

Academic Information System Governance Using The Framework It Balanced Scorecard And The Cobit Framework 2019 (Case Study: SMAN 15 Bandar Lampung)

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Abstract—Today's information system is a very important thing and has become a basic need of an organization. The information system used can facilitate the organization's business processes in order to achieve goals. A good information system is able to provide effective and accurate information to all its users. SMA N 15 Bandar Lampung is one of the schools that implements the use of information technology into academic information systems. The management of the academic information system of SMA N 15 Bandar Lampung is not well managed, this is because in the application of IT there are several processes that are lacking and not in accordance with existing standards and rapid technological changes make the organization unable to adapt well, the academic information system is also slow in its activities unexpectedly resulting in unexpected system failures, lack of effectiveness of technical guidance related to the use of Siakad. With these conditions, an IT governance evaluation activity is needed which can later produce findings and recommendations that can be used by SMA N 15 Bandar Lampung. The method used is the selected IT Balanced Scorecard and COBIT 2019 framework. The results of the analysis of the distribution of questionnaires on the respondents got the average current value in the APO04, APO07, APO13, DSS02, DSS03 processes which was 3.47 which means that the assessment results on the academic information system of SMA N 15 Bandar Lampung have capability level 3 (established). All ongoing business processes have been implemented with planning and monitoring.

Keywords—*Information System Audit, COBIT 2019, IT Balanced Scorecard, IT Governance.*

I. PRELIMINARY

The current information system is a very important thing and has become a basic need of an organization, both government and private. The information system used can facilitate the organization's business processes in order to achieve the goals or objectives of the organization's business strategy planning. A good information system is able to provide effective and accurate information to all its users.

Academic information system is an information system in universities that provides academic information services. This system is used for school data management by applying the use of information technology so that all business processes carried out can be managed into useful information in school management as a basis for decision making. Good governance of academic information systems is able to support school development towards healthy schools. One element of information system governance is data management. Data management is a very important element because data is an asset for the organization. Information technology governance is a structure and process that is interconnected and directs and controls the company in achieving company goals through added value and balance between the risks and benefits of information technology and its processes. An information system audit is an activity in governance that is absolutely necessary in order to evaluate the results of business processes that occur in the organization to see the maturity level. An audit of the information system system that is carried out regularly will provide a clear picture of the need. Information systems in the future and strengthen internal quality control so that the planning and design of information systems in the future will be right on target.

SMA N 15 Bandar Lampung is one of the schools that implements the use of information technology into academic information systems. The management of the academic information system of SMA N 15 Bandar Lampung is not well managed, this is because in the application of IT there are several processes that are lacking and not in accordance with existing standards and rapid technological changes make the organization unable to adapt well, the academic information system is also slow in its activities unexpectedly resulting in unexpected system failures, lack of effectiveness of technical guidance related to the use of Siakad. Thus, it is very necessary to monitor the implementation of SIAKAD in the information system which has not been carried out optimally

because the existing information technology cannot be used effectively.

So to overcome this, it is necessary to have an audit of academic information systems to see the maturity level so as to produce information system audit reports that can be used as recommendations in planning academic information systems in the future so that information system planning is in accordance with the vision, mission, goals and strategies of organizational development.

The results obtained from this study are that there are several differences in terms of the general description in COBIT 2019 which has a domain aspect, in COBIT 2019 there are three additional and objective domains. Furthermore, in terms of principles, COBIT 2019 has 9 principles that have been developed from the previous COBIT. In terms of advantages, COBIT 5 is more widely used, while the disadvantages are that it is not flexible, while COBIT 2019 has advantages that are more flexible and accurate in terms of principles and domain details, so it will be more difficult to implement. The audit results are then used as the basis for planning information with reference to the organization's business strategy plan.

In this study, the IT Balanced Scorecard framework is used to identify a company's strategic targets through 4 views, namely financial, internal, customer, learning, and growth. Then the IT Balanced Scorecard (IT Realized Goals) mapping of the 2019 COBIT Process. The next stage is to identify the chosen 2019 COBIT domain, therefore an audit related to the management of SIAKAD in SMA N 15 Bandar Lampung was carried out.

II. LITERATURE REVIEW

A. Information Technology Governance

Governance is a process carried out by an organization or community to overcome problems that occur. Governance is a series of processes, customs, policies, rules, and institutions that affect the management, procurement and control of a company or corporation [1].

B. IT Balanced Scorecard

In 1997, Van Grembergen and Van Bruggen developed the IT Balanced Scorecard (Information Technology Balanced Scorecard) for use in organizational information technology departments. The IT Balanced Scorecard has standards that make it easier for researchers to measure information technology performance. The IT Balanced Scorecard aims to enable users to adapt information system planning and activities to organizational goals and needs, adjust user efforts to information system goals, provide measurements to evaluate the organizational effectiveness of information systems, encourage and maintain improved information system performance, and achieving balanced outcomes among stakeholder groups. IT Balanced Scorecard is a performance management methodology for the application of

information technology which was developed from the balanced scorecard methodology [2].

C. COBIT 2019

COBIT 2019 builds on integrating more than 25 years of development in this field, not only in new insights from science, but also in operationalizing these insights into practice. From its foundations in the IT audit community, COBIT has evolved into a broader and more comprehensive information and technology governance and management framework and continues to establish itself as a generally accepted framework for information and technology governance

COBIT consists of IT governance and management that has developed broadly and is more comprehensive so that it can be used in IT governance with objectives grouped in the domains Evaluate, Direct, and Monitor (EDM), Align, Plan, and Organize (APO), Build, Acquire and Implement (BAI), Deliver, Service and Support (DSS) and Monitor, Evaluate, Assess (MEA) [3].

COBIT 2019 is a development of COBIT 5 conducted by ISACA. The COBIT 2019 Framework makes a clear distinction between governance and management. The two differences have different activities, require different structures and serve different purposes.

D. Study of literature

This research uses a number of literature studies, namely:

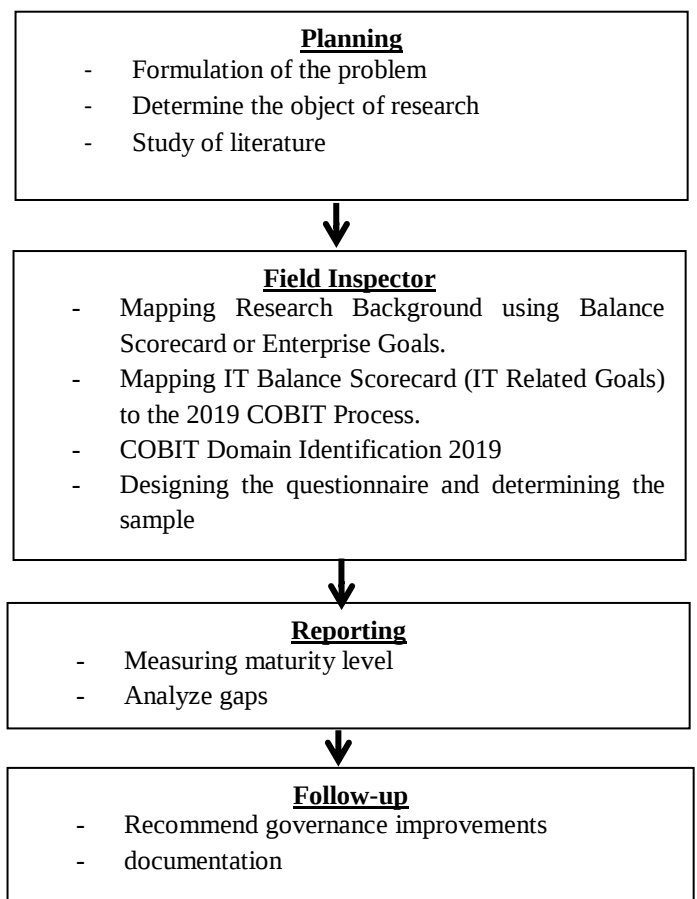
No	Name	Title	Problem	Results and Discussion
1	Rustam & Dewi, 2019	Evaluation of Information Technology Governance in Academic Information Systems Faculty of Engineering, University of Khairun Ternate Using the COBIT 5 Framework.	The issue raised in this research is the need for alignment and improvement of standard operating procedures for business processes at BAAK Khairun University, Ternate.	Depending on the computational results of the existing experience level and the capacity level of the destination state, i.e. level 3, there is a difference of two levels in order to achieve the anticipated capacity level target, then SIAK

				Khairun Ternate University must improve the SOP to complement the activities related in COBIT 5.
2	Asep & Devin a, 2020	Implementation of the Balanced Scorecard and COBIT 5 Framework for Information Technology Governance at PT.GITS Indonesia	The issue under study is the need for an IT governance audit at PT.GITS Indonesia.	The results of this research state that PT. GITS Indonesia is currently at level 3 (Established Process), with a certain level of level 4 (Predictable Process) that must be achieved. Based on the evaluation process, PT.GITS Indonesia needs to standardize the delivery or data you want to produce, as well as recheck the uniformity of the offer to see if it has been achieved, and then monitor and analyze it.
3.	Hardiana, Adinda, Azza	Audit Using COBIT 5.0 Domain	The challenges examined in this study	The findings of this study resulted in a level 2

h, ester, dan Sarika, 2021	DSS and MEA on Academic Information System (SIKAD) UPN Veteran Jakarta	include many obstacles at SIKAD UPN Veteran Jakarta in facilitating teaching operations, such as computers that often turn off and data is lost.	capacity in integrating the academic information system of UPN Veteran Jakarta, especially in the DSS and MEA domains. Gap analysis resulted in a score of 1.33 between current and predicted conditions.
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III. RESEARCH METHODOLOGY

This research was conducted using qualitative methods, qualitative methods were chosen because by using In this method the data is retrieved according to the current events. As follows. Research Stages.



Method of collecting data

The data collection methods used in this study to obtain the data of this research are as follows:

a. Interview

Researchers conducted interviews with school SIAKAD makers in order to get the information needed as report material.

b. Literature review

Literature studies are carried out by reading, citing and making notes sourced from library materials that support and relate to academic information systems. This is intended so that the author has a strong theoretical foundation.

c. Observasi

Researchers make direct observations directly on the object of research. The object of the research carried out was, among others, the State Senior High School 15 Bandar Lampung.

d. Questionnaire

At this stage the distribution of questionnaires using the Slovin method, the number of management and user respondents is 93 respondents with details for the position of 4 respondents and 89 respondents for users.

Reporting

In the activity reporting stage, the researcher performs:

1. Measuring Maturity Level / (maturity level)

In this process, the researcher scores each stage that is passed, maps the steps that will be scored in order to produce measurements at the level and achieve field evidence following COBIT 2019.

2. Analyze gaps (gaps)

After the results of the capability level have been found, the researcher analyzes the capability level gap in determining the problems that occur in the governance of academic information systems.

Follow-up

Researchers in the follow-up steps did:

1. Recommend governance improvements

This stage is the result of research outputs that are useful in making a framework based on the 2019 COBIT process which has been adapted to the needs of SMA N 15 Bandar Lampung after an audit by looking at the results of the current analysis and ideal conditions for the future so that recommendations for each sub activity appear and based on the results questionnaires that have been given to users and management so that recommendations for governance improvements will be given so that the same problem does not occur.

2. Documentation

In this stage, the researcher documents the research activities of academic information system governance.

IV. RESULTS AND DISCUSSION

Results

Results of Identification of Enterprise Goals

Researchers mapped and determined enterprise goals related to problems based on the 2019 COBIT guidelines. The following is the background of the problem in table 1.

Table 1. Research Background

No	Research Background
1	In the application of IT there are several processes that are lacking and not in accordance with existing standards and rapid technological changes make the organization unable to adapt properly.
2	Academic information systems are also slow in their activities so that unexpected system failures occur.
3	Lack of effective technical guidance related to the use of information technology.

The summary of the COBIT 2019 process resulting from the background mapping phase of the problem against IT Related Goals and the 2019 COBIT Process is in table 2.

Table 2. Domain COBIT 2019 in Research

Domain	Proses COBIT 2019
APO	APO04, APO07, APO13
DSS	DSS02

Computing Capability Level

The capability model is a measuring tool to determine the condition of SIAKAD performance at SMA N 15 Bandar Lampung. This measurement activity will result in an assessment of the current condition based on the process domains APO04, APO07, APO13, DSS02, DSS03. Capability level measurement is carried out using the following formula:

$$x = \frac{\sum Xi}{n}$$

Information:

X = Mean or average count

$\sum$ = Penjumlahan keseluruhan

Xi = How many scores X , $I = 1, 2, 3, \dots, n$

N = Number of samples

After the measurement process is carried out on the questionnaire, the capability level in the APO04 stage is obtained which is attached in table 3.

Table 3. Capability Level Process APO04 Respondents

Process	Activity	Current Score	Expect Score
APO04	APO04.01	3,45	4,50
	APO04.02	3,50	4,52
	APO04.03	3,48	4,50
	APO04.04	3,49	4,49
	APO04.05	3,44	4,47
	APO04.06	3,46	4,48

The capability level score for respondents in the APO04 stage can be seen in Figure 1.

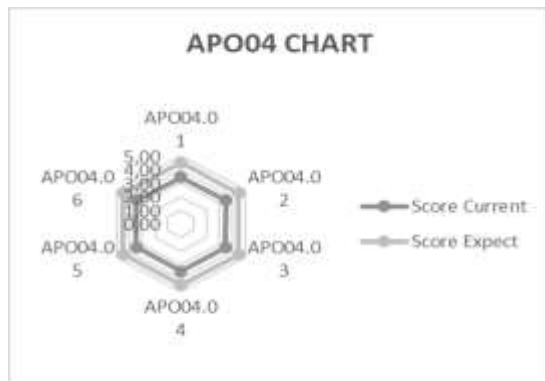


Figure 1. Graph of capability level scores for respondents in the APO04 stage

Furthermore, the computation of the capability level in the APO07 stage is attached in table 4.

Table 4. Capability Level Proses APO07 Responden

Process	Activity	Current Score	Expect Score
APO07	APO07.01	3,45	4,48
	APO07.02	3,47	4,48
	APO07.03	3,47	4,49
	APO07.04	3,50	4,51

The capability level score for respondents in the APO07 stage can be seen in Figure 2.

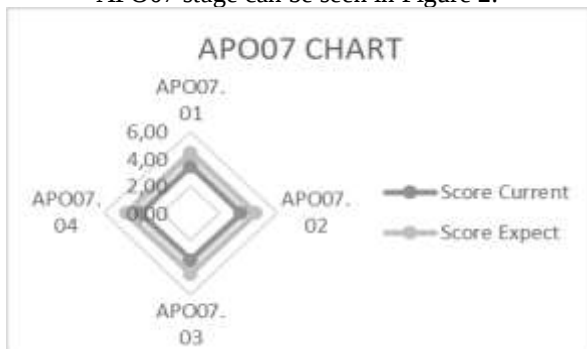


Figure 2. Capability level score graph for respondents in the APO07 stage

Furthermore, the computation of the capability level in the APO013 stage is attached in table 5.

Table 5. Capability Level of APO13 Process Respondents

Process	Activity	Current Score	Expect Score
APO13	APO13.01	3,50	4,53
	APO13.02	3,45	4,46
	APO13.03	3,48	4,49

The capability level score for respondents in the APO13 stage can be seen in Figure 3.

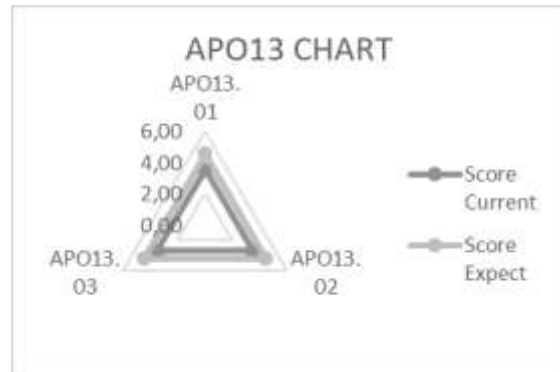


Figure 3. Capability level score graph for respondents in the APO13 stage

Furthermore, the computation of the capability level in the DSS02 stage is attached in table 6.

Table 6. DSS02 Process Capability Level Respondents

Process	Activity	Current Score	Expect Score
DSS02	DSS02.01	3,48	4,50
	DSS02.02	3,47	4,48
	DSS02.03	3,47	4,47
	DSS02.04	3,46	4,47
	DSS02.05	3,46	4,50

The capability level score for respondents in the DSS02 stage can be seen in Figure 4.

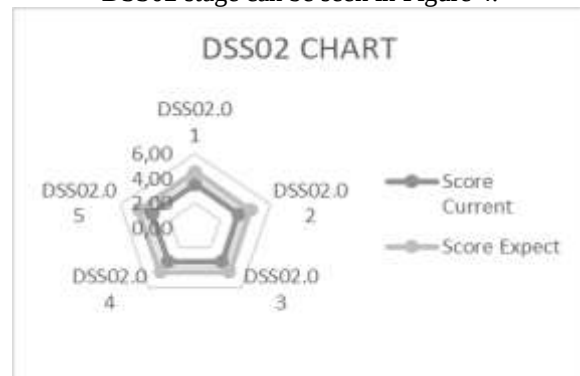


Figure 4. Graph of capability level scores for respondents in the DSS02 stage

Table 7. Process Capability Level DSS03 Respondents

Proses	Aktivitas	Skor Current	Skor Expect
DSS02	DSS03.01	3,45	4,47
	DSS03.02	3,48	4,51
	DSS03.03	3,48	4,49
	DSS03.04	3,44	4,48
	DSS03.05	3,51	4,49

The capability level score for respondents in the DSS03 stage can be seen in Figure 5.

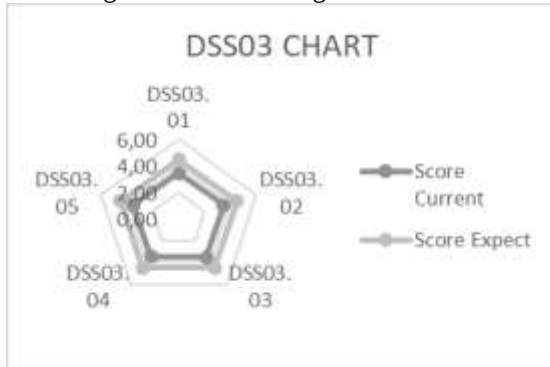


Figure 5. Graph of capability level scores for respondents in the DSS03 stage

Based on the results of the management respondent's capability level computation, the business process capability level score is shown in table 8 below:

Table 8. Capability Level of Respondents Process

Process	Capability Level (Current)	Model Capability Level	Expect Score
APO04	3,47	Predictable Process	4,49
APO07	3,47	Predictable Process	4,49
APO13	3,48	Predictable Process	4,49
DSS02	3,47	Predictable Process	4,48
DSS03	3,47	Predictable Process	4,49

The respondent's capability level score on 23 activities can be seen in the form of a graph in Figure 6.

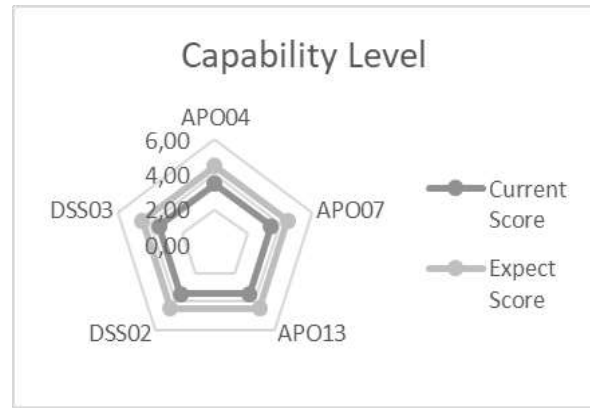


Figure 6. Graph of respondents' capability level scores on 23 activities

4.6 Maturity Level

Based on the results of the assessment of the maturity level of IT Governance. Analysis of the gap that occurs between the current IT process Maturity level (as-is) and the expected IT process Maturity level (to-be) at the Meteorology, Climatology and Geophysics Agency, in table 9.

Table 9. Maturity Level Process

Proses	Capability Level (Current)	Maturity Level	Capability Level (Expect)	GAP
APO04	3,47	3	4,49	1,02
APO07	3,47	3	4,49	1,02
APO13	3,48	3	4,49	1,02
DSS02	3,47	3	4,48	1,02
DSS03	3,47	3	4,49	1,01

Maturity level scores for respondents can be seen in Figure 7 dan Figure 8.



Figure 7. Respondent Maturity Level Chart

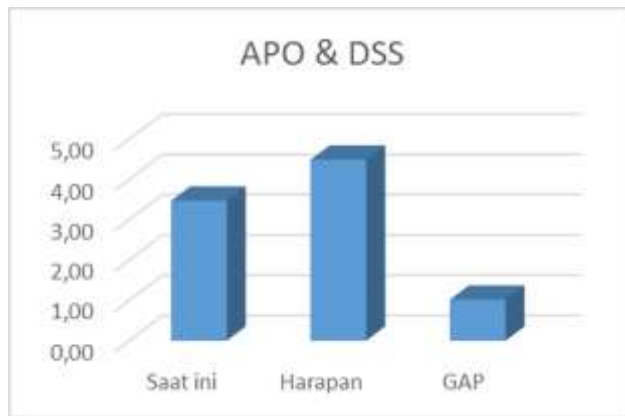


Figure 8. Respondent Maturity Level Chart

Gap Analysis

Based on the capability level scores above and the Maturity Score, there is a gap or gap that occurs between the current SIAKAD assessment of SMA N 15 Bandar Lampung and what is expected by the respondents. There are several findings that are used as reference materials to improve the capability level of academic information system governance at SMA N 15 Bandar Lampung. The analysis and recommendations for improvement are as follows:

1. APO04 (Managed innovation)

From the computational operation of the respondent's questionnaire, an average score of 3.47 was obtained, including the capability level 3 (established) scale, which indicates that risk management has now been implemented by preparation and review. Meanwhile, in the APO04 stage, the expect score was 4.49. So that at APO04 there is a 1.02 gap. The discovery of problems related to the management of innovation documents that have not been collected properly. For this reason, it is necessary to monitor and review innovations so that the document can be used as a benchmark for managing innovation in the future.

2. APO07 (Managed human resources)

From the computational operation of the respondent's questionnaire, an average score of 3.47 was obtained, including the capability level 3 (established) scale, which indicates that managing human resources has currently been implemented by preparation and review. Meanwhile, in the APO07 stage, the expect score was 4.49. So that at APO07 there is a 1.02 gap. The finding of the problem of lack of understanding of human resources on information technology. so technical guidance is needed regarding the use of information technology.

3. APO13 (Managed security)

From the computational operation of the respondent's questionnaire, an average score of 3.48 was obtained, including on the capability level 3 (established) scale,

which indicates that managing IT security has currently been implemented by preparation and review. Meanwhile, in the APO13 stage, the expect score was 4.49. so that at APO13 there is a 1.02 gap. The discovery of problems related to the use of computers alternately which resulted in excessive computer workloads and the vulnerability of data leakage. For this reason, it is necessary to monitor the information security management system so that it can be maintained properly.

4. DSS02 (Managed service requests and incidents)

The average result for the DSS02 process, with a current score of 3.47, included in the capability level measurement scale 3 (established), indicates that the current control system is carried out with development and submission, based on the procedures of the respondents' questionnaire scores. However, the expected score was 4.48 at the DSS02 stage. As a result, on DSS02 there is a gap or difference of 1.02 between the current and the expected. The discovery of request management problems and service incidents that occurred at SIAKAD. So it is necessary to carry out a classification action on the types of services in order to obtain incident resolution either in direct or indirect form.

5. DSS03 (Managed issues)

The average result for the DSS03 process, with a current score of 3.47, included in the capability level measurement scale 3 (established), indicates that problems managed in SIAKAD are currently carried out by development and submission, based on the procedure of the respondents' questionnaire scores. However, the expected score was 4.49 at the DSS03 stage. As a result, on DSS03 there is a gap or difference of 1.01 between the current and the expected. It was found that the problems that occurred in SIAKAD had not been managed properly. So it is necessary to carry out problem classification actions at SIAKAD against the types of problems that occur so that problems in SIAKAD are managed properly in direct or indirect form.

V. CONCLUSIONS AND SUGGESTIONS

Conclusion

In the Evaluation of Academic Information System Governance Using the IT Balanced ScoreCard Framework and the 2019 COBIT Framework at SMA N 15 Bandar Lampung, it can be concluded several things, namely:

1. The findings of the questionnaire analysis for respondents resulted in an average score of 3.47 in the procedures APO04, APO07, APO13, DSS02, DSS03, which indicates that the

academic information system of SMA N 15 Bandar Lampung has a capacity level of 3 (defined). Planning and evaluation are used to carry out fully functional business processes.

2. The results of the questionnaire obtained an overall prediction score of 4.49 for respondents, who were at level 5 (optimization), indicating that the system is anticipated to continue to grow and achieve company goals.
3. The results of the recommendations are used to make improvements to the findings found and to increase the level of IT governance at SMA N 15 Bandar Lampung in order to achieve goals in accordance with the school's vision and mission.

Recommendation

Based on the research, the researcher recommends suggestions for SMAN 15 Bandar Lampung so that it can be improved and improve IT governance as follows:

1. It is necessary to identify risk problems, by monitoring risks on a regular basis.
2. There is a need for planned hardware maintenance to extend the life of the device.
3. There is a need for comprehensive IT management in the form of application aspects, human resources, aspects of operational standards, as well as aspects of data and information.
4. It is necessary to monitor and review innovations so that the document can be used as a benchmark for future innovation management.
5. Need technical guidance related to the use of information technology for human resources who are responsible for SIAKAD.
6. It is necessary to monitor the information security management system so that the data can be well maintained.

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