Information Systems Audit Using the 2019 COBIT Framework with Domain DSS01 and BAI04 on the Grand Landak Hotel Reservation System

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Abstract
Grand Landak Hotel is one of the hotels that has implemented information systems in their operations, one of which is the room booking or reservation section. At this time the reservation system is used by the front office of the hotel by the receptionist, which is part of the hotel's front office. Therefore the system must be able to manage, store and maintain data security and the system can operate when there is an increase in reservations. So this research aims to evaluate the operational efficiency and availability of the reservation system in the Front Office Department of the Grand Landak Hotel using the COBIT 2019 framework. This research focuses on two main domains, namely DSS01 (Managed Operations) and BAI04 (Managed Availability and Capacity). While the data was obtained through interviews with the general manager and front office staff of the hotel. The results showed that the service process has been running well with a result of 49.4 percent and for capacity of 54.8 percent but technological innovation requires more attention, especially in actively involving employees in the process of implementing new systems.

1. Introduction

Hotel is a building, company or business that provides lodging services, provides restaurants and lounges for eating and drinking for customers who come to stay, has public facilities such as swimming pools, bars, laundry, spas where all facilities are intended for hotel customers (Kartikayeni et al., 2020).

The reservation system is the most important part of Front Office operations in the hospitality industry. It essentially not only supports the smooth process of check-in and check-out, but also ensures the availability of real-time room information, which is especially important when occupancy rates increase rapidly. In busy periods such as holidays or specific events, the demand for rooms increases rapidly, and any delays or errors in the reservation system can lead to guest dissatisfaction, backlogs, and potential revenue losses for the hotel. Therefore, the reliability of the reservation system is essential to support the productivity of front office staff in handling reservations efficiently (Tika Pradini, 2018).

Downtime can result in huge losses, even more than a million dollars per hour, especially for organizations that require continuous access to data, such as public utility services. In addition, the dependency between databases can worsen the situation if one system experiences downtime, which will disrupt all operations that depend on the interconnectedness of the data. System reliability and proper maintenance are crucial to avoid this major impact (Tika Pradini, 2018).

To ensure the system runs efficiently and is available around the clock, a COBIT 2019-based information system audit can be an effective solution. Domain DSS01 (Managed Operations) focuses on improving operational efficiency, helping to ensure processes run smoothly without a hitch. Meanwhile, BAI04 (Managed Availability and Capacity) aims to ensure system availability through capacity monitoring so that downtime can be minimized. With the implementation of these two domains, hotels can maintain the sustainability of reservation services, maximize guest satisfaction, and increase the productivity and effectiveness of Front Office staff (Bernanda & Angelia, 2021).

1.1 Literature Review

1.1.1 Theoretical Basis

1.1.1.1Audit

Audit is a systematic evaluation process of a system, activity, or unit to ensure that the implementation of these activities is in accordance with predetermined policies, procedures, or standards. In the context of information systems, audits are used to measure the level of conformity of the system with predetermined objectives and procedures. Audit aims to ensure the effectiveness, efficiency, and security of a system so that it can support the achievement of organizational goals (Wijaya et al., 2023).

1.1.1.2 COBIT

COBIT (Control Objectives for Information and Related Technology) is a framework designed by ISACA for information technology governance and management. This framework aims to provide comprehensive guidance for organizations to manage and maximize the value of technology and information, reduce risks, and optimize the use of resources. COBIT 2019 is the latest version of this framework, which offers universally recognized principles, tools, practices, and models to help organizations increase confidence in IT governance (Saleh et al., 2021).

1.1.1.3 Domain

Domain DSS01 focuses on IT service operations in order to ensure that services run efficiently, reliably and meet business needs. In this case to ensure that daily operations run smoothly including live room availability monitoring and quick response to incidents that may disrupt the reservation process. Domain BAI04 plays a role in ensuring reservations have sufficient capacity when handling high demand such as during the holiday season**.**

1.1.1.4 Previous Research Studies

Previous research shows that Front Office information systems in hotels often face challenges, such as lack of integration of IT strategy with business objectives, inadequate documentation, and weak risk management (Damayanti et al., 2024). In addition, staff training and monitoring of IT resources are also aspects that are often overlooked, which can have an impact on the efficiency and effectiveness of hotel operations (Tika Pradini, 2018).

In the Front Office, the main duties of the cashier include receiving payments and accurately reporting transactions in accordance with the applicable SOPs. Non-compliance with SOPs, such as not attaching proof of transactions (e.g. credit card slips), can lead to ineffectiveness in daily reports, which impacts the work efficiency of related departments such as finance (Kartikayeni et al., 2020). Therefore, the importance of detailed supervision by shift leaders and night auditors is emphasized to ensure the completeness of transaction reports.

The following are some examples of previous research results that are a reference in this study which are made in the form of a table as follows:

Table 1. Review of Previous Research

No.	Title	Problem	Solution	Results
1	Information Technology Governance Design Using the 2019 Cobit Framework at XYZ Hotel	Misunderstandings between IT and other departments, lack of IT resources, and IT project failures	COBIT 2019 to design more effective IT governance, by involving stakeholders and conducting risk analysis.	Processes with target capability level 3: BAI05, BAI06, BAI07, BAI11. Processes with target capability level 4: BAI02, BAI03.
2	Assessment of Capability Levels and Improvement Recommendations Using COBIT 2019 for the IT Consulting Industry	Absence of SOPs for IT risk documentation and local system downtime leading to critical data loss.	COBIT 2019 is used to assess IT governance capabilities and recommends a focus on risk management.	Results: APO12 level 2 (target 3), DSS01 level 3 (target achieved), DSS02 level 2 (target 3), 1 level gap in APO12 and DSS02.
3	Audit of Front Office Information Systems at World Hotel Using COBIT 4.1	Information system governance at the Front Office at World Hotel is still below expectations, with maturity level results ranging from level 1 and 2.	Data Security (DS5): Document security issues, tighten access management, and increase the frequency of information system user training (DS7).	DS5 (Ensure System Security): Maturity level average: 1.63 (level 2). DS7 (Educate and Train Users): Maturity level average: 1.33 (level 1).
4	Design of IT Governance Using COBIT 2019 (Subdomain APO01)	Absence of clear IT strategic planning and policy standards to support IT governance implementation.	Conduct regular audits using the COBIT 2019 framework and document all IT governance processes.	Current capability level for subdomain APO01: **1.98** (level 2: Repeatable but intuitive). Target capability level: **3.00** (level 3: Defined Process).
5	COBIT 2019 and ISO 27001 at XYZ Organization	XYZ organization faces information security threats, including cyberattacks and data theft.	The integration of COBIT 2019 and ISO 27001:2013 improves information security governance, evaluated by the maturity level of IT systems.	Average system maturity level: 3.07 (target: 5). Domain with the lowest maturity: BAI06 (1.50), highest: DSS02 (3.68). Identification of 12 priority domains for information security governance improvement.

6	Assessing Information Security Using COBIT 2019 and ISO 27001:2013	There is no comprehensive evaluation of the maturity level of information systems using modern frameworks.	evaluating domains such as APO12 (Managed Risk) and DSS05 (Manage Security Services). Develop a *roadmap* for governance improvement.	Average system maturity level: **3.07**, with a target of **5**. The highest gap in the **BAI10** (Managed Configuration) domain is **3.50**.
7	Audit of Front Office Information System at G'Sign Style Hotel with COBIT 4.1 Framework Approach	The *Front Office* information system at G'Sign Style Hotel has not been fully integrated with the hotel's business strategy. Unsystematic management of IT assets, inadequate documentation.	Asset documentation needs to be improved, with better capacity planning and standardized device maintenance.	The current average Maturity Level in each domain is: **PO1**: 2.4, **PO2**: 2.2P **O4, PO9, PO10**: 2.0 The expected level is Maturity Level 3.
8	Management Audit of Inventory Function (Case Study at Bigland Hotel Bogor)	There are weaknesses in the inventory management function such as inadequate storage of goods, incorrect recording on bin cards, and negligence when requesting goods.	Developed warehouse area, training on Store Requisition (SR) procedures, and updated bin card records.	The inventory function at the hotel runs quite well with documented SOPs. However, existing weaknesses can cause company losses if not followed up.
9	Evaluation of the Effectiveness of Operational Audit Implementation of Lodging Service Activities at Hotel Equator Surabaya	The effectiveness of operational audits is not optimal due to weaknesses in the internal control system for lodging services.	Evaluation includes auditing, testing, evaluating and following up on findings, with recommendations for improvement of internal controls and service quality.	Discovered weaknesses in the service system that need improvement to improve service quality and guest satisfaction.
10	The Effect of Company and Auditor Characteristics on Audit Delay	Audit delay in submitting financial reports in the hotel, restaurant and tourism sector in Indonesia	Test the effect of company size, operating complexity, KAP reputation, and auditor opinion on audit delay using multiple linear regression.	There is no significant effect of variables on audit delay. The regression model is not suitable, other variables are needed to explain audit delay.

2. Research Methodology

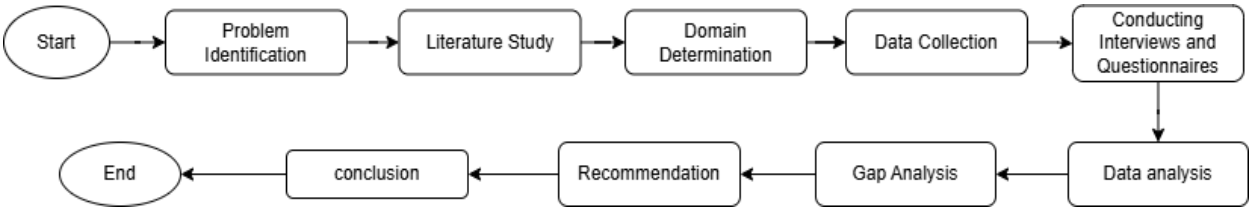

Fig 1. Research flow

2.1 Problem Identification

The initial step in this research is to determine the object of research, then proceed with identifying the problem to be studied, namely the use of information technology (IT) in operations and management of IT availability and services at the hotel. From the identification results, it was found that the utilization of Information Systems at Grand Landak Hotel, especially in the Front Office section, still requires improvement. This is due to the high demand for reservations in the hospitality industry, which often causes downtime in the Front Office operational system. These problems became the basis for conducting this research.

2.2 Literature Study

To support or explore the topic of this research properly, researchers conducted a literature study. This process involves the review of previous research journals related to the problem to be studied, namely the discussion of IT operational management and also the COBIT 2019 framework as the main tool in conducting this research. By using these references, researchers can explore and gain a deeper understanding of the concepts to be taken, and also the practices that will be used as a reference in conducting this research.

2.3 Domain Determination

In this study, two clear domains have been determined, namely Operational Management (DSS01) and Availability and Capacity Management (BAI04) at the Grand Landak hotel. By using this domain, the main focus of the research will be more detailed and easier so that it can increase the potential for improvement. With a well-defined scope, it will certainly be able to provide a more focused and relevant view of how the Grand Landak Hotel can improve their operational management and capacity availability according to the expected standards, especially in their Front Office operations.

2.4 Data Collection

This research uses a qualitative method, where the research provides an explanation in the form of subjective analysis by conducting interviews and survey questionnaires. The questionnaire designed refers to the COBIT 2019 framework guide and will be the main tool for collecting data from respondents where the respondents are the interviewees and Front Office staff from the hotel. This research method uses the respondent's point of view which is a priority picture in obtaining appropriate research results. The list of participants is presented in the following table:

Table 2. Respondent Data

No	Name	Position
1	Surya Dirgantara	General Manager
2	Fira Arika	Receptionist

The research respondents were determined based on the RACI Chart table that considers their roles and responsibilities towards the process domains identified in the previous stage. The RACI Chart can easily provide an overview of respondents according to their role, title and position within the company. There are four roles provided by the RACI Chart, namely:

1. Responsible (R): the party responsible for performing the task.
2. Accountable (A): the party responsible for all assigned tasks.
3. Consulted (C): parties who can provide input, opinions, information, and suggestions on ongoing tasks.
4. Informed (I): parties who need to be informed and know every development, change, action, decision, and result that occurs.

2.5 Conducting Interviews and Questionnaires

After the questionnaire was prepared, the next step was to give time to the hotel, including respondents relevant to the research objectives. The targeted respondents include the general manager and front office staff who are directly involved in hotel operations. Involving them as respondents allowed the researcher to gain a more in-depth and accurate insight into the performance as well as aspects related to operational management, availability, and capacity at the hotel.

2.6 Data Analysis

The collected survey results will be processed and analyzed using the capability level method. After data processing, various findings were found related to the operational management and capacity management processes at Grand Landak Hotel. The analysis also revealed problems that may occur in the process. In addition, testing is also carried out to measure the degree of reliability of the data, so that the results of the analysis are reliable and accurate. These steps are an important part of this study to understand the current level of performance and provide a solid foundation for improvement recommendations.

2.6.1 Assessment Method Ability level

The maturity level of IT services is measured by Capability Maturity Level Integration (CMMI) which is based on the Process Capability Scheme. Measurement of the maturity level of IT services refers to whether the process has been implemented or not / has not been done.

The process of measuring the maturity level of IT services is done with the formula:

$$Kapabilitas = \frac{\sum Aktivitas\ yang\ dilakukan}{\sum Aktivitas} x\ 100\%$$

Each process domain will be measured using the formula and provide a rating scale as follows:

Table 3. Rating Scale

No	Description	Capability Level
1	N - Not achieved	<15%
2	P - Partially achieved	15-50%
3	L - Largely achieved	50-85%
4	F - Fully achieved	>85%

The Capability Level is presented in the form of a table as follows:

Tabel 4. Capabilty Level

Level	Keterangan
Level 0	Incomplete
Level 1	Performed
Level 2	Managed
Level 3	Defined
Level 4	Quantitative
Level 5	Optimizing

A process can only be said to be able to reach the next level if the level assessment in the process reaches a rating scale of > 85% - 100% (Fully Achieved).

The explanation of each level will be described as follows:

A. Capability level 0 (Incomplete, namely if the business processes carried out by an organization still have deficiencies and use many methods or approaches that are less than the maximum of the process.
B. Capability level 1 (Performed, i.e. the process that is carried out has more or less achieved its objectives, but there are still a series of activities that are incomplete and less or not organized.
C. Capability level 2 (Managed, where activities have achieved goals with a complete and organized series.
D. Capability level 3 (Defined, namely the achievement of the objectives of an activity by using the SOP from the company and the process is well defined.
E. Capability level 4 (Quantitative, i.e. activities achieve their objectives and are well-defined and their performance can be measured quantitatively.
F. Capability level 5 (Optimizing, which is an activity or activity that achieves its objectives and is well defined and its performance can be measured with the aim of improving performance carried out on an ongoing basis.

2.7 Gap Analysis

Gap analysis is the difference between the current maturity level and the expected one. This analysis can help understand what conditions the company is currently experiencing and can help in determining what actions should be taken to improve and improve IT governance performance. Gap analysis can be calculated using the formula.

Gap = A - B . . . . . .

With A = expected level of maturity, B = current level of maturity.

2.8 Recommendation

Based on the results of the analysis and problem identification, a series of improvement recommendations were developed. The purpose of these recommendations is to provide good advice in order to improve the performance level of the operations management process and the available capacity of the front office operations, especially in terms of reservations. By implementing the recommendations, it is expected that the company can address the identified issues, improve existing processes, and increase the efficiency and effectiveness of their IT operations. This is an important step towards achieving the goal of improving and developing better IT operations management within the company.

2.9 Conclusion

This stage is the final step in the audit research process using COBIT 2019. All answers have been implemented into the available tools, and each problem that is the main subject matter of this research, namely the application of DSS01 and BAI04 at the front office of the Grand Landak hotel, produces a value which is then measured in accordance with the provisions of the COBIT 2019 tool. The results of each study were then analyzed to obtain information and insights related to the operational system at the hotel front office.

3. Results and Discussion

The respondents with RACI Chart mapping can be seen in the following table.

Table 5. RACI Diagram

Governance Process	General Manager	Receptionist
DSS01.01 Manage IT Service Operations	R	A
DSS01.02 Manage IT Service Risk	R	C
BAI04.01 Manage IT Innovation	A	R
BAI04.02 Digital-based Service Improvement	R	C

The table above explains the RACI Chart involving two groups of respondents, namely the General Manager and Receptionist. In the governance process related to operational management and IT service risk, the General Manager has the main responsibility for implementation. Meanwhile, the Receptionist acts as the main party that ensures the smooth running of the IT operational process and is involved in providing consultation or information regarding potential IT service risks that may arise.

In terms of managing IT innovations, the General Manager acts as the party fully responsible for management, while the Receptionist carries out operational tasks related to these IT innovations. For digital-based service improvement, the General Manager oversees the process, while the Receptionist is asked to provide opinions or suggestions regarding the service improvement efforts.

3.1 Results of the DSS01 Process Domain Assessment

Table 1. DSS01 Process Assessment Results

Deliver, Service, and Support (DSS)											
Process Name	**Level 0**	**Level 1**		**Level 2**		**Level 3**		**Level 4**		**Level 5**	
DSS01		DSS01.01	DSS01.02	DSS01.01	DSS01.02	DSS01.01	DSS01.02	DSS01.01	DSS01.02	DSS01.01	DSS01.02
General Manager				69.6%		60.6%		56.6%		62.5%	
Receptionist				69.5%		56.4%		49.4%		54.2%	
Percentage (%)				72.2%		58.5%		48%		58.3%	
Criteria				L		L		P		L	
Capability Score				59.22%							

Based on the results of data calculations in the DSS01 domain, the analysis shows that there are differences in capability achievement between the General Manager and Receptionist in managing services, risks, and operations related to IT processes at the hotel. At Level 2 and Level 3, the achievement values each show the Largely Achieved (L) category with an average percentage above 50%, namely 69.6% for the General Manager and 69.5% for the Receptionist at Level 2. However, at Level 4, the percentage begins to decline, especially for the Receptionist, who only reaches 49.4%, falling into the Partially Achieved (P) category. The General Manager did slightly better at this level with a score of 56.6%, remaining in the L category. The overall capability score for DSS01 was recorded at 59.25%, which is in the Largely Achieved (L) category. This shows that some processes related to services and risks are already running quite well, but still require improvement, especially in more structured risk management and the implementation of technological innovations that can support the sustainability of hotel operations.

Table 2. Process Assessment Results BAI04

Build, Acquire, and Implement (BAI)											
Process Name	**Level 0**	**Level 1**		**Level 2**		**Level 3**		**Level 4**		**Level 5**	
BAI04		BAI01.01	BAI01.02	BAI01.01	BAI01.02	BAI01.01	BAI01.02	BAI01.01	BAI01.02	BAI01.01	BAI01.02
General Manager				48.75%		62.5%		53.25%		54%	

Recepti onist			53.25%	56.7%	55.5%	49.3%
Percent age (%)			51%	59.6%	54.3%	51.6%
Criteria			L	L	L	L
Capabili ty Score			54.8%			

Based on the results of data calculations on the BAI04 domain, the analysis shows that the process of building, acquiring, and implementing the system has reached the Largely Achieved (L) category with an overall capability value of 54.8%. This indicates that most aspects of system implementation have gone well, although there is still room for improvement at several levels. At Level 2 and Level 3, the achievement shows quite good results, indicating that the service implementation process already supports most of the organization's needs. However, a decline was seen at Level 4 and Level 5, especially at Receptionist, which had a lower achievement than the General Manager. This shows that although the system has been implemented, efforts to innovate and strengthen the sustainability of the process still need to be improved.

3.2 GAP Analysis

The gap levels of the two domain processes can be seen in the following summary table:

Table 3. RACI Diagram Results

Domain	Currently	Expected	Gap
DSS01	59.2%	80%	20.8%
BAI04	54.8%	80%	25.2%

3.3 Recommendations for Improvement

Improvement recommendations are given referring to the results of the analysis of the level of maturity of the IT services being run. With this recommendation, of course, it can be input for Grand Landak Hotel to be able to improve the quality of IT Services and reduce the level of gaps that occur.

DSS01 Process Domain Improvement Recommendations

1. Improvement of more detailed Standard Operating Procedures (SOPs) to support service processes and risk management, particularly at Level 4.
2. Conduct ongoing training for Receptionists to improve technical skills in using devices and systems related to service operations.
3. Ensure operational supporting technology infrastructure, such as IT systems and software, are up-todate and in line with needs to reduce technical constraints.
4. Encourage cooperation between the General Manager and Receptionist in developing strategies to improve operational capabilities, especially in risk management.

Recommendation for Improvement of Process Domain BAI04

1. Integrate AI or automation-based systems to support work processes in the Front Office, such as chatbots for reservations or self-check-in for guests.
2. Conduct periodic evaluations and updates of digital systems to ensure suitability to operational needs and identify areas that require improvement
3. Actively involve Receptionists in the evaluation process and training of the new system so that they feel more prepared and confident in using the technology.
4. Develop an effective change management strategy so that the implementation of the new system not only runs smoothly but also has a maximum impact on service quality

4. Conclusions

In this study, it was concluded that the information system audit activities at the Grand Landak Hotel in measuring the level of governance performance capabilities obtained the following results:

1. The results of the capability level research on the DSS01 domain show that the level of capability is in the Largely Achieved category with a capability value of 59.25%. This is evidenced by the achievement at several levels, where Level 2 and Level 3 show quite good results with a percentage above 58%, but at Level 4 the achievement only reaches Partially Achieved with a percentage of 49.4%. Service processes have mostly been running well, but risk management and operations still need strengthening, especially in terms of technology support and employee training. And the results of capability level research in the BAI04 domain show that the level of capability is in the Largely Achieved category with a capability value of 54.8%. At Level 2 and Level 3, the achievement shows adequate results, but at Level 5 the Receptionist's achievement is lower than the General Manager. This indicates that technological innovation and system sustainability still need more attention, especially in actively involving employees in the process of implementing a new system.
2. The results show that there is a difference between current and expected capacity. Improvement at Level 4 is required in the DSS01 domain to achieve Fully Achieved and in the BAI04 domain to support technological innovation and better system sustainability.

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