

# Evaluation of IT Governance at Islamic Boarding Schools in the Special Region of Yogyakarta based on the COBIT 5 Framework

M. S. A. K. Mardlian<sup>1</sup>, Muhammad Taufiq Nuruzzaman<sup>2</sup>, Shofwatul ‘Uyun<sup>3</sup>,  
Bambang Sugiantoro<sup>4</sup>  
Informatics Department  
Universitas Sunan Kalijaga  
Yogyakarta, Indonesia

<sup>1</sup>kakaman869@gmail.com, <sup>2</sup>m.taufiq@uin-suka.ac.id, <sup>3</sup>shofwatul.uyun@uin-suka.ac.id, <sup>4</sup>bambang.sugiantoro@uin-suka.ac.id

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*Abstract— Nowadays, almost all aspects of company operations are supported by information technology systems. Many pesantren have utilized information technology in supporting operational activities such as: using computers, accessing the internet, having a website, and managing information technology systems. The purpose of this study is to implement the COBIT 5 framework in the DSS (Deliver, Service, Support) domain in evaluating information technology governance and calculate the capability level value and gap analysis at Islamic Boarding Schools. The results of the Capability Level Analysis in the COBIT 5 DSS Domain obtained from 42 Islamic Boarding Schools showed that DSS01, DSS02, and DSS03 on average were at level 2, DSS04, DSS05, DSS06 on average at level 1. The results of the Gap Analysis in the COBIT 5 DSS Domain show that in DSS01, DSS02, and DSS03 the average GAP is 3, in DSS04, DSS05, and DSS06 the average GAP is 4. The result shows that Information Technology Governance in Islamic Boarding Schools in the Special Region of Yogyakarta based on an assessment with the COBIT 5 Framework is still low status and needs to be improved, as evidenced by the low Capability Level Value and the high GAP Value.*

*Keywords— pesantren; DSS; capability level value; gap analysis; assessment with the COBIT 5 framework*

## 1 INTRODUCTION

Nowadays, information technology plays an important role. Information technology has been very useful in facilitating all organizational affairs both in the private sector and the public sector of government agencies. Many benefits are offered by technological advances, including faster and more efficient processing, transportation, access, and storage of information. Information is becoming one of the most valuable resources due to technological innovation and needs when managed properly [1]. IT governance is an organizational management component consisting of methods, organizational structure, and leadership to ensure the best possible use of information technology [2]. The basic purpose of IT governance is to encourage business and Information Technology alignment so that Information Technology investments can provide added value to the benefits of the organization or company [3].

COBIT 5 is ISACA's latest COBIT Framework, which provides a comprehensive business description of enterprise IT governance to highlight the important role that information and technology play in generating business value. The latest developments in the field of IT engineering and corporate governance have been incorporated into COBIT 5 [4]. COBIT 5 has five domains with different focus areas [5] among other: Domain APO (Align, Plan, and Organize), Domain DSS (Deliver, Service, and Support), Domain EDM (Evaluate, Direct and Monitor), Domain BAI (Build, Acquire, and Implement), and Domain MEA (Monitor, Evaluate, and Asses) [6].

Technological advances that exist today encourage Islamic boarding schools to develop and contribute to society more broadly. Pesantren that used to run traditionally (salaf) began to open up and adapt to technological developments in order to maintain and develop its existence as an Islamic educational institution in the midst of society's progress [7]. Currently, many pesantren have utilized information technology in supporting operational activities in pesantren such as: the use of computers, internet access, website, the availability of pesantren information systems, and the availability of human resources who manage Pesantren Information Technology [8]. However, in general, Islamic boarding schools have never conducted an Information Technology Governance Evaluation, so it cannot be proven whether the utilization of information technology in Islamic boarding schools has been running effectively and efficiently.

Yogyakarta Special Region (SR) is one of the provinces in Java Island which has an area of 3,185.80 km<sup>2</sup>, consisting of one city, and four regencies including Yogyakarta City, Sleman Regency, Bantul Regency, Kulon Progo Regency and Gunung Kidul Regency [9]. According to data from the Central Bureau of Statistics and based on the results of the 2020 Population Census, the total population of the Yogyakarta SR is 3,668,719 people. In 2022, the Ministry of Communication and Information in collaboration with the Katadata Insight Center (KIC) conducted a survey on the Status of *Indonesian Digital Literacy 2022*. The findings show that the SR of Yogyakarta Province received the highest digital literacy index score in Indonesia with a score of 3.64 [10]. This is the background for the author to conduct research on Information Technology Governance Evaluation with a Case Study of Islamic Boarding Schools to prove that the digital literacy index value has an influence or not on the

Information Technology Governance Condition of Islamic Boarding Schools in the SR of Yogyakarta Province.

Research related to the Evaluation of Information Technology Governance using the COBIT 5 Framework was previously conducted in 2019 [11]. The research discusses the capability level of the DSS01-DSS06 subdomain, it reaching level 2, meaning that the currently implemented information technology governance process is managed (planned, monitored, and adjusted), with gaps in subdomains DSS01, DSS02, DSS05, and DSS06, namely 1 being at target level 3, while in subdomains DSS03 and DSS04, there are no gaps corresponding to target level 2. Documentation on DSS domain information from each base practice and work product is quite good, although in technical implementation it is still not fully optimized.

Similar research was conducted in 2019 [12]. Based on the results of the research conducted, it can be concluded that information technology governance in the DSS domain shows that it has implemented all DSS sub-domains. However, it is still not fully documented and the management process is good. This can be seen from the results of the capability level process assessment of the existing subdomains which show that 4 of the 6 subdomains are still at level 1, namely Domain DSS01, DSS04, DSS05, and DSS06. and the remaining 2 are at level 2, namely DSS03 and level 3, namely DSS02 so that Eka Tjipta Foundation can improve existing information technology governance and can contribute to increasing the effectiveness and efficiency of using information technology to achieve organizational business goals.

Further research was conducted in 2020 [13]. The assessment of the process Capability level reveals the outcomes of the 6 processes examined, indicating that the condition of information technology governance has been partially applied, there are only 3 processes, namely the DSS01, DSS03 and DSS05 that can reach level 1 with the process of performance attribute category reaching the Largely Achieved level. While the other 3 processes, namely DSS02, DSS04 and DSS06 are now at level 0. Level, which is the goal process Capability level for the management of the Payakumbuh City Communication and Information Office, can be attained by putting the offered recommendations into practice.

The next research was conducted in 2020 [14]. It was concluded that the results of the capability level evaluation on COBIT 5 focus on the DSS domain, that the current capability level typically results in level 2 with a value of 2.02, specifically in the subdomains DSS01, DSS02, DSS03, DSS04, and DSS05, while 1 subdomain is at level 1, namely DSS06. This accomplishment demonstrates that IT processes have been carried out, accomplish goals, and are well managed. The expected Capability level typically results in level 3, meaning that IT processes that have been successfully completed, maintained and must be standardized to be used across the entire organizational framework. The difference between the existing capability level and the anticipated capability level is typically 1 level with a value of 0.98.

From research conducted in 2021 [2], it can be deduced that the capability level in the DSS01 domain reaches a value of 0.79, indicating that operational tasks based on COBIT 5 standards have been completed, but there are still some items that need to be improved from the current IT infrastructure or



collaborate with skilled outside parties to improve the quality standards of the IT infrastructure so that the implementation of business processes can be more effectively. The capability level with a value of 0.98 from this value in the DSS04 (domain necessitates management for handling the capabilities or skills of current human resources in carrying out business activities. While in Domain DSS02, DSS03, DSS05, DSS06 are at level 0 (incompleted process).

The research is being conducted by the author with a goal to develop and improve topics previously researched on. Namely the Evaluation of Information Technology Governance using the COBIT 5 Framework. This research focuses on the DSS Domain in the COBIT 5 framework. The objective of this research is broad and covers several Islamic Boarding Schools in the Regional Office of the Ministry of Religion of the Special Region of Yogyakarta which strongly distinguishes it from the previous research that have focused on one area.

## 2 METHOD

### 2.1 Literature Study

This project analyzed previously materials in DSS Domain in the COBIT 5 Framework.

2.1.1 *Research Population and Sample:* A sample is a group of members of a particular population selected according to certain guidelines to serve as a representative sample [16]. A population is a sum of all elements under investigation that share common traits; it can consist of people from a group, an event, or something else entirely [15]. In this study, 417 boarding schools were used as the the population. That was based on data from the Islamic Education and Religious Affairs Division of the Regional Office of the Ministry of Religious Affairs of the SR of Yogyakarta Province. Research obtained from sampling applies to the entire population. Therefore, a sample is needed that can represent the population. Sampling pays attention to the number of existing populations, it is better to take all samples if the population is less than 100, and if more than 100 then one can take 10%-25% as described in [17]. Based on the Population Data which amounted to 417 boarding schools as per the Islamic Boarding Schools in the Regional Office of the Ministry of Religious Affairs of the SR of Yogyakarta, the population was large enough prompting the researcher to use 10% of the population which is 417 x 10% making it 42 samples. The number of samples in this study meets the minimum justification requirements of a research sample. Non Probability Sampling technique with Purposive sampling was used. Its a sampling technique with certain considerations in accordance with the research focus [18] making it verified and meeting the characteristics of the respondent in accordance with the research focus. The Information Technology Governance Evaluation Research Sample is presented as Table 1.

Table 1. Population and Sample Data

District/City	Total Boarding School	Sample Quantity
Yogyakarta City	36	4
Sleman Regency	166	18
Bantul Regency	108	10



Kulon Progo Regency	66	6
Gunung Kidul Regency	41	4
<b>Quantity</b>	<b>417</b>	<b>42</b>

2.1.2 *Research Respondents:* According to the Non Probability Sampling technique with Purposive sampling type, respondents in this study have particular features that are employed as research samples [18]. In accordance with the focus of research on information technology governance in the research objective, the researcher presents the characteristics of the respondents to be; Islamic boarding schools registered with the Ministry of Religion and have Statistics, Islamic boarding schools that have been established for more than 3 years and have more than 200 students as one of the criteria for developing or large Islamic boarding schools, Islamic boarding schools that have internet access and information systems that are running to support pesantren activities such as websites, e-learning, academic systems and others and a boarding school that has a team or staff in charge of managing information technology. Respondent identification that refers to the RACI diagram, the identification of respondents is directed at roles related to IT governance. The hope of this approach to respondent identification is to get answers with sufficient validity and can represent the actual situation in the field. In general, RACI in the COBIT 5 framework categorizes roles in all IT processes. The roles categorized by RACI are then identified in the functional organizational structure of the object of research. In this study, respondents or officers who filled out the questionnaire included the Head of the Boarding School, the Head of the IT or Media Division and the IT Staff.

2.2.3 *Time of Research:* Researchers divided the research time into several stages in order to manage time and achieve goals within the stipulated timeframe. This research took two months with calculations being conducted for one week. The reaserch conductivity time progress is shown in black in each column of the table, as in Table 2.

Table 2. Time of Research

Description	December 2022 (Week)				January 2023 (Week)			
	1	2	3	4	1	2	3	4
Start	■							
Conduct Literature Study	■							
Determination of Research Scope		■						
Data Collection			■					
Data Analysis				■				
Recommendation					■			
Finish								■

### 2.3 Data Collection

2.3.1 *Completing the COBIT 5 Questionnaire:* Filling out the questionnaire to assess information technology governance is guided by the COBIT 5 Enabling Process E-book and the COBIT Self-Assessment Handbook. The questionnaire is focused on the DSS Domain which consists of six subdomains, namely DSS01 Manage Operations, DSS02 Manage Service

Requests and Incidents, DSS03 Manage Problems, DSS04 Manage Continuity, DSS05 Manage Security Service, and DSS06 Manage Business Process Control. COBIT 5 is used to measure the Capability Level in the DSS Domain. Table 3 provides an overview of the questionnaire used.

Table 3. COBIT 5 Questionnaire

Process	Attributes	Criteria	Criteria Are Met	Not achieved	Partially Achieved	Largely Achieved	Fully Achieved
Process		Y/N	(0-15%)	(15-50%)	(50-85%)	(85-100%)	
Level 0							
Level 1	PA 1.1						
Level 2	PA 2.1						
	PA 2.2						
Level 3	PA 3.1						
	PA 3.2						
Level 4	PA 4.1						
	PA 4.2						
Level 5	PA 5.1						
	PA 5.2						

Table 3 shows a summary of the questionnaire used in calculating the capability value and is adjusted to the criteria at level 1 to level 5. Capability level is a document owned by the organization related to the process being carried out. Researchers first explained to respondents regarding the COBIT 5 questionnaire, how to fill out the questionnaire and provided assistance in filling out the questionnaire so that accurate research results were obtained. Process Assessment Model (PAM) is a basic model for evaluating the capabilities of an organization's Information Technology processes [5]. PAM is based on the International Electrotechnical Commission (IEC) 15504 standard by the IEC and the International Organization for Standardization (ISO) standard. The PAM consists of two dimensions, namely the process dimension and the capability dimension, which are described as Fig. 1. Process Dimension is a process that is specified and categorized into certain process categories. Capability Dimension is a set of process characteristics categorized into capability levels and forming a capability dimension.

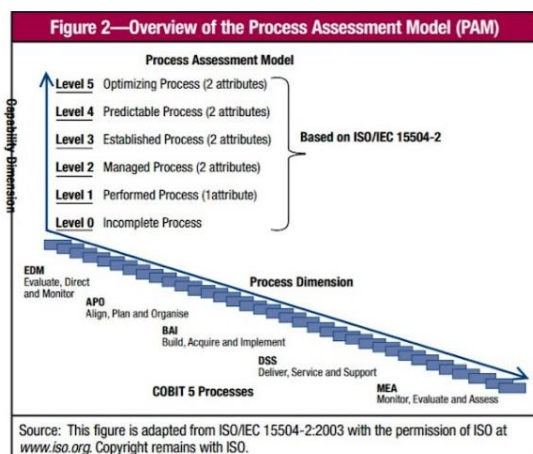


Figure 1. Process Assessment Model

Process attributes can be used to evaluate the Capability of each process because they have quantitative qualities. An explanation of the levels and process attributes in Table 4.

Table 4. Levels and Process Attributes of Process Capability

Level	PA	Description
0	0	Not done or failed
1	1.1	Done but no management
2	2.1	Done, planned and monitored
	2.2	Done, planned and monitored, and the work is well managed (needs determined and documented).
3	3.1	Performed activities are written in the SOP/policy/rule or a standard of operation is made, is an important element that must be done
	3.2	Activities are written in standard operating procedures (SOPs) / policies / rules or have standards for implementation, and there is an appropriate allocation of responsibilities and resources.
4	4.1	Written activities are carried out in SOPs / policies / rules are running well and there is an application of optimal service / information measures produced.
	4.2	Written activities are carried out in SOPs / policies / rules or and produce optimal services / information then monitored and analyzed.
5	5.1	Performed, there are innovations and strategies for developing activities according to the results of the analysis of previously standardized activities.
	5.2	Performed, there are innovations and activity development strategies, measured for their impact on business goals and evaluated.

Each attribute level has 4 rating scales defined in the ISO/IEC 15504 standard [5], 2013), as shown in Table 5.

Table 5. Rating Levels

Abbreviation	Description	% Achieved
N	Not Achieved	0 to 15% achievement
P	Partially Achieved	>15% to 50% achievement
L	Largely Achieved	>50 to 85% achievement
F	Fully Achieved	>85 to 100% achievement

2.3.2 *Verification of COBIT 5 Questionnaire:* The COBIT 5 questionnaire that has been filled in by the respondent requires verification so that the data obtained from filling out the questionnaire is accurate and in accordance with the actual situation and to minimize errors in filling in because there are 6 subdomains of the DSS Domain which must be filled in all with tiered level achievements or must meet the minimum level first before continuing the next level assessment. In conducting verification, direct checking of the results of the questionnaire that has been filled in is carried out and if there are errors, improvements are made with the consent of the respondent.

## 2.4 Data Analysis and Recommendations

2.4.1 *Capability Level Analysis:* Capability Level analysis is carried out to determine the actual condition of the organization's capability level, this analysis is carried out based on the answers to the questionnaires that have been filled out by respondents. For each DSS subdomain, the data will be used to generate a capability level value. The next step is to evaluate the value of the capability level to



measure the level of capability of information technology governance in boarding schools.

2.4.2 *GAP Analysis:* GAP Analysis is carried out to determine the comparison of the current level of capability with the desired capability of the organization, this analysis uses the results of the Capability Level Value of the DSS Subdomain in the COBIT 5 Questionnaire that has been filled in by Respondents. This gap analysis aims to provide recommendations by considering the capabilities of the organization and the existing infrastructure.

2.4.3 *Developing Recommendations:* Recommendations from the results of this study are prepared based on the calculation of Capability Level analysis and GAP Analysis. The results of these two analyses will help identify the target level that the organization wants to achieve and provide recommendations for improvements to improve the quality of information technology governance in accordance with the expected targets.

### 3 RESULT AND DISCUSSION

#### 3.1 Results of Data Collection

The results of Data Collection obtained by the author in the form of research sample results can be seen in Table 6.

Table 6. Research Sample Results

District/City	Total Boarding School	Sample Plan	Sampel Valid	Sampel Invalid
Yogyakarta	36	10	8	2
Sleman	166	23	15	8
Bantul	108	9	8	1
Kulon Progo	66	9	6	3
Gunung Kidul	41	7	5	2
<b>Quantity</b>	<b>417</b>	<b>58</b>	<b>42</b>	<b>16</b>

In Table 6, the results of the research sample show that the planned number of samples has been met and obtained a valid sample of 42 Islamic boarding schools with the distribution of each sample in each district/ city that varies. Of the 58 Research Permits that the author distributed, the results were obtained with details of Yogyakarta City: Letters of Permission distributed 10 get 8 Valid Samples and 2 Invalid Samples. Sleman Regency: Permission Letters distributed 23 get 15 Valid Samples and 8 Invalid Samples. Bantul Regency: Permission Letters distributed 9 get 8 Valid Samples and 1 Invalid Sample. Kulon Progo Regency: Permission Letters distributed 9 get 6 Valid Samples and 3 Invalid Samples. Gunung Kidul Regency: Permission Letters distributed 7 get Valid Samples 5 and Invalid Samples 2.

Based on the data in Table 6, the number of samples obtained is 42 Islamic boarding schools as a valid sample from a total population of 417 Islamic boarding schools and an invalid sample of 16 Islamic boarding schools that did not give approval to conduct research, so the author concludes that the valid sample obtained has met the minimum justification requirements for the research sample, which is 10% of the population and has met the distribution of samples from each district/ city in the SR of Yogyakarta Province so that it can represent research with a population of one province and the sample can represent the population so as to produce quality and accurate research.

#### 3.2 Capability Level Analysis

Capability Level analysis is carried out to determine the actual condition of the organization's capability level, this analysis is carried out based on the answers to the questionnaires that have been filled out by respondents in each DSS subdomain. The questionnaire data that has been obtained is recapitulated in each domain so that the capability value obtained by the boarding school can be known, starting from the lowest value, average value and highest value. The Capability Level Analysis is explained as follows:

3.2.1 *DSS01:* Domain DSS01 is focused on coordinating the implementation of operational procedure activities required to provide information technology services to internal and external clients, including the implementation of predetermined SOPs and required monitoring activities. Based on the questionnaires that have been filled in by respondents, the authors recapitulate the Capability Level Values in the DSS01 Domain with various achievement results according to the conditions in the field between the lowest Level 1 to the highest at Level 4 and none meet Level 5. Recapitulation of DSS01 Capability Level Values The author classifies and percentages the number of Islamic boarding schools based on the Capability Level Values obtained in the DSS01 Domain as shown in Table 7.

Table 7. Capability Level DSS01

Capability Level DSS01	Total	%
Level 1	8	19
Level 2	22	52
Level 3	8	19
Level 4	4	10
Level 5	0	0

Table 7 shows the capability level values obtained from 42 research respondents. From the classification and percentage, the capability level value is still low, this is evidenced by the Average Capability Level Value which is still at Level 2.

3.2.2 *DSS02:* DSS02 deals with responding to user requests in a timely and efficient manner, resolving all types of incidents, repairing or restoring services, documenting and resolving user requests, and investigating, diagnosing, escalating and resolving incidents. The Capability Level value in Domain DSS02 is recapitulated with the results of the achievement between the lowest Level, namely Level 1 to the highest Level, namely Level 4 based on the questionnaire that has been filled out by the respondent. The data recapitulation classifies and percentages the number of boarding schools obtained as shown in Table 8.

Table 8. Capability Level DSS02

Capability Level DSS02	Total	%
Level 1	15	36
Level 2	19	45
Level 3	7	17
Level 4	1	2
Level 5	0	0



The Capability Level value shown in Table 8 is a percentage graph of the results of filling out the DSS02 Domain questionnaire from 42 research respondents. In accordance with the Classification and percentage of Capability Level Value Domain DSS02 at Islamic Boarding Schools in the SR of Yogyakarta is still low, this is evidenced by the Average Capability Level Value obtained is still at Level 2.

3.2.3 *DSS03*: DSS03 is focused on finding and categorizing sources of problems, offering appropriate solutions to stop recurring problems, and making suggestions for improvement. Based on the questionnaires that have been filled in by respondents, the authors recapitulate the Capability Level Value in the DSS03 Domain with various achievement results according to the conditions in the field between Level 1 to Level 4 and none have met Level 5. Recapitulation of DSS03 Capability Level Values The author classifies and percentages the number of Islamic boarding schools based on the Capability Level Values obtained in the DSS03 Domain as shown in Table 9.

Table 9. Capability Level DSS03

Capability Level DSS03	Total	%
Level 1	12	29
Level 2	19	45
Level 3	9	21
Level 4	2	5
Level 5	0	0

Table 9 shows the Capability Level values obtained from 42 research respondents. From the classification and percentage of Capability Level Value Domain DSS03 at Boarding Schools in the SR of Yogyakarta is still low, this is evidenced by the Average Capability Level Value which is still at Level 2.

3.2.4 *DSS04*: DSS04 is focused on creating and maintaining a plan that allows business and IT to handle incidents and disruptions to IT services while maintaining the availability of information for the company. The Capability Level value in the DSS04 Domain is recapitulated with the results of the achievement between the lowest Level, namely Level 1 to the highest Level, namely Level 4 based on the questionnaire that has been filled out by the respondent. The data recapitulation classifies and percentages the number of boarding schools based on the Capability Level Value obtained in the DSS04 Domain as shown in Table 10.

Table 10. Capability Level DSS04

Capability Level DSS04	Total	%
Level 1	19	45
Level 2	14	33
Level 3	8	19
Level 4	1	3
Level 5	0	0

The Capability Level value shown in Table 10 is a percentage graph of the results of filling out the DSS04 Domain questionnaire from 42 research respondents. In accordance with the Classification and percentage of the Capability Level Value of Domain DSS04 at Boarding Schools in the Special Region of Yogyakarta is still very low, this is evidenced by the Average Capability Level Value obtained in this study is still at Level 1.

3.2.5 *DSS05*: DSS05 ensures that company information is safeguarded, creates and maintains access rights and roles for information security, conducts information security monitoring and manages the company's information security risk level in accordance with company security policies. Based on the questionnaires that have been filled in by respondents, the authors recapitulate the Capability Level Value at Domain DSS05 with various achievement results according to conditions in the field between Level 1 to Level 4 and none have met Level 5. Recapitulation of DSS05 Capability Level Values The author classifies and percentages the number of Islamic boarding schools based on the Capability Level Values obtained in the DSS05 Domain as shown in Table 11.

Table 11 Capability Level DSS05

Capability Level DSS05	Total	%
Level 1	17	40
Level 2	15	36
Level 3	7	17
Level 4	3	7
Level 5	0	0

Table 11 shows the capability level values obtained from 42 research respondents. The classification and percentage of the DSS05 capability level value it is still very low, this is evidenced by the Average Capability Level Value which is still at Level 1.

3.2.6 *DSS06*: DSS06 ensures that business processes are properly maintained so that relevant information can be processed under relevant information control parameters. The Capability Level value in the DSS06 Domain is recapitulated with the results of achieving the Capability Level value between the lowest Level, namely Level 1 to the highest Level, namely Level 4 based on the questionnaire that has been filled out by the respondent. The data recapitulation classifies and percentages the number of boarding schools based on the DSS06 Domain Capability Level Value obtained as shown in Table 12.

Table 12. Capability Level DSS06

Capability Level DSS06	Total	%
Level 1	23	55
Level 2	13	31
Level 3	6	14
Level 4	0	0
Level 5	0	0



The Capability Level value shown in Table 12 which shows a percentage graph of the results of filling out questionnaires from 42 research respondents in the DSS06 Domain. In accordance with the Classification and percentage of Capability Level Value of Domain DSS06 at Boarding Schools in the SR of Yogyakarta is still very low, this is evidenced by the Average Capability Level Value obtained by boarding schools in this study is still at Level 1.

3.2.7 *Results of Capability Level Calculation Recapitulation:* To find out the results of the Evaluation of Information Technology Governance at Islamic Boarding Schools in the SR of Yogyakarta using the COBIT 5 Framework in the DSS Domain, the author recapitulates the Capability Level Calculation in the DSS Domain. The results of the Capability Level Calculation Recapitulation represent the current governance conditions in the Yogyakarta SR Islamic Boarding Schools. The author categorizes the Boarding School based on the Capability Level Value achieved in the DSS Domain, as illustrated in Fig. 2 Capability Level Calculation Recapitulation Results.

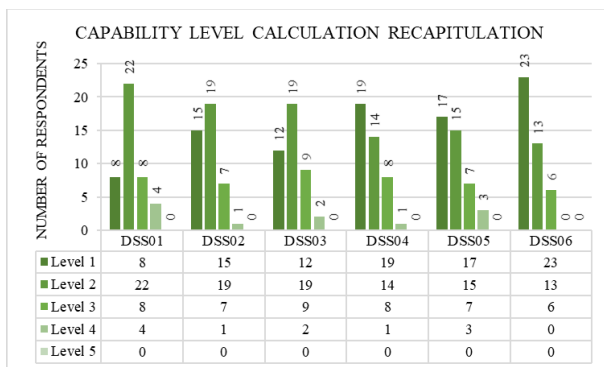


Figure 2. Capability level calculation recapitulation

In Fig. 2 recapitulation on the DSS Domain obtained from 42 research respondents, the analysis conducted by the author gets the following results on DSS01, DSS02 and DSS03 The lowest Capability Level value at Level 1, the highest at level 4 and the average at level 2. At DSS04 and DSS05 the lowest Capability Level value at Level 1, the highest at level 4 and the average at level 1. In DSS06 the lowest Capability Level value is at Level 1, the highest is at level 3 and the average is at level 1. Overall the Capability Level Value in the DSS Domain is still low, this is evidenced by the Average Capability Level Value obtained is still at Level 2 and level 1.

### 3.3 GAP Analysis

GAP Analysis is carried out to determine the comparison of the current level of capability with the desired capability of the organization, this analysis uses the results of the Capability Level Value of the DSS Subdomain in the COBIT 5 Questionnaire that has been filled in by Respondents. This gap analysis is carried out by measuring the Target Level or the expected Level minus the Capability Level Value that has been obtained or referred to as the Existing Level so as to

produce a GAP Value. The explanation of GAP Analysis in the DSS Domain is as follows:

3.3.1 *DSS01:* In Domain DSS01, the Capability Level value that has been obtained from 42 respondents is referred to as the Existing Level (EL) value which will be measured against the Target Level value so as to get the GAP value. The author sets the Target Level value at Level 5 because this level is close to the highest level obtained by the Islamic Boarding School, namely Level 4 and Level 5 is the ideal value to show good Information Technology Governance. Recapitulation done by the author on DSS01 as shown in Fig. 3.

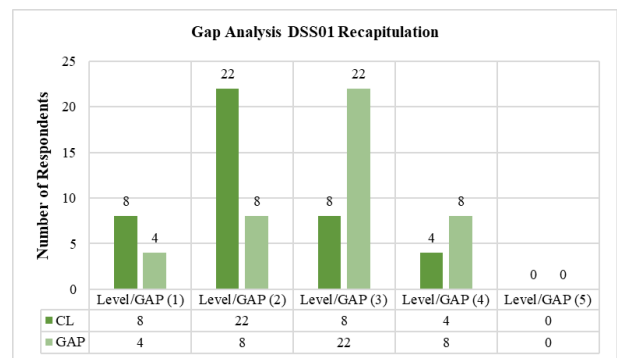


Figure 3. Gap analysis DSS01 recapitulation

Based on Fig. 3, the GAP value on DSS01 that has been carried out, the recapitulation gets the lowest GAP result of 1, the average of 3 and the highest of 4 with details of GAP Value 1 of 4 boarding schools because the 4 boarding schools get the Capability Level Value at level 4. GAP 2 value is 8 boarding schools because 8 boarding schools get Capability Level Value at level 3. GAP 3 value is 22 boarding schools because 22 boarding schools get the Capability Level Value at level 2. GAP 4 value is 8 boarding schools because 8 boarding schools get the Capability Level Value at level 1. GAP 5 value is 0 boarding schools because none of the boarding schools get the Capability Level Value at level 0.

3.3.2 *DSS02:* The capability level value from research on 42 boarding schools is known as the EL value in Domain DSS02, this value will be compared with the Target Level (TL) value or the expected level to produce a GAP value. The level that has been achieved by the Islamic Boarding School is currently Level 4 which is close to the highest level, namely Level 5 which is the optimum value to demonstrate effective information technology governance. Therefore, the authors set the TL value at Level 5. The EL value, TL value, and GAP value are recapitulated by the author on DSS02 as shown in Fig. 4.



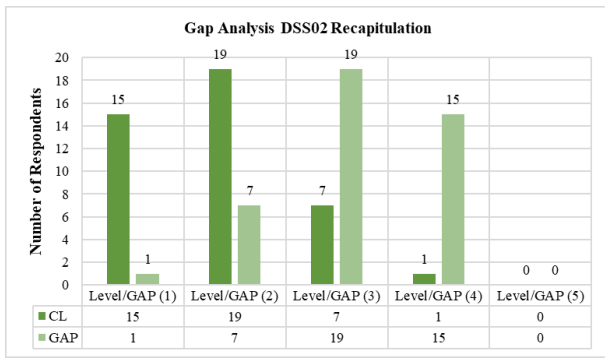


Figure 4 Gap Analysis DSS02 Recapitulation

The GAP value on DSS02 as shown in Fig. 4 After recapitulation, the GAP value on DSS02 yields a variety of outcomes. The boarding schools has a GAP value of 1 since it receives a Capability Level value at level 4, which is the lowest GAP value, the average GAP value is 3, and the greatest GAP value is 4. Because they receive a Capability Level rating at level 3, 7 boarding schools have a GAP value of 2. Due to the fact that they receive a Capability Level value at level 2, 19 boarding schools have a GAP value of 3. Due to the fact that 15 boarding schools receive a Capability Level rating at level 1, they have a GAP value of 4. While every boarding schools has gotten a Capability Level value between level 1 and level 4, there are no boarding schools that receive a GAP 5 value.

3.3.3 *DSS03*: In Domain DSS03, the Capability Level value that has been obtained from the research of 42 boarding schools is referred to as the EL value which will be measured by the Target Level value or the expected level so as to get the GAP value. The author sets the Target Level Value at Level 5 because the level is close to the highest level obtained by the Boarding School, namely Level 4 and Level 5 is the ideal value to show good Information Technology Governance. The recapitulation carried out by the author on DSS03 includes the EL Value, Target Level Value and GAP Value as shown in Fig. 5.

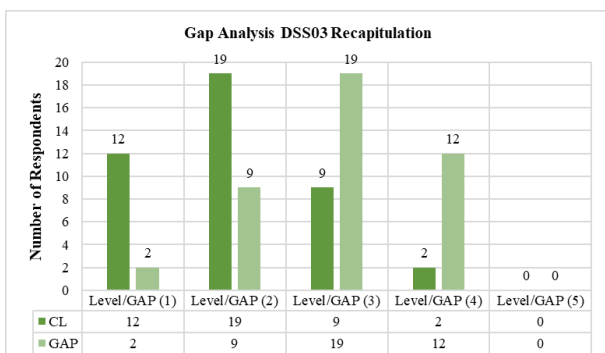


Figure 5. Gap analysis DSS03 recapitulation

Based on Fig. 5, the GAP value on DSS03 that has been carried out, the recapitulation gets the lowest GAP result of 1, the average of 3 and the highest of 4 with details of GAP Value 1 of 2 Lodges for getting Capability Level Value at level 4. GAP 2

value is 9 boarding schools because they get the Capability Level Value at level 3. GAP Value 3 a total of 19 huts because they get the Capability Level Value at level 2. GAP Value 4 a total of 12 huts because they get the Capability Level Value at level 1. GAP Value 5 a total of 0 huts because none of the huts get the Capability Level Value at level 0.

3.3.4 *DSS04*: The capability level value of this research on 42 boarding schools is known as the EL value in Domain DSS04 Manage Continuity, this value will be compared with the TL value or the expected level to produce a GAP value. The level that has been achieved by the Islamic Boarding School is currently Level 4 which is close to the highest level, namely Level 5 which is the optimum value to show effective information technology governance. Therefore, the authors set the TL value at Level 5. The EL value, TL value, and GAP value are recapitulated by the author on DSS04 as shown in Fig. 6.

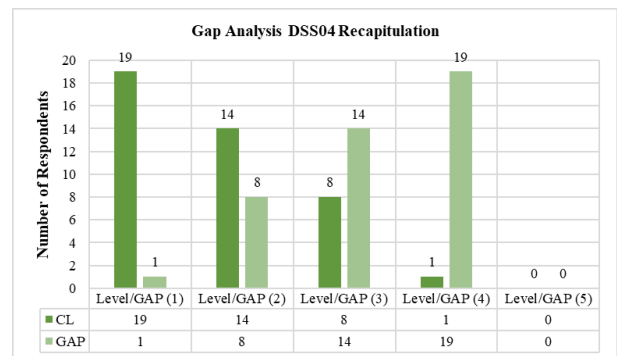


Figure 6 Gap Analysis DSS04 Recapitulation

The GAP value on DSS04 as shown in Fig. 6 following recapitulation yields different outcomes The boarding schools has a GAP value of 1 since it receives a Capability Level value at level 4, which is the lowest GAP value, the average GAP value, and the greatest GAP value with a description of 1. Due to the fact that they receive a Capability Level value at level 3, 8 boarding schools have a GAP value of 2. Due to the fact that 14 boarding schools receive a Capability Level value at level 2, they have a GAP value of 3. Due to the fact that 19 boarding schools receive a Capability Level rating at level 1, they have a GAP value of 4. While every boarding schools has gotten a Capability Level value between level 1 and level 4, there are no boarding schools that receive a GAP 5 value.

3.3.5 *DSS05*: In Domain DSS05, the Capability Level value that has been obtained from the research of 42 boarding schools is referred to as the EL value which will be measured against the Target Level value or the expected level so as to get the GAP value. The author sets the Target Level Value at Level 5 because the level is close to the highest level obtained by the Islamic Boarding School, namely Level 4 and Level 5 is the ideal value to show good Information Technology Governance. The





recapitulation carried out by the author on DSS05 includes the EL Value, Target Level Value and GAP Value as shown in Fig. 7.

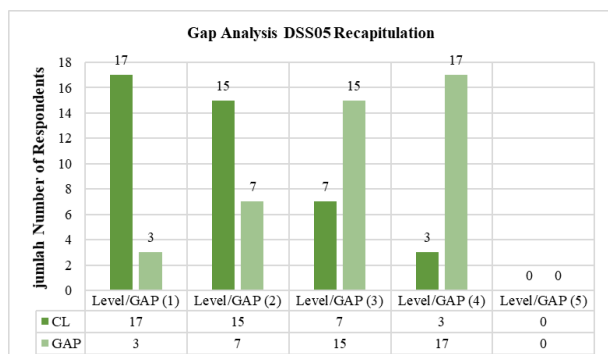


Figure 7. Gap analysis DSS05 recapitulation

Based on Fig. 7 gap value on DSS05 which has been done Recapitulation gets various GAP results with the lowest 1, average 4 and highest 4 with details of GAP Value 1 a total of 3 boarding schools because the 3 boarding schools get Capability Level Value at level 4. GAP 2 value is 7 boarding schools because 7 boarding schools get Capability Level Value at level 3. GAP 3 value is 15 boarding schools because 15 boarding schools get the Capability Level Value at level 2. GAP 4 value is 17 boarding schools because 17 boarding schools get the Capability Level Value at level 1. GAP 5 value is 0 boarding schools because none of the boarding schools get the Capability Level Value at level 0.

3.3.6 *DSS06*: The capability level value of the research on 42 boarding schools is known as the EL value in Domain DSS06 Manage Business Process Controls, this value will be compared with the TL value or the expected level to produce a GAP value. The level that has been achieved by the Islamic Boarding School is currently Level 3 which is close to the highest level, namely Level 5 which is the optimum value to demonstrate effective information technology governance. Therefore, the authors set the TL value at Level 5. The EL value, TL value, and GAP value are recapitulated by the author on DSS06 as shown in Fig. 8.

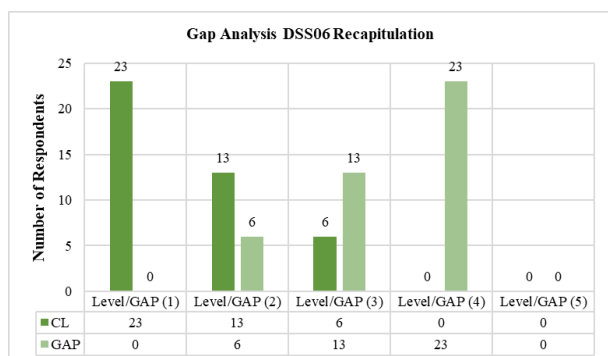


Figure 8. Gap analysis DSS06 recapitulation

The GAP value on DSS06 as shown in Fig. 8 after recapitulation produces various results The lowest

GAP value is 2, the average is 4 and the highest is 4 with a description No boarding school has a GAP value of 1 because no one gets a Capability Level value at level 4. 6 boarding schools have a GAP value of 2 because they get a Capability Level value at level 3. 13 boarding schools have a GAP value of 3 because they get a Capability Level value at level 2. 23 boarding schools have a GAP value of 4 because they get a Capability Level value at level 1. There are no boarding schools that get a GAP 5 value because all boarding schools have received a Capability Level value at level 1 - 3.

### 3.4 Recommendation

The recommendation of this research based on Capability Level Analysis and Gap Analysis is that the results of Achieving Capability Level Value must be increased so that Gap Analysis can decrease and be at the Optimal Value, namely Level 5. The overall recapitulation of Capability Level Value and Gap Analysis can be seen in Table 13.

Table 13 Recapitulation of Capability Level and GAP Values

Domain DSS	Capability Level Score			GAP Value		
	Lowest	Average	Highest	Lowest	Average	Highest
DSS01	1	2	4	1	3	4
DSS02	1	2	4	1	3	4
DSS03	1	2	4	1	3	4
DSS04	1	1	4	1	4	4
DSS05	1	1	4	1	4	4
DSS06	1	1	3	2	4	4

The boarding school must increase the Capability Level Value from the lowest currently obtained level at level 1 to level 5 by meeting the requirements needed at Level 2 Process PA 2.1 Performance Management and PA 2.2 Work Product Management, at Level 3 Process PA 3.1 Process Definition and PA 3.2 Process Deployment, at Level 4 Process PA 4.1 Process Measurement and PA 4.2 Process Control, at Level 5 Process PA 5.1 Process innovation and PA 5.2 Process optimization. Islamic boarding schools can improve information technology governance by fulfilling the processes at each level. Increasing the current capability level value to the target level in information technology governance can be done by creating a SOP and implementing it by running information technology services in accordance with the principles of IT Governance. Add IT resources and provide training to improve the IT Team's ability to manage IT.

The results of this study can be used as a guideline for Islamic Boarding Schools in making policies and applying them to Information Technology Governance to comply with Good Corporate Governance. The results of this study are also as Suggestions and Input for Leaders and Policy Makers in Government Agencies as Recommendations in making policies and the necessary standardization of Information Technology Governance in Islamic Boarding Schools.

## 4 CONCLUSION

The results of this study are Information Technology Governance using the COBIT 5 Framework at Islamic Boarding Schools in the Special Region of Yogyakarta is still



at low status and needs to be improved, as evidenced by the low Capability Level Value and high GAP Value.

The results of the Capability Level Analysis in the COBIT 5 DSS Domain obtained from 42 Islamic Boarding Schools show that in Domain DSS01, DSS02, DSS03 the lowest is at Level 1, the highest is at level 4 and the average is at level 2, in DSS04 and DSS05 the lowest is at Level 1, the highest is at level 4 and the average is at level 1, in DSS06 the lowest is at Level 1, the highest is at level 3 and the average is at level 1. Overall the Capability Level Value in the DSS Domain is still low, this is evidenced by the Average Capability Level Value obtained which is still at Level 2 and level 1.

The results of GAP Analysis in the COBIT 5 DSS Domain obtained from 42 Islamic boarding schools get results in DSS01, DSS02, DSS03 lowest GAP 1, highest 4 and average 3, in DSS04 and DSS05 lowest GAP 1, highest 4 and average 4, in DSS06 lowest GAP 2, highest 4 and average 4. Overall the GAP Value in the DSS Domain is still very high, this is evidenced by the high average GAP Value obtained by the boarding school, namely 3 and 4.

The recommendation given is to increase the Capability Level Value obtained at the lowest level 1 to the optimal level, namely level 5 by fulfilling the requirements needed and fulfilling the processes at each level, with the fulfillment of the optimal level, the Gap Value will decrease. In its implementation, the boarding school can make a SOP for IT Governance and implement it by running good information technology services in accordance with IT Governance and improving existing IT resources by providing regular training in order to improve the ability of the IT Team to manage Information Technology. Policies from the Government are needed regarding the standardization of information technology governance in Islamic Boarding Schools so that information technology governance runs effectively and efficiently.

#### AUTHOR'S CONTRIBUTION

M. S. A. K. Mardlian is the first author conducting literature review of the previous research, data collection, analysis, recommendations and implementation, while Muhammad Taufiq Nuruzzaman is the second author He advises and manages the concept of the research. Last, the research got theoretically supervision from the third and fourth author with Shofwatul 'Uyun and Bambag Sugiantoro.

#### COMPETING INTERESTS

In accordance with the journal's publication ethics, M. S. A. K. Mardlian, Muhammad Taufiq Nuruzzaman, Shofwatul 'Uyun and Bambag Sugiantoro, the article's authors, declare that there are no competing or conflicting interests in their work (CI).

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