

## LITERATURE REVIEW OF INFORMATION TECHNOLOGY AUDIT IN E-GOVERNMENT USING COBIT

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### Abstract

The Indonesian government continues to strive to improve public services to meet global demands, one of which is the development of technology such as a broad and integrated internet known as e-government. In implementing the e-government concept, it is necessary to have an IT audit to align the IT management process with the plans, objectives, and business strategies of government institutions. One framework that can be used as a standard is COBIT. This study uses the Systematic Literature Review research method to answer Research Questions (RQ): RQ1 regarding how the COBIT framework is used in IT audit case studies, especially in the e-government field, RQ2 regarding the COBIT domain used in research. The results of the study obtained 32 journals that were selected through a literature search process, literature selection according to criteria, and quality assessment. The results of the study, especially in the context of the main research question, namely the journals reviewed using the COBIT framework with various versions in evaluating e-government implementation. In COBIT there is a workflow that starts from identifying problems in the organization to analyzing capability level. In this study, it is known that the COBIT 2019 version is more adaptable to organizational conditions and technological developments because this version has more domains and design factors have been added (answer RQ1). The COBIT framework has 5 domains, namely the EDM, APO, BAI, DSS, and MEA domains. The most dominant domains used in assessing e-government implementation in journals are the APO and DSS (answer RQ2).

**Keywords:** *COBIT, E-government, Systematic Literature Review*

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### 1. INTRODUCTION

In order to meet global demands, the Indonesian government continues to strive to improve the quality of information and communication technology. This is also attempted by the government to improve public services as the main task and function of the government is to provide good and reliable services to help the needs of its people. One of the efforts to improve this service is the government with the development of technology such as a broad and integrated internet which can be referred to as electronic government (E-government). E-government is the transformation of processes, transactions, creation, and implementation of a more efficient government system, carried out through information and communication technology to provide better services to citizens while reducing waste and corruption, increasing accountability, transparency, and public trust [1].

In implementing the e-government concept, an information technology (IT) audit is needed to align IT management processes with the planning, objectives, and business strategies of the government institutions themselves. IT Audit is an activity of collecting and evaluating evidence to find out whether the existing system has used the resources owned efficiently, can support the achievement of organizational goals effectively, maintain data integrity, and protect the organization [2]. IT audit is one of the urgent needs of agencies in improving and improving IT processes in public services, especially e-government. In some previous studies, it was explained that IT audits need to be carried out because it is through this process that IT audit results are obtained where the results of these activities can be used as a reference or material to correct discrepancies that exist in agencies [2]–[5].

One framework that can be used as a standard in conducting IT audits is the Control Objective for Information & Related Technology (COBIT). COBIT

is a standard that functions to provide direction for IT governance and management which is used by management, auditors, and users as a bridge to separate control needs, technical issues, and business risks. So it can be said that the principle of COBIT is to provide the information an organization needs to achieve its goals [6]. The definition of COBIT can also be described as a standard that is considered complete because it is comprehensive in scope and can be used in various types of organizations [5].

The COBIT framework distinguishes between management and governance, where governance is carried out to obtain assurance that the conditions, needs, and decisions of stakeholders are evaluated to align with agreed corporate goals. Performance is controlled based on agreed goals and directions. Where the direction is set by prioritizing and making decisions. While management is carried out to plan, build, implement and monitor activities, this is following the guidelines determined through governance so that corporate goals can be achieved [4].

Concerning the background of the existing problems, there have been several previous studies using COBIT to conduct IT audits. The first research focuses on auditing information systems using COBIT 5 in the Indonesian Navy [5]. The second study focuses on an overview of the current condition of IT governance at the Public Works Service in Tanggamus District [7]. The third study focuses on auditing the New Student Acceptance System (SPPDB) using COBIT 4.1 to find out the IT risks that exist in the university, knowing the IT controls to deal with IT risks, knowing the IT process investment according to the COBIT PO 5 domain and measuring the maturity level [8]. The fourth study focuses on auditing information security governance to find out whether the implementation of information security governance at the Ministry of Religion of Lampung Province has been going well [3]. The latest research focuses on how to manage the operational management of both academic and non-academic activities at the university level so that activities carried out as a whole through academic information systems and E-Office need to be carried out an IT governance audit at the university level to find out whether they have been carried out optimally [9].

Based on the knowledge gap in several journals above, it is known that the COBIT framework has a broad scope, so this research is focused on public services (e-government). On the research problem side, there is an urgency for institutions to improve and improve IT processes in public services, especially e-government. In this case, the IT audit process is carried out to align IT actions with the vision and mission to be achieved by government institutions. So that the IT audit is expected to be able to evaluate how far the capability level is in the process of implementing e-government services. This is also in line with the Regulation of the President of the Republic of

Indonesia Number 95 of 2018 which explains that an information and communication technology (ICT) audit is a systematic process for objectively evaluating and obtaining evidence on information technology assets to determine the level of conformity between information technology and criteria, or established standards.

This research is a literature study using Systematic Literature Review (SLR) to analyze the use of COBIT 2019 in conducting IT audits in e-government implementation in government institutions. The selected journals in this study will be reviewed and analyzed so that this research can provide a summary regarding the use of COBIT 2019 in auditing information technology in the e-government sector. This research is expected to make it easier for users or future researchers to understand COBIT 2019, especially in the field of e-government.

## 2. RESEARCH METHOD

This research study used the Systematic Literature Review (SLR) research method. The SLR method is an activity of identifying, evaluating, and translating previous studies that have relevance to certain research questions, phenomena, or topics [10]. The stages of the SLR research method are as follows:

### 2.1 Research Question

A research Question (RQ) is built based on the needs or objectives of the chosen topic. Research Questions in this study are:

- RQ1: How is the COBIT framework used in IT audit case studies, especially in the e-government field?
- RQ2: What COBIT domains were used in the research?

### 2.2 Literature Search

The literature search process is carried out to obtain data sources in the form of relevant research that can be used to obtain answers to the Research Questions and related references. The literature search process was carried out on the Scopus and SINTA databases using the keywords "COBIT" and "e-government". The year of publication of the journal is limited between 2019 and 2022. The journals obtained based on search results total 74 files with details in Table 1 below:

Table 1. Literature Search Results

Database	Number of Files
Scopus	12
SINTA	62
Total	74

### 2.3 Literature Selection

Literature or journals that have been searched will then be selected based on inclusion and exclusion criteria to suit the needs and be suitable for use in conducting this SLR research. Following are the

inclusion criteria and exclusion criteria in journal selection:

Inclusion criteria:

- The research used was obtained from the Scopus or SINTA database with a minimum Sinta index of 3.
- Research has COBIT coverage with case study activities in government.
- The research mentions and describes the COBIT domain used.
- Research using Indonesian and international languages.

Exclusion criteria:

- Research is an unpublished final project.
- Research does not describe the COBIT domain used.
- Research is not literature review research.

From the selection of literature based on the inclusion and exclusion criteria above, 32 journal files were obtained with details in Table 2 below:

Database	Number of Files
Scopus	10
SINTA	22
Total	32

### 2.4 Quality Assessment

The data or journals that have been obtained will be evaluated based on the question of quality assessment criteria as follows:

- QA1: Does the journal contain research related to how IT audits are carried out in the field of e-government using the COBIT framework?

QR2: Does the journal state which domains are used?

### 2.5 Data Collection

This study uses secondary data in the form of journals obtained through the Scopus and SINTA databases with a minimum index of SINTA 3 and the year the journal was published between 2019 and 2022. The literature study in this study was carried out using the SLR method.

### 2.6 Data Analysis

The process that is carried out after the data is collected is the process of analysis by making a summary and formulation of findings from the literature used in this study. The analysis process will produce data that will be displayed and refers to RQ1 and RQ2.

## 3. RESULT AND DISCUSSION

In this study, data were analyzed based on quality assessment. Table 3 below shows the results of the evaluation of the data or journals that have been obtained based on the question of quality assessment criteria:

Table 3. Grouping of Journals Based on QA 1

No	Research	Framework
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1	(Aprianto et al., 2021)	COBIT 5, ISO 31000:2018
2	(Umar et al., 2019)	COBIT 5
3	(Hanif et al., 2020)	COBIT 5
4	(Nachrowi et al., 2020)	COBIT 2019, ITIL 4
5	(Thamrin et al., 2021)	COBIT 5
6	(Safitri et al., 2021)	COBIT 2019
7	(Darmawan & Dwiha, 2019)	COBIT 5
8	(Darmawan & Harto, 2019)	COBIT 5
9	(Sari et al., 2021)	COBIT 5
10	(Tiasmi et al., 2021)	COBIT 5
11	(Haster & Hartomo, 2022)	COBIT 5
12	(Suwarno, 2021)	COBIT 5
13	(Rabhani et al., 2020)	COBIT 5
14	(Nurhuda et al., 2021)	COBIT 5
15	(Agansa et al., 2021)	COBIT 5
16	(Antara et al., 2019)	COBIT 5
17	(Ningsih et al., 2019)	COBIT 5, ISO/IEC 38500:2008
18	(Novianto & Siregar, 2019)	COBIT 5
19	(Vatresia et al., 2022)	COBIT 5
20	(Putra et al., 2020)	COBIT 5
21	(Lelasari et al., 2021)	COBIT 5
22	(Prasetyo & Setyadi, 2022)	COBIT 4.1
23	(Nugroho & Gumilang, 2020)	COBIT 4.1
24	(Prasetyawan et al., 2019)	COBIT 4.1
25	(Awaludin Rizal et al., 2020)	COBIT 5
26	(Zainuddin et al., 2020)	COBIT 5
27	(Vergantana et al., 2020)	COBIT 5
28	(Wulandari et al., 2019)	COBIT 5
29	(Kasma et al., 2019)	COBIT 2019
30	(Audia & Sugiantoro, 2022)	COBIT 2019
31	(Yasin et al., 2020)	COBIT 2019
32	(Magdalena & Solihah, 2020)	COBIT 5

The results of data or journal analysis by conducting quality assessments based on criteria questions or quality assessment 2. The results of the quality assessment based on quality assessment 2 are described in Table 4 below:

Table 4. Grouping of Journals Based on QA 2

Research	Domain
1	APO12
2	DSS05
3	DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
4	EDM03, APO10, APO12, BAI02, BAI03, BAI06, BAI07, BAI10, DSS04, DSS05, MEA01
5	DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
6	APO12, DSS02, DSS03
7	APO01, APO02, APO03, APO04, APO05, APO06, APO07, APO08, APO09, APO10, APO11, APO12, APO13
8	BAI01, BAI02, BAI03, BAI04, BAI05, BAI06, BAI07, BAI08, BAI09, BAI10, DSS01, DSS02, DSS03, DSS04, DSS05, DSS06, MEA01, MEA02, MEA03
9	APO12
10	EDM01, APO01, APO02, APO03, APO07, APO08, BAI02
11	APO03, APO07, APO12, APO14, BAI01, BAI02, BAI09, DSS04, MEA03
12	PO01, PO02, PO03, PO04, PO05, PO06, PO07, PO08, PO09, PO10, ME1, ME2, ME3, ME4
13	MEA01, MEA02, MEA03

14	DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
15	EDM02, BAI04, APO06, DSS02, APO04
16	EDM01, EDM02, EDM03, EDM04, DSS01, DSS02, DSS03, DSS04, DSS05, DSS06, MEA01, MEA02, MEA03
17	EDM04, MEA01
18	EDM01, EDM02, EDM03, EDM04, EDM05, APO01, APO04, APO07, APO13, DSS01, DSS04, DSS05, MEA02
19	DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
20	EDM01, EDM02, EDM03, EDM04, EDM05, APO01, APO02, APO03, APO04, APO05, APO06, APO07, APO08, APO09, APO10, APO11, APO12, APO13, DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
21	DD03, DSS06
22	PO09
23	DS11
24	PO3, AI2, AI5
25	EDM05, APO01, APO04, APO06
26	DSS01, DSS02, DSS03, DSS04, DSS05, DSS06
27	EDM05, APO01, APO12, DSS 04, MEA03
28	DSS01, BAI01, APO07, DSS06, EDM01, MEA03, APO06
29	EDM, APO, BAI, DSS, MEA
30	APO07, APO08, APO11, BAI03, BAI08
31	EDM01, EDM03, EDM05, APO01, APO03, APO04, APO07, APO08, APO09, APO10, APO11, APO12, APO13, APO14, BAI06, BAI07, BAI08, BAI09, BAI10, DSS01, DSS02, DSS03, DSS04, DSS05, DSS06, MEA01, MEA02, MEA03, MEA04
32	APO13

The process of searching for journals, selecting journals, and assessing quality have identified journals from the selected journals. A total of 32 journals describes the use of COBIT in government organizations, especially in the field of e-government. All selected relevant journals provide information related to design, analysis, and assessment using the COBIT framework. The selected journal is a case study on government organizations, especially in the field of e-government.

Referring to the SLR above, Table 3 can answer RQ 1 which in the table shows that government organizations implementing e-government need to carry out evaluations or assessments. In line with the Presidential Regulation of the Republic of Indonesia Number 95 of 2018, the regulation states that evaluation of e-government implementation can be carried out, one of which is through ICT audit activities. The selected journals present research related to case studies in the use of the COBIT framework in the field of e-government in government organizations.

Based on Table 3, it is also known that there are several versions of the COBIT framework. This

framework continues to be developed periodically by an institution called ITGI (IT Governance Institute). This institution is part of the Information Systems Audit and Control Association or ISACA. So, when compared between versions, COBIT 2019 has the biggest update compared to previous versions. This can be seen from the addition of design factors to COBIT 2019 so that it is more adaptable to organizational conditions. The COBIT 2019 domain is also more objective and emphasizes the results achieved. COBIT 2019 has more principles and is more flexible than COBIT 5 or previous versions so that it can adapt to developments in information technology [6].

Based on the results of the SLR carried out, several updates were also found in the 2019 version of the COBIT framework. Several updates to the 2019 version of the COBIT framework compared to the previous version, namely COBIT 5, can be detailed in Table 5 below:

Table 5. Comparison of COBIT 2019 and COBIT 5

No	COBIT 5	COBIT 2019
1	It doesn't have a factor design	have a design factor
2	Have 5 principles	Have 9 principles
3	The details of the domain are called IT governance processes	The domain details are called IT governance objectives
4	Have 37 domains	Have 40 domains (additional domains APO14 and MEA01, while BAI01 is cleaved into BAI01 and BAI11)
5	There are 5 cascade goals	There are 4 cascade goals and company goals by first aligning IT goals
6	Governance: enabler	Governance system components

Research related to the implementation of audits or assessments using COBIT can be done through several steps. The following are the steps in the 2019 version of the COBIT framework: (1) The first step taken is to identify the problem by creating a design factor); (2) The results of problem identification are then used in the stage of determining the 2019 COBIT domain according to the scope of needs. In the COBIT process, this stage is the most important. In determining the domain there are several processes, namely identifying stakeholder needs and enterprise goals, identifying alignment goals, and identifying IT domains and processes through design factors; (3) The third step, after the domain is determined, the next step is to determine the research respondents; (4) The fourth step determines the target capability level. Capability level achievement is obtained based on domain mapping results on COBIT; (5) The fifth step, after the achievement level has been determined, data collection is carried out; (6) The last step, based on the data that has been collected, a capability level analysis can be carried out.

After knowing the achievement of the capability level, it can be seen whether the level that has been

achieved at this time has reached the expected level. If the current capability level achieved is the same as the expected capability level, then the IT process can be declared to have been running well and in line with expectations. However, if there is a gap (difference) between the capability level and the expected level, efforts are needed to improve the IT process so that the capability level can reach the expected level.

The SLR results in the table above also show what domains are used in these journals. Table 4 shows the various domains used to answer RQ 2. From the 32 journals, it can be identified that the domains that are used the most or are most dominant are the APO (Align, Plan, Organize) and DSS (Deliver, Service, Support) domains. In the COBIT 2019 guidance, the APO domain focuses on the organization as a whole, IT support activities, and strategies. The APO domain consists of 14 processes. Second, the DSS domain focuses on IT service operations and support, including security. The DSS domain consists of 6 processes.

In the COBIT framework, apart from the 2 domains above, there are other domains, namely EDM (Evaluate, Direct, Monitor), BAI (Build, Acquire, Implement), and MEA (Monitoring, Evaluate, Assess) which are also used in these journals. The EDM domain focuses on evaluating strategic choices, providing direction to senior management regarding strategic choices, and monitoring the selected strategic achievements. The EDM domain consists of 5 processes. The BAI domain discusses how to define, acquire and implement IT solutions and their integration with business processes. The BAI domain consists of 11 processes. The MEA domain monitors IT performance and compliance through external requirements, control objectives, and internal performance targets. The MEA domain consists of 4 processes.

#### 4. CONCLUSION

The results of this SLR study obtained as many as 32 journals that had been selected in the process of searching and selecting literature according to the assessment of the quality of the journals and the established criteria. The results of SLR research, especially in the main context of this research, namely government organizations and in these journals use the COBIT framework with various versions in conducting assessments or evaluations, especially in the field of e-government implementation. In using the COBIT framework, there is a workflow that starts from identifying problems in the organization to analyzing or calculating capability levels. In this study, it is also known that the 2019 COBIT version is more adaptable to organizational conditions and technological developments because this version has more domains and has added design factors (answer RQ1).

The COBIT framework has 5 domains, namely the EDM, APO, BAI, DSS, and MEA domains. Of the five domains, the most dominant domains used in assessing e-government implementation in the above journals are the APO and DSS domains. The EDM, BAI, and MEA domains are also used in some of these journals. The difference in the domain used is due to differences in the results of problem identification of each research object. So that the selected domain varies because it adapts to the conditions of the research object (Answer to RQ2).

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