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Governance Capability Gap Analysis of SIMLITABMAS: A COBIT 2019-Based Evaluation Methodology and Literature Review

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Abstract

This study aims to evaluate and enhance the Information Technology (IT) governance capability of the SIMLITABMAS system using the COBIT 2019 framework. By integrating a literature study with a formal evaluation methodology, the research focuses its analysis on the Deliver, Service, and Support (DSS) domain, specifically DSS02 (Managed Service Requests and Incidents), DSS03 (Managed Problems), and DSS05 (Managed Security Services). Literature review results indicate that the DSS domain is a critical juncture in university digital services, which frequently encounters obstacles due to manual procedures. Capability measurement results reveal that SIMLITABMAS is currently at Level 3 (Defined) with a fulfillment rate of 75.2%. This finding confirms a one-level gap toward the target of Level 4 (Measured), driven by a high dependency on informal communication channels such as WhatsApp and low digital literacy among users regarding system manuals. As a strategic solution to bridge this gap, this study recommends the implementation of AI Chatbot technology as a 24/7 automated helpdesk. The integration of the COBIT 2019 methodology with this automation solution is proven to transform service governance from an ad-hoc stage toward a more standardized, secure, and quantitatively measurable support system to sustainably support institutional research productivity.

I. INTRODUCTION

The implementation of Information Technology (IT) in higher education has transformed from a mere operational support tool into a strategic enabler for achieving competitive advantage. Information system auditing has become a crucial step in ensuring that IT management aligns with organizational goals and

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delivers measurable value [1]. Effective IT governance must be capable of identifying performance bottlenecks and providing adaptive recommendations tailored to the institution's needs [2].

Nahdlatul Ulama University of Surabaya (UNUSA) manages SIMLITABMAS (Management Information System for Research and Community Service) as a primary pillar for documenting the Tridarma (Triple Dharma) performance. This system is critical as it serves as a barometer for research productivity, which directly impacts institutional accreditation and rankings [3] However, observations indicate a disparity between the availability of system features and the effectiveness of support services.

The primary issue identified is inefficiency in user services. Despite the availability of technical manuals, users tend to bypass official procedures and submit repetitive inquiries directly to administrators via instant messaging applications. This phenomenon indicates a failure in self-service systems and creates an excessive workload for LPPM administrators. From a governance perspective, this condition reflects weaknesses within the Deliver, Service, and Support (DSS) domain, particularly in the management of service requests and incidents [2].

To address these issues, a comprehensive evaluation using the COBIT 2019 framework is required. COBIT 2019 was selected due to its flexibility in considering unique Design Factors for the organization, enabling a precise mapping of the current state (as-is) and the desired state (to-be). A focus on the DSS domain will provide an in-depth overview of the extent to which IT services are delivered and supported consistently.

This study focuses on a gap analysis to determine strategic steps for enhancing the governance capability of SIMLITABMAS. Through a systematic literature study and evaluation methodology, this research is expected to formulate effective recommendations to bridge capability gaps, resulting in research service governance that is more responsive, efficient, and standardized.

II. RELATED WORKS

A. *Review of Related Research*

Saleh et al. (2021) evaluated IT infrastructure using COBIT 2019 within the DSS01 domain. The results showed an average maturity level of 3.21 (Defined Process) [4]. Gap analysis identified a gap of 0–1 level, with recommendations focusing on strengthening Standard Operating Procedures (SOPs) and operational controls. Similarly, research conducted by Zahroh et al. (2025) developed audit working papers for IT helpdesks using the DSS02, DSS03, and DSS04 domains. The evaluation results indicated that the system was at level 3 (Defined), where processes were documented but not yet consistently measured [5]. This study emphasized the importance of structured incident documentation to improve service quality.

Pratama et al. (2023) analyzed the capability of the DSS domain, achieving an average score of 3.41 (Defined Process). A gap of 0.5 to 1.0 level toward the target was identified, particularly in the aspect of managed security services (DSS05). The resulting recommendations included the refinement of incident management and the cultivation of risk awareness culture [6]. Furthermore, research by Rosyadi & Zaman (2024) evaluated academic services in several higher education institutions using the COBIT 2019 DSS domain. Findings showed that most institutions were still at the Managed Process level (Level 2), requiring progression toward an Established Process (Level 3) through the optimization of operational procedures and service continuity plans [7].

Based on the literature review above, a pattern emerges indicating that the Deliver, Service, and Support (DSS) domain frequently serves as a weak point in IT governance within the higher education sector, with average capability levels ranging from Level 2 (Managed) to Level 3 (Defined). Most studies confirm the existence of gaps between daily operational practices and the expected governance standards.

The novelty of this research lies in its focus on evaluating SIMLITABMAS as a key research management system. Unlike previous studies, which mostly focused on general academic systems or physical infrastructure, this research specifically utilizes the COBIT 2019 evaluation methodology to map

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capability gaps in research and community service support services. This analysis serves as the foundation for formulating a more precise evaluation methodology to enhance the efficiency of digital services within the university environment.

B. *IT Governance and Audit*

IT Governance is a framework of structures and processes designed to ensure that an organization's use of IT aligns with its business strategies and objectives [1]. Within the higher education environment, IT governance is essential to guarantee that digital services supporting the Tridarma (Triple Dharma) of Higher Education operate optimally.

IT auditing is a systematic process used to evaluate the effectiveness, security, and efficiency of these systems [8]. The primary focus of the audit in this study is to conduct a gap analysis between the current capability levels and the targets established by the institution.

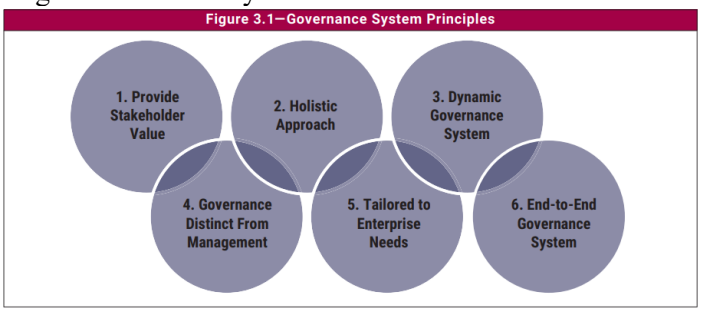

Figure 1. *COBIT 2019 Governance Principles*

Figure 1 illustrates the core Governance Principles of COBIT 2019, which serve as the foundation for building an effective governance system. These principles emphasize a holistic approach, dynamic configuration, and the clear distinction between governance and management.

The six principles for a governance system are as follows (Figure 1):

1. Provide Stakeholder Value: Each entity requires a governance system to satisfy stakeholder needs and generate value from the use of IT.
2. Holistic Approach: A governance system for enterprise IT is built from a variety of component types that work together in a holistic manner.
3. Dynamic Governance System: The governance system must be dynamic. This means that whenever one or more design factors change (e.g., a change in strategy or technology), the impact of these changes on the Enterprise Governance of IT (EGIT) system must be considered.
4. Governance Distinct from Management: The governance system must clearly distinguish between governance and management activities and structures.
5. Tailored to Enterprise Needs: The governance system must be tailored to the entity's specific needs, using a set of design factors as parameters to customize and prioritize the components of the governance system.
6. End-to-End Governance System: The governance system must cover the entire enterprise end-to-end, focusing not only on the IT function but on all technology and information processing applied by the enterprise to achieve its goals, regardless of where that processing occurs.

C. *COBIT 2019 Framework*

The COBIT (Control Objectives for Information and Related Technologies) framework is a framework developed by ISACA for the governance and management of information technology within organizations. The latest version, COBIT 2019, was released as an enhancement to COBIT 5, incorporating more flexible concepts and guidelines relevant to business dynamics and contemporary IT requirements [1][9][10].

COBIT 2019 introduces a new structure consisting of 40 Governance and Management Objectives, divided into two major areas: the Governance Domain (EDM) and the Management Domains (APO, BAI, DSS, and MEA). Each domain contains specific processes used to evaluate the extent to which IT

governance operates effectively within an organization. This approach enables auditors and IT managers to perform measurements based on capability level indicators and process maturity in accordance with organizational business goals [1][9].

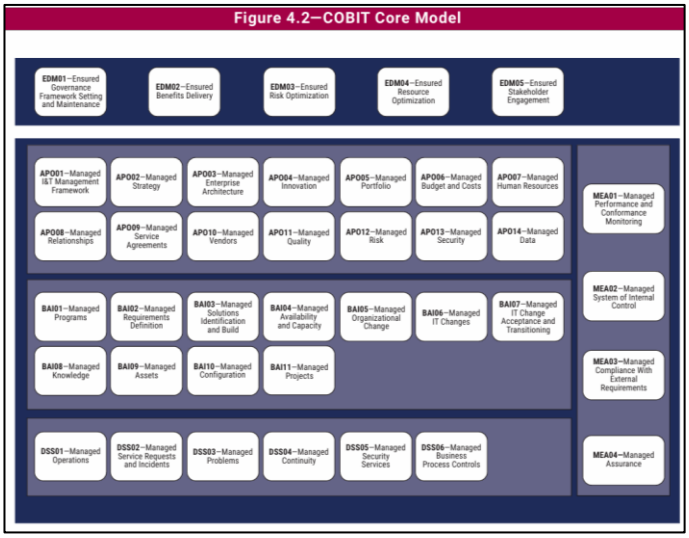

Figure 2. COBIT 2019 Core Model: 40 Governance and Management Objectives

COBIT 2019 categorizes all IT governance and management processes into five primary domains, each serving distinct yet integrated functions. The EDM (Evaluate, Direct, and Monitor) domain focuses on strategic-level governance functions: evaluating needs, directing policies, and monitoring organizational performance in IT management [11]. The APO (Align, Plan, and Organize) domain serves as the foundation for strategic planning, ensuring IT alignment with business objectives through strategy formulation, architecture, policies, and resource management [12]. The BAI (Build, Acquire, and Implement) domain covers the development, procurement, and implementation of IT solutions to deliver benefits and support operations [13]. The DSS (Deliver, Service, and Support) domain ensures stable IT services through the management of operations, incidents, problems, security, and business continuity [14]. Meanwhile, the MEA (Monitor, Evaluate, and Assess) domain is responsible for monitoring performance, evaluating effectiveness, and ensuring regulatory compliance [14][10]. These five domains operate comprehensively to produce an IT governance system that is effective, measurable, and sustainable.

D. *Deliver, Service, and Support (DSS) Domain*

Within the COBIT 2019 framework, the Deliver, Service, and Support (DSS) domain is one of the five management domains that focuses on the operational aspects and IT service support [14]. This domain plays a vital role in ensuring that IT services are delivered reliably, securely, and in accordance with stakeholder requirements. DSS supports the implementation and management of information technology systems in an organization's daily operations, particularly concerning operations, user support, and incident control [1][8]. The DSS domain consists of six primary management objectives[15].

Each process within the DSS domain is equipped with best practices, recommended activities, and performance measurement indicators that serve as benchmarks in IT service audits and evaluations. The primary focus of this domain is to ensure that IT services run smoothly, are responded to promptly when issues arise, and possess reliable prevention and recovery mechanisms in the face of disruptions or disasters [16]. Auditing this domain enables organizations to identify weaknesses in IT operational processes and provides improvement recommendations based on international standards [17].

Table 1. DSS Domain Objectives.

No	Objective	Domain Name	Description
1	DSS01	*Manage Operations*	Managing IT operational activities, including the execution of standard operating procedures.
2	DSS02	*Manage Service Requests and Incidents*	Managing service requests and incidents to maintain service quality.
3	DSS03	*Manage Problems*	Identifying and resolving underlying problems affecting IT services.
4	DSS04	*Manage Continuity*	Ensuring the continuity of operational services despite disruptions or disasters.
5	DSS05	*Manage Security Services*	Ensuring information security and preventing threats to sensitive data.
6	DSS06	*Manage Business Process Controls*	Controlling business processes to ensure the continuity and quality of academic services.

E. *RACI Model in Governance*

he evaluation methodology in this study utilizes the RACI model to clarify the distribution of roles and responsibilities within each DSS process. Clearly defined roles are crucial for bridging capability gaps caused by operational ambiguity. The RACI model (Responsible, Accountable, Consulted, and Informed) is a tool used in IT governance to delineate roles and responsibilities for every activity in a process [18]. In COBIT 2019, the use of RACI is not presented in a standardized table format as it was in COBIT 5; however, role assignment remains a vital component of the governance system, particularly within the "organizational structures" and "policies and procedures" design factors. RACI ensures that every process has a direct executor (Responsible), a final decision-maker (Accountable), parties to be consulted (Consulted), and parties who must be notified (Informed).

F. *Capability Level*

Capability levels are the measurement instruments in COBIT 2019 used to evaluate the extent to which an IT process has been effectively implemented and managed on a scale of 0 to 5 [9]. This assessment refers to the ISO/IEC 33000 standard, where Level 3 (Defined) indicates that processes are well-standardized and documented, while Level 4 (Measured) requires quantitative performance measurement through objective data. Through capability level analysis, an organization can identify the gaps between current operational conditions and the desired ideal targets.

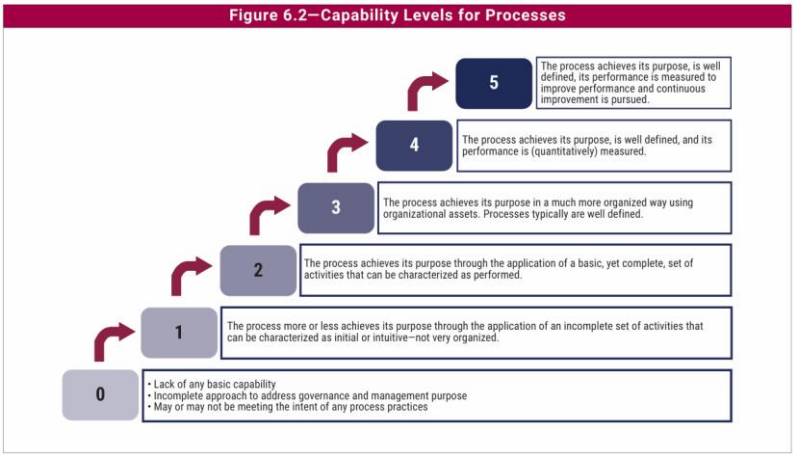

Figure 3. Capability Level Model

Figure 3 illustrates the COBIT 2019 capability level model, which consists of six levels ranging from Level 0 (Incomplete) to Level 5 (Optimizing). Each level represents the maturity of process implementation, beginning from an unstructured state (Level 0), basic processes with minimal execution (Levels 1–2), standardized and documented processes (Level 3), quantitatively measured processes (Level 4), and finally achieving a state of continuous improvement (Level 5). This model enables organizations to evaluate how effectively a process supports IT governance objectives and how improvements can be implemented systematically.

The measurement of capability levels in COBIT 2019 follows a 0–5 scale, describing the extent to which a process is managed and controlled within the organization. The capability level measurement is shown in Figure 3, with a detailed explanation of each level provided in Table 2 as follows:

Table 2. Summary of Capability Levels

Level	Name	Description
0	*Incomplete Process*	The process is not implemented or fails to achieve its purpose.
1	*Performed Process*	The process is implemented but not formally documented.
2	*Managed Process*	The process is implemented, managed, and documented.
3	*Established Process*	The process is standardized across the organization and well-documented.
4	*Predictable Process*	The process is executed consistently and measured quantitatively.
5	*Optimizing Process*	The process is continuously improved to meet current and future business goals.

G. *SIMLITABMAS UNUSA*

The Management Information System for Research and Community Service (SIMLITABMAS) was developed by Nahdlatul Ulama University of Surabaya (UNUSA) through the Institute for Research and Community Service (LPPM) [19]. SIMLITABMAS is designed to accelerate bureaucratic processes and support information transparency in managing the Tridarma (Triple Dharma) activities of higher education. This web-based system was developed to manage the entire lifecycle of faculty research and community service, ranging from proposal submission and selection to implementation and final reporting. The system serves to support the governance of LPPM activities, ensuring they are more efficient and well-documented.

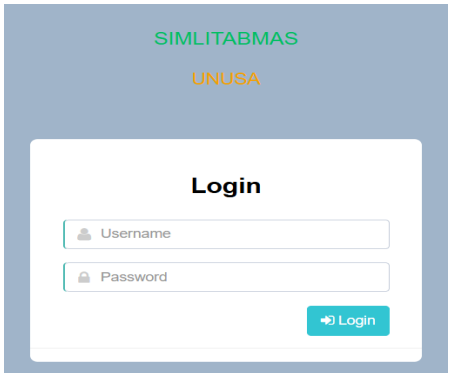

Figure 4. SIMLITABMAS UNUSA Interface

III. METHODS

The methodology of this research is structured to provide a systematic evaluation framework for measuring the governance capability level of SIMLITABMAS. The approach employed is a mixed-

methods design, which combines quantitative analysis through the COBIT 2019 toolkit with qualitative analysis conducted via interviews and document observations.

A. Research Conceptual Framework Model

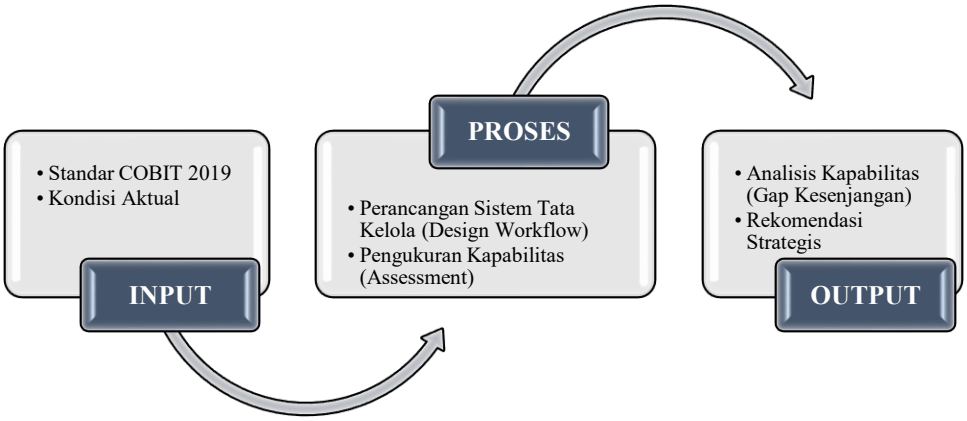

Figure 5. Research Framework Model

The research workflow is categorized into three main continuous components:

1. Input:
   a. COBIT 2019 Standards: A literature study focusing on governance and management functionalities, as well as gaining a comprehensive understanding of the 11 Design Factors.
   b. Actual Conditions: Collection of internal organizational data, including vision, mission, organizational structure, and identification of operational issues within the SIMLITABMAS service.
2. Process:
   a. Governance System Design (Design Workflow): Conducting an analysis of Design Factors and the Goals Cascade to determine the priority domains for auditing (Scoping).
   b. Capability Assessment:
      1) Respondent Mapping
      Utilizing the RACI matrix to identify informants with authority (Accountable) and those responsible for execution (Responsible).
      2) Instrument Development
      Constructing questionnaires derived from standard COBIT 2019 activities using the N-P-L-F (Not, Partially, Largely, Fully) rating scale.
      3) Data Collection
      Executed through data triangulation (interviews, observation of physical evidence/SOPs, and questionnaires).
3. Output:
   a. Gap Analysis: Calculating the difference between the current capability level (As-Is) and the expected target level (To-Be).
   b. Strategic Recommendations: Formulation of actionable improvement steps to bridge capability gaps and enhance the efficiency of digital research services at UNUSA.

B. *Instrument and Rating Scale*

The research instrument is equipped with a rating scale to measure the extent to which each activity is implemented. This study adopts the COBIT 2019 standard fulfillment scale:

N (*Not Achieved*) : 0 - 15% fulfillment.
P (*Partially Achieved*) : 15% - 50% fulfillment.
L (*Largely Achieved*) : 50% - 85% fulfillment.

F (*Fully Achieved*) : 85% - 100% fulfillment.

C. *Gap Analysis*

The final stage of this methodology involves calculating the magnitude of the gap. Gap analysis is a critical phase in IT auditing based on the COBIT 2019 framework, particularly when evaluating the current maturity level (capability level) relative to the levels desired or targeted by the organization. The objective of this stage is to identify disparities between the actual state and the ideal state to formulate appropriate improvement strategies and recommendations. Gap analysis is defined as the comparison between the current maturity value and the expected maturity value [20], calculated using the formula:

$$\text{Gap} = \text{Target Level (To-Be)} - \text{Current Level (As-Is)}$$

A larger gap value indicates that the organization is further from its expected target, whereas a smaller gap value signifies better system performance and closer alignment with institutional goals.

IV. RESULTS AND DISCUSSIONS

This section presents a synthesis of the literature that strengthens the justification for selecting the COBIT 2019-based evaluation methodology for SIMLITABMAS services.

A. Literature Analysis Based on Methodological Components

Based on a literature review of various previous studies regarding IT governance in higher education, the synthesis of findings is categorized according to the research conceptual framework model as follows:

1. Input Component: COBIT 2019 Standard Foundation
   Literature review indicates that COBIT 2019 was selected due to its capability for "tailoring" to specific organizational characteristics.
   a. Effectiveness of Design Factors: The literature suggests that utilizing the 11 Design Factors (DF) is crucial for higher education institutions to ensure the audit focus remains relevant and does not exceed IT resource constraints. This study utilizes DF1 through DF4 to map a "Service/Stability" strategy aligned with research service characteristics.
   b. Governance vs. Management Functions: Literature studies emphasize the importance of distinguishing between governance (evaluation and direction) and management (operational execution). Regarding SIMLITABMAS, the literature indicates that service failures often stem not from technical systems, but from the governance of service support.
2. Process Component: Capability Evaluation and Goals Cascade
   The evaluation process in this study adopts systematic steps validated by literature as the most objective methods:
   a. Urgency of the DSS Domain: Literature consistently identifies the Deliver, Service, and Support (DSS) domain as the most critical area in digital public services. The selection of DSS02 (Incidents), DSS03 (Problems), and DSS05 (Security) is supported by previous findings stating that direct interaction with users (faculty) is the most vulnerable point for operational inefficiency.
   b. Data Triangulation: The use of questionnaires, interviews, and observation of physical evidence (such as SOPs and communication logs) constitutes the "gold standard" in IT auditing to mitigate respondent subjectivity.
3. Output Component: Gap Analysis and Recommendations
   The synthesis of literature regarding research outputs in governance provides the following conclusions:

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a. Interpretation of Gap Analysis: Literature indicates that a gap of one level is commonly found in organizations undergoing digital transformation. This gap typically emerges because operational activities are already being performed but have not yet been standardized or documented (transitioning from Level 3 to Level 4).
b. Automation through AI Chatbots: In alignment with IT literature trends (2020–2024), the integration of AI into service governance is considered a strategic solution to enhance capability levels without significantly increasing human resource burdens. Chatbots serve as an interactive knowledge base to bridge the user literacy gaps identified within SIMLITABMAS.

B. *Synthesis of Comparative Research*

The following table summarizes the comparative literature used as references in this discussion:

Table 3. Summary of Comparative Research

Literature Source	Evaluation Focus	Findings/Results	Relevance to This Study
Samsinar (2022) [20]	DSS Domain: DSS02, DSS03	Identified gaps in incident log documentation.	Validates the use of the DSS domain as an audit focus and strengthens the selection of DSS02.
Xiaolu (2019) [9]	DSS Domain: DSS05	Information security is significantly influenced by user awareness.	Serves as the basis for the DSS05 questionnaire instrument.
COBIT 2019 Framework	Governance Standardization	Facilitates tailoring through Design Factors.	Utilized as the primary evaluation instrument.
AI/Chatbot Studies (2023)	Service Automation	Chatbots enhance 24/7 service response times.	Provides the foundation for the proposed AI Chatbot solution for SIMLITABMAS.
This Study	DSS02, DSS03, DSS05	Gap Analysis + AI Chatbot Recommendation.	Offers a concrete technical solution (AI) in addition to policy recommendations.

C. *Discussion of Methodological Relevance*

In alignment with the research title, the application of "Literature Study" and the "COBIT 2019 Evaluation Methodology" to identify issues such as reporting via WhatsApp has been scientifically proven as a valid approach. The literature demonstrates that:

1. Gap Analysis is not merely a numerical representation but a reflection of the organization's operational culture and maturity.
2. The COBIT 2019 Framework provides a robust structure for translating faculty grievances into measurable technical parameters.

Process Simplification through the Design Toolkit ensures that the evaluation of SIMLITABMAS is highly targeted, achieving effective governance

.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the research findings integrating a literature study with the COBIT 2019 evaluation methodology, it can be concluded that the current governance of SIMLITABMAS is at Level 3 (Defined) with a fulfillment rate of 75.2%. This finding aligns with the literature synthesis, which indicates that the Deliver, Service, and Support (DSS) domain frequently serves as a critical weak point in university digital services due to a reliance on manual procedures and unmeasured documentation. Field evaluations confirm

a one-level gap toward the target of Level 4 (Measured), driven by persistent informal reporting patterns via WhatsApp and low user digital literacy. Consistent with academic references regarding the effectiveness of service automation, this study concludes that the implementation of AI Chatbot technology serves as a valid strategic solution to bridge gaps in incident and problem management. Consequently, strengthening governance based on the COBIT 2019 framework successfully transforms SIMLITABMAS services from an ad-hoc stage toward a support system that is more standardized, secure, and quantitatively measurable.

VI. ACKNOWLEDGMENTS

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VII. CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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