

# IT Governance Evaluation of Hotel Warehouse Section Using the COBIT 5 Framework

I Wayan Surya Pramana<sup>1\*</sup>, Putu Risanti Iswardani<sup>2</sup>, Putu Arya Mertasana<sup>3</sup>

<sup>1,2</sup>Department of Electrical and Computer Engineering, Post Graduate Program, Udayana University

<sup>3</sup>Department of Electrical and Computer Engineering, Udayana University

\*guzsurya.pramana@gmail.com

**Abstract** - The warehouse section of a hotel requires good IT governance support to ensure operational activities in the warehouse run smoothly, especially in matters relating to IT Resource (Hardware, Software and Infrastructure). So that to ensure IT governance in the warehouse of a hotel has been running well or not, it is necessary to evaluate the IT governance. Based on that, the purpose of this research is to evaluate IT governance in the warehouse section of a hotel. Evaluation is carried out by an audit process to assess the maturity of IT governance through calculation of capability levels using the COBIT 5 framework on the Delivery, Service and Support (DSS) domains. The research was conducted in a case study at Mercure Bali Nusa Dua Hotel with the conclusion that the level of IT governance capabilities in the warehouse section at Mercure Bali Nusa Dua Hotel is at the level of Managed Process with capability level 2.5, which indicates that IT governance in the Mercure Bali Nusa Dua Hotel warehouse section has been well managed in terms of planning, supervision and control of IT services. Recommendations are given in accordance with the audit results with hope that the company can achieve the expected capability level by making improvements to IT processes that have the greatest capability gap

**Index Terms** - IT Audit, COBIT 5, Capability Level, Delivery, Service and Support Domain

## I. INTRODUCTION

The warehouse section of a hotel requires good IT governance support to ensure that operational activities in the warehouse run smoothly, especially in matters relating to IT resources (Hardware, Software and Infrastructure). To ensure IT governance in the warehouse section of a hotel has been running well or not, it is necessary to evaluate IT management that has been running. Evaluation is generally carried out with an audit process to measure the level of maturity and IT governance readiness of a company in meeting IT service needs in order to achieve company goals

In terms of IT governance audits, COBIT 5 is one of the popular terms used. This is known from journals that use COBIT 5 as a guide in an audit process, including:

- 1) Journal by Susanti R.Y. and Sucahyo Y.G. entitled "Information Technology Governance Evaluation and Processes for Improvement Prioritization based on COBIT 5 Framework at the Secretariat General of the Indonesian House of Representatives" [1]. Susanti R.Y and Sucahyo Y.G use the COBIT 5 framework in evaluating IT governance of the Secretariat General of the Indonesian House of Representatives
- 2) Journal by Durachman Y., et al, entitled "IT Security Governance Evaluation with use of COBIT 5 Framework: A Case Study on Syarif Hidayatullah UIN Library Information System" [2]. Durachman Y., et al. using the COBIT 5 framework in evaluating the IT

Security Governance of UIN Syarif Hidayatullah Library Information System

Based on that, the purpose of this research is to evaluate IT governance in the warehouse section of a hotel through an audit process using the COBIT 5 framework. With evaluation, it is expected that the maturity level and readiness of IT governance of a company can be identified and recommendations can be increasing the level of maturity to achieve company goals. The scope of the research is as follows:

- 1) The research was conducted in a case study in the warehouse section of the Mercure Bali Nusa Dua Hotel
- 2) Assessment of capability level is carried out in the IT domain process Deliver, Service and Support (DSS)

## II. THEORY

### A) Definition and Objectives of IT Audit

IT audit is the process of checking the level of maturity or readiness of an organization in managing information technology [3], to verify that the information technology has been run in accordance with the standards, regulations, and practices that have been approved and accepted.[5] According to Gondodiyoto, the objectives of information technology audits are as follows[3]:

- 1) Asset Security : Prevent misuse of company assets including hardware, software and human resources

- 2) System Effectiveness : Ensuring the system can provide effective results according to user needs
- 3) Efficiency : The system can meet the information needs of users with minimal resources
- 4) Availability : Availability of support / information technology services in supporting the company's business processes on an ongoing basis
- 5) Confidentiality : Protection of information from illegal access / unauthorized parties
- 6) Reliability : Conformity and accuracy in reporting and accountability of company management
- 7) Maintaining Data Integrity : Maintain and secure data

**B) IT Audit Stages**

According to Singleton [3], IT audits are generally divided into three stages as follows:

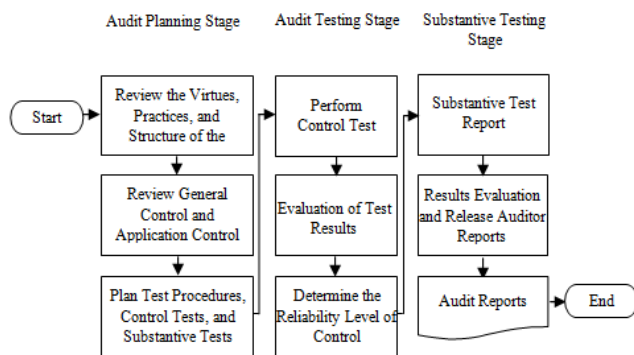


Fig 1. Audit TI Stages (Source : Information Technology Auditing and Assurance(Singleton,2011))[3]

- 1) Audit Planning Stage : In this stage, the auditor plans to conduct an audit based on risk analysis of the company's internal control, policy review, company practices and structure, application control within the company, as well as evidence collected through questionnaires, interviews and direct observation
- 2) Audit Testing Stage : In this stage, testing of internal control is carried out using either manual techniques or special computer audits. In conclusion of this stage, the auditor must assess the quality of internal controls
- 3) Substantive Testing Stage : In this stage, a detailed investigation is carried out into financial data through substantive tests

**C) COBIT 5**

Control Objectives for Information and Related Technology (COBIT) is a framework created by Information Systems Audit and Control Association (ISACA) for IT management and IT governance [7][8]. COBIT 5 is a comprehensive framework that can help companies achieve their goals for IT governance and IT management [3]. According to ISACA, there are five basic principles in COBIT 5 [3][11], including:

- 1) Meeting stakeholder needs : The company creates value for stakeholders by maintaining a balance between the realization of benefits and the optimization of risk and the use of resources
- 2) Covering the enterprise end-to-end : Integrating the company's governance into corporate governance that covers all functions and processes within the company
- 3) Applying a single integrated framework : Relating to IT standards and best practices
- 4) Enabling a holistic approach : Efficient and effective IT management requires a comprehensive approach, considering the components that interact
- 5) Separating governance from management : The COBIT 5 framework makes clear distinction between governance and management

**D) Domain And Process Of COBIT 5**

According to ISACA [3][12], COBIT 5 identifies a set of governance and management enablers covering 37 processes. In the governance area, there are five processes in the Evaluate, Direct, and Monitor (EDM) domain as follows:

- 1) EDM1 Set and Maintain the Governance Framework
- 2) EDM2 Ensure Value Optimization
- 3) EDM3 Ensure Risk Optimization
- 4) EDM4 Ensure Resource Optimization
- 5) EDM5 Ensure Stakeholder Transparency

In the management area, there are 32 processes that divided into four domains. 13 processes in the domain Align, Plan, and Organize (APO), namely :

- 1) APO1 Define the Management Framework for IT
- 2) APO2 Manage Strategy
- 3) APO3 Manage Enterprise Architecture
- 4) APO4 Manage Innovation
- 5) APO5 Manage Portfolio
- 6) APO6 Manage Budget and Cost
- 7) APO7 Manage Human Resources
- 8) APO8 Manage Relationships
- 9) APO9 Manage Service Agreements
- 10) APO10 Manage Suppliers
- 11) APO11 Manage Quality
- 12) APO12 Manage Risk
- 13) APO13 Manage Security

Ten process in the Build, Acquire, and Implement (BAI) domain, namely :

- 1) BAI1 Manage Programs and Projects
- 2) BAI2 Define Requirements
- 3) BAI3 Identify and Build Solutions
- 4) BAI4 Manage Availability and Capacity
- 5) BAI5 Manage Organizational Change Enablement Deliver, Service and Support
- 6) BAI6 Manage Changes
- 7) BAI7 Manage Change Acceptance and Transitioning
- 8) BAI8 Manage Knowledge
- 9) BAI9 Manage Assets

10) BAI10 Manage Configuration

Six process in the Deliver, domain Services, and Support (DSS) domain, namely :

- 1) DSS1 Manage Operations
- 2) DSS2 Manage Service Requests and Incidents
- 3) DSS3 Manage Problems
- 4) DSS6 Manage Continuity
- 5) DSS5 Manage Security Services
- 6) DSS6 Manage Business Process Controls

And three process in the Monitor, Evaluate, and Assess (MEA) domain, namely :

- 1) MEA1 Performance and Conformance
- 2) MEA2 the System of Internal Control
- 3) MEA3 Compliance with External Requirements

D) COBIT 5 Process Capability Model

According to ISACA, the level of capability used in assessing process capability is as follows [3]:

- 1) Level 0: Incomplete Process : The process is not implemented or fails to achieve the process objectives
- 2) Level 1: Performed Process : Implementation of the process reaches its goal. In this level there are attributes PA1.1 Process Performance to measure the extent to which the process objectives are achieved
- 3) Level 2: Managed Process : The process at level 1 is implemented in a process arrangement and work products are managed appropriately. In this level there are PA2.1 Performance Management attributes to measure the extent to which the process has been regulated and the PA2.2 attribute to measure the extent to which work products produced by the process are well managed
- 4) Level 3: Established Process : The process on level 2 is implemented using a defined process and is able to achieve the results of the process. In this level there are PA3.1 Process Definition attributes to measure the extent to which processes are defined to support the implementation of PA3.2 Process Deployment processes and attributes to measure the extent to which process standards are implemented effectively
- 5) Level 4: Predictable Process : The process at level 3 is run with defined limits to achieve the process results. In this level there are attributes PA4.1 Measurement Process to measure the extent to which the measurement results are used in achieving company goals and attributes of PA4.2 Process Control to measure the extent to which processes are regulated quantitatively to produce a stable and predictable process
- 6) Level 5: Optimizing Process : The process at level 4 is continuously improved to meet organizational goals now and in the future. In this level there are attributes PA5.1 Process Innovation to measure the extent to which process changes are identified from the implementation of the process and PA5.2 Process Optimization to measure the extent to which changes are defined

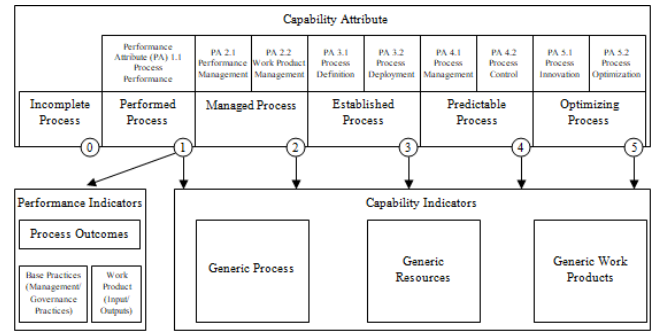


Fig 2. COBIT 5 Process Capability Model (Source : ISACA, Assessor Guide: Using COBIT@5, 2013)[6][9]

The assessment scale to assess the capability level of the process is as follows [10]:

- 1) N: Not Achieved (0-15%): There is little or no evidence of achievement at all
- 2) P: Partially Achieved (> 15% - 50%): There are some evidence of achievement
- 3) L: Largely Achieved (> 50% - 85%): There is evidence of significant achievement
- 4) F: Fully Achieved (> 85% - 100%): There is complete evidence

III. METHODOLOGY

A) Data Collection Method

Data collection method used in this are as follows:

- 1) Interview : Interviews were conducted with respondents who have a direct link in IT governance of the warehouse section of Mercure Bali Nusa Dua Hotel to collect company objective and capability level that determined by company to the warehouse section for each IT process. The respondent for this research are as follows:

No.	Designation
1.	Finance Controller
2.	Cost Controller
3.	IT Support
4	Warehouse Staff

- 2) Observation : Observations are carried out by observing the operational processes in the warehouse section of the Mercure Bali Nusa Dua Hotel, which is related with the use of IT services including hardware, software, infrastructure and environmental conditions.
- 3) Questionnaire : Questionnaires were distributed to the respondents mentioned in table 1, the questionnaire contained a statement to assess the capability level of existing IT governance in the respondent's view

B) Research Phase

Research phase that used in this research are as follows:

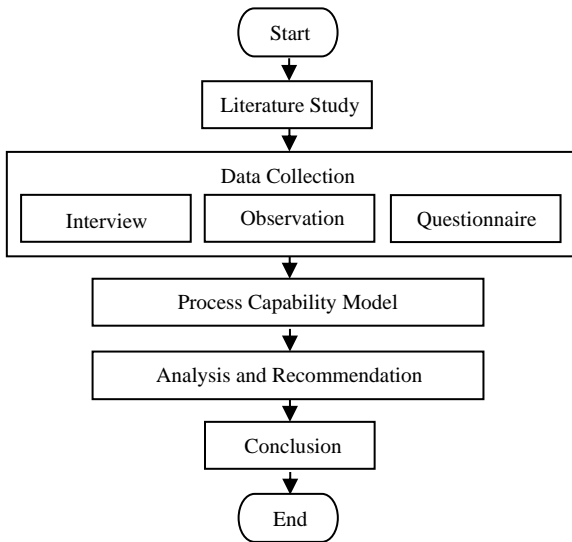


Fig 3. Research Phase

IV. DISCUSSION

The evaluation of governance in the warehouse section of Mercure Bali Nusa Dua Hotel is done by measuring the capability level of existing IT governance. Balanced Scorecard is used in the measuring process to found IT process in the COBIT 5 Deliver, Service and Support Domain that has an effect on the company's goals for the warehouse section which is related to IT governance.

BSC Dimension	Enterprise Goal	Relation to Governance Objectives		
		Benefits Realization	Risk Optimization	Resource Optimization
Financial	1. Stakeholder value of business investments	P		S
	2. Portfolio of competitive products and services	P	P	S
	3. Managed business risk (safeguarding of assets)		P	S
	4. Compliance with external laws and regulations		P	
	5. Financial transparency	P	S	S
Customer	6. Customer-oriented service culture	P		S
	7. Business service service continuity and availability		P	
	8. Agile responses to a changing business environment	P		S
	9. Information-based strategic decision making	P	P	P
	10. Optimization of service delivery costs	P		P
Internal	11. Optimization of business process functionality	P		P
	12. Optimization of business process costs	P		P
	13. Managed business change programmes	P	P	S
	14. Operational and staff productivity	P		P
	15. Compliance with internal policies		P	
Learning and Growth	16. Skilled and motivated people	S	P	P
	17. Product and business innovation culture	P		

Fig 4. Balanced Scorecard COBIT 5 Enterprise Goals (Source : ISACA : A Business Framework for the Governance and Management of Enterprise IT, 2012)[4]

IT BSC Dimension	Information and Related Technology Goal
Financial	01 Alignment of IT and business strategy
	02 IT compliance and support for business compliance with external laws and regulations
	03 Commitment of executive management for making IT-related decisions
	04 Managed IT-related business risk
	05 Realized benefits from IT-related investments and services portfolio
	06 Transparency of IT costs, benefits and risk
Customer	07 Delivery of IT services in line with business requirements
	08 Adequate use of applications, information and technology solutions
Internal	09 IT agility
	10 Security of information, processing infrastructure and applications
	11 Optimization of IT assets, resources and capabilities
	12 Enablement and support of business processes by integrating applications and technology into business processes
	13 Delivery of programmes delivering benefits, on time, on budget, and meeting requirements and quality standards
	14 Availability of reliable and useful information for decision making
	15 IT compliance with internal policies
	16 Competent and motivated business and IT personnel
Learning and Growth	17 Knowledge, expertise and initiatives for business innovation

Fig 5. Balanced Scorecard COBIT 5 IT Related Goals (Source : ISACA : A Business Framework for the Governance and Management of Enterprise IT, 2012)[4]

A) Mapping Process

From the results of interviews obtained by the company objectives for the warehouse section at Mercure Bali Nusa Dua Hotel. These results are mapped into the enterprise goal in the balanced scorecard and obtain the following results:

TABLE 2  
COMPANY OBJECTIVE FOR WAREHOUSE SECTION  
Company Objectives

Ensuring asset security and availability of resources for the company's operations through the implementation of procedures and system information support and trained human resources
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TABLE 3  
MAPPING OF COMPANY OBJECTIVE TO ENTERPRISE GOALS

No.	Enterprise Goals	Dimension
3	Managed business risk (safeguarding of assets)	Financial
7	Business service continuity and availability	Customer
11	Optimization of business process functionality	Internal
16	Skilled and motivated people	Learning and Growth

After the enterprise goal is obtained, then the results of the acquisition are mapped into it-related goals, and obtain the following results

TABLE 4  
MAPPING OF ENTERPRISE GOALS TO IT RELATED GOALS

Enterprise Goals	IT Related Goals
Managed business risk (safeguarding of assets)	4,10,16
Business service continuity and availability	4,10,14
Optimization of business process functionality	1,7,8,9,12
Skilled and motivated people	16

TABLE 5  
DETAILED MAPPING RESULT OF ENTERPRISE GOALS TO IT RELATED GOALS

No.	Description
1	Alignment of IT and business strategy
4	Managed IT-related business risk
7	Delivery of IT services in line with business requirements
8	Adequate use of applications, information and technology solutions

9	IT Agility
10	Security of information, processing infrastructure and applications
12	Enablement and support of business processes by integrating applications and technology into business processes
14	Availability of reliable and useful information for decision making
16	Competent and motivated business and IT personnel

Furthermore, the acquisition of the IT related goals mapped into the IT Process of COBIT 5 Deliver, Service, and Support domain to find out the IT process in the Deliver, Service, and Support domain that had an effect on the company's objectives. The result are as follows :

TABLE 6  
MAPPING OF IT RELATED GOALS TO IT PROCESS OF DSS DOMAIN

IT Related Goals	IT Process of DSS
Alignment of IT and business strategy	
Managed IT-related business risk	1,2,3,4,5,6
Delivery of IT services in line with business requirements	1,2,3,4,6
Adequate use of applications, information and technology solutions	
IT Agility	
Security of information, processing infrastructure and applications	5
Enablement and support of business processes by integrating applications and technology into business processes	
Availability of reliable and useful information for decision making	3,4
Competent and motivated business and IT personnel	5

TABLE 7  
DETAILED MAPPING RESULT OF IT RELATED GOALS TO IT PROCESS OF DSS DOMAIN

DSS	Description
DSS1	Manage Operations
DSS2	Manage Service Request and Incident
DSS3	Manage Problems
DSS4	Manage Continuity
DSS5	Manage Security Services
DSS6	Manage Business Process Controls

From the table above, it is found that all the IT process in the Deliver, Service, and Support domain affect the company's objectives, so that the assessment of the capability level will be carried out on all of the IT process in this domain.

*B) Assessment Process*

The assessment process is done by calculating the average of capability level based on the assessment of all respondents in the questionnaire that has been distributed, so that the following results are obtained :

1) Assessment Score

Range of capability level assessment scores determined as follow :

TABLE 8  
ASSESSMENT SCORE

Score	Status
0-15	Not Achieved (N)
>15-50	Partially Achieved (P)
>50-85	Largely Achieved (L)
>85-100	Fully Achieved (F)

2) Capability Level Of DSS01

TABLE 9  
CAPABILITY LEVEL OF DSS01

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4		
DSS01	1.1	2.1	2.2	3.1	3.2	4.1	4.2
Average Quest. Result	100	95	91	87	87	84	X
Capability Level	3						

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS01 capability level is 3, which mean the IT process in the level of Established Process

3) Capability Level Of DSS02

TABLE 10  
CAPABILITY LEVEL OF DSS02

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4		
DSS02	1.1	2.1	2.2	3.1	3.2	4.1	4.2
Average Quest. Result	100	92	90	87	86	81	X
Capability Level	3						

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS02 capability level is 3, which mean the IT process in the level of Established Process

3) Capability Level Of DSS03

TABLE 11  
CAPABILITY LEVEL OF DSS03

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4		
DSS03	1.1	2.1	2.2	3.1	3.2	4.1	4.2
Average Quest. Result	100	89	89	83	X		
Capability Level	2						

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS03 capability level is 2, which mean the IT process in the level of Managed Process

4) Capability Level Of DSS04

TABLE 12  
CAPABILITY LEVEL OF DSS04

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4
DSS01	1.1	2.1	2.2	3.1	3.2
Average	100	93	90	88	87
Quest. Result				82	X
Capability Level	3				

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS04 capability level is 3, which mean the IT process in the level of Established Process

5) Capability Level Of DSS05

TABLE 13  
CAPABILITY LEVEL OF DSS05

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4
DSS01	1.1	2.1	2.2	3.1	3.2
Average	100	89	88	84	X
Quest. Result					
Capability Level	2				

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS05 capability level is 2, which mean the IT process in the level of Managed Process

6) Capability Level Of DSS06

TABLE 14  
CAPABILITY LEVEL OF DSS06

Proc	Lvl0	Lvl1	Lvl2	Lvl3	Lvl4
DSS01	1.1	2.1	2.2	3.1	3.2
Average	100	87	84	X	
Quest. Result					
Capability Level	2				

The X marks indicated the result of the assessment is below 86. If the score does not reach 86 or above it's mean the level is not fully achieved, then the assessment stopped in that level. The result of DSS06 capability level is 2, which mean the IT process in the level of Managed Process

7) Total Capability Level

Based on the capability level of each IT processes, the average results are obtained as follows

TABLE 15

TOTAL CAPABILITY LEVEL		
IT Process	Capability Level	Expected Level
DSS01. Manage Operations	3	4
DSS02. Manage Service Request and Incident	3	4
DSS03. Manage Problems	2	4
DSS04. Manage Continuity	3	4
DSS05. Manage Security Services	2	4
DSS06. Manage Business Process Controls	2	4
Capability Level	2.5	4

Expected level is the capability level that the company expects for each IT process. So that the graph that obtained from the results are as follows

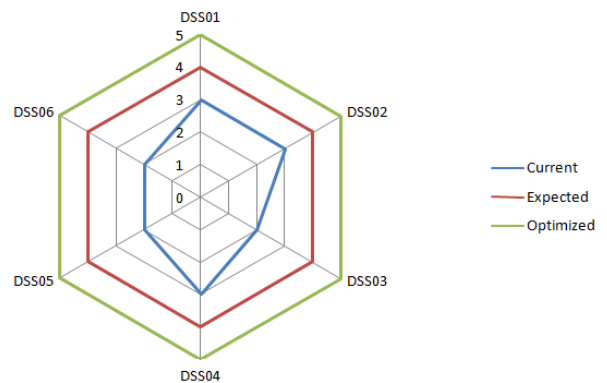


Fig 6. Capability Level Graph

From table 15 and figure 6, obtained the level of capability for all IT processes in the Deliver, Service and Support domain is 2.5, which indicates that the capability level for IT governance in the warehouse section of Mercure Bali Nusa Dua Hotel is at Manage Process level

8) Analysis dan Recommendation

Based on the results of the capability level and findings during the audit, the recommended improvements for each IT process in the IT governance of the Mercure Bali Nusa Dua Hotel warehouse section are as follows:

TABLE 16  
AUDIT FINDING AND ANALYSIS

IT Process	Audit Finding and Analysis
DSS01. Manage Operations	There are reports that are not updated regularly (UPS check reports, Offsite backup check reports, Fire extinguisher check reports, and Room temperature check reports)
	Evaluation of the problem finding report on IT services in warehouse section is not carried out periodically, it's known from some data in the problem finding report, not recorded in the IT incident report
DSS02. Manage Service Request and Incident	IT incident reports are not updated regularly, it's known from some data in



	the problem finding report, not recorded in the IT incident report
DSS03. Manage Problems	There is an operational process in the warehouse that cannot be supported by the warehouse system (The process of collecting data for stock opname, process of collecting data for items in and out, process of checking the expiration date of the items and process of tracing items location in the warehouse)  Reports of operational processes that cannot be supported by a warehouse system are done manually
DSS04. Manage Continuity	Business continuity plan training is not conducted regularly, this is known from training reports of business continuity plan that are not regularly scheduled  Business continuity plan training material has not been updated since the last 2 years, this is known from matching information in business continuity plan book 2016 to 2018
DSS05. Manage Security Services	Access log in and out of the warehouse room, manually controlled and inputted  Training in handling security issues of IT services in warehouse section is not carried out regularly, this is known from training reports handling problems that are not regularly scheduled  Information related to security issues has never been updated in the past year, this is known from the date stated on the file
DSS06. Manage Business Process Controls	There are several control processes carried out manually in the warehouse section, this is caused by a warehouse system that is not able to support the control process  Reports from the control process that are carried out manually are made manually, so the report is difficult to trace

TABLE 17  
RECOMMENDATIONS

IT Process	Recommendation
DSS01. Manage Operations	UPS check reports, Offsite backup check reports, Fire extinguisher check reports, and Room temperature check reports must be checked regularly  Data recorded in problem finding report IT incident report must be in sync
DSS02. Manage Service Request and Incident	Data recorded in IT incident report and problem finding report of warehouse section must be in sync
DSS03. Manage Problems	Warehouse system need to be upgraded to cover all operational process in the warehouse or at least additional system be prepared to make sure the process of collecting data for stock opname, process of collecting data for items in and out, process of checking the expiration date of the items and for

	tracing items location not done and reported manually
DSS04. Manage Continuity	Business continuity plan training must be conducted regularly and documented  Business continuity plan training material need to be updated regularly, so that recent problem found can be informed well to the users
DSS05. Manage Security Services	Biometrics authentication device need to be applied for access log into and out of the warehouse room, to ensure recorded log cannot be manipulated  Training in handling security issues of IT services must be carried out regularly  Information related to security issues need to be updated regularly, so that recent security issues found can be informed well to the users
DSS06. Manage Business Process Controls	Warehouse system need to be upgraded to cover all operational process control in the warehouse or at least additional system be prepared to make sure the control process not done and reported manually

## V. CONCLUSION

Based on the research, it was concluded that the capability of IT governance in the warehouse section at Mercure Bali Nusa Dua Hotel was at the level of a Managed Process with a capability level of 2.5. This indicates that IT governance in the warehouse section of Mercure Bali Nusa Dua Hotel has been managed well including (Plan, Monitor and Control). Recommendations are given in accordance with the results of the analysis in the hope that the company can achieve the expected capability level by making improvements to the IT process which has the greatest capability value gap

## 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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