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Article

Data Visualization for Institutional Efficiency and Evidence-Based Policymaking: Enhancing Good University Governance Through Accreditation Management in Higher Education

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ABSTRACT

This study investigates the feasibility and effectiveness of an accreditation data visualization management information system in supporting Good University Governance (GUG) while enhancing institutional efficiency and evidence-based policymaking in higher education. The study examines how digital data visualization contributes to transparency, accountability, and more efficient organizational decision-making in accreditation management. A qualitative case study was conducted at UIN Sayyid Ali Rahmatullah Tulungagung, involving university leaders, accreditation team members, IT personnel, and academic staff. Data were collected through semi-structured interviews, non-participant observation, and document analysis, and analyzed using thematic analysis. The findings indicate that the system improves transparency by providing accessible, comprehensive, and real-time information that supports informed managerial decisions. It also strengthens accountability through reliable data management, traceability, and controlled access while reducing administrative redundancy and improving coordination across accreditation units. These improvements contribute to institutional efficiency by optimizing resource utilization, reducing the time and administrative costs associated with accreditation management, and supporting evidence-based policy formulation for institutional planning and quality assurance. The study further identifies the need for continuous system enhancement through the integration of additional accreditation indicators to strengthen institutional performance evaluation. This research contributes to the economics of higher education and institutional governance literature by demonstrating how data visualization serves not only as a governance tool but also as a mechanism for improving organizational productivity, resource allocation, and policy effectiveness. The study offers practical insights for higher education institutions seeking to strengthen governance and institutional performance through digital transformation.

Keywords: Accreditation Management; Evidence-Based Policymaking; Good University Governance; Institutional Efficiency.

INTRODUCTION

In the era of digital transformation, higher education institutions are increasingly expected to operate as data-driven organizations in which strategic decisions rely on the availability of accurate, integrated, and timely information. Digital transformation has shifted the role of information systems from administrative support toward strategic organizational assets that improve institutional performance, accountability, and long-term competitiveness. Consequently, data management has become a fundamental

organizational capability encompassing the processes of collecting, organizing, integrating, storing, and maintaining institutional data to support operational activities and strategic decision-making (Juan and Ciro, 2025; Wamba et al., 2017).

Recent international evidence demonstrates that despite substantial investment in digital technologies, many higher education systems continue to experience fragmented information management. The OECD Digital Education Outlook 2023, based on a survey across 29 countries and jurisdictions, reports that although national student information systems have been implemented in many countries, interoperability between institutional digital systems remains limited, with fewer than one-third of participating countries reporting that most learning management systems can effectively exchange data with institutional management systems. As a result, universities frequently perform repetitive data entry, manual verification, and duplicated reporting processes that consume considerable administrative resources. Likewise, UNESCO identifies interoperability, integrated data governance, and institutional digital capacity as persistent challenges in achieving effective digital transformation within higher education. These findings indicate that the principal challenge is no longer the availability of digital technologies, but rather the effective governance and utilization of institutional information for organizational decision-making.

From the perspective of Institutional Economics, organizational performance depends on institutional arrangements that facilitate efficient coordination, information exchange, and collective decision-making (North, 1990). Complementing this perspective, Transaction Cost Economics argues that organizations adopt governance structures capable of minimizing the costs associated with searching, verifying, coordinating, monitoring, and processing information (Williamson, 1985). In higher education institutions, fragmented information systems increase transaction costs because academic and administrative units repeatedly collect identical information, perform redundant verification, and coordinate manually across departments. Conversely, integrated digital information systems reduce these costs by facilitating seamless information exchange, improving data reliability, shortening administrative processes, and enabling institutional leaders to allocate organizational resources more efficiently.

These challenges become particularly significant during accreditation management, one of the most comprehensive quality assurance mechanisms in higher education. Accreditation requires reliable and integrated institutional information covering governance, academic programs, human resources, finance, research, community engagement, infrastructure, and internal quality assurance. Nevertheless, many universities continue to experience fragmented databases, isolated information systems, inconsistent documentation, and limited interoperability among organizational units. Such fragmentation prolongs accreditation preparation, increases administrative workloads, duplicates institutional resources, and limits organizational responsiveness. From an economic perspective, these inefficiencies represent avoidable transaction costs that reduce institutional productivity and weaken evidence-based policymaking.

To address these challenges, data visualization-based management information systems have emerged as strategic instruments for digital governance. Data visualization transforms complex institutional datasets into intuitive and interactive dashboards that enable decision-makers to monitor organizational performance, identify strategic priorities, detect performance gaps, and communicate institutional information more effectively (Knaflic, 2015; Yigitbasioglu & Velcu, 2012). Previous studies demonstrate that dashboard-based visualization improves managerial decision quality, organizational responsiveness, and

institutional performance (Maulachela et al., 2021). Likewise, Wamba et al. (2017) argue that integrating big data analytics with visualization technologies strengthens organizational competitiveness through more efficient utilization of information resources.

The relationship between accreditation data visualization systems and institutional efficiency can be explained through a clear causal mechanism. Integrated visualization dashboards consolidate institutional information into a unified platform that minimizes fragmented databases and repetitive reporting. Consequently, university personnel spend less time retrieving, validating, and reconciling accreditation data, thereby reducing administrative transaction costs. Simultaneously, university leaders gain faster access to reliable institutional information, enabling more efficient resource allocation, more accurate performance monitoring, and stronger evidence-based policymaking. Therefore, accreditation data visualization systems generate economic value by improving institutional efficiency while simultaneously strengthening organizational governance.

The implementation of digital information systems should also be understood within the broader framework of Good University Governance (GUG), which emphasizes transparency, accountability, responsibility, independence, and fairness as fundamental principles of institutional management (Sudarmanto et al., 2024). Internationally, governance quality is increasingly recognized as a determinant of institutional effectiveness, public trust, and sustainable organizational development (OECD, 2020). Within this governance framework, accreditation data visualization systems operationalize governance principles by providing transparent institutional information, facilitating accountable reporting, strengthening regulatory compliance, and improving organizational traceability throughout accreditation processes. Thus, digital information systems function not merely as technological innovations but as strategic governance infrastructures capable of improving both institutional performance and organizational efficiency.

Although previous studies have extensively examined digital transformation, management information systems, dashboards, and governance in higher education, the literature remains fragmented. Most existing studies primarily investigate technological implementation, system acceptance, or governance practices, while relatively limited attention has been devoted to explaining the economic mechanisms through which accreditation data visualization systems generate institutional value. Specifically, previous studies rarely integrate Institutional Economics and Transaction Cost Economics to explain how visualization systems reduce transaction costs, improve institutional efficiency, optimize resource allocation, and strengthen evidence-based policymaking. Furthermore, empirical evidence remains limited regarding how university stakeholders utilize accreditation visualization systems to simultaneously improve governance quality and institutional performance.

Accordingly, this study addresses these gaps by positioning accreditation data visualization systems as strategic governance infrastructures that simultaneously generate administrative and economic value. Theoretically, this research integrates Good University Governance, Institutional Economics, and Transaction Cost Economics to explain the economic consequences of digital information systems in higher education. Empirically, it provides qualitative evidence from UIN Sayyid Ali Rahmatullah Tulungagung regarding how accreditation data visualization systems improve transparency, accountability, institutional efficiency, and evidence-based policymaking. By moving beyond technological implementation toward the economics of digital governance, this study extends the literature on higher education management while providing

practical implications for universities seeking to optimize organizational resources and strengthen sustainable institutional development through digital transformation.

Institutional Economics, Transaction Cost Economics, and Institutional Efficiency

Institutional Economics argues that organizational performance depends not only on the availability of financial, human, and technological resources but also on institutional arrangements that facilitate coordination, information exchange, and decision-making (North, 1990). Complementing this perspective, Transaction Cost Economics (TCE) explains that organizations seek governance mechanisms capable of minimizing transaction costs associated with information searching, coordination, monitoring, and verification (Williamson, 1985). In higher education, fragmented accreditation data increase these costs through repetitive data collection, manual verification, and disconnected administrative processes. Therefore, integrated digital information systems function as institutional governance mechanisms that reduce information asymmetry, strengthen organizational coordination, and improve the quality and efficiency of institutional decision-making.

The reduction of transaction costs contributes directly to institutional efficiency, defined as an organization's ability to optimize financial, human, technological, and informational resources while minimizing unnecessary resource consumption. Digital transformation enhances institutional efficiency by integrating information systems that streamline administrative processes, improve organizational coordination, support evidence-based decision-making, and optimize resource allocation (Jain & Gulati, 2025; Dimyati & Hermanu, 2023). Within accreditation management, data visualization systems operationalize these theoretical perspectives by transforming complex institutional data into integrated dashboards that improve data accessibility, reduce repetitive reporting, and facilitate timely decision-making. Consequently, accreditation data visualization systems generate organizational value beyond their technological functions by reducing transaction costs, strengthening Good University Governance, enhancing institutional efficiency, and supporting Evidence-Based Policymaking.

Good University Governance (GUG)

Good University Governance (GUG) is a concept of higher education governance that applies the principles of good governance, including transparency, accountability, responsibility, independence, and fairness (Sudarmanto et al, 2024; OECD, 2020). The implementation of GUG aims to improve the quality of institutional management, strengthen public trust, and enhance the competitiveness of universities. Recent studies indicate that the success of GUG implementation is strongly influenced by the availability of information systems capable of providing accurate, transparent, and accountable data (Khotimah et al., 2024; Risanty & Kesuma, 2019).

Effective data management plays a direct role in realizing the principles of GUG. Transparency can be achieved through open access to information; accountability through structured reporting systems; responsibility through compliance with regulations; independence through objective data management; and fairness through equal access to information for all stakeholders. Therefore, the integration of data management and information systems is a key factor in achieving good and sustainable university governance (Gaftandzhieva et al., 2023; OECD, 2021).

Evidence-Based Policymaking (EBPM)

Evidence-Based Policymaking (EBPM) refers to the process of formulating, implementing, and evaluating policies based on reliable empirical evidence, systematic data analysis, and scientific knowledge rather than intuition or subjective judgment. In organizational and public sector contexts, EBPM enhances decision quality by enabling policymakers to identify priorities, evaluate policy alternatives, and allocate resources more effectively based on objective evidence. Recent studies emphasize that advances in digital technologies, including integrated information systems, data analytics, and visualization tools, have significantly strengthened the implementation of evidence-based policymaking by improving data accessibility, transparency, and analytical capacity for decision-makers (Head, 2019; Parkhurst, 2016). Within higher education, evidence-based policymaking supports institutional governance by facilitating strategic planning, quality assurance, performance evaluation, and resource optimization through the use of accurate and timely institutional data. Consequently, data visualization systems play an important role in translating complex accreditation data into meaningful information that enables university leaders to make more transparent, accountable, and evidence-informed decisions while improving institutional performance and governance outcomes (Head, 2019).

Data Management in Higher Education Accreditation

Data management in higher education accreditation refers to the systematic processes of collecting, organizing, integrating, storing, and utilizing institutional data to support accreditation and strategic decision-making (Juan & Ciro, 2025). Beyond its technical functions, it encompasses data governance, data quality, and interoperability to ensure that institutional information is accurate, reliable, and accessible. From the perspectives of Institutional Economics and Transaction Cost Economics, effective data management serves as a governance mechanism that reduces information asymmetry, minimizes transaction costs associated with data searching, verification, and coordination, and strengthens organizational efficiency (North, 1990; Williamson, 1985). Consequently, integrated data management becomes a strategic organizational capability that enhances transparency, accountability, and evidence-based decision-making while optimizing institutional resource utilization.

Higher education accreditation is a comprehensive quality assurance process that requires integrated evidence across multiple institutional dimensions, including governance, academic programs, human resources, finance, research, community engagement, and quality assurance (OECD, 2020; Hou et al., 2024; Robertsone & Lapiņa, 2022). However, many universities continue to experience fragmented databases, isolated information systems, and inconsistent documentation, resulting in administrative inefficiencies and increased transaction costs during accreditation (Sá & Serpa, 2020). Therefore, integrated information systems supported by accreditation data visualization play a strategic role in consolidating institutional information, improving data accessibility, reducing repetitive reporting, and facilitating timely decision-making (Williamson et al., 2020). These capabilities strengthen Good University Governance, improve institutional efficiency, and support Evidence-Based Policymaking by providing accurate, timely, and reliable information for institutional management.

Previous Study

Table 1 summarizes and categorizes previous qualitative studies on Good University Governance (GUG) into major themes, providing a comparative overview of their research focus, key findings, and existing research gaps.

Table 1. Thematic Synthesis of Previous Studies and Research Gaps

Theme	Key References	Research Focus	Main Findings	Research Gap
Institutional Economics, Transaction Cost Economics, and Institutional Efficiency	North (1990); Williamson (1985); Jain & Gulati (2025); Dimyati & Hermanu (2023)	Institutional governance, transaction costs, and organizational efficiency	Institutional arrangements and governance mechanisms improve organizational performance by reducing information asymmetry, coordination costs, and inefficient resource allocation. Digital transformation further enhances institutional efficiency through integrated information systems and optimized organizational processes.	Previous studies explain institutional efficiency and transaction cost reduction conceptually but provide limited empirical evidence on how accreditation data visualization systems operationalize these theories to improve governance and institutional performance in higher education.
Good University Governance (GUG)	OECD (2020, 2021); Sudarmanto et al. (2024); Khotimah et al. (2024); Risanty & Kesuma (2019); Gaftandzhieva et al. (2023)	Governance principles, accountability, and transparency in higher education	Good University Governance promotes transparency, accountability, responsibility, independence, and fairness. Effective governance increasingly depends on integrated information systems that provide accurate, transparent, and accountable institutional information.	Existing studies emphasize governance principles but rarely explain how accreditation data visualization systems operationalize GUG while simultaneously improving institutional efficiency and organizational decision-making.
Evidence-Based Policymaking (EBPM)	Head (2019); Parkhurst (2016)	Evidence-based decision-making supported by digital information	Evidence-Based Policymaking improves policy quality through systematic data analysis, reliable evidence, and digital technologies that enhance data accessibility and analytical capacity.	Previous research discusses evidence-based policymaking conceptually but provides limited explanation of how accreditation data visualization systems generate evidence that supports strategic governance and institutional resource allocation.
Data Management in Higher Education Accreditation	Juan & Ciro (2025); Wamba et al. (2017); OECD (2020); Hou et al. (2024); Robertsone & Lapiņa (2022); Sá & Serpa (2020); Williamson et al. (2020)	Institutional data management, accreditation, and digital information systems	Effective data management improves data quality, interoperability, organizational coordination, and accreditation performance. Integrated information systems supported by visualization enhance data accessibility, reduce administrative duplication, and facilitate timely decision-making.	Existing studies primarily examine data management and accreditation independently, with limited attention to accreditation data visualization as a strategic governance infrastructure that simultaneously strengthens GUG, institutional efficiency, and Evidence-Based Policymaking.

Resource: Elaborated by the Author, 2026

Based on Table 1, the reviewed literature demonstrates that Institutional Economics, Transaction Cost Economics, digital governance, evidence-based policymaking, and data management are increasingly recognized as critical determinants of higher education performance. Previous studies consistently show that effective governance mechanisms, integrated information systems, and digital transformation enhance transparency, accountability, organizational coordination, and institutional efficiency by reducing information asymmetry and transaction costs while improving resource allocation and decision-making quality. However, the existing literature remains fragmented, as most studies examine governance, institutional efficiency, data management, or evidence-based policymaking independently without explaining their interrelationships within higher education accreditation. Furthermore, limited empirical evidence exists on how accreditation data visualization systems function as strategic governance infrastructures that simultaneously operationalize Good University Governance, reduce transaction costs, improve institutional efficiency, and support Evidence-Based Policymaking. Accordingly, this study addresses this theoretical gap by integrating Institutional Economics and Transaction Cost Economics to explain how accreditation data visualization systems create organizational value through effective data management, enhanced governance quality, optimized resource utilization, and evidence-based decision-making in higher education.

Research Framework

This study proposes a research framework that conceptualizes how accreditation data management systems, particularly those utilizing data visualization, support the implementation of Good University Governance (GUG), with a focus on transparency and accountability.

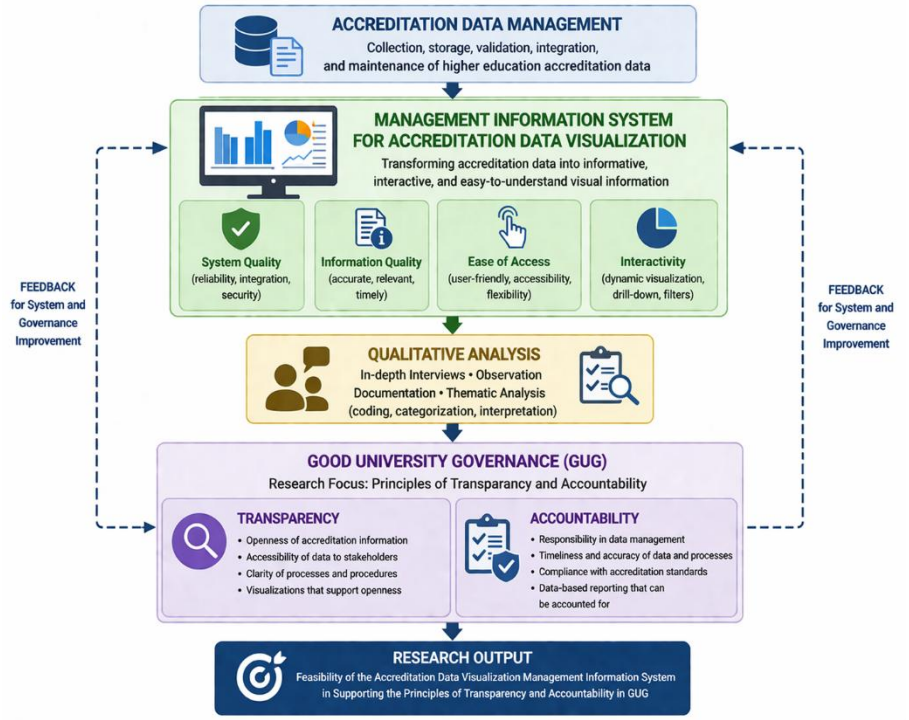


Figure 1

Research Framework (Elaborated by the Author, 2025)

RESEARCH METHOD

Research Approach and Design

This study adopts a qualitative case study approach to explore the feasibility of an accreditation data visualization management information system in supporting Good University Governance (GUG) while examining its perceived contribution to institutional efficiency and evidence-based policymaking. A qualitative approach is appropriate for investigating complex organizational phenomena within their natural settings and for capturing participants' experiences and interpretations (Creswell & Poth, 2024). The case study design enables an in-depth examination of how the system is implemented and utilized within a specific institutional context. Beyond exploring governance practices, the study also investigates how stakeholders perceive the system's role in improving organizational coordination, optimizing resource utilization, supporting institutional decision-making, and enhancing institutional performance, thereby incorporating perspectives from institutional economics and public policy.

Research Setting

The study was conducted at UIN Sayyid Ali Rahmatullah Tulungagung, a higher education institution that has implemented an accreditation data visualization management information system. This institutional setting provides an appropriate context for examining not only governance practices but also how digital information systems support institutional efficiency, resource management, and evidence-based decision-making in accreditation management.

Participants and Sampling Technique

Participants were selected through purposive sampling to identify information-rich individuals possessing direct knowledge and experience regarding accreditation management and digital information systems (Campbell et al., 2020). The participants consisted of university leaders responsible for strategic policy decisions, accreditation team members, information technology personnel, and academic and administrative staff involved in institutional data management. This sampling strategy ensured comprehensive insights into the governance, managerial, and organizational dimensions of system implementation, including its perceived influence on institutional efficiency and decision-making processes.

Data Collection Methods

Data were collected through semi-structured interviews, non-participant observation, and document analysis to achieve methodological triangulation (Creswell & Poth, 2024). Semi-structured interviews explored participants' experiences regarding system usability, transparency, accountability, institutional coordination, and perceived contributions to organizational efficiency and policy formulation (Kallio et al., 2016; Adeoye-Olatunde & Olenik, 2021). Non-participant observations examined how the system was utilized during accreditation activities, focusing on workflows, information accessibility, coordination mechanisms, and decision-support processes (Moser & Korstjens, 2022). Document analysis included accreditation reports, institutional policies, dashboard outputs, and administrative records to understand how the system supported governance practices, institutional planning, and evidence-based managerial decision-making.

Data Analysis

Data were analyzed using thematic analysis following Braun and Clarke (2021), including data familiarization, initial coding, theme generation, theme refinement, and interpretation. In addition to identifying themes related to transparency and accountability, the analytical process examined themes associated with institutional efficiency, resource utilization, organizational productivity, evidence-based policymaking, and institutional performance. These analytical dimensions were interpreted from participants' perceptions and organizational practices rather than through quantitative economic measurements, allowing the study to explain how digital governance systems create institutional value within higher education.

Trustworthiness of Data

The rigor of the study was ensured through credibility, transferability, dependability, and confirmability (Nowell et al., 2017; Stahl & King, 2020). Credibility was established through triangulation of interviews, observations, and documents. Transferability was enhanced by providing detailed descriptions of the institutional context and system implementation. Dependability was supported through an audit trail documenting research procedures and analytical decisions, while confirmability was strengthened through reflexive practices that minimized researcher bias. These strategies enhance the trustworthiness of the findings and support the interpretation of governance and institutional efficiency outcomes within the context of higher education.

RESULT AND DISCUSSION

The thematic analysis of interview transcripts, field observations, and institutional documents identified two major themes concerning the implementation of the accreditation data visualization management information system: (1) Transparency through Accessible and Informative Systems and (2) Accountability through Controlled and Reliable Data Management. These themes emerged through iterative coding, categorization, and interpretation and were examined through triangulation across multiple data sources. The findings indicate that participants perceived the system as a practical instrument for organizing accreditation information, monitoring institutional performance, coordinating administrative activities, and supporting accreditation-related reporting and decision-making.

The findings are interpreted in relation to the system's operational characteristics, particularly its centralized presentation of accreditation indicators, visualization dashboard, organization of supporting evidence, and role-based access permissions. These features provide a basis for understanding how the system may support institutional governance in practice. However, the reported benefits concerning administrative efficiency, workload reduction, and resource utilization represent participants' perceptions and experiences rather than objectively measured effects attributable exclusively to the system.

Theme 1: Transparency Through Accessible and Informative Systems

The first theme demonstrates how participants associated the accreditation data visualization system with greater transparency through three interrelated dimensions: information accessibility, clarity of presentation, and completeness of institutional data. Participants described the system as relatively easy to access and use, allowing them to retrieve accreditation information through a centralized interface rather

than searching across multiple administrative files. The dashboard presents accreditation indicators in a structured and visual format, helping users obtain an overview of institutional performance and accreditation progress.

One participant explained the difference between conventional document-based information retrieval and the dashboard-based approach:

> "Previously, we had to search through multiple files from different units. Now the dashboard allows us to see accreditation indicators immediately in one place, making monitoring much easier." (Participant 3)

Another participant emphasized the role of visualization in facilitating the interpretation of institutional information:

> "The graphical presentation helps us understand accreditation progress more quickly because the information is displayed visually rather than as lengthy tables." (Participant 7)

These accounts suggest that the perceived transparency benefits stem from two characteristics of the system: the consolidation of accreditation information and the visual presentation of performance indicators. Centralization provides a common point of access, while graphical representations help users identify the status of accreditation indicators without having to interpret extensive administrative tables. Field observations were consistent with these accounts, showing that the dashboard brought accreditation indicators together within a single interface and presented information through charts, progress indicators, and links or references to supporting evidence. Documentary analysis also indicated that accreditation information was organized according to relevant accreditation criteria, facilitating the retrieval of supporting documents during monitoring and reporting activities.

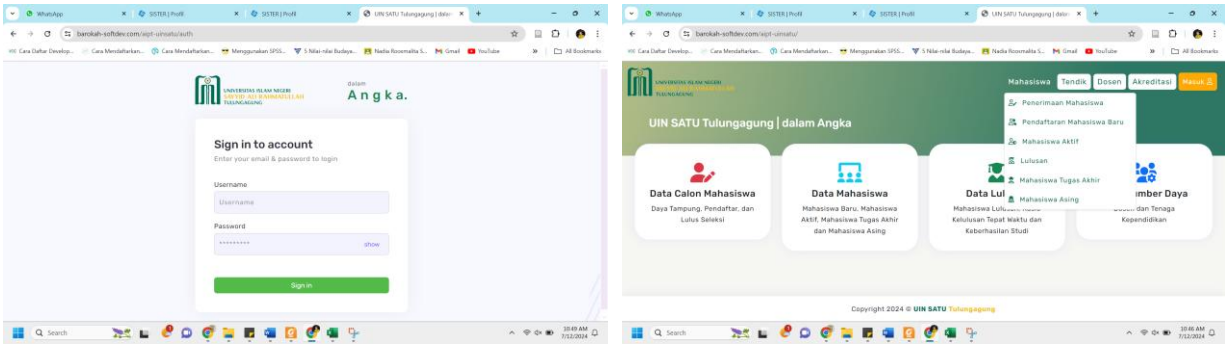


Figure 1. Integrated Accreditation Data Visualization Dashboard. The dashboard illustrates how accreditation indicators are consolidated into a single interface. Its relevance to transparency lies in providing users with an overview of institutional accreditation information without requiring them to navigate multiple independent data sources.

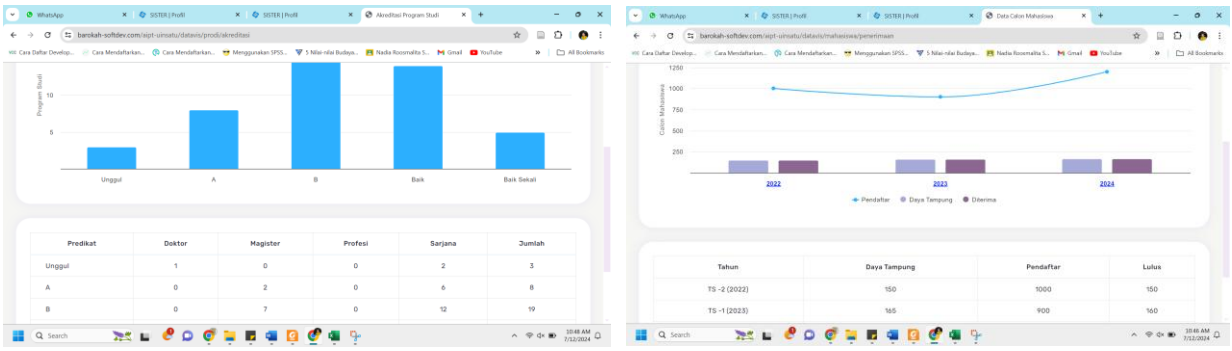


Figure 2. Visualization of Accreditation Indicators and Progress. The graphical presentation of accreditation indicators illustrates how users can review performance information and identify the progress of accreditation-related activities. This feature corresponds to participants' accounts of the perceived benefits of visual information presentation for monitoring and interpretation.

(Note: Figures 1 and 2 should be supported by actual screenshots of the implemented system, with confidential information appropriately concealed.)

Beyond accessibility and clarity, participants identified data completeness as an important condition for meaningful transparency. Although the existing dashboard was perceived as useful for monitoring accreditation progress, participants recommended incorporating additional indicators, including student re-registration records, cohort-based graduation rates, and other relevant institutional performance measures. These suggestions indicate that accessibility alone is insufficient to ensure comprehensive institutional transparency. The usefulness of the system also depends on whether the information presented adequately represents the institution's performance and responds to evolving accreditation requirements.

The findings therefore suggest that the system's contribution to transparency is conditional on the quality, relevance, and completeness of the information it displays. A centralized dashboard can simplify access to existing information, but it cannot independently guarantee that all institutional performance dimensions are adequately represented. Continuous development of indicators, data integration, and supporting evidence is consequently important for maintaining the system's usefulness for institutional monitoring and governance.

Theme 2: Accountability Through Controlled and Reliable Data Management

The second theme concerns accountability through data consistency, traceability, and controlled access. Participants perceived that centralized data management helped maintain consistency between information displayed on the dashboard and the institution's accreditation documents. The system was also described as supporting more organized reporting by enabling organizational units to refer to a common set of institutional information.

One participant highlighted the relationship between data consistency and access control:

> "The information displayed is consistent with our accreditation documents, and access rights ensure that only authorized users can make changes." (Participant 5)

Another participant described the perceived contribution of centralized data management to administrative coordination:

"Because the data are stored in one integrated system, we no longer need to repeatedly request documents from different departments. This makes reporting more organized and reduces inconsistencies." (Participant 2)

These accounts indicate that participants associated accountability with the combination of standardized information, identifiable supporting evidence, and differentiated user permissions. Rather than treating accountability solely as the obligation to produce reports, participants' experiences suggest that accountability also involves maintaining information that can be checked, verified, and accessed according to organizational responsibilities.

Field observations indicated that access permissions differed according to user roles. Editing and downloading functions were restricted to designated administrators, whereas general users could monitor accreditation progress through the dashboard. Institutional documents further indicated that accreditation evidence was systematically organized and archived, providing a basis for verification during internal monitoring and accreditation reviews. Taken together, these observations and documents support the interpretation that the system incorporates organizational arrangements intended to maintain data integrity and regulate access.

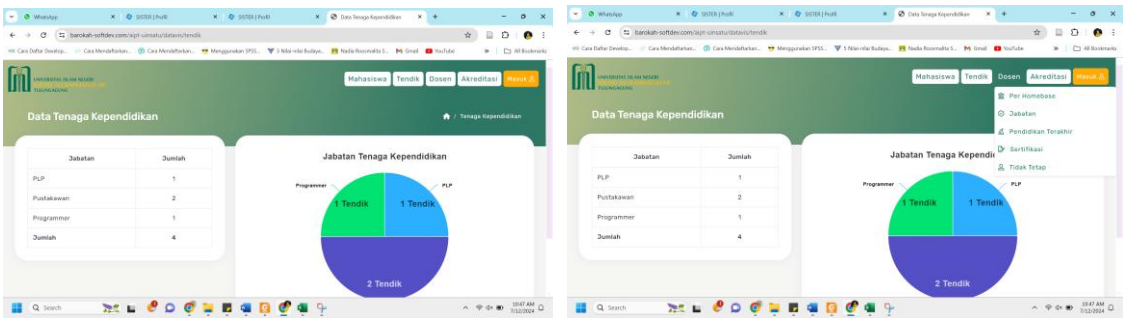


Figure 3. Role-Based Access and Data Management Interface. A screenshot of the relevant interface should demonstrate the distinction between monitoring functions and administrative functions, where applicable. This evidence illustrates how differentiated permissions can support the control of institutional information while enabling users to access data relevant to their responsibilities.

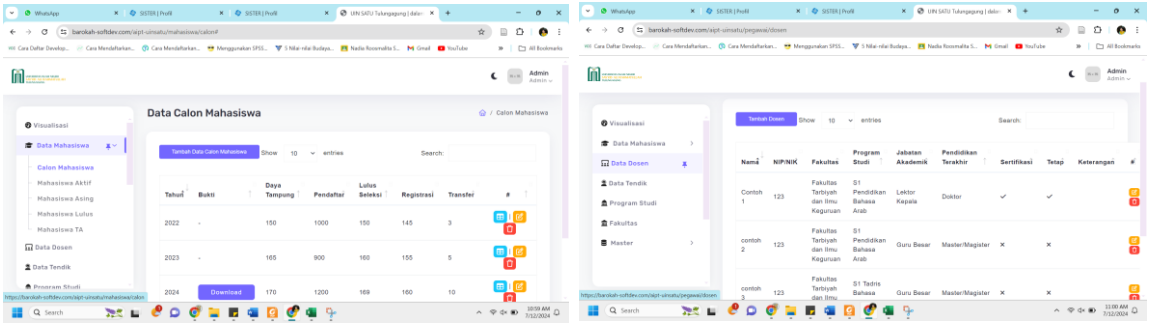


Figure 4. Organization and Traceability of Accreditation Evidence. A screenshot showing the organization of supporting evidence according to accreditation criteria should illustrate how

institutional documents are associated with relevant indicators and can be retrieved for monitoring and verification.

(Note: Figures 3 and 4 should reflect actual system functions. Claims concerning audit trails, automatic verification, or document-level traceability should be included only if these capabilities have been verified.)

Participants also associated centralized data management with more coordinated administrative workflows. According to their accounts, the availability of shared information reduced the perceived need to request identical documents repeatedly from different organizational units. Standardized access was therefore viewed as potentially helping staff devote more attention to accreditation preparation and improvement activities rather than repetitive information collection.

Nevertheless, the qualitative evidence does not establish the magnitude of any reduction in administrative workload or prove that the system independently caused improvements in reporting efficiency. Such effects may also depend on staff competence, data-update procedures, organizational commitment, and the quality of coordination between units. The findings are therefore best understood as evidence of perceived operational benefits and of the organizational conditions under which a centralized information system may support accountability.

Overall, the two themes demonstrate that transparency and accountability are interconnected but analytically distinct. Transparency concerns the accessibility and intelligibility of institutional information, whereas accountability concerns the reliability, traceability, and controlled management of that information. The system's governance value lies in the interaction between these dimensions: accessible information becomes more useful for institutional oversight when users can also rely on its consistency and identify the supporting evidence.

The findings demonstrate how an accreditation data visualization management information system may support higher education governance through two interrelated mechanisms: accessible institutional information and controlled, reliable data management. Participants perceived that centralized dashboards, visualized accreditation indicators, organized supporting evidence, and role-based access facilitated information retrieval, monitoring, and inter-unit coordination. These findings suggest that the governance value of digital systems extends beyond technological functionality to the organizational arrangements governing how information is accessed, validated, and utilized.

From the perspective of Institutional Economics, the system represents an organizational mechanism that may reduce information asymmetry and uncertainty by establishing a shared reference for accreditation information (North, 1990). Centralized access and standardized indicators can facilitate coordination across academic and administrative units, although their effectiveness remains contingent on data quality, update procedures, and clearly defined responsibilities. This extends previous research on digital information systems and institutional governance (Handayani et al., 2021; Indarti et al., 2022) by examining how these mechanisms operate in higher education accreditation management.

The findings also align with Transaction Cost Economics (TCE), which explains organizational arrangements in terms of the costs associated with information searching, coordination, monitoring, and verification (Williamson, 1985). Participants associated integrated data management with fewer repetitive

document requests, more organized reporting, and easier evidence retrieval. These experiences suggest a plausible pathway through which information integration may reduce administrative burdens and support organizational efficiency. However, because transaction costs and processing time were not quantitatively measured, these benefits should be interpreted as participants' perceived experiences rather than demonstrated causal effects. This distinction adds contextual evidence to research on digital transformation and institutional efficiency (Jain & Gulati, 2025; Dimyati & Hermanu, 2023).

Regarding Evidence-Based Policymaking (EBPM), the dashboard provides an information infrastructure through which accreditation indicators can inform institutional monitoring and planning. Accessible visualizations may help decision-makers identify performance gaps and prioritize follow-up actions, consistent with the emphasis on reliable and accessible evidence in policymaking (Head, 2019; Parkhurst, 2016). Nevertheless, visualization alone does not guarantee evidence-based decisions. Its contribution depends on data completeness, accuracy, timeliness, and the capacity to interpret indicators in relation to institutional objectives. Participants' recommendations to incorporate student re-registration records and cohort-based graduation rates reinforce the importance of aligning dashboard content with broader institutional performance needs.

These findings further illuminate Good University Governance (GUG) by demonstrating the complementary roles of transparency and accountability. Transparency is supported by accessible and intelligible information, whereas accountability requires consistent data, traceable supporting evidence, and appropriate access controls. Participants' experiences suggest that centralized information management can support both dimensions, while their recommendations for additional indicators reveal persistent limitations in data completeness. Thus, effective digital governance requires more than system availability; it depends on continuous data validation, clear accountability for information management, and alignment between system functionality and institutional requirements. This interpretation is consistent with broader discussions of governance and integrated information systems (OECD, 2020; Sudarmanto et al., 2024).

The study's principal contribution lies in integrating Institutional Economics, TCE, EBPM, and GUG into a governance-oriented explanation of accreditation data visualization. Rather than treating the system merely as a technological innovation, this study conceptualizes it as governance-support infrastructure connecting information accessibility, administrative coordination, data accountability, and evidence-informed decision-making. Its novelty lies in explaining the organizational mechanisms through which participants perceive these benefits, rather than claiming causal effects that the research design cannot establish.

Practically, higher education institutions should prioritize indicator completeness, standardized data definitions, regular validation, clearly assigned data ownership, and role-based access controls. Where technically feasible, dashboards could also connect identified accreditation gaps with responsible units and corrective-action monitoring. Future research should evaluate these proposed mechanisms across multiple institutions using mixed-method or longitudinal designs and measurable indicators, including information-retrieval time, reporting timeliness, data discrepancies, and duplicated administrative requests. Such approaches would help determine whether perceived governance benefits translate into measurable improvements in institutional performance and resource efficiency.

CONCLUSION AND RECOMMENDATION

This study concludes that the accreditation data visualization management information system at UIN Sayyid Ali Rahmatullah Tulungagung may support transparency, accountability, institutional coordination, and evidence-informed decision-making by integrating accessible and reliable accreditation information. Theoretically, the study integrates Institutional Economics, Transaction Cost Economics, Good University Governance, and Evidence-Based Policymaking to conceptualize data visualization as governance-support infrastructure rather than merely a technological tool. Practically, higher education institutions should strengthen data integration, indicator completeness, data governance, and staff digital competencies, while policymakers should promote standardized data architectures and interoperability across institutions. However, the findings are limited by the single-case qualitative design and reliance on participants' perceptions, without quantitative measurement of efficiency or transaction costs. Future research should employ comparative, longitudinal, and mixed-method approaches to assess the measurable organizational and economic impacts of accreditation data visualization across diverse higher education contexts.

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