum quantity of goods
2	Information	There are several processes that are still done manually so that the information generated becomes less valid, not real time and difficult to account for
3	Economic	The operational process that is still done manually causes greater expenditure, especially in the procurement of paper, stationery
4	Control	Control is difficult to do especially in processes that are still done manually, this is because the manual process is vulnerable to fraud and data manipulation
5	Efficiency	The current system has not been able to provide operating efficiency, especially in terms of time and HR personnel, this is caused by several operational processes that cannot be supported by a warehouse system, so that it is still done manually
6	Service	There is a process that is still done manually, indicating that the service from the system that is currently running has not been able to provide a complete quality of service to support the warehouse process operational process

## 2. Analysis of User Needs

In addition to the analysis of the system that runs, interviews are also conducted to determine the expectations of users of the new system so that the design can meet the system requirements that the user needs appropriately[9]. The user expectations for the new system are as follows:

- The system currently in use is a corporate standard so that it cannot be replaced by a branch hotel, so it is expected that the new system is a system that can help the performance of the system currently running
- It is hoped that the new system will be able to support processes that currently cannot be overcome using a system that has been running, which are: the stock data collection process, the tracking process of goods, the process of collecting goods in and out, checking the expiration date of the goods and the process of setting minimum / maximum number of items
- It is expected that the new system can be used easily by the user, in this case the user expects a new system that is not too much input / key-in.
- It is expected that the new system can produce data that is real time

## B. Planning

Based on ongoing system analysis and user needs analysis, the management information system for the Mercure Bali Nusa Dua warehouse section is designed with the following plans:

### a. Performance

The results of the performance analysis are some processes that are still done manually so that the warehouse operational process becomes slower. To cover a slow warehouse operational process, the Warehouse Management System is designed using a barcode scanning system. This is based on user expectations for a system that can be used easily without too much process of inputting data into the system

### b. Information

Information analysis results, namely, the processes that exist in the Warehouse Management Information System are still done manually, so that the information obtained by the user is less valid and not real time. Therefore, a system with an input system is designed into the system, so that all information contained in the warehouse is complete and clear. Every time the goods enter the warehouse, detailed data collection will be carried out in the case of data collection of goods, data collection on the expiration date, and the receipt of incoming and outgoing items.

### c. Economic

Economic analysis results, namely, the operational process is still done manually so that the procurement of paper and stationery is increasing. To reduce paper procurement, all processes in the warehouse are carried out in the system, such as checking stock, expiration date and processing of goods in and out.

### d. Control

Control analysis results, namely, the operational process is still done manually so that there is data manipulation of items in the warehouse, so to prevent the manipulation of goods data, a system is designed that has a history of in and out of goods. So, it will be seen when one item is not included in the report list.

### e. Efficiency

The results of the analysis in terms of efficiency, namely, the warehouse operational process is quite long so it takes a lot of time and effort. The new warehouse management information system will use barcode scans to speed up the process of procuring goods and processes in and out of warehouse items.

### f. Service

The results of the analysis from the service side, namely, the old system of warehouse management information systems has a long service quality, this

is because some processes carried out by the old system still use manual methods. To improve service from warehouse information systems, a new system design is carried out, where several processes that still use updated manual methods use an item input system and barcode scanning to accelerate warehouse operational processes.

### C. Modeling

Based on the planning that has been made, the management information system design for the Mercure Nusa Dua Hotel warehouse section is as follows:

#### 1. Design of Algorithms

The algorithm for each process in the warehouse management information system design is as follows:

##### a. Stock Data Collection Process

The design of the inventory data algorithm for the stock taking process is as follows:

- 1) Start
- 2) Select the Update menu
- 3) Scan the item barcode
- 4) Input the amount of new stock
- 5) Input the expiration date
- 6) Input the minimum number of items (optional)
- 7) Input the maximum number of items (optional)
- 6) Click the Submit button
- 7) Finish

The input of the minimum and maximum number of items is made optional because based on the results of the interview this data is determined only once, so if the algorithm is run more than once, then when running the next algorithm the system will display the previous input automatically.

This process is designed using barcode scans. This is to facilitate system users when collecting data so that the data collection process can be carried out more quickly and the risk of input errors can be reduced.

##### b. Goods Location Tracking Process

The design of the item location tracking algorithm is as follows:

- 1) Start
- 2) Select the Find menu
- 3) Scan the item barcode
- 4) Location of goods displayed by the system
- 5) Finish.

The process of tracking the location of goods is used to locate the items that the user wants. Similarly, in the stock data collection process, the process of tracking the location of goods is also designed using a barcode scan. This is to facilitate system users during the process of tracking the location of goods so that the location tracking process becomes more efficient with time and effort.

##### c. Outgoing Entry Data Collection Process

The algorithm design for collecting goods in and out is as follows:

- 1) Start
- 2) Select the Find menu
- 3) Scan the item barcode
- 4) Location of goods displayed by the system
- 5) Exit the Find menu
- 6) Select the Update menu
- 7) Scan item barcodes
- 8) Input the amount of new stock
- 9) Input the expiration date.
- 10) Click the Submit button
- 11) Finish

The process of collecting goods in and out is designed using a barcode scan feature to reduce the risk of input errors and reduce paper and ink expenses when checking goods in and out of the warehouse

##### d. The Process of Checking the Item Expiration Date

The design of the item expiration date checking algorithm is as follows:

- 1) Start
- 2) Select the Check menu
- 3) Scan the item barcode
- 4) Data item details are displayed by the system
- 5) Finish

The checking process for expiration dates is designed using a barcode scan feature to facilitate the process of controlling the user's system against the expiration date of warehouse items

##### e. Process of Setting Min Amount / Max Item

The design of the algorithm for setting the min / max number of items is as follows:

- 1) Start
- 2) Select the Update menu
- 3) Scan the item barcode
- 4) Input the amount of new stock
- 5) Input the expiration date
- 6) Input the minimum number of items (optional)
- 7) Input the maximum number of items (optional)
- 6) Click the Submit button
- 7) Finish

The process of setting the minimum and maximum amount of goods is designed using the barcode scan feature to make it easy for system users to control the maximum number and minimum amount of inventory of certain items.

#### 2. Use Case Diagram Design

Use case diagram is a relationship diagram between the user and the system. This diagram shows what the user can do on the system.[10] The design of the use case diagram

from the warehouse management information system is as follows:

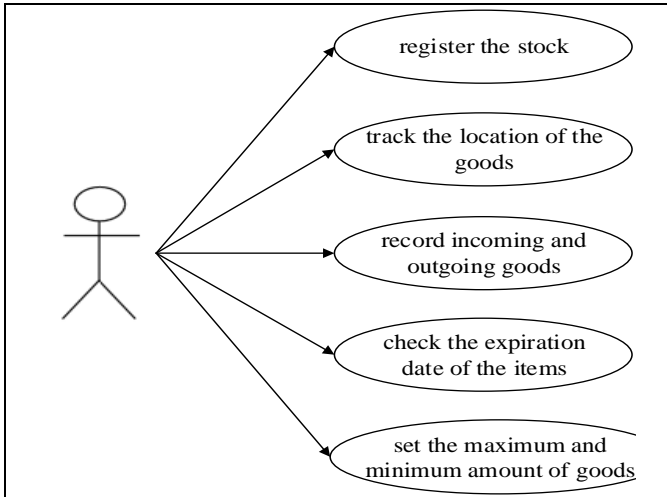


Figure 3. Use case diagram design

The interaction between the user and the system shown in the diagram in figure 3 are as follows:

- Through the system, users can record the stock of goods in the warehouse.
- Through the system, the user can track the location of certain items in the warehouse.
- Through the system, users can record incoming and outgoing goods.
- Through the system, the user can check the expiration date of items in the warehouse.
- Through the system, the user can set the maximum and minimum amount of stock in the warehouse..

#### IV. CONCLUSION

Based on the research conducted the following conclusions were obtained:

- The system that has been running at Mercure Bali Hotel Nusa Dua is a corporate standard so it cannot be replaced by a branch hotel.
- Users expect new system to be able to support processes that currently cannot be overcome using a system that has been running, among others: the stock data collection process, the location tracking process of goods, the process of collecting goods in and out, checking the expiration date of the goods and the process of setting amount of min / max of goods.
- The new system design for the warehouse section of Mercure Bali Nusa Dua Hotel has been made based on user expectations, so that expected output from the new system can meet user needs.

#### ACKNOWLEDGEMENT

Thank you for Mercure Bali Nusa Dua Hotel, which has provided a place for us to conduct our research and thanks

to Accounting team especially in warehouse section of Mercure Bali Nusa Dua Hotel for the cooperation and assistance provided during the research

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