IDENTIFYING IT GOVERNANCE AND MANAGEMENT OBJECTIVES (GMO) WITH COBIT 2019: CASE STUDY ISLAMIC STATE UNIVERSITY AR-RANIRY

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Abstract: The alignment of IT governance with institutional strategies plays a vital role in improving educational services, innovation, professionalism, collaboration, and communication. This study examines IT governance at UIN Ar-Raniry using the COBIT 2019 framework, with a qualitative approach analyzing documents outlining the institution's vision, mission, goals, and strategies. The analysis identifies client service/stability as the priority design factor, focusing on fostering a customer-oriented service culture while addressing critical risks in data and information management. Key challenges include duplication of initiatives, insufficient IT resources, inadequate staff skills, staff dissatisfaction, outdated systems hindering new initiatives, and poor data quality and integration. To address these challenges, 14 prioritized Governance and Management Objectives (GMOs) were identified from COBIT 2019's 40 sub-domains, including EDM02 (Ensure Benefits Delivery), EDM04 (Ensure Resource Optimization), APO02 (Manage Strategy), APO05 (Manage Portfolio), BAI01 (Manage Programs and Projects), and DSS01 (Manage Operations). These GMOs aim to guide IT governance efforts, optimize resources, address organizational inefficiencies, and improve overall performance. This framework is anticipated to enable UIN Ar-Raniry to effectively create value through IT implementation, ensuring alignment with its strategic goals and addressing its most pressing governance issues.
Keywords: COBIT 2019; COBIT; IT Governance; UIN Ar-Raniry

Abstrak: Tata elola teknologi informasi (TI) yang selaras dengan strategi institusi memainkan peran penting dalam meningkatkan layanan pendidikan, inovasi, profesionalisme, kolaborasi, dan komunikasi. Penelitian ini menganalisis tata kelola TI di UIN Ar-Raniry menggunakan kerangka kerja COBIT 2019, dengan pendekatan kualitatif yang menganalisis dokumen visi, misi, tujuan, dan strategi institusi. Hasil analisis mengidentifikasi client service/stability sebagai prioritas dari desain faktor strategi, dengan tingkat kepentingan tujuan yaitu pada pengembangan budaya layanan yang berorientasi pada pelanggan, serta mengatasi risiko utama dalam pengelolaan data dan informasi. Beberapa tantangan utama yang dihadapi meliputi duplikasi inisiatif, keterbatasan sumber daya TI, kurangnya keterampilan staf, ketidakpuasan staf, sistem yang sudah usang sehingga menghambat inisiatif baru, serta kualitas dan integrasi data yang buruk.Untuk menangani tantangan tersebut, diperoleh 14 Governance and Management Objectives (GMO) yang diprioritaskan diidentifikasi dari 40 sub-domain COBIT 2019, termasuk EDM02 (Ensure Benefits Delivery), EDM04 (Ensure Resource

Optimization), APO02 (Manage Strategy), APO05 (Manage Portfolio), BAI01 (Manage Programs and Projects), dan DS501 (Manage Operations). Keempat belas GMO ini dirancang untuk memandu upaya tata kelola TI, mengoptimalkan sumber daya, mengatasi ketidakefisienan organisasi, dan meningkatkan kinerja institusi secara keseluruhan. Kerangka kerja ini diharapkan mampu mendukung UIN Ar-Raniry menciptakan nilai melalui penerapan TI yang efektif serta memastikan keselarasan dengan tujuan strategis dan pengelolaan isu tata kelola yang paling mendesak.
Kata kunci: COBIT 2019; COBIT; Tata Kelola TI; UIN Ar-Raniry.

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Introduction

Information Technology (IT) plays a significant role in educational institutions in managing information effectively (Fardani et al., 2020). Higher Education Institutions (HEIs) apply the use of IT to support the teaching and learning process (Windasari et al., 2022), research and development, community services, and digitization of administrative activities to simplify the HEI's business processes (Leal Filho et al., 2024; Solechan & Prasandy, 2016). IT can help educational institutions create value by managing data, improving communication and administration, and making data-driven decisions.

State Islamic University (UIN) Ar-Raniry Banda Aceh, as one of the state universities in the administrative scope of the Ministry of Religious Affairs of the Republic of Indonesia, stipulates an integrated education management system supported by information technology (UIN Ar-Raniry, 2020). This is materialized by the development of information technology infrastructure and information system services that have been implemented at UIN Ar-Raniry including; 1) Information system for admission of freshmen students 2) Payment Information System, 3) Registration Information System, 4) Academic Information System, 5) Graduation Information System, 6) Budgeting Information System, 7) Human Resources Information System, 8) Asset Information System, 9) Financial Information System, 10) Lecturer Workload Information System, 11) Library Information System, 12) Research and Community Service Management Information System, and 13) Scholarship Information System (Blueprint UIN Ar-Raniry, 2022). Those information systems developed within the UIN institution itself, by utilizing resources from the internal scope. In addition, UIN Ar-Raniry is also known to have several information systems derived from its existing stakeholders such as; 1) PUSAKA, 2) eKinerja, 3) MySAPK, 4) Sister, and 5) Sinta which are developed by the Ministry of Religious Affairs and the Ministry of Education and Culture of the Republic of Indonesia.

The information technology systems and services have been running well and helping the activities at UIN Ar-Raniry. It has also helped that all standard procedures and business processes have been well implemented so that the transformation of activities that were previously conventional and semi-digital is now digital-based. However, it is necessary to ensure that the various Information and Technology systems and services implemented are aligned with the strategy of UIN Ar-Raniry. This alignment is crucial so that decisions related to information technology support the vision, mission, and strategic goals. Integrating IT into the university activities and services, UIN Ar-Raniry can increase operational efficiency, improve service quality, and strengthen data security. In addition, this alignment ensures that investments in IT provide added value that matches the needs and priorities of the organization.

It is known that UIN Ar-Raniry's vision is "To become a modern, professional and reliable university in terms of Islam, nationality and universality to build a pious, moderate, intelligent and advanced society". The mission outlines the development of the tri dharma of universities and colleges that focuses on religious moderation, modern, professional, and reliable education to increase the productivity and competitiveness of graduates, and Good University Governance (GUG). This vision and mission are then elaborated more broadly and in detail in the Strategic Plan (Rencana Strategis/Renstra) document of UIN Ar-Raniry Banda Aceh.

The above description illustrates that university's governance is allowed to make IT investments and take calculated risks as long as the university's own strategic choices are in line with market needs, namely the preparation and strengthening of human resource competencies and qualifications, and in accordance with broader national and regional political expectations (Lackner, 2024). However, massive technological growth and global uncertainty require university like UIN Ar-Raniry to transform and adapt to current needs. One of them is by aligning IT Governance and university strategies to create value.

A framework that can be used to align IT governance with the institution's strategy is Control Objectives for Information and Related Technology (COBIT) (Gouwnalan & Tanaamah, 2023). The COBIT framework focuses on IT governance and provides complete guidance for institutions to identify, measure, and control risks associated with the use of information technology (Dwitawati et al., 2024). Some studies suggest that there is a positive correlation between measurable IT investment and institutional performance achievement through the use of the COBIT framework (De Haes et al., 2020; Ishlahuddin et al., 2020; Kesuma et al., 2022). Therefore, it is expected that COBIT can outline the most appropriate governance and management objectives based on the strategy, objectives, risk profile, and information technology issues at UIN Ar-Raniry.

The COBIT 2019 framework has proven to be an effective tool in aligning IT governance with institutional strategy, enhancing operational efficiency by aligning

strategic goals (Febriyani et al., 2022). It strengthens IT capabilities in higher education institutions, providing a foundation for improved governance practices (Utomo et al., 2022). The framework also plays a critical role in supporting digital transformation, particularly through the "smart campus" concept. Additionally, COBIT 2019 demonstrates strengths in IT governance audits, risk management, and adaptability to technological changes, ensuring both efficiency and compliance with established standards (Ajismanto & Surahmat, 2021; Lompoliu et al., 2022).

A crucial step in implementing COBIT 2019 is establishing Governance and Management Objectives (GMO), which provides a structured approach to setting priorities, and targets, and addressing strategic risks (Nugraha & Syaidah, 2022). Defining GMO ensures that IT governance effectively supports the organization's vision and mission (Nugraha & Syaidah, 2022). Without a well-defined GMO framework, maturity assessments of governance risk become irrelevant or less strategic (Lompoliu et al., 2022; Mangoki et al., 2024). The COBIT 2019 toolkit offers a systematic approach to identifying organizational needs, analyzing gaps, and formulating risk-based strategic objectives, ultimately driving operational efficiency and sustained digital transformation (Suryadi & Kurniawan, 2021).

Based on the description above, this research will focus on the alignment of information technology governance using the COBIT 2019 case study of Ar-Raniry State Islamic University Banda Aceh through a qualitative approach to secondary data in the form of documentation: 1) Strategic Plan, Operational Plan, Statute, and Organization of UIN Ar-Raniry; 2) Vision, Mission, and Goals of UIN Ar-Raniry; 3) Risk Profile; and 4) Importance of Each Generic IT-Related Issue. It is expected that this research will produce several recommendations regarding the implementation of information systems and technology in line with the organizational governance of UIN Ar-Raniry.

Literature Review

Governance

Governance is a system or process used to direct, manage, and monitor how institutions run, which includes structures and mechanisms used to make decisions, set policies, and monitor the implementation of institutional policies to run efficiently, transparently, and under ethical principles, and can achieve goals effectively (Drew et al., 2006). Information technology governance aims to improve the overall management of information and technology to ensure growth, performance, and value creation-oriented institutions (Alghorbany et al., 2024).

In the context of digital transformation, information technology governance is seen as the result of aligning institutional strategy with the potential and resources of technology and information for value creation (performance) commonly known as Enterprise Governance Information and Technology (EGIT). EGIT explains that information and technology (I&T) is a crucial supporting element in maintaining the growth and sustainability of the institution itself. EGIT is an integral part of

institutional governance that must be the focus of attention, from the policy level to implementation. Thus IT will truly be an enabler in improving institutional performance and the budget invested for Information Technology will be right on target, as presented in Figure 1.

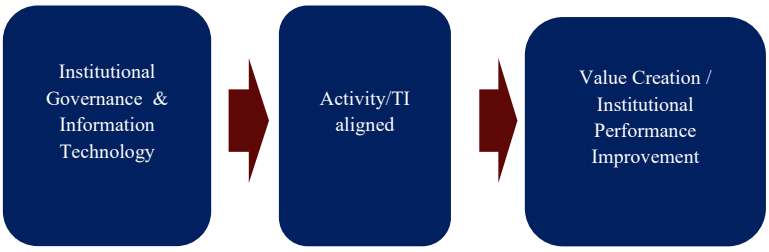

Figure 1. Context of Institutional Governance of Information and Technology (De Haes et al., 2020)

COBIT Framework

This framework offers guidance that helps institutions organize and manage their IT systems effectively and be able to face challenges in the era of digital transformation (Widharto et al., 2022). This research uses the COBIT 2019 framework which is the latest version developed by the Information Systems Audit and Control Association (ISACA) in 2018. The COBIT framework ensures the difference in activities between governance and management (ISACA, 2019b). Governance ensures stakeholders' needs, conditions, and options are evaluated to determine balanced and agreed organizational goals; prioritization and decision-making; and performance and compliance are monitored against agreed directions and goals (Dwitawati et al., 2024). Whereas management activities focus on planning, building, executing, and monitoring activities, aligned with the direction set by the governance body, to achieve institutional goals.

The above activities are broken down into 5 domains and 40 governance processes. The domains are namely: (1) Evaluate, Direct and Monitor (EDM) domain, which covers the strategies taken and monitoring of strategic achievements; (2) Align, Plan and Organize (APO), which addresses the overall organization, strategy and supporting activities for I&T; (3) Build, Acquire and Implement (BAI), focuses on the definition, acquisition, and implementation of I&T solutions and their integration into business processes; (4) Deliver, Service and Support (DSS), addresses the delivery and operational support of I&T services, including critical security aspects; and (5) Monitor, Evaluate and Assess (MEA), addresses the monitoring of I&T performance and conformance to internal performance targets, internal control objectives and compliance with external requirements. Institutions must be able to establish, coordinate, and maintain systems to achieve defined management and governance objectives (ISACA, 2019c).

Several studies put forward some recommendations for aligning organizational strategy with technology and information to improve performance. IT governance improvements should be based on the best guidelines and frameworks, and it is also necessary to evaluate the organizational structure and adequacy of regulatory rules on the object under study (Widharto et al., 2022). The COBIT 2019 framework can be used to help achieve a better capability maturity level in the IT governance system (Utomo et al., 2022). The IT governance design obtained from the COBIT 2019 design toolkit can help the development of organizations to achieve good IT governance assurance standardization to improve services and support the learning process efficiently and effectively in the education sector (Febriyani et al., 2022). The application of COBIT 2019 can help institutions achieve good IT governance by aligning IT processes with the goals of the organization to improve IT management, better transparency, and higher accountability (Lompoliu et al., 2022).

Governance and management priorities are obtained from the analysis of design factors consisting of strategy; objectives; risk profile; I&T-related issues; threat landscape; compliance requirements; IT roles; resource models for IT; IT implementation methods; technology adoption strategies; and institution size. Although there are many factors in designing the governance of an institution, there are factors that are most important and have an impact on the governance process of an institution, namely the strategy, objectives, risk profile, and IT-related issues of an institution, while other factors are added to complete the scope of the governance system (ISACA, 2019a).

Method

This research uses a qualitative approach. Qualitative method is a research approach that relies on descriptive data in the form of written or spoken language from observable individuals or subjects (Gupta, 2024). The qualitative approach aims to understand the current reality of the context being analyzed (Ñañez-Silva et al., 2024). This research concludes the importance of good governance and the achievement of priority management objectives (GMOs) at UIN Ar-Raniry as a strategic foundation to support effective and sustainable institutional management. The flow of this research process is designed systematically, with an integrated approach, and explained in detail through the visualization in Figure 2. The figure provides a clear picture of the steps taken to achieve the results under the research objectives.

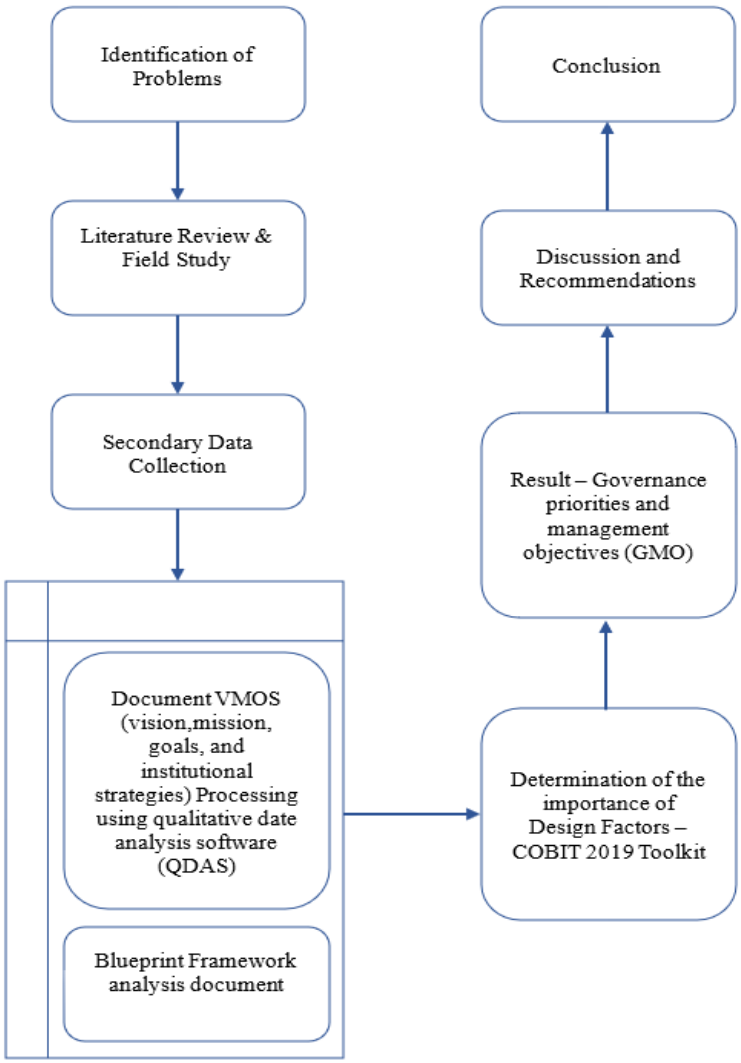

Figure 2. Research Process Flow

By conducting an observational study of UIN Ar-Raniry's vision, mission, goals, and institutional strategies (VMOS), as listed in https://bit.ly/aicoding_vmos, where the VMOS is documented in 1) UIN Ar-Raniry's basic and official documents (university statutes), 2) strategy and policy documents (strategic plans and institutional development plans) and also the university's website. This VMOS is then processed using qualitative data analysis software (QDAS) ATLAS.ti version 24 to produce a set of codings that will make it easier for researchers to find out the priorities of university governance and management that are aligned with the strategies and goals of the institution in COBIT 2019. this process is shown in Figure 3. Furthermore, to align the Risk Profile and IT-related issues, framework analysis is carried out on the UIN Ar-Raniry Blueprint document to produce information categorization that is in accordance with the design factor 3 and design factor 4 framework in COBIT 2019.

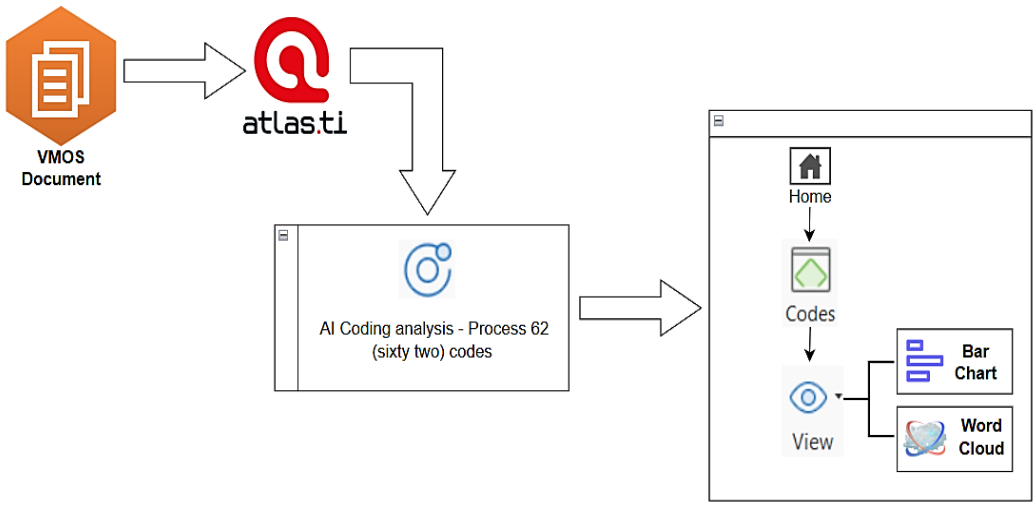

Figure 3. VMOS Coding Process

Result and Discussion

Result

This result has been achieved through a series of processes. The process begins with the creation of a document called VMOS, which contains information about UIN Ar-Raniry's vision, mission, goals, and strategies. This document is then imported into ATLAS.ti to be analyzed with the help of an artificial intelligence feature called AI CODE, which automatically recognizes certain words, phrases, or patterns that occur frequently and relate to certain concepts or categories, which are then converted into the form of codes, with the results of the analysis producing 62 (sixty-two) codes.

Furthermore, the results of the analysis in the form of codes were visualized in the form of bar charts and word clouds. A bar chart is used to display the frequency or number of occurrences of certain codes in the form of a bar graph, allowing researchers to see the words or themes that occur most frequently, as shown in Figure 4. Meanwhile, Word clouds show the main words or themes that occur frequently, with larger word sizes indicating a higher frequency of occurrence in the data, as shown in Figure 5. The results of this visualization can be used with the View feature available in ATLAS.ti so that researchers can see a visual summary of the analysis results and understand the main patterns in the data.

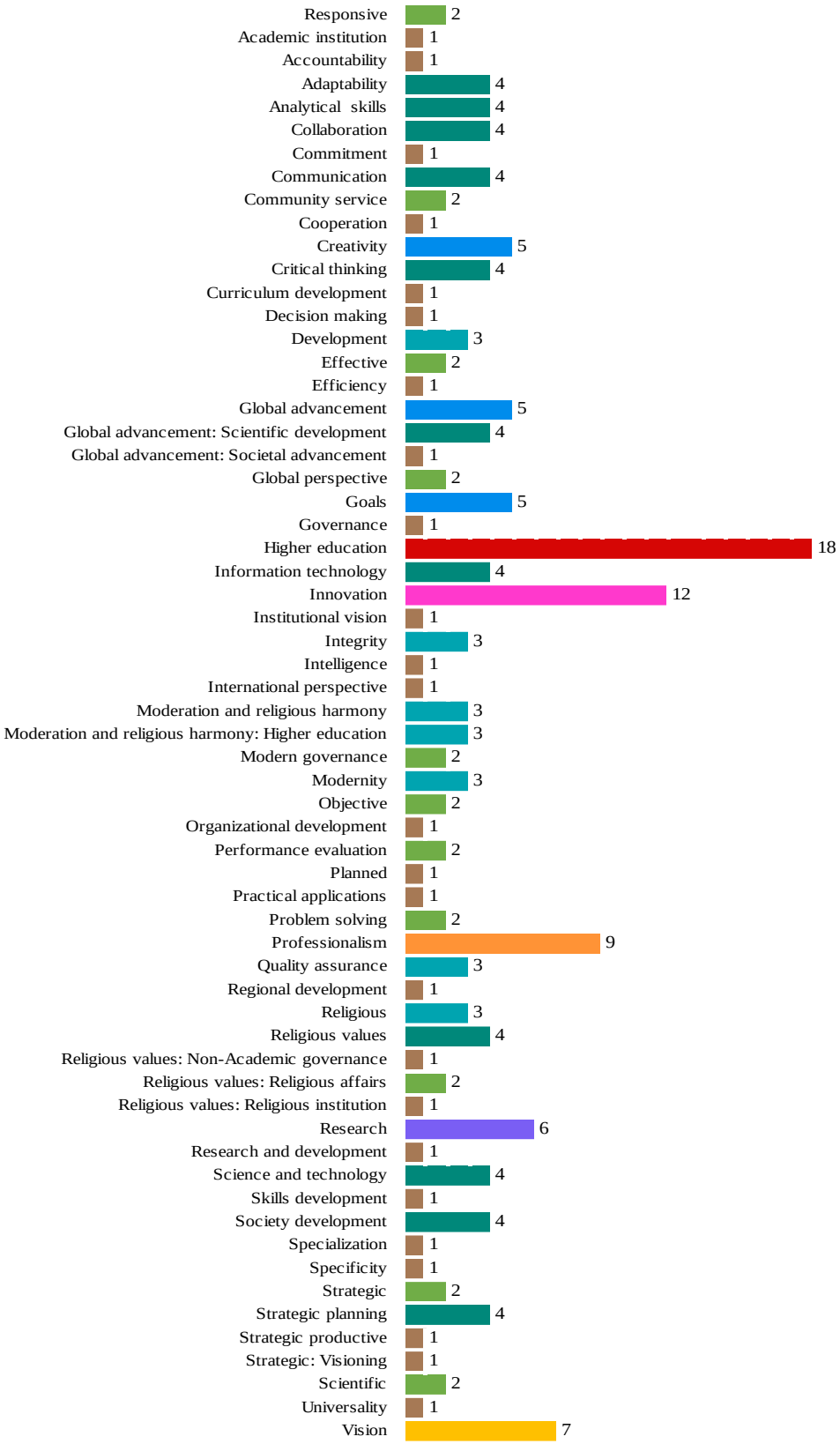

Figure 4. Results of AI coding of institutional strategies using ATLAS.ti 24

Figure 5. UIN Ar-Raniry Institutional Strategy Word Cloud

The alignment result between VMOS with institutional strategy and goals in the COBIT 2019 toolkit, as well as the level of importance as described below:

Level of importance of UIN Ar-Raniry Strategy

The result of VMOS coding was grouped based on similarity, synonym, and association to the institution strategy archetype as shown in Table 1. The table describes the level of importance of strategies at UIN Ar-Raniry represented by several codes and values. According to the table, the code that describes customer service/stability has the highest number, which is 29, followed by Innovation/Differentiation in second place with a value of 25, Growth/Acquisition in third place with 11, and cost leadership in the lowest place with a value of 4. With the same pattern, it can be concluded that UIN Ar-Raniry's strategy is worth 5 (five) for the aspect of customer service/stability and 4 (four) for Innovation/Differentiation. Meanwhile, the Growth/Acquisition strategy is worth 3 (three) and cost leadership has an importance level with a value of 2 (two). In more detail as included in Table 1.

Table 1. Insitutional Strategy COBIT 2019 and VMOS Code Alignment

Institutional Strategy (COBIT 2019)	Related VMOS Coding	Value
rowth / Acquisition	Development (3), Global Advancement (5), Regional Development (1), Research and Development (1), Skill Development (1)	11
Innovation / Differentiation	Innovation (12), Analytical Skills (4), Creativity (5), Critical Thinking (4)	25
Cost Leadership	Efficiency (1), Effective (2), Planned (1)	4
Client Service / Stability	Accountability (1), Responsive (2), Commitment (1), Communication (4), Community Service (2), Integrity (3), Performance Evaluation (2), Problem Solving (2), Professionalism (9), Quality Assurance (3)	29

Table 2. UIN-Ar Raniry's Strategy by Priority

Value	Importance score (1-5)	Baseline
Growth/Acquisition	3	3
Innovation/Differentiation	4	3
Cost Ledership	2	3
Client Service/Stability	5	3

Level of Importance of UIN Ar-Raniry Goals

The alignment of institutional goals with VMOS coding is demonstrated in Table 3. The table illustrates how the institutional goals defined in the COBIT 2019 framework are effectively supported by corresponding VMOS attributes, which provide the foundational elements necessary to achieve each goal. Notably, while most institutional goals meet the baseline importance level (3), the Customer-Oriented Service Culture (EG05) is recommended to achieve a higher level (4) as per COBIT 2019 guidelines. Further details are available in Table 4.

Table 3. Insitutional Goals COBIT 2019 and VMOS Code Alignment

Value	Related VMOS Coding
EG01—Portfolio of competitive products and services	innovation (12),strategic planning (4)
EG02—Managed business risk	problem-solving (2),quality assurance (3)
EG03—Compliance with external laws and regulations	accountability (1),integrity (3)
EG04—Quality of financial information	quality assurance (3),effective (2)
EG05—Customer-oriented service culture	responsive (2)
EG06—Business-service continuity and availability	planned (1)
EG07—Quality of management information	information technology (4)
EG08—Optimization of internal business process functionality	efficiency (1)

Value	Related VMOS Coding
EG09—Optimization of business process costs	efficiency (1)
EG10—Staff skills, motivation and productivity	accountability (1),integrity (3)
EG11—Compliance with internal policies	accountability (1),integrity (3)
EG12—Managed digital transformation programs	information technology (12),innovation (12)
EG13—Product and business innovation	innovation (12)

Table 4. UIN Ar Raniry's Objectives/Goals based on COBIT 2019

Value	Importance Score (1-5)	Baseline
EG01—Portfolio of competitive products and services	3	3
EG02—Managed business risk	3	3
EG03—Compliance with external laws and regulations	3	3
EG04—Quality of financial information	3	3
EG05—Customer-oriented service culture	4	3
EG06—Business-service continuity and availability	3	3
EG07—Quality of management information	3	3
EG08—Optimization of internal business process functionality	3	3
EG09—Optimization of business process costs	3	3
EG10—Staff skills, motivation and productivity	3	3
EG11—Compliance with internal policies	3	3
EG12—Managed digital transformation programs	3	3
EG13—Product and business innovation	3	3

UIN Ar-Raniry risk profile importance level

The UIN Ar-Raniry Blueprint document describes the IT master plan which is used as a reference in integrating information communication and technology within the UIN Ar-Raniry environment which includes managing data interoperability, developing references in determining IT investment priorities, and strengthening IT governance that supports institutional goals. This indicates that the IT risk profile can be mapped by utilizing this document which is aligned with the COBIT 2019 toolkit, and identifies key risk categories and scenarios (see Appendix 1 for the detail information).

A quantitative risk analysis, as outlined in Appendix 1, evaluates the likelihood and impact of each risk category. High-priority risks, such as "Data & Information Management," are emphasized due to their significant potential impact and high probability of occurrence. In contrast, categories like "Geopolitical" and "Environmental" are considered lower priorities because they have minimal influence on daily operations. This analysis is further supported by a comprehensive mapping of risk categories and scenarios, as detailed in Table 5.

Table 5. Risk Profile of UIN Ar-Raniry Based on COBIT 2019

Risk Scenario Category	Impact (1-5)	Likelihood (1-5)	Risk Value	Risk Rating	Baseline
IT investment decision making, portfolio definition & maintenance	2	2	4	Normal Risk	9
Program & projects life cycle management	3	3	9	High Risk	9
IT cost & oversight	3	2	6	Normal Risk	9
IT expertise, skills & behavior	4	3	12	High Risk	9
Enterprise/IT architecture	3	2	6	Normal Risk	9
IT operational infrastructure incidents	4	3	12	High Risk	9
Unauthorized actions	3	3	9	High Risk	9
Software adoption/usage problems	2	2	4	Normal Risk	9
Hardware incidents	3	2	6	Normal Risk	9
Software failures	3	2	6	Normal Risk	9
Logical attacks (hacking, malware, etc.)	4	3	12	High Risk	9
Third-party/supplier incidents	2	1	2	Low Risk	9
Noncompliance	3	2	6	Normal Risk	9
Geopolitical Issues	2	1	2	Low Risk	9
Industrial action	2	1	2	Low Risk	9
Acts of nature	3	3	9	High Risk	9
Technology-based innovation	4	3	12	High Risk	9
Environmental	2	1	2	Low Risk	9
Data & information management	4	4	16	Very High Risk	9

Level of Importance of UIN Ar-Raniry IT Related Issues

Using the same document, the UIN Ar-Raniry Blueprint, the alignment of IT-related issues (see Appendix 2 for the detail information). The result shows that the main issues that should be the focus of UIN Ar-Raniry's IT governance are: a) duplication or overlap between different initiatives or resources; b) insufficient IT resources, staff with inadequate skills or staff dissatisfaction; c) implementation of new initiatives or innovations that are hampered or fail due to current IT architecture and systems; and d) general problems with data quality and data integration in different areas. Thus, it can be concluded that the determination of values in Table 6 is based on the results of aligning the UIN Ar-Raniry blueprint document with the fourth design factor in COBIT 2019, namely IT-related issues.

Table 6. IT-related issues at UIN Ar-Raniry

IT-Related Issue	Importance (1-3)	Problem Description	Baseline
Frustration between different IT entities across the organization because of a perception of low contribution to business value	1	No Issue	2
Frustration between business departments (i.e., the IT customer) and the IT department because of failed initiatives or a perception of low contribution to business value	1	No Issue	2
Significant IT-related incidents, such as data loss, security breaches, project failure and application errors, linked to IT	2	Issue	2
Service delivery problems by the IT outsourcer(s)	2	Issue	2
Failures to meet IT-related regulatory or contractual requirements	1	No Issue	2
Regular audit findings or other assessment reports about poor IT performance or reported IT quality or service problems	1	No Issue	2
Substantial hidden and rogue IT spending, that is, IT spending by user departments outside the control of the normal IT investment decision mechanisms and approved budgets	1	No Issue	2
Duplications or overlaps between various initiatives, or other forms of wasted resources	3	Serious Issue	2
Insufficient IT resources, staff with inadequate skills or staff burnout/dissatisfaction	3	Serious Issue	2
IT-enabled changes or projects frequently failing to meet business needs and delivered late or over budget	2	Issue	2
Reluctance by board members, executives or senior management to engage with IT, or a lack of committed business sponsorship for IT	2	Issue	2
Complex IT operating model and/or unclear decision mechanisms for IT-related decisions	1	No Issue	2
Excessively high cost of IT	2	Issue	2
Obstructed or failed implementation of new initiatives or innovations caused by the current IT architecture and systems	3	Serious Issue	2
Gap between business and technical knowledge, which leads to business users and information and/or technology specialists speaking different languages	1	No Issue	2
Regular issues with data quality and integration of data across various sources	3	Serious Issue	2
High level of end-user computing, creating (among other problems) a lack of oversight and quality control over the applications that are being developed and put in operation	1	No Issue	2
Business departments implementing their own information solutions with little or no involvement of the enterprise IT department (related to end-user computing, which often stems from dissatisfaction with IT solutions and services)	1	No Issue	2
Ignorance of and/or noncompliance with privacy regulations	1	No Issue	2

IT-Related Issue	Importance (1-3)	Problem Description	Baseline
Inability to exploit new technologies or innovate using I&T	2	Issue	2

The design of strategic factors, objectives, risk profiles, and information technology issues concluded that of the 40 GMOs contained in COBIT 2019, 14 (fourteen) GMOs were obtained that were prioritized at UIN Ar-Raniry institutions, as shown in Figure 6. The results of the alignment of UIN Ar-Raniry's strategy using the 2019 COBIT toolkit obtained priority GMOs: EDM02 (Ensure Benefits Delivery), EDM04 (Ensure Resource Optimization), APO02 (Manage Strategy), APO03 (Manage Enterprise Architecture), APO05 (Manage Portfolio), APO08 (Manage Relationships), APO09 (Manage Service Agreements), APO10 (Manage Suppliers), BAI01 (Manage Programs and Projects), BAI02 (Manage Requirements Definition), BAI03 (Manage Solutions Identification and Build), BAI05 (Manage Organizational Change Enablement), BAI06 (Manage Changes), DSS01 (Manage Operations).

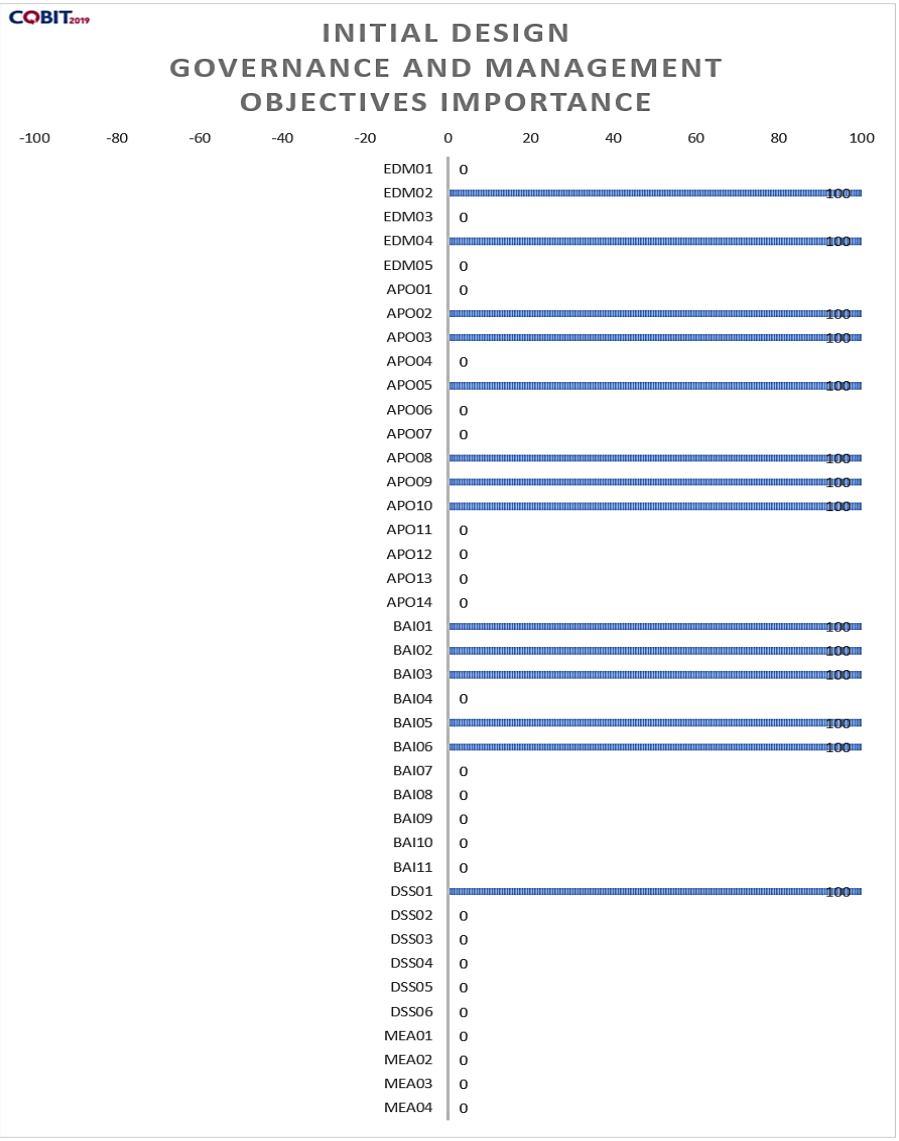

Figure 6. GMO Prioritization of UIN Ar-Raniry

Discussion

Design Factor Strategy, Goals, Risk Profile and Issues Related to Information and Technology

According to COBIT 2019 the level of importance in the strategy design factor and institutional goals (DF 1 and DF 2), level 1 if the strategy or goal is irrelevant (has low relevance), level 2 if the strategy or goal has low relevance, level 3 strategy or goal has moderate relevance, level 4 strategy or goal has high relevance, and level 5 means the strategy or goal has very high relevance or can be said to be a priority strategy or goal (ISACA, 2019c).

The results of this study indicate that in order to ensure that information technology governance is in line with UIN Ar-Raniry's strategy for value creation and improving the quality of higher education, the main priority of information

technology investment is carried out by paying attention to UIN's strategy which leads to educational services (services/clients), innovation and/or differentiation of the institution's own services. This statement is in line with research conducted by (Febriyani et al., 2022) and (Utomo et al., 2022) where both studies concluded that the strategy that is the top priority and must be considered by educational institutions is services/client-based educational services which in this case are represented to students, society and government.

The alignment of UIN Ar-Raniry's objectives with the design factors in COBIT 2019 in the Enterprise Goal section (institutional goals) shows that Information Technology investment at UIN Ar-Raniry must pay attention to all objectives in the design factor that meet the minimum standards, and there is a specific priority goal scale, namely a customer-oriented service culture. This statement is in line with research conducted by (Nugraha & Syaidah, 2022) and (Lompoliu et al., 2022) where the research also determines that the priority goal for the institution is a customer-oriented service culture but on the other hand several goals that are also a priority for the institution.

The adjustment of the risk profile of UIN Ar-Raniry with the design factors in COBIT 2019 in the Risk Profile section shows that information technology investment at UIN Ar-Raniry for risk scenarios that are prioritized, namely data and information management, this is because the risk scenario has a very high-risk rating. This is by research (Utomo et al., 2022) and (Ajismanto & Surahmat, 2021) where this research also describe that data and information management is a priority risk scenario with a very high-risk rating for an educational institution but on the other hand there are also several other risk scenarios which are also very high risk.

The alignment of IT-related issues at UIN Ar-Raniry with the design factors in COBIT 2019 in the IT-Related Issues section shows that information technology investment at UIN Ar-Raniry, some serious problems are present so that special attention must be given and prioritized for solving these problems including problems related to the implementation of new initiatives or innovations that are hampered or fail, caused by current IT architecture and systems, as well as general problems with data quality and data integration in various ways. This statement is also in line with research conducted by (Mangoki et al., 2024) where the focus related to IT problems in the study is that these two problems are problems with a very serious category.

Governance and Management Objectives (GMO) Prioritization at UIN Ar-Raniry Institution

The priority GMOs of UIN Ar-Raniry indicate that in the governance of information technology, UIN Ar-Raniry must pay attention to 14 (fourteen) GMOs which are used as a reference since the planning process, implementation to monitoring and evaluation of programs and activities at UIN Ar-Raniry. Each GMO has a different function, so each GMO should not go unnoticed at the governance

and management level at UIN Ar-Raniry. In detail, the GMOs are as included in the following discussion:

EDM02 (Ensure Benefits Delivery). This process ensures that any investment in information technology delivers tangible positive impacts for UIN Ar-raniry. These benefits include better operational efficiency through digitization of administrative processes, improved academic services that are felt directly by students and lecturers, and stronger support for research activities through access to digital repositories. By regularly monitoring implementation results, the university can ensure these benefits are aligned with its strategic goals.

EDM04 (Ensure Resource Optimization). Optimization of IT resources at UIN Ar-Raniry includes careful and efficient management of manpower, hardware, software, and budget. For example, the university can utilize existing hardware through server virtualization to support infrastructure efficiency. In terms of manpower, regular training of IT staff to adopt the latest technologies such as AI and cloud computing is essential. In addition, budget management should be prioritized on strategic programs such as network infrastructure upgrades and the development of mobile application-based services, which can provide direct added value to the campus community.

APO02 (Manage Strategy). UIN Ar-Raniry's IT strategy should be designed to support the university's vision and mission as a center of superior Islamic education. This requires synergy between the university's strategic plan and IT roadmap, including strategies that support the development of online learning, integration of information systems between work units, and adoption of the latest technologies such as artificial intelligence to support academic needs.

APO03 (Manage Enterprise Architecture). UIN Ar-Raniry needs a solid IT architecture to ensure the integration of all information systems. This can be realized through the development of Enterprise Architecture Framework that integrates SIAKAD, financial system, and other systems in UIN Ar-Raniry. With this integration, data can be accessed in real time, reduce redundancy, and improve the efficiency of administrative processes.

APO05 (Manage Portfolio). IT project portfolio management is an important step to ensure that all IT projects deliver maximum impact. Projects such as digitizing academic document archives, to developing mobile applications for student services, need to be carefully planned. UIN Ar-Raniry can utilize the Agile approach in project management to ensure flexibility and successful implementation.

APO08 (Manage Relationships). Relationship management with stakeholders is a key element for technology success on campus. UIN Ar-Raniry needs to build effective communication with students, lecturers, education staff, and external partners such as IT service providers. Discussion forums surveys, and workshops can be a medium to gather input from all relevant parties so that their needs can be accommodated in the development of IT solutions.

APO09 (Manage Service Agreements). UIN Ar-Raniry should ensure that all IT service agreements are in line with campus needs. For example, the university needs to cooperate with an internet service provider that can guarantee a stable connection to support online learning. Clear SLA (Service Level Agreement) management and regular performance monitoring are key to maintaining the quality of services received.

APO10 (Manage Suppliers). Managing relationships with technology suppliers is important to ensure the quality of products and services received is up to standard. UIN Ar-Raniry can implement an evaluation mechanism based on performance, price, and innovation offered. In addition, the university also needs to ensure that all technology products are used to support sustainability and ease of integration with existing systems.

BAI01 (Manage Programs and Projects). UIN Ar-Raniry must ensure that every technology program and project goes according to plan. Large projects such as the implementation of e-learning systems and the strengthening of IT infrastructure need to be managed with a professional approach that involves detailed planning, periodic monitoring, and evaluation of results so that they are completed within the target time and budget.

BAI02 (Manage Requirements Definition). Any IT solution developed by UIN Ar-Raniry should start with in-depth needs identification. For example, the academic service needs of students and lecturers should be mapped through surveys or interviews to ensure that the resulting solution is truly relevant and can be well adopted.

BAI03 (Manage Solutions Identification and Build). The development of IT solutions at UIN Ar-Raniry must involve the latest technological innovations and layered testing. For example, the implementation of an application for online class management must go through a trial phase in several faculties before being fully implemented across campus.

BAI05 (Manage Organizational Change Enablement). Technological change is often faced with resistance, so UIN Ar-Raniry needs to ensure the readiness of all elements of the organization to accept change. This can be done through training and socialization that explains the benefits of digital transformation for the campus community.

BAI06 (Manage Changes). Any changes to IT systems that occur within UIN Ar-Raniry need to be managed systematically to minimize operational disruptions. For example, updates/changes to the SIAKAD system must be tested in the environment and given simulations first before being implemented directly, to avoid disruptions that can hamper academic activities.

DSS01 (Manage Operations). Stable IT operations should also be a special concern. UIN Ar-Raniry must ensure that all IT services, such as the student portal and online payment system, can run without a hitch. In addition, responsive technical support should be provided to handle issues quickly and efficiently.

Conclusion

From the explanation that has been presented previously, the following conclusions can be drawn: The results of the alignment of UIN Ar-Raniry's strategy with information technology governance using the 2019 COBIT toolkit show that to improve institutional performance and value creation process, the strategy should focus on client service/stability and Innovation/Differentiation. In achieving the overall goal, the institution must meet the baseline value on the goal factor design. However, there is one key objective that should be of particular concern, namely a customer-oriented service culture. While the main risk profile that needs attention is data and information management. On the other hand, in the issue of information technology, several things are the main focus including: 1) duplication or overlapping between various initiatives or resources; 2) insufficient IT resources, staff with inadequate skills, or staff dissatisfaction; 3) implementation of new initiatives or innovations that are hampered or fail due to current IT architecture and systems; and 4) data quality issues and data integration in various aspects.

Prioritized GMOs cover the following domains: EDM02 (Ensure Benefits Delivery), EDM04 (Ensure Resource Optimization), APO02 (Manage Strategy), APO03 (Manage Enterprise Architecture), APO05 (Manage Portfolio), APO08 (Manage Relationships), APO09 (Manage Service Agreements), APO10 (Manage Suppliers), BAI01 (Manage Programs and Projects), BAI02 (Manage Requirements Definition), BAI03 (Manage Solutions Identification and Build), BAI05 (Manage Organizational Change Enablement), BAI06 (Manage Changes), and DSS01 (Manage Operations). Each of these GMOs is assigned a 100% level of importance, indicating they are fully prioritized and considered critical in the initial design phase. This reflects their maximum relevance and essential role in achieving institutional governance and management objectives.

Supplementary information

Supplementary information accompanies this paper at https://bit.ly/Appendix_IdentifyingGMO

Additional file:
Appendix 1. Insitutional risk Profile COBIT 2019 and UIN Ar-Raniry Blueprint 2022-2026 document alignment.
Appendic 2. Insitutional IT-Related Issues COBIT 2019 and UIN Ar-Raniry Blueprint 2022-2026 Aligment

Conflict of Interest

We have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Role of the author:

Author 1/ corresponding author (Venita Ananda): Conceptualization, methodology, writing, review, editing and submitting journal. *Author 2 (Ghufran Ibnu Yasa)*: Data curation, checking, and evaluating. *Author 3 (Ima Dwitawati)*: validation, evaluating, and review.

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