JOGTA Journal of Governance, Taxation and Auditing
P-ISSN - 2830-6392 (PRINT)
E-ISSN - 2962-2522 (ONLINE)
JOURNAL OF GOVERNANCE, TAXATION AND AUDITING
Indexed By : GARUDA Google ROAD INDEX COPERNICUS OneSearch ISJD EBSCO Clarivate Analytics DOAJ

AUDIT OF IT PROCESS AI-02 COBIT IN ACADEMIC INFORMATION SYSTEM (CASE STUDY ON SEVERAL VOCATIONAL HIGHER EDUCATION IN BANDUNG)

Volume: 1
Number: 4
Page: 475 - 482

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Article History:
Received: 2023-04-30
Revised: 2023-04-14
Accepted: 2023-06-15

Abstract:
The development of Information Technology (IT) allows the Academic Information System (SIAK) to become a central element in the management process of Higher Education, primarily Academic. On the other hand, the sophistication of IT in SIAK develops a variety of new risks (IT Risks) that accompany it if not managed properly. Therefore, the maturity level of SIAK management determines the performance of the academic activity process. In SIAK, the element that determines system performance is Application Software. The results of this study indicate that IT Process AI-02 (Procurement of Application Software) Vocational Higher Education in Bandung, as measured based on COBIT standards, is still at the 2.1 level. This means a part/function (management) already handles Software Procurement but is still "Repeatable but intuitive." Because it is managed sporadic and only refers to leadership policies with limited control over IT/SIAK. From the radar chart of the research results, it can be seen that the prominent role of IT Process AI-02 is the aspect (indicator) of "Approval," "Technical Support from Vendors," and focus on handling the problem of "data integration" because many universities are in the transition period from old IT to new IT. Other indicators (COBIT requirements) still need to be higher (meaning they have not become a concern) when the AIS procurement process is carried out.

Keywords: SIAK, IT Governance, Maturity Score, IT Process AI-02

Cite this as SURYA, R. T., KERIHI, A. S. Y., MURHABAN., HAQ, A. "Audit of IT Process AI-02 Cobit in Academic Information System (Case Study on Several Vocational Higher Education in Bandung)." Journal of Governance, Taxation and Auditing,

INTRODUCTION

Higher education, including Vocational Higher Education today, is highly dependent on the existence and use of Academic Information Systems (AIS). It can even be an enabler. SIAk requires appropriate Information Technology that is used efficiently, which requires increasingly large investment funds and operational costs. Therefore, information technology must provide benefits that optimize the Academic Information System's (SIAK) performance. This means that SIAK must be managed with an adequate level of IT Governance. Managing SIAK based on the principles of IT governance, university management will be able to control IT risks that may arise. Starting from Cyber Crimes, fraud against academic databases, decreased performance of Information Systems, slow E-learning Systems, inefficient financial management of IT investments, and various risks that may arise from using SIAK from immature management.

Previous research shows that the SIAK of most universities in Indonesia still has a relatively low level of information technology governance maturity (IT Maturity Level) when referring to Best Practice Standards such as COBIT. This means the SIAK needs to be managed systematically,

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structured, or well-documented and refers to various best practice measures. This is the reason (rationality) why research on IT Governance Audit of SIAK is essential, especially in IT Process AI-02 (Procurement and Implementation).

COBIT is the best IT Framework today, used to manage Information Systems (and their elements) to achieve an optimal Maturity Level. This research is intended to measure the extent of the Maturity Level of IT Process AI-02, namely, "Acquire and Maintain Application Software," including control of existing IT Risks.

Definition of IT Governance. IT Governance is a process of controlling the management of Information Technology (or Information Systems) carried out by an organization, which includes using IT resources such as software, Brainware, and databases for IT infrastructure. Other experts say that IT Governance is a management activity/process in choosing and using decisions related to obtaining and using IT resources. Oltsik (2003) defines IT Governance as a set of policies, processes/activities, and procedures that support the operation of IT (Information Systems) so that the results are in line with business strategy (organizational goals).

COBIT Basic Concepts. COBIT, which stands for "Control Objective for IT and its related," is one of the instruments and frameworks created to control an Information System. Apart from being a reference for building and managing IT Governance (IT Management Framework), COBIT is also used by IT / SSI Auditors as a standard in conducting audits whose object is Information Systems. COBIT says that the Process of managing Information Systems (ISAK) must begin by conducting and determining various IT Processes (activities) covered by the "IT Planning and Organise" Domain. Then, it is followed by the "IT Acquiring and IT Implementation" Domain, then the "IT Delivery and IT Support" Domain, and ends by carrying out activities (IT processes) in the "IT Monitoring and IT Evaluation" Domain.

Each IT Process is equipped with controls that measure success in carrying out these IT activities. Control Objective set by IT Framework COBIT consists of a High-level Control Objective comprising 34 pieces. Each high-level control objective comprises three to twelve detail-level control objectives (DCOs). 384 Detail-Level Control Objectives (DCOs) are spread across various domains. The Domain "IT Acquisition and Implementation (AI)" consists of six IT Processes as follows:

1. AI-01 "Identify Automated Solutions"
2. AI-02 "Acquire and Maintain Application Software"
3. AI-03 "Acquire and Maintain Technology Infrastructure
4. AI-04 "Develop and Maintain Procedures"
5. AI-05 "Install and Accreditation"
6. Ai-06 "Manage Changes"

This research is focused on measuring the Maturity Value of IT Process Ai-02, namely "Acquire and Maintain Application Software."This IT Process is measured through qualitative data (interviews and observations) and then converted into quantitative data (Scoring). The IT Process Maturity Score is then accumulated and expressed in one number called the IT Maturity Level. The level of this number is as follows:

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Figure 1. IT Process Maturity Level Figures

The meaning of the *IT Process* Governance Maturity Level Value is explained as follows:

Level 0 (No IT management at all/Non-Existent. **A** condition where a university needs to be made aware of the importance of Information Technology Governance. Only a few COBITs are carried out at this College, even though it uses the Academic Information System (SIAk).

Level 1 (Initial/Ad-Hoc). Conditions where the College has carried out some *IT Processes*, but these activities are carried out reactively (sporadically) without using standardized standards and routine systems. Colleges already have an Academic Information System, but it is managed without being supported by certain sections/units that specifically handle it.

Level 2 (Repeatable/manageable but intuitive). Conditions where universities have implemented various *IT processes* based on COBIT standards (and have run SIAk) with management-based governance. However, the existing IT management needs to be better defined and standardized, so running it is often inconsistent (*disorganization*). Universities have started to use procedures in the AIS, but not all of them are documented, and the procedures/systems have not been formally socialized to related parties. There has yet to be formal training related to the effectiveness of the performance of these systems and procedures. The individual still determines implementation responsibility for the AIS (section) deemed competent to do so (*IT Function*). The highest leadership of the College has a low commitment to developing the AIS to a more mature level.

Level 3 (Defined Process). Conditions where the College has formal and written standard procedures (documented) and has been socialized to various levels of management (and users) as part of daily work activities. Universities already have their own AIS management that is managed with good IT management (good practice). However, there is no method or reference to systematically measure the effectiveness of procedures/systems/management, so it is still possible that many deviations and errors in the *IT Process* are being carried out because it does not refer to Best Practices.

Level 4 (Managed and measurable). The condition where Higher Education has several indicators or quantitative measures that are used as targets/objectives to control the performance of various *IT Processes* carried out by SIAK, which already refers to *Best Practice*. There are already facilities to monitor and measure the effectiveness of IT procedures and management. Higher education can quickly find out and take the necessary actions if there is a process of using IT that is indicated to be running ineffectively (IT Risk). *The IT process* is continuously improved (learning and growing) and compared with best practices from similar industries. There are also tools to automate *IT Process* control and SIAK performance improvement processes.

Level 5 (Optimistic/Optimised). A condition where the College has implemented *IT* Governance that refers to *best* practices optimally. The *IT Process* carried out by SIAK has reached the best level of maturity because various continuous improvements have been made, and the Process of comparison (*benchmarking*) with other parties is the best reference (standard). Automated tools have been used to support *workflow* in managing various *IT processes* and the operation of SIAK. The College is constantly improving the efficiency and quality of performance of the various IT Processes that are carried out, even so flexible that they are easily adaptable to changes in Information Technology.

Academic Information System (AIS). *Sources* of data and information currently reliable in supporting the management of higher education academic activities are processed by the Academic *Information System (SIAk)*. The Academic Information System functions to provide all academic information needed by *stakeholders*, namely the highest leadership (*top management)*, head of department (*middle management)*, head of study program (*operational management)*, lecturers, including non-managerial parties such as students, homeroom teachers, parents and heads of

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administrative fields (*supporting activities)*. Academic Information System has become a tool (strategic instrument). However, as an information system, various IT risks always prevent the strategic goals from being achieved and can even result in losses for higher education.

Although the Academic Information System (AIS) consists of various elements, its performance is primarily determined by the application software used: Whether it has features, menus and facilities appropriate to the College's Academic Processes. How the software is implemented (installed) and customized (adjusted) will determine whether the application software can improve the performance of the SIAK.

METHODS

This research uses *qualitative* research methods, where the data are in the form of opinions/opinions of leaders of Vocational Universities (at various levels) located in Bandung City. The data is then converted into quantitative data using the *Scoring Method (Surendro)* concerning the COBIT Maturity Level weighting method. Respondents are leaders and users of respondent universities from various levels, ranging from lecturers, heads of departments, and heads of study programs to assistant directors and directors whose job functions and responsibilities are related (directly or indirectly) to SIAK, including students who are also end-users.

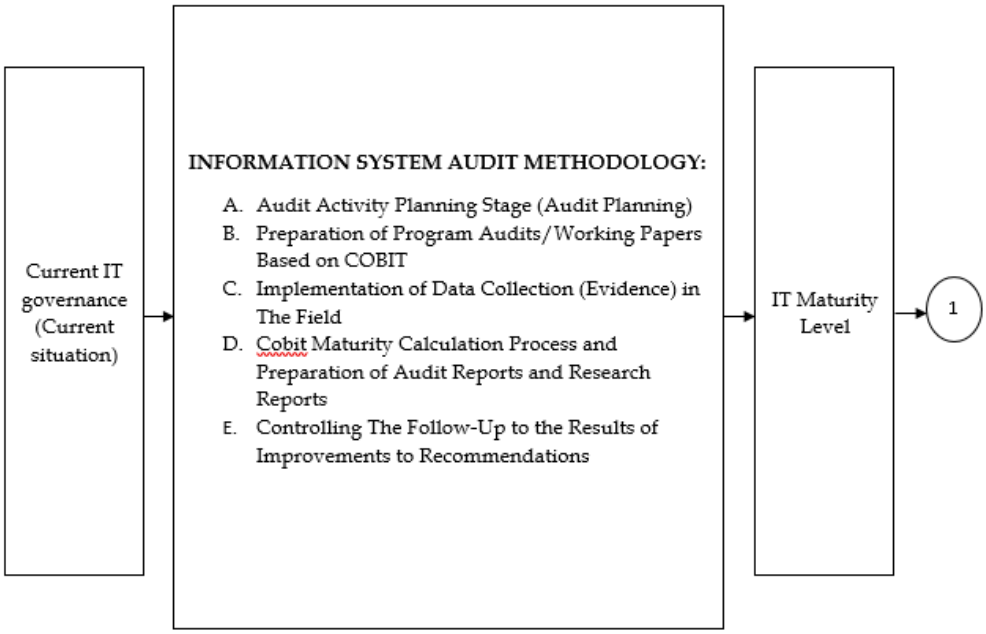

Figure 2. SIAK Governance Audit Methodology

RESULT AND DISCUSSION

The data from the questionnaires collected in this study came from 100 respondents. The questionnaire questions were based on the *High-Level Control Objective* of IT Process AI-02, which is defined as follows:

"*To control over the IT process of acquiring and maintaining application software that satisfies the business requirement to provide automated functions that effectively support the business process is enabled by the definition of specific statements of functional and operational requirements, and a phased implementation with clear deliverables...*" (Source: *COBIT 3rd Edition: Control Objectives, 2000*)

The *high-level control objective* is then translated into several more detailed *statements* called *Detailed control objectives (DCO)*. The following is the DCO statement for *IT Process* AI-02:

1. If the Application software is created by the College itself (not purchased), this activity must be carried out using systematic and structured Application design and programming methods.

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2. New application software will generally change various aspects of the Academic Information System (AIS). Therefore, the relevant management must control and direct these changes well.
3. The relevant parties must first approve the general and detailed design of each application software. If buying ready-made application software (in the form of *Application Packages*), the features must be adjusted (in this case, it must be in line with the Academic Information System of the College).
4. If the application is self-made, the software documentation is made systematically and clearly to facilitate the future improvement/development of the application.
5. The source documents of the data to be processed by this application software must be properly prepared and designed.
6. The application software must-have features that meet the needs of the Process being automated and make it easy for users to do so.
7. Various *Application Control* elements, according to the activities being automated, should be covered in the application.
8. Application Software must have passed testing based on the appropriate method/method, and the relevant leadership must approve the test results.

Table 1. Management Awareness and Achievement Score of IT Process AI-02

No.	Detailed Control Objective (DCO) AI-02	L	M	H	Performance Value
1	Effectiveness of Application Software Procurement Procedures	19%	68%	13%	1,9
2	Application Software Specification feature agreement with *End-User*	16%	65%	19%	2,0
3	*Existing Systems* specification change procedures and methods	26%	48%	26%	2,0
4	*Approval of* Application Software Specification Design from Leadership	6%	42%	52%	2,5
5	Involvement of related parties to match the specifications of the purchased App	39%	45%	16%	1,8
6	Design of input data source documents for new application software	32%	52%	16%	1,8
7	*Check List* for feature match check New application	39%	48%	13%	1,7
8	*User-friendly* factor	6%	68%	26%	2,2
9	Establishment of Application software procurement team	16%	61%	23%	2,1
10	Involvement of relevant leaders to determine the features of the Application Software	10%	61%	29%	2,2
11	Quality testing of procured (made/purchased) Application Software	13%	58%	29%	2,2
12	Completeness of Manual Book	13%	55%	32%	2,2
13	Training for potential users of the application	16%	48%	35%	2,2
14	*Technical* support from vendors	10%	48%	42%	2,3
15	Effective tendering procedures and mechanisms	42%	35%	23%	1,8
16	Considering the *IT Security* factor of the held application software	6%	65%	29%	2,2
17	Integration of data from Application software with legacy system	6%	42%	52%	2,5
	AVERAGE Performance Level of *IT Process* AI02	**19 %**	**54 %**	**28 %**	**2,1**

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The calculation results (data processing) show that as many as 54% of higher education leaders say they have handled the activities/processes of procuring Application Software quite well (*Mediocare*). Even 28% considered that the Governance of *IT Process* AI-02 had been done well and by COBIT standards. Generally, the remaining risk (*Residual Risk*) is only 19%, categorized as *Low IT Risk*.

However, if analyzed partially, it can be seen that most of these Vocational Universities do not involve many potential users (*business owners*) such as Departments, Study Programs, Lab Heads, Lecturers, students, and other related parties in the Process of procuring Application Software for SIAK. The 39% figure shows that there still needs to be more user involvement as required in the COBIT DCO. Another exciting thing from the data findings is that 32% said there needed to be systematic document preparation for the procured application software. This shows that 84% of higher education leaders consider application software not central in determining the quality of academic information systems (SIAK).

42% of universities still tender for the procurement of Application Software in a sober (low) less effective (when referring to COBIT). This implies that there is generally no effective mechanism and procedure for tendering (purchasing) Application software. The low-performance Value of this aspect, which is 1.8, shows that universities do not consider it essential to create a clear and structured mechanism related to the Application Software procurement process. Table 1 above also shows the overall performance value of the attributes (indicators). A Total Performance Value of 2.1 indicates that the level of achievement of AI-02 based on the DCO of the COBIT standard is at the MEDIUM Level. This value means the remaining *IT Risk* is relatively high (*Medium Risk)*. However, some other aspects that must be watched out for because they are below 2) are as follows:

1. Effectiveness of Application Software Procurement Procedures (Performance Value 1.9)
2. Related Party Involvement (Performance Score 1.8)
3. Design of Tender Input Document for New Application (Performance Value 1.8)
4. *Check List* (Performance Value 1.7)
5. Tender Procedures and Mechanisms (Performance Score 1.8)

The five attributes with performance scores below 2 have the potential to pose serious risks (Medium and Hgh); if not handled properly, it will have an impact on the effectiveness of SIAK.

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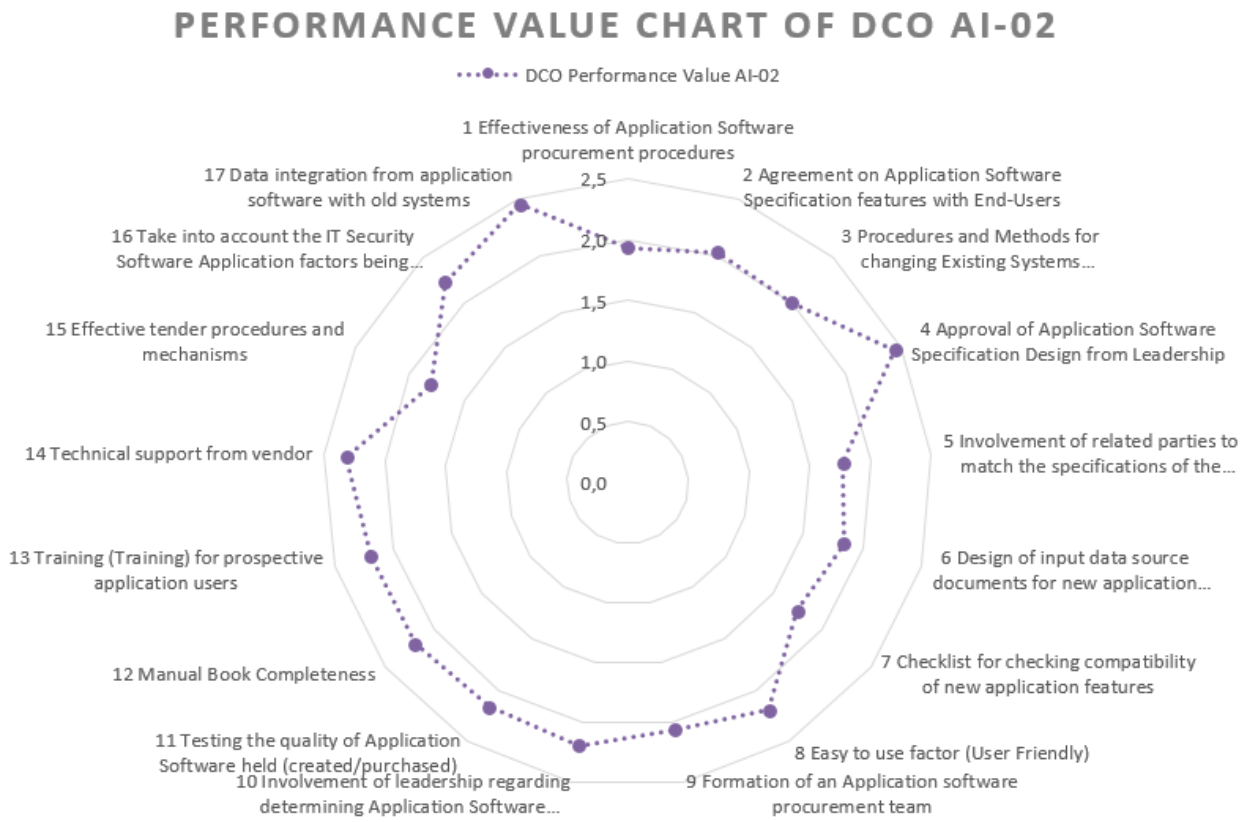

Figure 3. DCO AI-02 Achievement Performance Value

Figure 3 shows the leadership approval process for the Application Software procurement process. This means that in almost all procurements of Application Software, the focus is on the approval of the leadership. The risk (IT Risk) is if the College's leadership does not have sufficient understanding of the application software being used.

Another interesting point is the "Technical Support" from the vendor, which is quite a concern for the Higher Education leaders. This indicates that most buy so that vendor support becomes one of the Critical Success Factors (CSF). However, on the other hand, this also creates a dependency for the College on the vendor. Therefore, to reduce this risk (IT RISK), it needs to be equipped with good Vendor Management to maintain the continuity of the operationalization of Application Software in its role of running the Academic Information System effectively.

CONCLUSION

The role of Academic Information Systems today not only causes an organization's various activities to be more efficient and practical but also to become an enabler to improve performance and provide value. The sophistication of technology that has maturely developed should make the main activities and functions of higher education, namely carrying out its academic activities, more optimal. To enable the Academic Information System to provide optimal benefits, it must be managed by building the right IT Governance for SIAK. COBIT is one of the IT Governance Frameworks that is increasingly recognized and popularly used today to optimize an information system's performance. Because it succeeds in identifying, defining, and mapping various IT processes that should naturally be carried out in medium- and large-scale organizations. Using the COBIT IT Framework, it is expected that the AIS can be used optimally to improve the performance of Higher Education, especially the Academic Process.

An essential element of the Academic Information System is the Application Software, which is the driving force. This study is measured through the measurement of the IT Process "Acquire

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and Maintain Application Software" (AI-02) as contained in the "Acquisition and Implementation" domain of the IT Framework COBIT. As many as 55% of higher education leaders assess this activity as having been carried out quite well, with a performance value of 2.1, indicating that the achievement level is 55% of the AI-02 "Detailed Control Objective / DCO" set by COBIT. Thus, only about 20% did not achieve DCO, which is in the Low-Risk (Controlled) category. This means that the risks accompanying the implementation of IT Process AI-02 can be handled well and maintain the performance of AI02.

The Maturity Level of IT Process Ai-02 Governance shows a number 2.0, which means that IT Management of IT Process AI-02 has been carried out with recurring patterns (management) based on specific management systems and procedures. However, it is primitive (not patterned, not based on a clear and measurable structured method). Management of IT Process AI-02 activities is only carried out based on sporadic activities based on IT Projects and is driven more by the IT Function that technically runs it. The involvement of stakeholders, including university leaders and end-users, in IT Process AI02 activities still needs to be improved. At the same time, the involvement of "business owners" such as Departments, Study Programmes, Finance Departments, Lecturers, and others will determine whether the application software can be used effectively or not and by the users' activities.

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