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Risk Management Analysis On The School Activity Plan And Budget Application Information System (ARKAS) Using Cobit 2019

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ARKAS; risk management; COBIT 2019; information technology; schools; transparency; efficiency

ABSTRACT
This research focuses on the implementation of the School Activity Plan and Budget Application Information System (ARKAS) at the Palu Safety Center Christian Vocational School to increase efficiency and effectiveness in planning and managing school activities and budgets. However, the implementation of ARKAS is inseparable from various risks that can affect the effectiveness and success of the system. Therefore, risk management analysis is essential to ensure that all potential risks can be identified, analyzed, and minimized. This study uses the COBIT 2019 framework to manage risks in the application of information technology in schools. The study identifies challenges such as resistance to change, resource limitations, and information security risks. This study aims to explore how the implementation of ARKAS in the Palu Safety Army Christian Vocational School can be optimized through risk management analysis using the COBIT 2019 framework. The results of the study show that the use of COBIT 2019 can help in identifying and managing risks effectively, so that the implementation of ARKAS can run more efficiently and transparently. The resulting recommendations are expected to improve the quality of school budget management and become a reference for other schools that face similar challenges in the application of information technology.

Introduction

In the era of globalization and rapid advancement of information technology, the application of information technology has become an important need for educational institutions, including schools such as the Palu Salvation Army Christian Vocational School (Aditya, D., & Sari, 2012). The implementation of information systems such as the School Activity Plan and Budget Application Information System (ARKAS) is expected to increase efficiency and effectiveness in planning and managing school

activities and budgets. The implementation of this system is expected to increase transparency, accountability, and efficiency in the management of the education budget (Arifin, Z., & Kurniawan, 2020).

However, the implementation of ARKAS is inseparable from various risks that can affect the effectiveness and success of the system (Febriyani, W., Rozi, F., & Kusumasari, 2023). Therefore, risk management analysis is essential to ensure that all potential risks can be identified, analyzed, and minimized. COBIT 2019, a comprehensive information technology governance and management framework, offers a systematic approach to managing risks in the application of information technology (Handayani, S., & Utomo, 2017).

This study focuses on the implementation of ARKAS at the Palu Salvation Army Christian Vocational School, a vocational school that has special needs in terms of effective management of activities and budgets. Using the COBIT 2019 framework, this study aims to identify, analyze, and manage the risks that arise in the implementation of ARKAS in the school.

Increasing the Complexity of School Budget Management, in the increasingly complex management of school budgets, an information system that can better support the planning and budget management process (Kurnia, A., & Lestari, 2015). The Need for Transparency and Accountability ARKAS is designed to increase transparency and accountability in school budget management. However, the implementation of this system requires proper risk analysis to ensure that the goal can be achieved. Application of Information Technology in the Educational Environment, The implementation of information technology such as ARKAS in the educational environment is often faced with various challenges, including resistance to change, limited resources, and information security risks (Kusuma, T., & Hardiyanto, 2009).

Risk Management Based on the COBIT 2019 Framework COBIT 2019 provides comprehensive guidance for risk management in the application of information technology. Risk analysis based on this framework can be helpful in identifying and managing risks effectively (Nugroho, Y., & Wardhana, 2021). The Palu Salvation Army Christian Vocational School has unique characteristics and challenges that affect the implementation of ARKAS. A risk analysis specific to the Palu Safety Ball Christian Vocational School is important for the successful implementation of the system (Prasetyo, M., & Hidayat, 2018). Therefore, this study will explore how the implementation of ARKAS in the Palu Safety Army Christian Vocational School can be optimized through risk management analysis using the COBIT 2019 framework (Puspitasari, M., & Sugiyanto, 2013). This research is expected to make an important contribution to improving the quality of school budget management and become a reference for other schools that face similar challenges in the application of information technology (Safrudin, D., & Ramdhani, 2022).

The following is an overview of risk management analysis in the implementation of ARKAS (School Activity Plan and Budget Application) in schools

- Increasing Complexity of School Financial Management, Budget management and activity plans in schools are increasingly complex with increasing demands for transparency and accountability. ARKAS (School Activity Plan and Budget Application) is designed to help schools manage budgets more efficiently and effectively. However, without proper risk management, this application can cause various new problems.

- In an effort to meet national and international standards, schools in Indonesia need reliable information systems for budget management. COBIT 2019, as a comprehensive IT management framework, provides guidance to ensure that ARKAS can be implemented with minimal risk and maximum benefits.
- Data Security and Privacy Challenges With the implementation of ARKAS, there are increased risks related to data security and privacy. Sensitive data related to school finances and personal information can be a target for cybercriminals. Risk management analysis using COBIT 2019 can help identify and manage these risks.
- Compliance with Regulations and Standards: Schools in Indonesia must comply with various regulations and standards related to budget management and information technology. COBIT 2019 provides a framework to ensure that the implementation of ARKAS is in accordance with applicable regulations, such as Law Number 14 of 2008 concerning Public Information Disclosure.
- Improving Operational Efficiency, One of the main goals of ARKAS is to improve operational efficiency in school budget management. However, without the right risk management approach, the expected efficiency may not be achieved. Using COBIT 2019 for risk analysis helps in planning, implementing, and overseeing the use of ARKAS more effectively.
- Preparation of Competent Human Resources, The implementation of new technologies such as ARKAS requires skilled and competent human resources. Risk management in the framework of COBIT 2019 also includes human resource management to ensure that the staff involved have the necessary skills and knowledge to operate and manage ARKAS properly.
- Risk of Implementation Failure, Without good risk management, the implementation of ARKAS can experience failures that result in financial and reputational losses. COBIT 2019 provides tools to identify, evaluate, and manage risks that may occur during the implementation process.

However, challenges arise when the application of information technology is not aligned with the business goals and needs of users in the school. Some schools may have difficulty understanding the relationship between the large investment required for the application of information technology and the expected increase in productivity (Safrudin, D., & Ramdhani, 2022). Some of them even consider that the application of information technology is only a waste of budget because it does not have a significant impact on improving school performance (Setiawan, B., & Wijayanti, 2019).

The importance of risk management in the context of the application of information technology is also highlighted in the context of schools. Risks such as student data leaks, system failures, or non-conformities with user needs must be identified, evaluated, and managed properly so that the application of information technology can have a positive impact and support the school's educational goals (Susanto, E., & Rahman, 2011).

Considering the challenges and importance of risk management in the application of information technology in schools, risk management analysis using the COBIT 2019 approach becomes relevant (Syafrudin, I., & Melinda, 2008). COBIT 2019 provides a comprehensive framework for managing risks related to the use of information technology, which can assist schools such as the Palu Safety Army Christian Vocational School in identifying, evaluating, and managing risks that may arise in the context of implementing ARKAS or other information systems (Tsai, J., & Miller, 2005).

Thus, good information technology governance planning, which is based on the COBIT 2019 framework, is important for schools in ensuring that the application of

information technology not only brings optimal benefits but can also make a significant contribution to the achievement of educational goals and the improvement of school performance (Wahyudi, H., & Anggraeni, 2010).

In the APO12 (Manage Risk) domain of COBIT 2019, schools can identify, analyze, and respond to risks related to the implementation of ARKAS. APO12 provides guidance for establishing and maintaining appropriate risk management, including determining risk tolerance and assigning risk management responsibilities. By following this guide, the Palu Safety Army Christian Vocational School can ensure that the main risks in the implementation of ARKAS are identified and responded to with appropriate mitigation measures, thereby minimizing the negative impacts that may arise (Wattimury, G., & Faza, 2023).

In addition, the EDM03 (Ensure Risk Optimization) domain of COBIT 2019 emphasizes the importance of optimizing risk to achieve the right balance between risk and value generated by information technology investments (Wijaya, R., & Putri, 2016). EDM03 helps schools ensure that risk management is not only focused on mitigating threats, but also on taking advantage of opportunities to improve grades. Thus, the implementation of ARKAS can be carried out with a holistic approach, where existing risks are managed in a way that supports the achievement of the school's strategic goals (Yulianto, A., & Rahmawati, 2014).

By integrating risk management approaches from the APO12 and EDM03 domains, Palu Safety Army Christian Vocational School can create a conducive environment for the effective and efficient implementation of ARKAS. The implementation of the COBIT 2019 framework in managing information technology risks will assist schools in achieving the expected transparency, accountability, and efficiency, while providing a solid foundation for the development and improvement of information systems in the future.

(Tulus & Tanaamah, 2023). Design of Information Technology Governance in Educational Institutions Using COBIT 2019 Framework. This paper emphasizes the importance of auditing and analyzing information technology governance in educational institutions using the COBIT 2019 framework, with a focus on improving risk management and security to improve the position of institutions in the education sector. Key findings emphasize the institution's focus on innovation, cost leadership, legal and regulatory compliance, and key business objectives related to customer service, business continuity, personnel management, and innovation. The methodology used in this study involves qualitative methods for data collection, including interviews and literature studies. This includes identifying problems through stakeholder interviews, conducting literature studies, analysing using the COBIT framework, and applying data processing based on stakeholder input.

(Gouëdard et al., 2020). Education responses to COVID-19, Implementing a way forward. This paper discusses the challenges countries face in responding to the impact of the COVID-19 pandemic on education and provides recommendations for developing and implementing effective education policy responses. - Shaping implementation strategies by considering various dimensions and factors.

- Establishing communication strategies to reach different audiences effectively.
- Monitoring implementation to understand progress and address potential challenges.

The methodology includes reviewing the OECD's education policy implementation framework, proposing recommendations for effective implementation, assessing available technologies, safeguarding social well-being and support, ensuring

health precautions, prioritizing assessments, and monitoring progress. It also emphasizes the importance of a clear vision, appropriate teaching tools, competency development, and ensuring a coherent implementation strategy with clear communication channels.

This research introduces a unique contribution by focusing on the application of COBIT 2019 for risk management in the School Activity Plan and Budget Application Information System (ARKAS) within an educational setting, specifically at the Palu Safety Army Christian Vocational School. While previous studies have extensively explored IT governance frameworks like COBIT in business and corporate environments, this study brings a fresh perspective by applying these principles to the specific context of school budget management and educational technology. The novelty lies in the tailored approach of using the APO12 and EDM03 domains from COBIT 2019 to address the challenges faced by schools in managing risks related to transparency, data security, and operational efficiency when implementing ARKAS. Furthermore, the research also highlights the importance of proactive stakeholder involvement, a comprehensive documentation strategy, and continuous improvement in the IT governance process within the educational sector.

The primary objective of this study is to explore how the implementation of ARKAS can be optimized through a structured risk management analysis using the COBIT 2019 framework. This includes identifying, evaluating, and mitigating risks that may impact the effectiveness and success of the system. The study aims to provide actionable recommendations that will enhance the efficiency, transparency, and security of the ARKAS system, ultimately improving school budget management and serving as a reference for other educational institutions facing similar challenges.

Research Methods

Data Collection Methods

a. Primary Data

Primary data in this study were obtained through in-depth interviews with stakeholders involved in the use of ARKAS, including

a) Teachers To understand how ARKAS helps in activity planning and budgeting.
b) Principals To find out how ARKAS is applied in the overall management of the school.
c) Administrative Officer To obtain detailed information on the day-to-day operations and challenges faced in the use of ARKAS.

Interview

1. A data collection method in which researchers ask questions directly to respondents to obtain in-depth and detailed information.
2. It can provide rich and in-depth data, allows for clarification if there is an unclear answer, and can capture the emotional nuances and non-verbal expressions of the respondent.
3. It requires greater time and cost, depending on the interviewer's skills, and may face bias from the interviewer or respondent.

Observation

1. A data collection method in which researchers observe a subject or phenomenon in a natural situation or under pre-arranged conditions.
2. It can provide real, contextual data, allowing for direct observation of behaviors and interactions in natural contexts.

3. It can take a long time, may have difficulty interpreting the data, and the observed subjects may change their behavior because they know they are being observed (the Hawthorne effect).

Questionnaire

1. A data collection method in which respondents are asked to answer a series of written questions that have been prepared by the researcher.
2. It can reach a large number of respondents in a short time, costs less than face-to-face interviews, and allows for easier statistical analysis.
3. Responses may not be in-depth, the risk of respondents not answering honestly or not understanding questions correctly, and response rates may be low in the absence of incentives.

b. Secondary Data

Secondary data is obtained from a variety of relevant documents and literature, including, official documentation and financial statements of schools using ARKAS. Literature related to COBIT 2019 and risk management in the context of information systems. Implementation guide and ARKAS user manual.

1. Literature Study A method of collecting data by searching for supporting literature data. The literature can be in the form of books, scientific journals, ebooks, and so on that are related to research.
2. Work Program of the Palu Salvation Army Christian Vocational School. Data is obtained from explanations and elaborations within a certain period of time and has been determined so that it makes it easier to classify the problems being studied.

Results and Discussions

From the data collection stage, results were obtained through literature study and direct observation on business processes and risk management related to the ARKAS application system at the Palu Safety Army Christian Vocational School. Risk identification data was obtained that included risk events, causes, and impacts of these risks.

Risk Identification Table of SMKS Christian Palu Salvation Army

No	Risk Events	Causes	Impact
1	Delay in material procurement ajar	Budget delay	Hindering the learning process
2	Errors in management budget	Lack of training ARKAS	Budget is not on target
3	Incompetence operate the application	Lack of staff trained	Efficient use of the ARKAS system descending
4	ARKAS application system failure	Technical issues	Interference in the management process finance
5	Budget data leak	System security weak	Risk of financial and reputational loss schools
6	Not suitable for use budget	Lack of supervision	There is a deviation in approximate consumption
7	Report incompatibilities finance	Data input error	Inaccurate financial statements
8	Delay in preparation budget	Long review process	Implementation of school activities delayed
9	Lack of socialization of use ARKAS	Lack of communication	Staff understanding of ARKAS less
10	Limited budget for procurement	No budget adequate	Activities and procurement of the school does not optimal

Risk Identification Explained

- Delay in procurement of teaching materials
  - Causes of delays in budget disbursement or procurement processes.
  - The impact of the teaching and learning process is disrupted due to the lack of teaching materials.
- Mistakes in budget management
  - Cause: The staff in charge does not understand the use of the ARKAS application.
  - The impact of budget allocation is not in accordance with the needs of the school.
- Inability to operate the app
  - Cause: Lack of training for the staff who manage the application.
  - Impact The efficiency and effectiveness of the use of the ARKAS application has decreased.
- ARKAS application system failure
  - Causes of technical issues such as bugs or server down.
  - Impact: Financial management and planning of school activities are disrupted.
- Budget data leak
  - Causes: Inadequate security systems.
  - Impact Financial risk and reputational loss for the school.
- Not in accordance with the budget use
  - Cause: Lack of supervision of the use of the budget.
  - Impact There are irregularities and inefficiencies in the use of school funds.
- Inconsistency of financial statements
  - Causes of errors in financial data input.
  - Impact The resulting financial statements are inaccurate and can cause problems in audits.
- Delay in preparing the budget
  - Causes of the long-time budget review process.
  - Impact The implementation of school activities can be delayed because the budget is not ready.
- Lack of socialization of the use of ARKAS
  - The cause is the lack of communication and training regarding the use of the ARKAS application.
  - Impact School staff lack understanding of how to use the app properly.
- Budget limitations for procurement
  - Causes Inadequate budget to meet all school needs.
  - Impact Some school activities and procurement cannot be carried out optimally. By adjusting this data, we can focus on the context and challenges relevant to budget management and risk management at the Palu Salvation Army Christian Vocational School.

Data Processing and Analysis

Observation and Interview

In this study, observation and interviews are used as data collection methods to analyze risk management in the APO12 (Manage Risk) and EDM03 (Ensure Risk Optimization) domains in the implementation of ARKAS at SMK BK Palu. The observation method allows researchers to directly observe the processes that occur in the field, thus obtaining in-depth empirical data on how risks are identified and managed. Observations were made in the admin and manager sections of ARKAS to identify documents related to the risks of the Procurement and IT sections.

Interviews were conducted with related parties, both before and after the distribution of the questionnaire. This interview aims to get a direct perspective from the respondents regarding risk management. The results of these interviews are used as parameters to check the alignment between the results of the questionnaire and the interview, which increases the validity of the data collected.

APO12 Domain: Manage Risk

In the APO12 domain, interview questions are designed to understand how schools identify, analyze, and manage risks associated with the implementation of ARKAS. Some important questions include risk identification methods, frequency of risk reviews, risk tolerance, and mitigation measures implemented. The purpose of this question is to get a thorough overview of the risk management process in schools.

The questionnaire statement provided also assesses various aspects of risk management, such as risk identification procedures, periodic risk analysis, risk list updates, risk tolerance limits, implementation of mitigation measures, risk management authority, and understanding of roles by all parties involved. The Likert Scale is used to measure the level of respondents' agreement with these statements.

Domain EDM03: Ensure Risk Optimization

In the EDM03 domain, the interview questions focus on how schools optimize risk to achieve a balance between risk and value generated. It includes strategies for mitigating threats and capitalizing on opportunities, decision-making processes, support for strategic objectives, frequency of evaluation of risk management effectiveness, performance indicators, and integration of risk management in the planning and development of information systems.

The questionnaire statements in this domain also evaluate the effectiveness of risk optimization strategies, stakeholder involvement in decision-making, support for strategic objectives, periodic evaluation of risk management effectiveness, performance indicators, and the integration of risk management in information system planning. The Likert scale used helps measure respondents' perception of how well schools manage and optimize risk. The observation and interview methods provide comprehensive data on risk management in the APO12 and EDM03 domains in the implementation of ARKAS at SMK BK Palu. Well-designed interview questions and questionnaire statements allow researchers to gain in-depth insights into the process and effectiveness of risk management in schools. As such, this analysis can be helpful in identifying areas that need improvement and developing better strategies for managing future risks.

Raci Chart

The table below illustrates the mapping of the RACI Chart based on duties and job titles to determine prospective respondents

Tasks / Activities	R (Responsible)	A (Accountable)	C (Consulted)	I (Informed)
System Requirements Analysis	IT team	Manager Projects	Principal, Teacher	Students, People Old
System Design	IT team	Manager Projects	Principal, Teacher	Students, People Old
System Development	IT team	Manager Projects	Principal	Teacher, Student, Old Man
System Testing	IT team, QA	Manager Projects	Principal, Teacher	Students
User Training	IT team, Trainer	Manager Projects	Principal, Teacher	Students, People Old
System Implementation	IT team	Manager Projects	Principal, Teacher	Students, People Old
Monitoring and Evaluation	IT team, QA	Manager Projects	Principal, Teacher	Students, People Old
Risk Management (Using COBIT 2019)	IT team, Risk Manager	Manager Projects	Principal, Teacher, COBIT Expert	Students, People Old
Security Management Information	IT team, Security Officer	Manager Projects	Principal, Teacher, Security Consultant	Students, People Old

Questionnaire Results

The preparation of the questionnaire in the analysis of information technology risk management for ARKAS at SMK BK Palu was made by utilizing the level of ability developed from the maturity level model in COBIT 2019, especially in the APO12 (Manage Risk) and EDM03 (Ensure Risk Optimization) process domains. This questionnaire is designed to measure the extent to which the implementation of ARKAS risk management has progressed and how mature it is.

The questionnaire is filled out by the relevant parties in accordance with the RACI Chart that has been determined previously. In this case, there are 3 respondents who will be the target to fill out the questionnaire, namely the Principal, Administration, Teacher, and ARKAS Operator. Filling out the questionnaire is carried out by accompanying the respondents directly by coming to SMK BK Palu, the assistance aims to make it easier for respondents to fill out the questionnaire and ensure the right understanding of each question.

The results of the questionnaire will be used to determine the capability value and capability level of ARKAS risk management at SMK BK Palu. These values will then be mapped in the form of a table such as the table below to illustrate the mapping of value answers and capability levels as a reference in determining the maturity level of the risk management process.

Range Of Values answers	Value capabilities	Level capabilities	Description
0 – 0,50	0	0 (Non-existent)	No process identified
0,51 – 1,50	1	1 (Performed process)	The process has been carried out but not yet documented well
1,51 – 2,50	2	2 (Managed process)	The process has been managed and documented but not yet standard
2,51 – 3,50	3	3 (Established process)	The process has been documented and implemented with the specified standard
3,51 – 4,50	4	4 (Predictable process)	The process has been monitored and measured, giving results consistent
4,51 – 5,00	5	5 (Optimising process)	Process continuously improved based on analysis quantitative

The results of filling out the questionnaire will be analyzed to provide an overview of the maturity level of ARKAS risk management at SMK BK Palu in the APO12 and EDM03 process domains. These results will be the basis for compiling recommendations for improvement and improvement of ARKAS risk management to be more effective and efficient.

Results of APO12 and EDM03 Domain Level Capability Analysis

Capability level analysis for the APO12 (Manage Risk) and EDM03 (Ensure Risk Optimization) domains was carried out to evaluate the extent of the implementation of risk management in ARKAS at SMK BK Palu. This measurement was carried out using the Likert scale, where respondents were asked to provide an assessment of various statements related to implementation and risk management.

- APO12 Capability Level Analysis

1. Data

First of all, let's calculate the average of each row and column in the questionnaire filling results table:

Data Table

Rows\Columns	1	2	3	4	5	6
1	3	4	3	4	5	3
2	5	4	4	5	5	5
3	4	3	3	4	4	5
4	5	5	5	5	5	5
5	5	5	5	5	5	5
6	4	4	4	4	4	4
7	4	4	4	4	4	4
8	4	4	4	4	4	4
9	4	4	4	4	4	4

2. Calculate the Average Score

Calculate the average for each row:

Average of Row 1: (3+4+3+4+5+3)/6 = 22/6 = 3.67
Average of Row 2: (5+4+4+5+5+5)/6 = 28/6 = 4.67
Average of Row 3: (4+3+3+4+4+5)/6 = 23/6 = 3.83
Average of Row 4: (5+5+5+5+5+5)/6 = 30/6 = 5.00
Average of Row 5: (5+5+5+5+5+5)/6 = 30/6 = 5.00
Average of Line 6: (4+4+4+4+4+4+4)/6 = 24/6 = 4.00
Average Line 7: (4+4+4+4+4+4)/6 = 24/6 = 4.00
Average of Row 8: (4+4+4+4+4+4)/6 = 24/6 = 4.00
Average Line 9: (4+4+4+4+4+4)/6 = 24/6 = 4.00

Calculate the average for each column:

Average of Column 1: (3+5+4+5+5+4+4+4+4)/9 = 38/9 = 4.22
Average of Column 2: (4+4+3+5+5+4+4+4+4)/9 = 37/9 = 4.11
Average of Column 3: (3+4+3+5+5+4+4+4+4)/9 = 36/9 = 4.00
Average of Column 4: (4+5+4+5+5+4+4+4+4)/9 = 39/9 = 4.33
Average of Column 5: (5+5+4+5+5+4+4+4+4)/9 = 40/9 = 4.44
Average of Column 6: (3+5+5+5+5+4+4+4+4)/9 = 39/9 = 4.33

3. Converting Average Values to Likert Scale

Use the following likert scale for conversions:

- strongly disagree = 1

- Disagree = 2
- Neutral = 3
- Agree = 4
- Strongly Agree = 5

The average value is already on the Likert scale so it doesn't require further conversions.

4. Calculating the Capability Level Value

Based on the calculated average, we will compile the Capability Level table as follows:

Capability Level Table

No	Sub-domain	Capability Value	Capability Level
1	APO12. 01	4.22	4
2	APO12. 02	4.11	4
3	APO12. 03	4.00	4
4	APO12. 04	4.33	4
5	APO12. 05	4.44	4
6	APO12. 06	4.33	4
Average		4.24	4

The "As-Is" capability value is a current assessment of the system's ability to meet the criteria set for each sub-domain. From the table above, all sub-domains in APO12 have capability values ranging from 4.00 to 4.44, with an overall average of 4.24. This means that under its current conditions, the system has level 4 capability, which indicates that processes are well defined, managed, and consistently measured.

APO12 Capability Level Analysis on Arkas Systems

APO12 refers to the risk management process in the COBIT 2019 framework that focuses on the identification, evaluation, and mitigation of IT risks. In the context of the Arkas system, this evaluation is important to ensure that risks that may affect system operations can be managed effectively.

- APO12.01 (Identifying IT Risks): A score of 4.22 indicates that risk identification has been done consistently and well-documented.
- APO12.02 (Analyzing IT Risks): A value of 4.11 reflects that the risk analysis is carried out with a structured methodology and the results are used for decision-making.
- APO12.03 (Defining IT Risk Response): A value of 4.00 indicates that the risk response has been established and implemented consistently.
- APO12.04 (Managing Overall IT Risk): A score of 4.33 indicates that risk management is carried out holistically by involving all relevant stakeholders.
- APO12.05 (Defining IT Risk Control): A score of 4.44 indicates that risk control is very well planned and implemented.
- APO12.06 (Monitoring and Reviewing IT Risks): A score of 4.33 indicates that risk monitoring and review is carried out on an ongoing basis to ensure the effectiveness of risk control.

To-Be Capability Rating 5.00

A "To-Be" capability value of 5.00 indicates an ideal target where all sub-domains reach level 5 capability level, which means that the process is not only well managed and measured, but also optimized for continuous improvement. At this level, best practices

are implemented, and organizations proactively make improvements to minimize risk and maximize efficiency.

Recommendations for Achieving a To-Be Capability Value of 5.00

- Improved Documentation and Standardization: Improved process documentation and operational standards to ensure consistency and transparency across all sub-domains.
- Use of Advanced Technology: Adopt more advanced technologies and tools for risk analysis and management.
- HR Training and Development: Conduct ongoing training for employees to improve their understanding and skills in risk management.
- Periodic Evaluations and Reviews: Conduct periodic evaluations and reviews to identify areas of improvement and ensure that best practices are implemented effectively.

With these steps, the Arkas system can move towards the value of the To-Be 5.00 capability, which will improve the organization's ability to proactively and efficiently manage risk.

EDM03 Capability Level Analysis

1. Data

First of all, let's calculate the average of each row and column in the questionnaire filling results table:

Data Table

Rows\Columns	1	2	3	4	5	6
1	3	3	3	3	3	3
2	4	4	4	4	3	3
3	4	3	4	3	4	4
4	5	4	5	4	5	5
5	4	4	4	3	4	4
6	4	4	4	4	4	4
7	4	3	5	4	4	4
8	4	4	3	3	4	4
9	3	2	3	2	2	3

2. Calculate the Average Score

Calculate the average for each row:

- Average of Row 1: (3+3+3+3+3+3)/6 = 18/6 = 3.00
- Average of Row 2: (4+4+4+4+3+3)/6 = 22/6 = 3.67
- Average of Row 3: (4+3+4+3+4+4)/6 = 22/6 = 3.67
- Average of Row 4: (5+4+5+4+5+5)/6 = 28/6 = 4.67
- Average of Row 5: (4+4+4+3+4+4)/6 = 23/6 = 3.83
- Average of Line 6: (4+4+4+4+4+4+4)/6 = 24/6 = 4.00
- Average of Row 7: (4+3+5+4+4+4)/6 = 24/6 = 4.00
- Average of Row 8: (4+4+3+3+4+4)/6 = 22/6 = 3.67
- Average of Row 9: (3+2+3+2+2+3)/6 = 15/6 = 2.50

Calculate the average for each column:

- Average of Column 1: (3+4+4+5+4+4+4+4+4+3)/9 = 35/9 = 3.89
- Average of Column 2: (3+4+3+4+4+4+3+4+4+2)/9 = 31/9 = 3.44
- Average of Column 3: (3+4+4+5+4+4+5+3+3)/9 = 35/9 = 3.89
- Average of Column 4: (3+4+3+4+3+4+4+3+2)/9 = 30/9 = 3.33
- Average of Column 5: (3+3+4+5+4+4+4+4+2)/9 = 33/9 = 3.67
- Average of Column 6: (3+3+4+5+4+4+4+4+3)/9 = 34/9 = 3.78

3. Converting Average Values to Likert Scale

The average value is already on the Likert scale so it doesn't require further conversions.

4. Calculating the Capability Level Value

Based on the calculated average, we will compile the Capability Level table as follows:

Capability Level Table

It	Sub-domains	Capability Values	Capability Level
1	EDM03.01	3.89	4
2	EDM03.02	3.44	3
3	EDM03.03	3.89	4
4	EDM03.04	3.33	3
5	EDM03.05	3.67	4

Average: 3.67 -> 4

Based on the Capability Level analysis, the EDM03 domain has an average capability value of 3.67 which is converted to 4 on the Capability Level scale.

The "As-Is" capability value is a current assessment of the system's ability to meet the criteria set for each sub-domain. From the table above, all sub-domains in EDM03 have capability values that range from 3.33 to 3.89, with an overall average of 3.64. This means that under the current conditions, the system has level 3 or 4 capability, which indicates that the process is well defined, managed, and measured consistently.

EDM03 Capability Level Analysis on Arcade Systems

EDM03 refers to the risk management process in the COBIT 2019 framework that focuses on the identification, evaluation, and mitigation of IT risks. In the context of the Arkas system, this evaluation is important to ensure that risks that may affect system operations can be managed effectively.

- EDM03.01 (Ensuring IT Risk Management Processes): A score of 3.89 indicates that the risk management process is being carried out consistently and well-documented.
- EDM03.02 (IT Risk Assessment): A value of 3.44 reflects that the risk assessment is carried out with a structured methodology and the results are used for decision-making.
- EDM03.03 (Defining IT Risk Response): A value of 3.89 indicates that the risk response has been established and implemented consistently.
- EDM03.04 (Monitoring IT Risk): A value of 3.33 indicates that risk monitoring is carried out thoroughly by involving all relevant stakeholders.
- EDM03.05 (IT Risk Review): A value of 3.67 indicates that the risk review is well planned and implemented.

To-Be Capability Rating 5.00

A "To-Be" capability value of 5.00 indicates an ideal target where all sub-domains reach capability level 5, meaning that the process is not only well managed and measured, but also optimized for continuous improvement. At this level, best practices are implemented, and organizations proactively make improvements to minimize risk and maximize efficiency.

Recommendations for Achieving a To-Be Capability Value of 5.00

- Improved Documentation and Standardization: Improved process documentation and operational standards to ensure consistency and transparency across all sub-domains.
- Use of Advanced Technology: Adopt more advanced technologies and tools for risk analysis and management.

- HR Training and Development: Conduct ongoing training for employees to improve their understanding and skills in risk management.
- Periodic Evaluations and Reviews: Conduct periodic evaluations and reviews to identify areas of improvement and ensure that best practices are implemented effectively.

With these steps, the Arkas system can move towards the value of the To-Be 5.00 capability, which will improve the organization's ability to proactively and efficiently manage risk.

GAP Analysis

GAP analysis in this study, GAP is used in this study as a measure of the gap between the current conditions (as is) and the conditions to be achieved (to be). Based on the previous capability analysis on the EDM03 and APO12 domains, the results obtained are as follows:

APO12 Capability Level Analysis

Average Data and Capability Level:

- Line:
  - Average Line 1: 3.67
  - Average Line 2: 4.67
  - Average Line 3: 3.83
  - Average Line 4: 5.00
  - Average Line 5: 5.00
  - Average Line 6: 4.00
  - 7 Row Average: 4.00
  - Average Line 8: 4.00
  - Average Line 9: 4.00
- Column:
  - Average Column 1: 4.22
  - Average Column 2: 4.11
  - Average Column 3: 4.00
  - Average Column 4: 4.33
  - Average Column 5: 4.44
  - Average Column 6: 4.33

Average Results and Conclusion:

The current condition capability value (as is) in the APO12 domain ranges from 4.00 to 4.44 with an overall average of 4.24. This indicates that the current system has level 4 capability, which means that processes are well defined, managed, and consistently measured. While the condition to be achieved (to be) is at level 5, which means the process is optimized for continuous improvement.

MEET APO12:

- US capability rating: 4.24
- Capability to be rating: 5.00
- GAP Value: 0.76

EDM03 Capability Level Analysis

Average Data and Capability Level:

- Line:
  - Average Line 1: 3.00
  - Average Line 2: 3.67
  - Average Line 3: 3.67

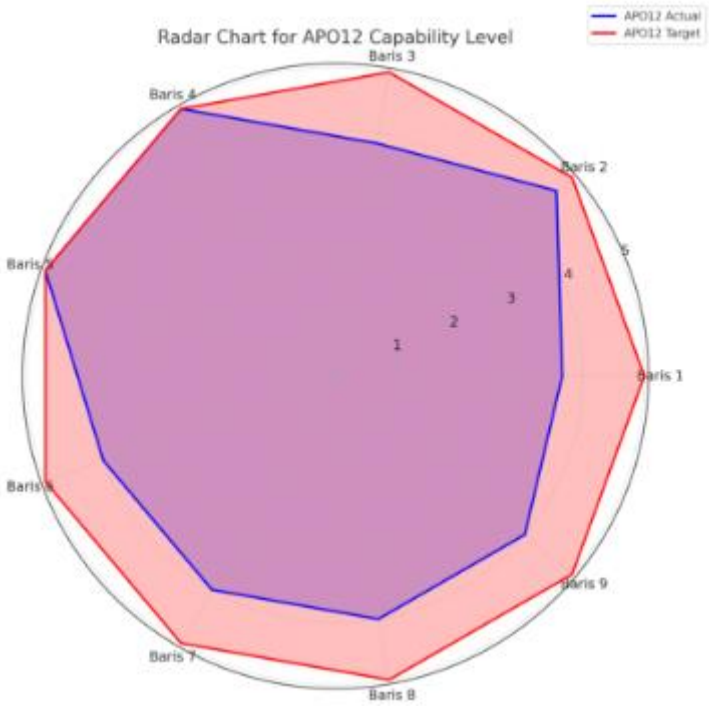
  - Average Line 4: 4.67
  - Average Line 5: 3.83
  - Average Line 6: 4.00
  - 7 Row Average: 4.00
  - Average Line 8: 3.67
  - Average Line 9: 2.50
- Column:
  - Average Column 1: 3.89
  - Average Column 2: 3.44
  - Average Column 3: 3.89
  - Average Column 4: 3.33
  - Average Column 5: 3.67
  - Average Column 6: 3.78

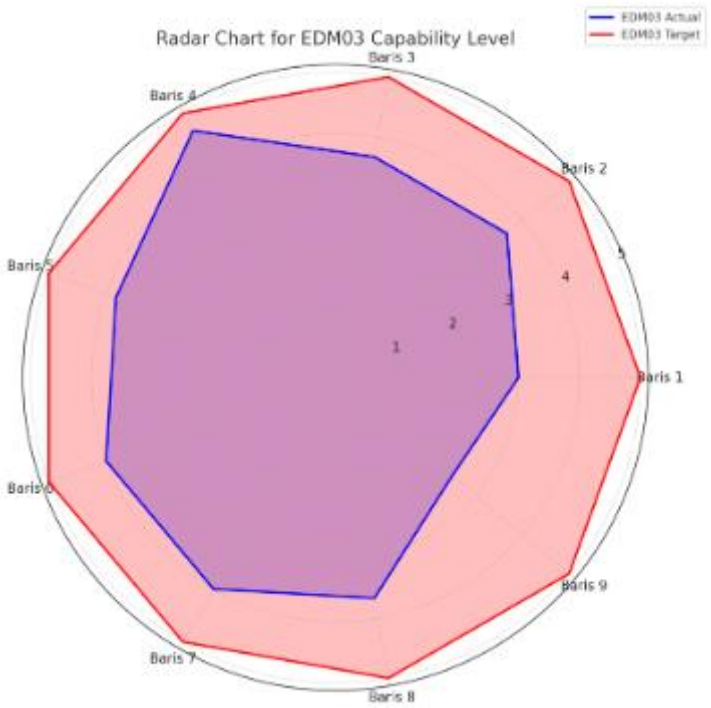
Average Results and Conclusion:

The current condition capability value (as is) in the EDM03 domain ranges from 3.33 to 3.89 with an overall average of 3.67. This indicates that the current system has level 3 or 4 capability, which means that the process is well defined, managed, and measured consistently. While the condition to be achieved (to be) is at level 5, which means the process is optimized for continuous improvement.

MEET EDM03:

- US capability rating: 3.67
- Capability to be rating: 5.00
- GAP Value: 1.33
- Next, a radar diagram is prepared that displays the radar diagram of each of the processes





Here is a radar graph for the APO12 and EDM03 capability levels. The blue area represents the current ability level (as it is), while the red area represents the target's ability level (which will be).

- APO12 Ability Level:

  The current ability level ranges between 3.67 and 5.00.

Target capability level 5.00 for all rows.

- EDM03 Capability Level:

  The current ability level ranges between 2.50 and 4.67.

  Target capability level 5.00 for all rows.

  The chart visually highlights the gap between the current capability level and the target capability level for both domains.

Recommendations

This phase of recommendations aims to address the findings in the short term. Suggestions for improvement for the purposes of the EDM03 and APO12 processes will be elaborated based on findings and impacts. The recommended improvements are as follows:

EDM03 Process Improvement Recommendation Table

EDM03.01	Be more proactive in engaging relevant stakeholders, including senior management teams, IT departments, and other stakeholders.
EDM03.02	Involve relevant authorities, such as senior management, in the process of identifying goals and metrics, as well as obtaining approval for measurement approaches.

Present the recommendations given to improve the EDM03 process. The recommendations given are related to efforts to be more proactive in involving stakeholders in decision-making.

APO12 Process Improvement Recommendation Table

APO12.01 (1)	Conduct thorough research and evaluation of the independent advisors contacted, including considering their reliability, reputation and expertise in applicable laws, regulations and standards.
APO12.01 (2)	Create a document that clearly outlines a comprehensive and detailed procedure that will serve as a reference for employees.

Present recommendations given to improve the APO12 process. The recommendations given are related to data collection methods and documentation recording.

By implementing these recommendations, it is hoped that it can reduce the gap that exists between the current condition (as is) and the condition to be achieved (to be), as well as improve the overall system capability.

Conclusion

ARKAS Information System Evaluation: The implementation of the ARKAS information system at the Palu Safety Army Christian Vocational School has reached level 4 capability in the APO12 and EDM03 domains. This shows that the process is well defined, managed, and consistently measured. However, there is room for further improvement towards level 5, which will reflect the optimization of the process on an ongoing basis.

GAP Analysis: The GAP analysis shows that there is a difference in capability between the current condition (as is) and the desired condition (to be). In the APO12 domain, the capability GAP is 0.76, while in the EDM03 domain, the capability GAP is 1.33. This shows that there is still a need for improvements in risk management and risk optimization in both domains.

Risk Management: The implementation of ARKAS has helped in better risk management in schools, but improvements are still needed to achieve a higher level of capability. Effective risk management will help improve administrative and academic performance in schools.

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