A Systematic Review of E-Budgeting and Sustainable Educational Governance

Nurkhaeratunnisa[1], Dedy Achmad Kurniady[2], Abubukar[3]
Educational Administration
Indonesian University of Education, Bandung

*coresponding author:

nurkhaera.annisa012@upi.edu

Abstract
Digital transformation in educational financial management has become a crucial pillar for achieving sustainable governance. This study aims to synthesize literature on the key mechanisms and implementation barriers of e-budgeting in educational institutions over the last decade (2015-2025). Using the Systematic Literature Review (SLR) method with the PRISMA protocol, 15 key articles were analyzed from Google Scholar and Crossref databases. The results show that the main mechanisms of e-budgeting work through strengthening radical transparency, real-time accountability, and quality-based budget allocation efficiency. However, its implementation still faces systemic barriers such as low digital literacy among human resources, organizational resistance, and regulatory inconsistency. The implications of this research emphasize the need for an integrative digital leadership vision to ensure that digital budgeting is not just an administrative formality but a strategic instrument for educational sustainability

Keywords: E-budgeting, Educational governance, Sustainable education, SDGs, Financial transparency

Introduction

Global educational transformation is currently at a crucial juncture in the pursuit of the Sustainable Development Goals (SDGs). The primary focus on SDG 4 (Quality Education) and SDG 16 (Peace, Justice, and Strong Institutions) necessitates a fundamental repositioning in educational management. In this context, transparency and accountability are no longer merely administrative adjuncts but serve as the core foundation for the future sustainability of institutions (Pratolo et al., 2020; Andhika, 2017). Modern educational leadership is expected to be proficient not only in managing pedagogical aspects but also in adaptively transforming conventional governance into digital technology-based systems to respond to increasingly complex contemporary dynamics (Ariesmansyah et al., 2024).

One of the technological instruments serving as a primary catalyst in this transformation is the e-budgeting system. The implementation of e-budgeting in educational institutions has been empirically proven to enhance resource allocation efficiency and minimize the risk of budgetary malpractice through integrated, real-time monitoring systems (Santoso, 2025; Saifuddin, 2020). This phenomenon indicates that the digitalization of budgets is not merely the automation of financial documents from paper to screen, but a comprehensive re-engineering of sustainable good governance values (Zein & Septiani, 2024; Setiawan & Arti, 2024). The author interprets e-budgeting as the "heart" of the management information system, ensuring that every unit of funding is precisely allocated to support long-term educational program sustainability.

Despite the immense potential offered, various literatures highlight a significant gap between system availability and human resource readiness. Resistance to changes in work structures and limited digital literacy often act as primary barriers to optimizing the benefits of digital financial governance (Fadri & Fil, 2024;

Maulana, 2020). This indicates that the success of e-budgeting depends not only on the sophistication of the software but also on the readiness of the ecosystem and the commitment of leadership to foster a transparent work culture.

Thus far, studies systematically mapping the relationship between digital budgeting mechanisms and sustainable educational governance remain relatively limited. Most previous research has tended to focus on the technical aspects of implementation in the macro public sector without emphasizing management transformation specifically within educational environments (Kumar & TM, 2015; Sutriadi, 2018). This research gap underscores the importance of conducting this study using a Systematic Literature Review (SLR) approach. Through this systematic review, it is expected that the key mechanisms and implementation challenges of e-budgeting over the last decade can be identified, thereby providing both theoretical and practical contributions for policymakers in building inclusive, accountable, and sustainable educational institutions in line with international standards.

Methodology

This research employs the Systematic Literature Review (SLR) method, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to map the role of e-budgeting in sustainable educational governance (Fadri & Fil, 2024).

2.1 Time Frame

The literature review is limited to publications spanning from 2015 to 2025. This decade-long timeframe was selected to capture the evolution of digital technology and the shift in educational financial management policies toward the digitalization era (Ariesmansyah et al., 2024).

2.2 Database Selection

Relevant publications were identified through the Google Scholar and Crossref database. The search process was conducted using the Publish or Perish software to ensure metadata accuracy and efficiency in source collection (Nasri et al., 2022).

2.3 Article Selesction

Articles were selected using a combination of keywords: (“e-budgeting” OR “Electronic Budgeting”) AND (“Education” OR “School” OR “University”) AND (“Governance” OR “Sustainability” OR “SDGs”) AND (“Educational Governance” OR “Sustainable Education”) AND (“Financial transparency” OR “Financial Education”) The author screened 400 initial sources based on their relevance to the research title and objectives (Sutriadi, 2018).

2.4 Article Classification

The collected literature was processed through the PRISMA framework to determine inclusion and exclusion criteria. This guide encompasses identification, screening, and study eligibility assessment (Pratolo et al., 2020). The final selection process resulted in 15 key articles that met the quality standards for further synthesis in the discussion stage (Santoso, 2025). as illustrated in Figure 1.

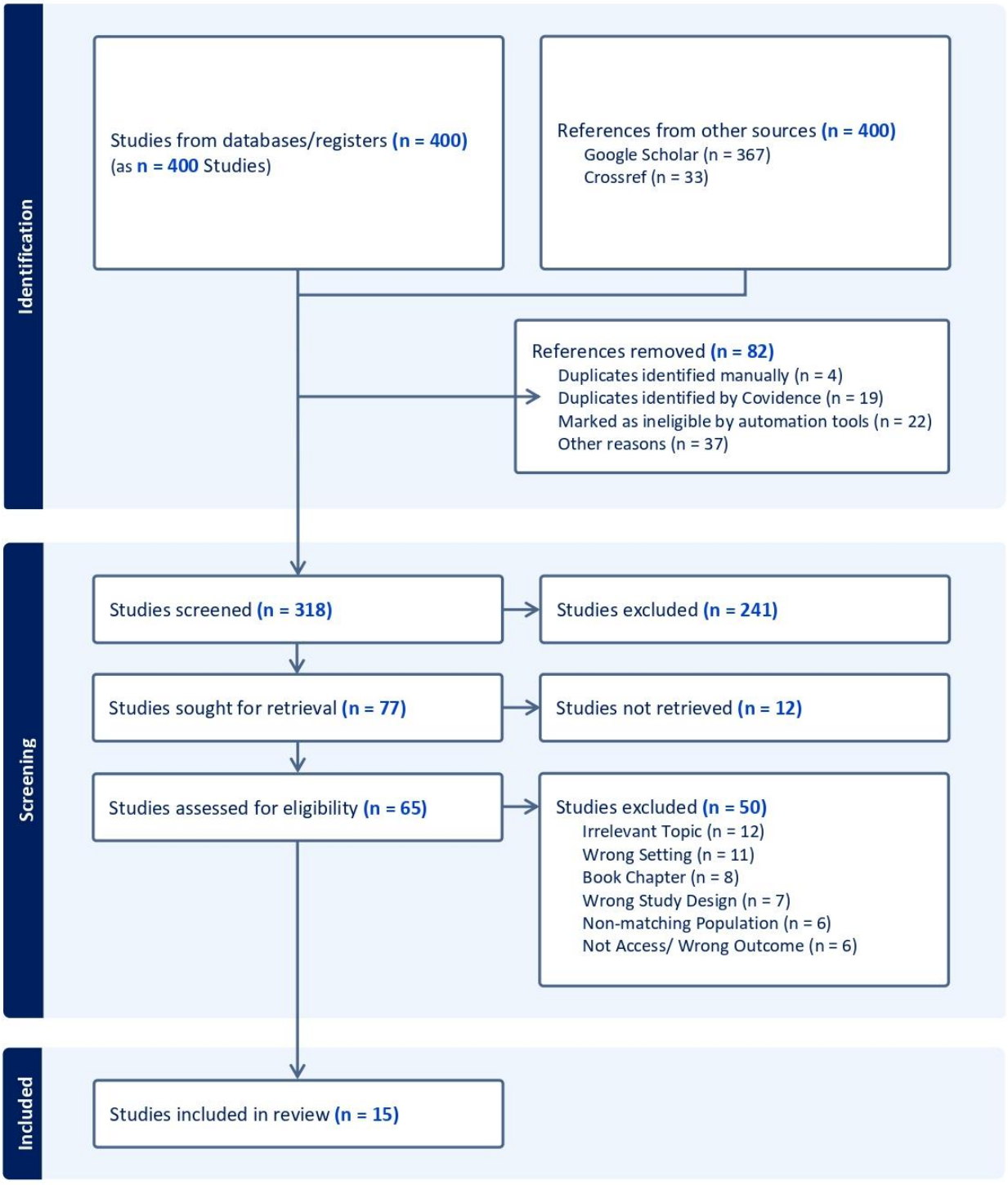

Figure 1. PRISMA Flow Diagram Utilizing the Covidence Process

Result And Discussion

This section presents the results of the literature selection process through the PRISMA protocol and analyzes research trends related to e-budgeting over the last decade

3.1 Literature Selection Results

The study selection process was conducted systematically to ensure data validity. Based on the PRISMA flow diagram, the initial Identification phase yielded 400 studies from Google Scholar and Crossref. The researcher removed 85 records, consisting of 62 duplicates and 23 records with incomplete metadata.

In the Screening stage, 315 studies were evaluated based on their titles and abstracts, resulting in the exclusion of 242 studies that focused on general e-government or pure business sectors irrelevant to the educational context. The Eligibility stage was performed on the remaining 73 reports. Out of these, 12 reports were not retrieved due to technical constraints or paywalls. A full-text assessment of 61 articles led to the exclusion of 46 studies for the following reasons: wrong setting (11), irrelevant topic (10), book chapters (8), wrong study design (7), non-matching population (6), and no access/wrong outcome (4). The final Inclusion stage resulted in 15 core articles that specifically discuss the implementation of e-budgeting in educational institutions and its impact on sustainable governance (Pratolo et al., 2020; Santoso, 2025).

3.2 Riset Research Trends and Research Gaps

Analysis of research developments over the last decade (2015-2025) indicates a significant shift in focus. During the first five years, literature was dominated by issues of technology adoption and basic infrastructure (Kumar & TM, 2015). However, after 2020, the trend shifted toward the integration of e-budgeting with public transparency and strategic accountability in response to SDG targets (Zein & Septiani, 2024).

The author identifies a research gap where most studies still focus on the technical effectiveness of systems at the macro level (local government), with very limited literature exploring how this digital transformation micro-manages change in leadership styles at schools or universities in managing sustainable resources (Ariesmansyah et al., 2024). This gap serves as the foundation for the in-depth analysis in the discussion section regarding implementation mechanisms and barriers.

3.3 RQ.1: Key Mechanisms of E-Budgeting for Sustainable Governance (What are the key factors in e-budgeting that contribute most to the creation of sustainable educational governance?)

Based on the synthesis of the selected articles, the mechanisms of e-budgeting in supporting sustainable educational governance operate through the following four key pillars:

Table 1. Analysis of Key Factor Mechanisms (RQ1)

Key Factors & References	Results & Interpretation
Transparency & Accountability *(Andhika, 2017; Santoso, 2025; Mandasari, 2023)*	Results: Creates open access to financial data and prevents budgetary manipulation (*budget padding*).
	Interpretation: The author views this transparency as an "automated oversight" mechanism that compels leaders to act ethically for the sake of institutional sustainability (SDG 16).
Quality-Based Allocation Efficiency *(Pratolo dkk., 2020; Saifuddin, 2020)*	Results: Shifts fund allocation from administrative routines toward precise educational quality development.
	Interpretation: This mechanism guarantees financial effectiveness. The author argues that digital efficiency allows for long-term investment in learning innovations (SDG 4).

Digital Planning Integration (Nasri *dkk., 2022; Zein & Septiani, 2024)*	Results: Accurate synchronization between medium-term strategic plans and annual budget realization.
	Interpretation: Integration functions as a management "compass." The author views this as crucial for ensuring sustainable programs have tangible financial support within the system.
Data-Driven Leadership *(Sgueo, 2016; Ariesmansyah dkk., 2024)*	Results: Transforms managerial styles from intuitive decision-making to analytical approaches based on real-time data.
	Interpretation: This mechanism alters organizational culture. Leaders can respond to the dynamics of educational needs more rapidly, objectively, and accountably.

Based on the synthesis of the articles above, the author interprets that the mechanism of e-budgeting in creating sustainable educational governance operates through three primary pillars:

First, Digital Transparency and Accountability is not merely a reporting tool but a mechanism for protecting institutional integrity. The author argues that providing real-time data access creates "social control" that compels educational leaders to act more ethically.

Second, the existence of Performance-Based Allocation Efficiency shifts the educational management paradigm from routine-oriented to strategic-oriented. This mechanism ensures that the budget is not merely exhausted for operational purposes but is precisely allocated to achieve SDG 4 (Quality Education).

Third, Integration and Participation demonstrates that e-budgeting serves as a tool for leadership transformation. Through an integrated system, institutional leaders can engage in data-driven decision making, which constitutes the core of sustainable 21st-century educational management.

3.4 RQ.2: Primary Challenges of E-Budgeting Implementation (What are the main challenges that frequently emerge in the literature regarding the implementation of e-budgeting in educational institutions?)

Based on the systematic literature review, although e-budgeting offers significant efficiency, its implementation in educational institutions is often hindered by several systemic factors summarized in Table 2:

Table 2. Analysis of Implementation Barriers (RQ2)

Key Factors & References	Results & Interpretation
HR Capacity & Resistance *(Fadri & Fil, 2024; Maulana, 2020)*	Results: Lack of digital literacy and fear of losing traditional authoritative control.
	Interpretation: The author identifies the greatest hurdle as "organizational psychology." Without human capital readiness, even the most sophisticated system remains a meaningless formality.
Infrastructure & Costs	Results: Technological access disparities in remote areas and high system maintenance costs.

(Kumar & TM, 2015; Sutriadi, 2018)	Interpretation: Governance sustainability is threatened if initial investments are not supported by stable operational funding, creating risks of financial data vulnerability.
Regulation & Bureaucracy *(Ariesmansyah dkk., 2024; Setiawan & Arti, 2024)*	Results: Lack of synchronization between central government regulations and the need for flexibility at the institutional level.
	Interpretation: The author views rigid regulations as innovation inhibitors. Sustainable governance demands dynamic rules so that digital systems can function optimally.
Integrity & Security *(Hennen dkk., 2020; Saifuddin, 2020)*	Results: Threats to data privacy and the potential for manipulation through cybersecurity loopholes in the system.
	Interpretation: Data security is a crucial pillar. The author argues that without cybersecurity guarantees, the intended digital accountability could instead become a liability for the institution.

Based on the data in Table 2, the author interprets that the barriers to e-budgeting implementation in educational institutions are a multidimensional phenomenon centered on human ecosystem readiness. The results from Fadri & Fil (2024) and Maulana (2020) reinforce that technology is merely an instrument; its success depends heavily on the digital mindset of the administrators. The author observes that "Cultural Resistance" emerges because digital systems demand a shift from subjective to objective work cultures. In many institutions, this is perceived as a threat to traditional authority in fund management, leading to subtle resistance in the form of data entry delays or using the system merely as a formality.

Furthermore, the author highlights an infrastructure paradox as suggested by Sutriadi (2018). On one hand, digitalization aims for efficiency, but on the other hand, the initial investment and maintenance costs often exceed the routine financial capacity of schools or small universities. The author argues that without dedicated budget support for IT infrastructure, e-budgeting risks widening the governance quality gap between urban institutions and those in remote areas.

Regarding the policy aspect, the regulatory synchronization highlighted by Ariesmansyah et al. (2024) serves as a critical note. The author finds that educational leaders are often trapped in a "double bureaucracy," where they must satisfy e-budgeting system requirements while simultaneously maintaining manual procedures due to legal frameworks that are not yet fully adaptive. The author's interpretation indicates that to achieve SDG 16 targets, this digital transformation requires a more dynamic legal umbrella. Without regulatory simplification, educational leadership will remain burdened by administrative complexities that distract them from their primary focus: improving the quality of sustainable education

Implications

Based on the results regarding mechanisms (RQ1) and challenges (RQ2), this study generates several crucial implications for the development of educational governance:

1) Theoretical Implications: This research reinforces digital governance theory by asserting that e-budgeting is not merely a financial automation tool but a decisive variable in realizing resilient institutions. The author argues that the integration of digital transparency and accountability (Andhika, 2017) contributes

to educational management literature on how technology can fundamentally alter organizational behavior in alignment with SDG principles.

2) Practical Implications for Educational Leaders: For practitioners and institutional leaders, the results regarding human resource resistance (Fadri & Fil, 2024) imply that successful digital transformation cannot be achieved solely through software procurement. Educational leaders must adopt a "Digital Leadership" style that prioritizes enhancing technological literacy for administrators. The author's interpretation suggests that investment in human capital is a prerequisite for the e-budgeting system to function as a strategic decision-making instrument rather than a mere administrative burden.

3) Policy Implications: Findings related to regulatory inconsistency (Ariesmansyah et al., 2024) provide a basis for policymakers to harmonize rules between central and regional governments. The implication is the need for a more flexible legal framework that allows schools to perform dynamic budget adjustments within the digital system without violating rigid bureaucratic procedures. This is essential to ensure that sustainable educational governance operates inclusively across various regions.

Conclusion

This study concludes that e-budgeting implementation is a strategic pillar in transforming educational management toward sustainable governance. Based on the systematic literature review of the last decade, it is found that the key mechanisms of e-budgeting operate through the strengthening of radical transparency, quality-based allocation efficiency, and a shift toward data-driven decision-making leadership paradigms. The author interprets that this system is not merely a financial automation tool but an "integrity culture" instrument that compels educational institutions to operate more ethically and accountably in line with SDG 16 targets.

However, this immense potential is still hindered by non-technical systemic barriers. The primary challenge lies in "organizational inertia," manifesting as human resource resistance and low digital literacy among leaders and administrators. Furthermore, the lack of synchronization between central policies and operational practices in schools acts as a barricade to management flexibility. Without harmony between infrastructure readiness, human capital capacity, and dynamic legal frameworks, e-budgeting risks becoming a bureaucratic formality without delivering a real impact on educational quality.

This research implies that 21st-century educational leaders must possess an integrative digital leadership vision. It is recommended that educational authorities focus not only on technical system procurement but also prioritize human resource reskilling and regulatory alignment. The author suggests that future research explore e-budgeting effectiveness through case studies in underdeveloped regions to mitigate the risk of national digital governance disparities.

References

Andhika, L. R. (2017). "Evolusi konsep tata kelola pemerintah: Sound governance, dynamic governance dan open government" Evolution of government governance concepts: Sound governance, dynamic governance, and open government. Jurnal Ekonomi dan Kebijakan Publik, 8(2), 87-102.

Ariesmansyah, A., et al. (2024). "Dinamika Digital Governance: Antara Teori dan Praktek di Era 4.0" Dynamics of Digital Governance: Between Theory and Practice in the 4.0 Era. Jakarta: PT. Inovasi Publik.

Fadri, Z., & Fil, S. (2024). "Era Digital Dan Dampaknya Terhadap Administrasi Publik: Tantangan Dan Transformasi" The Digital Era and Its Impact on Public Administration: Challenges and Transformations. Bandung: Digital Press.

Hennen, L., et al. (2020). "European e-democracy in practice". London: Springer Open.

Kumar, T. V., & TM, E. (2015). "E-governance for smart cities". Singapore: Springer-Verlag.

Mandasari, N. (2023). "Perbandingan Konsep Tata Kelola Pemerintah: Transparansi dan Akuntabilitas" Comparison of Government Governance Concepts: Transparency and Accountability. Journal of Ebisma, 4(1), 20-35.

Maulana, R. Y. (2020). "Collaborative governance in the implementation of e-government-based public services inclusion". Jurnal Administrasi Publik, 11(2).

Nasri, H., et al. (2022). "Implementation of collaboration planning and budget performance information in e-government framework". Repository Universitas Islam Riau.

Pratolo, S., et al. (2020). "Performance-based budgeting implementation in higher education institutions: Determinants and impact on quality". Cogent Business & Management, 7(1).

Saifuddin, R. (2020). "Pemanfaatan Teknologi Informasi dalam Peningkatan Pendapatan Asli Daerah dan Tata Kelola Keuangan" The Use of Information Technology in Increasing Local Original Revenue and Financial Governance. Garuda Kemdikbud.

Santoso, I. A. P. (2025). "Peran Digitalisasi Dalam Meningkatkan Transparansi dan Akuntabilitas Pemerintahan" The Role of Digitalization in Enhancing Government Transparency and Accountability. Public Administration Journal, 5(1).

Setiawan, I., & Arti, N. D. B. (2024). "Hubungan inovasi pemerintahan terhadap restrukturisasi pemerintahan di Indonesia" The Relationship of Government Innovation to Government Restructuring in Indonesia. Jurnal Administrasi Pemerintahan Daerah, 16(1).

Sgueo, G. (2016). "Participatory budgeting: An innovative approach to budget management". European Parliamentary Research Service.

Sutriadi, R. (2018). "Smart city, smart region, smart village... to reach sustainability". IOP Conference Series: Earth and Environmental Science, 202.

Zein, H. M., & Septiani, S. (2024). "Digitalisasi Pemerintahan Daerah: Katalis Untuk Integrasi dan Optimasi Good Governance" Local Government Digitalization: Catalyst for Integration and Optimization of Good Governance. Yogyakarta: Graha Ilmu.