Risk Management Analysis of Student Activity System Services using COBIT 5 Framework

Mega Oktaviani Fadillah
Department of Information System
UniversitasAhmad Dahlan
Yogyakarta of Indonesia

Imam Riadi
Department of Information System
UniversitasAhmad Dahlan
Yogyakarta of Indonesia

ABSTRACT
The development of Information Technology (IT) plays an important role in the company's operations and business processes. IT has an important role in the continuity of business operations and contributes significantly to various fundamental changes to the organization's structure, operations, and management. Ahmad Dahlan University Yogyakarta is a university in Indonesia that has implemented an information system for services. The Student Activity Information System (SKK) is one of the information systems that has long been implemented by BIMAWA (Student and Alumni Bureau) to provide services for students who will take care of SKPI (Certificate of Diploma Companion). In its business processes, this service still has various risks from information system infrastructure, even from humans and nature. The COBIT 5 framework with the APO12 (Manage Risk) domain was used in this study to analyze risk management on such services. There are three stages of analysis in the research conducted, namely Current Capability Level analysis, Expected Capability Level analysis, and GAP analysis. The Capability Level assessment is carried out by collecting data using observation methods, interviews in person, and questionnaires that will be calculated using the Guttman Scale. The results showed that the Current Capability Level value for the APO12 (Manage Risk) domain was 2.60, which means that the risk management of SKK Services is at level 2 (Managed Process). The Expected Capability Level targeted by BIMAWA is at level 3, so the gap value obtained is 0.40.Recommendations are given to be used as guidelines in implementing SKK Services in BIMAWA.

Keywords
Information Systems Services, Risk Management, COBIT 5, APO12, Capability Level, Guttman Scale

1. INTRODUCTION
The rapid development of Information Technology (IT) requires companies or colleges to manage the potential of existing resources by applying IT to face competition [1]. IT applications have been leveraged to get a job done effectively and efficiently [2]. IT plays an important role in the company's operations and business processes so IT elements and components must be integrated [3]. Higher education is one of the educational institutions that has utilized many Information Systems (IS) to provide services [4]. BIMAWA (Student and Alumni Bureau) is one of the bureaus at Ahmad Dahlan University Yogyakarta that has implemented an information system for services. SKK (Student Activity Information System) is a system built to optimize the service of SKPI (Certificate of Companion Diploma). The application of an information system service has problems that can affectperformance, both in terms of service and in terms of usage [5]. Many problems occur starting from frequent damage to incoming data, system users who do not understand how to operate the system, frequent server downs, and bugs in the system. The effectiveness and flexibility of services are compromised because of the risk of existing problems.Therefore, an information technology system requires an analysis, where the analysis will later provide solutions for improving information technology services to reduce or minimize the risk of losses that can occur. An agency requires a risk assessment to be able to map the quality of the positive and negative risks that will be generated so that can provide solutions related to the potential risks that will arise [6]. The framework that will provide a solution regarding the potential that will emerge, of course, with an evaluation of risk management is COBIT 5 [7]. The COBIT 5 framework allows IT to be thoroughly organized and managed as covers the entire business scope and functional areas of IT taking into account the interests of related internal and external stakeholders. The process domain that focuses on managing risk well is APO12 (Manage Risk) which discusses how to evaluate the risk management process that has been determined by the organization [8].

2. LITERATURE STUDIES

2.1 Study of Previous Theories
This study used five previous research objectives. First, research was conducted by Putri in 2019 with the title "Evaluation of Information Technology Risk Maturity Using the COBIT 5 Model Assessment Process (Case Study of PT. XYZ Australia)" [9].Third, research was conducted by Zakkadiaksa in 2020 with the title "Evaluation of Information Technology Risk Management Using COBIT 5 with domains EDM03 and APO12 (case study on UPT-ICT UniversitasBrawijaya)" [10].Fourth,research was conducted by Butar in 2021 with the title "Risk Management Analysis Using COBIT 5 Domain APO12 (Case Study: YayasanBinaDarma)" [11].Fifth,research was conducted by Indriyanto in 2021 with the title "Risk Assessment Analysis on Stock System Services Using THE COBIT 5 Framework" [12].

2.2 Analysis
The analysis is a series of objective and systematic activities by applying a methodology that divides the whole component into sub-components to study, decipher, detail, and solve an objective [4].In general, the notion of analysis is an activity that consists of a series of activities according to certain criteria and then searching for their relationship, and then interpreting their meaning.

2.3 Information Technology

Information Technology (IT) is the use of technology used to manage data which includes processing, obtaining, compiling, storing, and manipulating data to produce relevant, accurate, and timely information for personal, business, and government purposes [13].

2.4 Risk

Risk is defined as the possibility of a threat and vulnerability that could harm the company [14]. The emergence of risks that always exist makes risk management the right course of action to minimize potential losses that occur [15].

2.5 Risk Management

Risk management in the book The Basics of IT Audit [16] means the process of controlling potential loss, damage, and unwanted results, as well as discussing goals, strategies, and operations for the organization or company. According to Setiyaningrum [2], the control and measurement of risk managementare carried out by all parties by determining which risks need attention.

2.6 IT Risk Management

IT risk management is a collection of processes consisting of identifying, assessing, and developing IT risk prevention plans that have the potential to cause losses to the organization [17].According to Gibson, IT risk management has several elements, namely assessing or analyzing risks, identifying risks to be mitigated that are based on the likelihood and impact of the risk that occur, and choosing methods to control risks that are focused on reducing vulnerabilities and emerging impacts.

2.7 COBIT 5

Control Objectives for Information and Related Technology (COBIT 5) is a framework to support activity processes that focus on the strategic value of information technology implementation (IT strategic value) and determine IT implementation [18]. Simply put, COBIT 5 helps companies create optimal value from IT by maintaining a balance between realizing benefits, optimizing risk levels, and using existing resources [19].

2.7.1 Basic Principles of COBIT 5

The COBIT 5 framework has several basic principles. The basic principle consists of 5 principles, which can be seen in Figure 1.

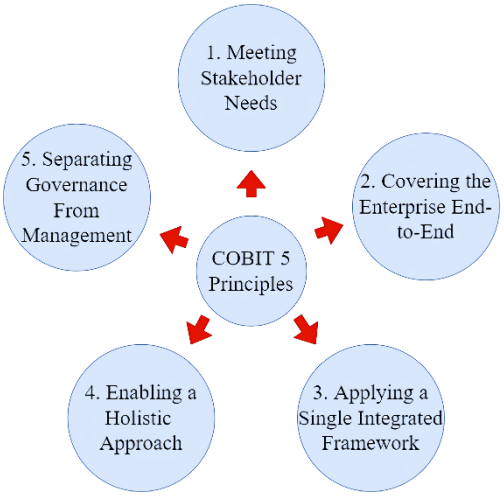

Figure1. The Five Principles of COBIT 5

Based on Figur 1, the COBIT 5 framework has 5 (five) main principles that must be carried out [19], namely:

1. Meeting stakeholder's needs
   Enterprises exist to create value for their stakeholders by maintaining a balance between the realisation of benefits and the optimisation of risk and use of resources.
2. Covering the enterprise end-to-end
   Integrating IT governance with enterprise governance includes all functions and processes needed to regulate and manage company IT wherever information is processed both internally and externally.
3. Applying a single integrated framework
   COBIT 5 aligns with other relevant standards and frameworks as a general governance framework and integrator previously spread across various frameworks such as COBIT, Val IT, Risk IT, BMIS, ITAF, and others.
4. Enabling a holistic approach
   COBIT 5 defines a set of enablers that influence each other in support of the implementation of a comprehensive governance and management system for an organization's IT.
5. Separating governance from management
   COBIT 5 is a framework that makes a clear distinction between governance and management. These differences include aspects of activity, organizational structure, and organizational goals.

2.7.2 Enabler COBIT 5

COBIT is a comprehensively structured framework to help companies create optimal value from IT. COBIT 5 requires enablers to be able to carry out their functions correctly. ISACA [19]describes enablers as factors that influence something that an organization does (in this case corporate IT governance and management).

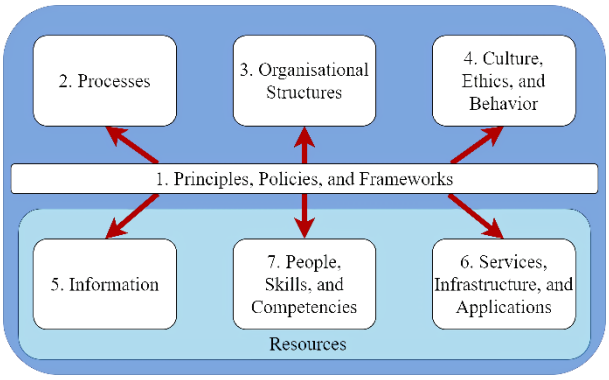

Figure2. Seven Enabler COBIT 5

Based on Figur 2, there are 7 (seven) categories of enablers (supporters) in COBIT 5, namely as follows:

1. Principles, Policies, and Frameworks is a means to translate the desired process into a guideline of day-to-day management practice.
2. Processesprovide details of activities and activities carried out to achieve predetermined company goals.
3. Organisational Structures is a key decision-making entity in a company.
4. Culture, Ethics, and Behavioris a factor that determines the success of a company in governance and management activities.
5. Informationis a necessity to ensure an organization can run and be managed properly.

6. Services, Infrastructure, and Applications involve infrastructure, technology, and applications that provide IT processes and services to organizations.
7. People, Skills, and Competenciesare needed to fulfill all activities and make the right decisions with the right steps.

2.7.3 Implementasi COBIT 5

The COBIT 5 framework has seven stages implementation.Here is an explanation for each implementation cycle on COBIT 5 [20]:

1. Phase1 – Initiate Programme
   Identifying drivers in the organization as well as identifying the drivers of current change and what should change. The purpose of this stage is to obtain information and understanding related to the organization consisting of goals, tasks, authorities, the concept of organizational programs, and the current approach to managing the organization.
2. Phase 2 – Define Problems and Opportunities
   Defining the scope of implementation or improvement initiatives using COBIT mapping of IT objectives and processes to help with selection. The goal of this stage is to align IT goals with the organization's strategy and risks, as well as prioritize the organization's most important goals.
3. Phase 3 – Define Road Map
   Determining targets for improvement followed by a gap analysis to identify potential solutions. The purpose of this stage is to set capability targets for the selected process.
4. Phase 4 – Plan Programme
   Plan practical solutions that are feasible to implement with a justifiable business case, and develop an implementation change plan. The purpose of this stage is to provide an opportunity to improve the performance of the selected process so that reaches the target.
5. Phase 5 – Execute Plan
   Implement the proposed solutions into the practice of daily activities and carry out monitoring to ensure the alignment that has been achieved with work measurements.
6. Phase 6 – Release Benefits
   Have a focus has ongoing activities of improved governance and management practices.
7. Phase 7 – Review Effectiveness
   Evaluate any achievements of the initiative as a whole, identify further governance or management needs, and strengthen the needs ongoing.

2.7.4 RACI Chart

RACI Chart is the entirety of decision-supporting activities or authorizations that must be taken within an organization by looking at all parties or positions involved [14]. The following are the roles of the RACI Chart, among others:

1. R-esponsible (Who is getting the task done?), the person acting as the executor of the duties.
2. A-ccountable (Who accounts for the success of the task?), the person in charge acts as the person in charge of a task and has the authority as a decision-maker.
3. C–onsulted (Who is providing input?), consult with people who play a role in providing direction, advice, and contributions when necessary.
4. I–nformed (Who is receiving information?), is the party necessary to obtain information related to the implementation and achievement of existing activities.

2.7.5 Capability Level

Capability is the ability of a process to achieve current and future business goals. Capability Levels have six levels as can be seen in Table 1 [21].

Table 1.*Capability Level*

Level		Description
0	Incomplete Process	The process is not implemented or fails to achieve the process goal.
1	Performed Process	The implemented process has achieved the purpose of process.
2	Managed Process	The process has been implemented with good management (planned, monitored, and organized) and the work product has been available, controlled, and maintained.
3	Established Process	The managed process is implemented with a defined process that can achieve the expected results.
4	Predictable Process	The process that has been running is operated with defined limits to achieve the expected.
5	Optimizing Process	Predicted processes are continuously enhanced to meet current business goals and relevant future business goals.

The grading scale used in measurements at each level is later used to meet the values at each point as shown in Table 2:

Table2. Assessment Scale

Code		Description	Range
N	Not achieved	There is no or little evidence of the achievement of process attributes.	0 - 15%
P	Partially achieved	There is some evidence regarding the approach and some achievement of attributes for the process.	>15 – 50%
L	Largely achieved	There is evidence of a systematic approach, and significant achievements in the process, although there may still be insignificant drawbacks.	>50 – 85%
F	Fully achieved	There is evidence of a systematic and complete approach and the full achievement of the process attributes.	>85 – 100%

2.8 Guttman scale

The Guttman scale was used in this study to calculate data from answers that had been given by respondents. The Guttman scale provides concise and robust responses to respondents' responses [22]. The calculation of the weight of the questionnaire value, if the value is [Y] then according to the Guttman Scale is worth 1, while if the value of [T] is worth 0. Calculations are managed based on respondents' answers in each domain [23].

3. METHODOLOGY

3.1 Research Stage

The research stage is the process of acquiring or gaining knowledge to solve problems systematically and logically [24]. The following are the stages of the study as shown in Figure 3:

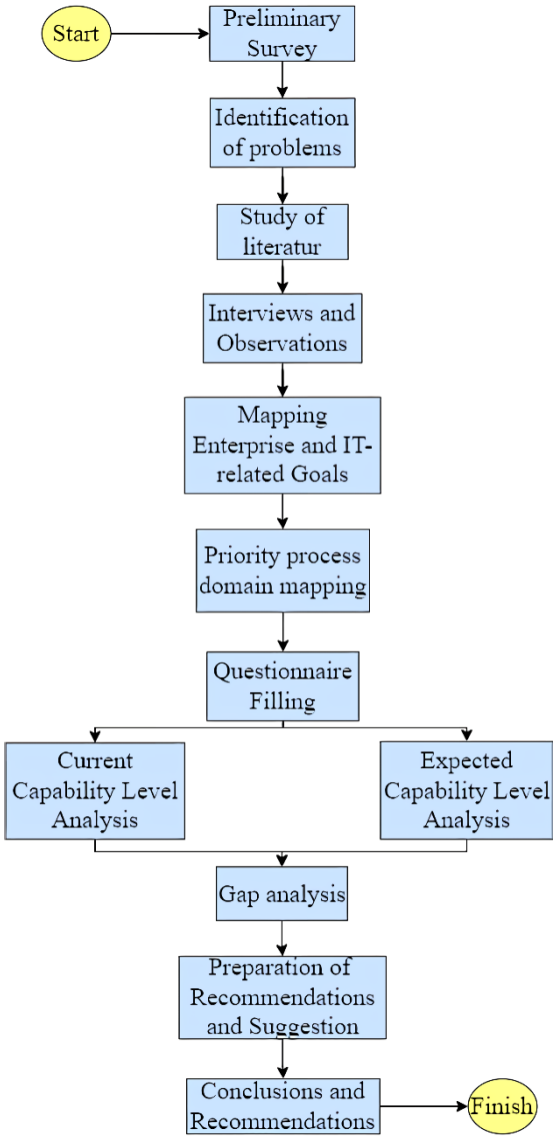

Figure 3. Stages of Research

Based on Figure 3, there are 9 (nine) stages of research conducted, namely:

1. The first stage is to conduct a preliminary survey. The purpose of this stage is to understand and know about the general description of BIMAWA, for example, such as the duties of BIMAWA, organization structure, and services provided.
2. Problem identification serves to get the problems faced by conducting Field Studies to find out directly the problems that are happening, as well as Literature Studies that are carried out by collecting information from various relevant sources as basic research on the problems that are happening.
3. Conducting data collection using observation, interview, and document collection methods to map the COBIT 5 framework.
4. Mapping Enterprise Goals, IT-related Goals, and IT processes. Mapping produces priority process domains that are the focus of research. Filling out the questionnaire, the questionnaire data is then processed to find out the Current Capability Level position.
5. Respondents were determined based on the RACI Chart of the APO12 (Manage Risk) domain.
6. Conducting a Current Capability Level analysis, this stage is carried out to ensure that IT objectives are aligned with the strategy and risks of the organization's strategy risks, as well as prioritizing the organization's most important objectives.
7. Conducting Exected Capability Level analysis, this stage is carried out to set the target of the selected Capability Level.
8. Conducting a gap analysis, this stage is carried out to determine the difference value between the Current Capability Level value and the Exected Capability Level value. Recommendations or suggestions are made based on the results of thegap calculation.
9. The last stage is to conclude the research which contains a summary of the results of the research process that has been carried out and provides suggestions for further research.

3.2 RESULTS AND DISCUSSION

3.2.1 COBIT 5 Mapping

The framework mapping stage is carried out by aligning the goals owned by the organization into Enterprise Goals (EG). Alignment is done by selecting processes that have a strong relationship (Primary /P). The results of the Enterprise Goals alignment can be seen in Table 3.

Table3. Enterprise Goals Alignment

Organizational Objectives	EG Code	EG	BSC Dimensions
Provision of services to meet the target areas of organizations oriented towards student and alumni activities.	06	Customer-oriented service culture	Customer (P)
	07	Business service continuity and availability	Customer (P)

Table 3 shows the goals that organizations have falling into two categories of EG, namely codes 06 and 07. The next stage is aligning Enterprise Goals with IT-related Goals (ITG) with a strong relationship (Primary /P). The alignment results can be seen in Table 4:

Table4. IT-related Goals Alignment

EG Code	EG	ITG Code	ITG
06	Customer-oriented service culture	01	Alignment of IT and business strategy
		07	Delivery of IT services in line with business requirements
07	Business service continuity and	04	Managed IT-related business

	availability		risk
		10	Security of information, processing infrastructure, and applications
		14	Availability of reliable and useful information for decision making

Based on the results of the alignment of EG and ITG in Table 4 and the identification of research problems, the process domainwas chosen for the research is processes domain APO12 (Manage Risks).The APO12 domain has several process subdomains. The following is a table of the APO12 (Manage Risk) process subdomains:

Table5. Subdomain APO12

No	Sub Processes	Description
1.	APO12.01	Collect Data
2.	APO12.02	Analyze Risks
3.	APO12.03	Maintain a Risk Profile
4.	APO12.04	ArticulateRisks
5.	APO12.05	Define a Risk Management ActionPortfolio
6.	APO12.06	Respond to Risks

3.2.2 Determination of Respondents

The determination of prospective respondents is carried out through a description of functions and positions derived from the organizational structure, then adjusted based on the RACI Chart (Responsible, Accountable, Consulted, and Informated) APO12 (Manage Risk) domain. The RACI Chart is used to determine potential respondents who fill out the questionnaire.

RACI Chart identification is taken based on people who directly run the wheels of business, basically the parties involved in SKPI services at BIMAWA UAD have been involved as RACI Chart coverage actors. Both as executors, decision-makers, direction givers, and roles that must understand the decisions taken. RACI Chart of the APO12 (Manage Risk) process domain obtained by 5 respondents, the results can be seen inTable 6:

Table6. Research Respondents

No.	COBIT 5 Unit	Code
1.	Business Process Owners	R1
2.	Project Management Office	R2
3.	Compliance	R2
4.	Business Continuity Manager	R2
5.	Chief Risk Officer	R3
6.	Head Architect	R3
7.	Service Manager	R3
8.	Privacy Officer	R3
9.	Chief Information Security Officer	R4
10.	Audit	R4
11.	Chief Information Officer	R4
12.	Head IT Operations	R4
13.	Head IT Administration	R4
14.	Information Security Manager	R4
15.	Head Development	R5

Based on Table 6, the results of the RACI Chart APO12 (Manage Risk) domain mapping on student activity information system services, 15 work units that have been matched with service work units and produce 5 respondents who will fill out the research questionnaire because several work units are carried out by the same person.

3.2.3 Observations and Interviews

The observation and interview stages are carried out to obtain relevant data related to the research topic. Interviews to obtain valid data so that the results of the study can be maintained to completion [25]. The following are the results of the research interviews conducted:

1. An overview of BIMAWA Universitas Ahmad Dahlan, such as profile, vision, mission, goals, and organizational structure.
2. Services provided by BIMAWA.
3. Applied service rules and policies.
4. Service conditions of the Student Activity Information System.
5. Business process Student Activity Information System Services.
6. Problems that occur in the Student Activity Information System Service.
7. Goals and objectives are possessed by the organization.
8. Risks that interfere with the assets and service activities of the Student Activity Information System.

3.2.4 Current Capability Level

The Current Capability Level is obtained based on the results of the calculation of questionnaire data from each respondent in each subdomain of the APO12 (Manage Risk) process. The data is obtained to produce a Capability Level value in each process subdomain, and finally produce a Current Capability Level value for the APO12 process domain. The Capability Level results in the APO12 subdomain can be seen in Table 7.

Table7. Current Capability Level

No	Sub Processes	*Current Capability Level*
1.	APO12.01	2.57
2.	APO12.02	2.68
3.	APO12.03	2.67
4.	APO12.04	2.69
5.	APO12.05	2.53
6.	APO12.06	2.44
	Average	**2.60**

Based on Table 7, that the current capability level of the APO12 domain (Manage Risk) is 2.60. This result shows that the SKK Service owned by BIMAWA is at level 2 (Managed Process).

3.2.5 Level Completeness

Completeness of levels in the APO12 (Manage Risk) domain aims to find out whether the requirements that must be met for each level are met, by the category provisions of the Capability Level assessment results obtained. Based on the results of the Capability Level in Table 7, the completeness of the attribute level for student activity information system services has reached level 2, so the completion at level 2 must be met.

Level completeness is assessed based on the Rating Scale (NPLF) at each level. The completeness of the level 1 attribute level can be seen in Table 8.

Table8. Process Performance

Results of Work	Description	Information	Proof
APO12.01	IT-related risks are identified, analyzed, managed, and reported	√	Monthly Reports
APO12.02	There is an up-to-date and complete risk profile	√	Monthly Reports
APO12.03	All significant risk management actions are managed and controlled	√	Monthly Reports
APO12.04	Risk management measures are implemented effectively	√	Evaluation Report
APO12.05	Project proposals to reduce risks	√	Evaluation Report
APO12.06	Risk-related event response plan	√	Evaluation Report
		Rating Scale	**100%**

Based on Table 8, PA 1.1 attributes have a 100% Rating Scale. At level 2, the completeness of the level must meet the attributes of PA 2.1 and PA 2.2. The achievement of the APO12 domain process at level 2 of the PA 2.1 attribute can be seen in Table 9.

Table9. Performance Management

No	Description	Information	Proof
1.	Objectives for process performance are identified in risk management	√	Monthly Reports and Evaluation Reports
2.	Process performance is planned and monitored in risk management	√	Monthly Reports and Evaluation Reports
3.	Process performance is adjusted to meet plans in risk management	-	-
4.	The responsibility and authority to carry out the process are defined, assigned, and communicated in the management of risks	√	Employee SOPs
5.	Resources and information necessary to carry out the identification process, are available, allocated,and used in risk management	√	Evaluation Report
6.	The interface of the parties involved is managed to ensure effective communication and clear assignment of responsibilities in risk management	√	Evaluation Report
		Rating Scale	**83.33%**

Based on Table 9, PA attribute 2.1 has 6 criteria that must be met.Fulfillment of this process aims to measure the extent to which the standard process is implemented effectively as a defined process to achieve process outcomes in risk management. Based on Tabel 9, the PA 2.1 Performance Management attribute in SKPI Services at BIMAWA has an average score of 83.33%. The achievement of the APO12 domain process at level 2 of the PA 2.2 attribute can be seen in Table 10.F

Table10. Work Product Management

No	Description	Information	Proof
1.	Requirements for the work product of the process are defined	√	Monthly Reports
2.	Requirements for documentation and control of work products are established	√	Monthly Reports
3.	Work products are identified, documented, and precisely controlled	√	Monthly Reports
4.	Work products are reviewed by the planned regulations and adjusted as necessary to meet risk optimization requirements	√	Monthly Reports and Evaluation Reports
		Rating Scale	**100%**

Based on Table 10, the PA 2.2 Work Product Management attribute in SKK Services at BIMAWA has an average score of 100%. The results of the recapitulation of the APO12 attribute process can be seen in Table 11.

Table11. Recapitulation Results

Domain	*Process Capability Level*					
	0	**1**	**2**	**3**	**4**	**5**
APO12	F	F	F (2.1: L; 2.2: F)			
Ket: N (*Not Achieved*: 0 – 15%), P (*Partially Achieved*: >15 – 50%), L (*Largely Achieved*: >50 – 85%), F (*Full Achieved*: >85 – 100%)						

Based on Table 11, the indicators of achieving the Capability Level process at level 0 and level 1 reach 100% which is included in the Full Achieved category. While at level 2 the results for PA 2.1 reached 83.33% (Largely Achieved) and PA 2.2 reached Full Achieved, so the achievement of the process for level 2 was 91.66% which is included in the Full Achieved category.

3.2.6 GAP and Recommendations

The calculation of the gap value (difference) in the APO12 (Manage Risk) domain is obtained based on the comparative value of the Capability Level to be achieved by BIMAWA with the Current Capability Level value obtained based on the results of the questionnaire calculations from respondents (R1-R5) using the Guttman Scale.

Table12. GAP APO12

Sub Processes	*Capability Level*		
	Expected	***Current***	**GAP**
APO12.01	3	2.57	0.43
APO12.02	3	2.68	0.32
APO12.03	3	2.67	0.33
APO12.04	3	2.69	0.31
APO12.05	3	2.53	0.47
APO12.06	3	2.44	0.56
Average		**2.60**	**0.40**

Based on the results of known gaps in Table 12, recommendations are given to the Student Activities Information System Service to improve the risk management of such services. Recommendations are given with relevant directions so can be accepted and implemented by BIMAWA. The results of recommendations on the APO12 domain (Manage Risk) can be seen in Table 13.

Table13. Recommendations

No	Sub Domains	Recommendations
1.	APO12.01	a. Have a regular schedule of data collection, maintenance, and analysis. b. Add IT staff who assist in managing recording and always coordinate with other parties in conducting evaluations. c. Improve utilization of historical documenting results from IT risks. d. Documenting what risks have occurred to avoid the same risks from happening again. e. Adding staff who are specifically in charge of managing the data that has been collected from previous risk investigation activities. f. Prepare a care plan so that the implementation of new business processes runs according to what is expected. g. Adding staff who are experts in conducting risk analysis.
2	APO12.02	a. Include material on deepening risk factors in Employee SOPs. b. Make improvements to the risk management process related to the use of IT. c. Perform risk mapping. d. Have risk identification benchmarks that have been agreed upon by the various parties concerned. e. Have a record of the costs incurred to handle risks. f. Lists efforts to improve risk mitigation control in the documenting process. g. Have standards that are used to improve the company's business processes.
3.	APO12.03	a. Continue to maintain the efforts that have been made before and increase supporting factors so that business processes are well distributed. b. Have guidelines for planning, monitoring, and evaluation to maintain the course of business processes. c. Supervise the duties of each staff so as not to cause risks that cause business processes to be disrupted. d. Monitoring information from various sources to be included in the risk profile. e. Have a plan to collect a risk indicator guideline file so that the identification and monitoring process can run well. f. Monitoring the data inputted related to IT risk event information in the company's risk profile. g. Planning related to the status of the risk plan to be included in the IT risk profile.
4.	APO12.04	a. Have relationships with external parties to become supporting actors for decision-making. b. Have SOPs that manage IT-related business processes. c. Adding staff on an ongoing basis to assist in carrying out business processes, managing databases, and reporting them to leaders regularly. d. Planning to evaluate assessments related to gaps and risk analysis with third parties. e. Create SOPs or documents that govern the company's business processes.
5.	APO12.05	a. Make careful preparations in testing plans to overcome the risks that are occurring. b. Have a document that regulates the tolerance limit of risk. c. Have a plan and monitor projects designed to reduce risk.
6.	APO12.06	a. Document specific steps for planning and testing plans taken during a risk event. b. Conduct planning for incident categorization of risks and comparison of existing risks with risk tolerance thresholds c. Carry out appropriate response planning to minimize the impact when a risk incident occurs. d. Evaluate to find out the disadvantages of the roots of the problem that has occurred.

4. CONCLUSION

Based on the results of the risk management analysis carried out on the Student Activity Information System Service (SKK) owned by BIMAWA using the COBIT 5 framework, it is known that the Current Capability Level for the APO12 (Manage Risk) domain has a value of 2.60. The result of this value indicates that the Capability Level of Student Activity Information System Services is at level 2 (Managed Process), which means that at this level the SKK Service business process has carried out planning, monitoring, and the results of their work are well managed. The Expected Capability Level desired by BIMAWA is at level 3. GAP is obtained based on the gaps held between the Current Capability Level and the Expected Capability Level. The result of the GAP value based on calculations carried out using the APO12 (Manage Risk) domain obtained a GAP of 0.40. The analysis process carried out resulted in several recommendations given to SKK Services to achieve the desired level of Capability Level and improve the process that was already running at BIMAWA.

5. REFERENCES

[1] Amrulloh, A., Wibisono, G., Rakhmadi, A., & Key, K. (2020). Audit of Information Technology Governance in Universities Using Cobit 5 Focus of Preliminary Process of Research Methodology. 19(1), 115–120.

[2] Setyaningrum, N. D., Suprapto, & Kusyanti, A. (2018). Evaluation of Information Technology Risk Management Using the COBIT 5 Framework (Case Study: PT . Kimia Farma (Persero) Tbk – Plant Watudakon). Journal of Information Technology Development And Computer Science, 2(1), 143–152. http://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/731.

[3] Aziz, R. A., Kusrini, & Sudarmawan. (2018). Evaluation of Information Technology Risk Management in STATE-OWNED Companies Using THE COBIT 5 Standard (Case Study: PT TASPEN PERSERO). CIDA IT Journal, 4(2), 1–11. http://journal.amikomsolo.ac.id/index.php/itcida/article/view/80.

[4] Nurhidayat, R., & Handayaningsih, S. (2019). Risk Management Analysis On Student Resignation Services Using the COBIT 5 Framework Focus on Manage Risk (APO12). JSTIE (Journal of Bachelor of Informatics Engineering) (E-Journal), 7(1), 69. https://doi.org/10.12928/jstie.v7i1.15806.

[5] Maiyana, E., & Mengkasarinal, T. (2018). Implementation of Online Application for Certificate of Diploma Companion. Tower of Science, XII(79), 31–40. http://jurnal.umsb.ac.id/index.php/menarailmu/article/viewFile/508/447

[6] Sa'diyah, U., & Manuputty, A. D. (2018). Salatiga City Government E-Government governance analysis using the COBIT 5 Domain APO Framework. National Seminar on Information and Communication Technology, 2018(Sentika), 147–155. https://fti.uajy.ac.id/sentika/publikasi/makalah/2018/18.pdf.

[7] Arief, M. H., & Suprapto. (2018). Evaluation of Information Technology Risk Management Using the COBIT 5 Framework (Case Study on Perum Jasa Tirta I Malang). Journal of Information Technology Development And Computer Science, 2(1), 101–110. http://repository.ub.ac.id/1480/.

[8] Agtika, A. S., Mursityo, Y. T., & Rachmadi, A. (2019). Evaluation of Information Technology Risk Management at the Planning, Research and Development Agency (Barenlitbang) of Malang City Using COBIT 5 Domains EDM03 and APO12. Journal of Information Technology Development And Computer Science, 3(5), 4218–4225. http://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/5169.

[9] Putri, L. D. M., Perdanakusuma, A. R., & Rachmadi, A. (2019). Evaluation of Information Technology Risk Management Maturity Using the COBIT 5 Process Assessment Model (Case Study of PT . XYZ New Zealand). Journal of Information Technology Development And Computer Science, 3(6), 6089–6098. http://j-ptiik.ub.ac.id/index.php/j-ptiik/article/download/5647/2673.

[10] Zakkadiaksa, I., Hanggara, B. T., & Prakoso, B. S. (2020). Evaluation of Information Technology Risk Management Using COBIT 5 with Domains EDM03 and APO12 (Case Study on UPT-ICT Universitas Brawijaya). Journal of Information Technology Development And Computer Science, 4(8), 2329–2337. http://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/7621.

[11] Butarbutar, N., & Tanaamah, A. R. (2021). Risk Management Analysis Using COBIT 5 Domain APO12 (Case Study: Yayasan Bina Darma). Journal of Information Systems and Informatics, 3(3), 352–362. http://www.journal-isi.org/index.php/isi/article/view/155.

[12] Indriyanto, & Riadi, I. (2021). Analysis of Risk Assessment on Student Credit Services using COBIT 5 Framework. *International Journal of Computer Applications*, *183*(23), 29–37. https://doi.org/10.5120/ijca2021921826.

[13] Simatupang, E., Assegaf, S., & B, M. R. P. (2020). Governance of Information Technology Utilization Using COBIT at SMPN 18 Jambi City. Scientific Journal of Information Systems Students, 2(1), 89–102. http://ejournal.stikom-db.ac.id/index.php/jimsi/article/view/800.

[14] Fahri Husaini, Awalludiyah Ambarwati, L. J. (2019). IT Asset Risk Analysis Using octave method on SWD Resto. National Seminar on Information Systems, 3(1), 1940–1946. https://jurnalfti.unmer.ac.id/index.php/senasif/article/view/258.

[15] Thenu, P. P., Wijaya, A. F., & Rudianto, C. (2020). Information Technology Risk Management Analysis Using Cobit 5 (Case Study: Pt Global Infotech). Journal of Computer Development, 2(1), 1–13. https://doi.org/10.33557/binakomputer.v2i1.799.

[16] Rahmania, N. M., Suprapto, & Perdanakusuma, A. R. (2018). Assessment of Information Technology Risk Management Capabilities Using the COBIT 5 Framework (Case Study: Operational Area (DAOP) XX). Journal of Information Technology Development And Computer Science, 2(12), 6828–6836. http://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/3764.

[17] Ichwani, A., & Farida, A. D. (2020). Measurement of The Level of Risk Management Capability of Sharia Cooperative Information System Using COBIT Framework 5. Journal of Computing, 8(1), 1–14. https://doi.org/10.23960/komputasi.v8i1.2528.

[18] Darmawan, A. K., & Dwiharto, A. (2019). Capability Level Measurement of E-Government Service Quality in Pamekasan Regency Using the COBIT 5.0 Framework. INTENSIVE: Scientific Journal of Research and Application of Information Systems Technology, 3(2), 93–103. https://doi.org/10.29407/intensif.v3i2.12659.

[19] ISACA. (2012a). COBIT 5: A Business Framework for The Governance and Management of Enterprise IT COBIT 5. In *ISACA* (Vol. 34, Issue 1). ISACA. http://tp.revistas.csic.es/index.php/tp/article/viewArticle/432%0Ahttp://files/399/432.html.

[20] ISACA. (2012c). COBIT 5: Implementation. In *ISACA*. ISACA. http://www.isaca.org/COBIT/Pages/COBIT-5-spanish.aspx.

[21] ISACA. (2012b). *COBIT 5: Enabling Processes*. ISACA. https://community.mis.temple.edu/mis5203sec003spring2020/files/2019/01/COBIT5-Ver2-enabling.pdf.

[22] Purwanto, A., & Riadi, I. (2021). Analysis of Risk Management Assessment on Customer Services using COBIT 5 Framework. *International Journal of Computer Applications*, *183*(29), 17–25. https://doi.org/10.5120/ijca2022921996.

[23] Tamara, A. F., & Riadi, I. (2021). Analysis of Risk Assessment on Student Credit Services using COBIT 5 Framework. *International Journal of Computer Applications*, *183*(42), 50–58. https://doi.org/10.5120/ijca2021921826

[24] Noveryal, N., & Dahlan, A. (2022). *Analysis of a Maturity of Case Search Information Systems using Cobit 5 Framework*. *184*(12), 29–35.

[25] Bhaskoro, S. F., & Riadi, I. (2022). Analysis of Risk Assessment on Attendance Information Systems using COBIT 5 Framework. *International Journal of Computer Applications*, *184*(7), 16–24. https://doi.org/10.5120/ijca2022922030.