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Knowledge Management and IT Governance in Higher Education: A Systematic Review and a Proposed Integration Framework

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***Abstract*—In the digital transformation era, higher education institutions (HEIs) in developing countries struggle to align information technology governance (ITG) with institutional goals because of fragmented knowledge and constrained resources. Knowledge management (KM) can address these challenges by supporting informed decisions, increasing transparency, and fostering organizational learning. This study conducts a systematic literature review (SLR) to examine how KM strategies enhance ITG in HEIs. Using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) procedures, we screened 3,361 records from IEEE Xplore, Scopus, ACM Digital Library, SpringerLink, Google Scholar, and ResearchGate; 20 studies met the inclusion criteria targeting the KM--ITG nexus in HEIs within developing countries (2020--2025). We applied thematic synthesis to answer two research questions (RQs): (RQ1) How do HEIs employ KM to strengthen ITG? (RQ2) Which strategies integrate KM with ITG? For RQ1, HEIs utilize KM to enhance IT decision-making, improve operational efficiency, accelerate digital transformation, and boost staff capacity. For RQ2, integration strategies comprise tailored governance models, digital platforms, communities of practice (CoPs), maturity assessment frameworks, and leadership-driven approaches. This review maps current KM--ITG practices, identifies enablers and barriers, and highlights the need for context-sensitive frameworks in the Global South. The findings synthesize strategies and practices that can guide the design of knowledge-based ITG models to support sustainable digital innovation in higher education.**

***Index Terms*—Knowledge management, IT governance, higher education, systematic literature review, developing countries, digital transformation.**

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I. Introduction

In many developing countries, higher education institutions (HEIs) face persistent challenges in embracing digital transformation. Despite global efforts to expand educational technology, a significant digital divide remains. According to UNESCO (United Nations Educational, Scientific and Cultural Organization), more than two-thirds of HEIs in low-income regions lack adequate digital infrastructure or coherent Information and Communication Technology (ICT) policies, undermining the quality and resilience of academic services [1].

Similarly, the World Bank highlights that universities in the Global South often operate without integrated data systems or strategic governance mechanisms, limiting their ability to respond to disruptions or align Information Technology (IT) investments with institutional goals [2]. The OECD (Organization for Economic Co-operation and Development) further emphasizes that digital transformation is not merely a matter of infrastructure, but also of institutional capacity to generate and utilize knowledge for evidence-based governance and innovation [3].

The development of IT has changed various aspects of higher education. Universities do not only focus on learning and research, but must also manage operations effectively to improve national and global competitiveness. Integrating Information Systems and Information Technology (IS/IT) is a strategic initiative designed to enhance the operational efficiency of educational institutions. IS/IT automates administration, integrates academic data management, and optimizes resources. It also supports strategic planning by providing accurate data for decision-making [4], [5].

The role of IS/IT in enhancing educational quality encompasses various functions, including data analytics, Information Technology Governance (ITG), communication technologies, and research management. Digital transformation in academic institutions necessitates robust project management practices and a culture of transparency to ensure

seamless IT integration. A centralized IT structure can enhance decision-making and resource allocation, enabling institutions to maintain a competitive edge. By reducing redundancy and optimizing resources across units, centralized IT services contribute to both efficiency and strategic value [6], [7].

Centralized IT organizational structures facilitate improved decision-making and optimized resource utilization, which are crucial to maintaining a competitive edge. Centralizing IT services and applications reduces redundancy and ensures the efficient allocation of resources across departments and campuses. Effective ITG involves prioritizing IT projects and investments, enabling institutions to channel resources toward initiatives that deliver the most significant institutional value [8].

Universities often implement technological solutions without adequate planning, misaligning them with the institution's strategic goals and management processes. Without clear guidelines for effective and efficient technology adoption, institutions allow such implementations to deviate from their intended direction, ultimately preventing strategic technological advancement [9]. HEIs that leverage information technology must develop comprehensive strategies for integrating IS/IT. Although each institution has unique characteristics, it must identify appropriate methodologies and clearly define its IS/IT needs and the supporting technologies [10].

Given these structural and strategic deficits, Knowledge Management (KM) emerges as a crucial enabler for strengthening ITG in HEIs. KM facilitates the capturing, sharing, and applying of institutional knowledge to inform IT planning, enhance agility, and promote long-term alignment between technology and academic missions. Several studies have shown that the integration of KM into ITG frameworks improves transparency, accelerates cross-functional collaboration, and fosters a culture of continuous learning and strategic responsiveness [8], [11], [12]. This integration is particularly critical in complex, resource-constrained environments where institutional memory, stakeholder engagement, and adaptive decision-making are essential to effective governance.

Despite its acknowledged significance, the literature on the strategic incorporation of KM into ITG in higher education, particularly in developing nations, remains disjointed. While many studies discuss KM or ITG independently, few explore their convergence and the strategies used to implement KM within ITG practices. This study conducts a Systematic Literature Review (SLR) to investigate the impact of KM techniques in improving ITG in HEIs in developing nations. It seeks to (1) identify KM practices supporting ITG and (2) analyze their effectiveness in the context of higher education. This review provides a conceptual foundation for designing more adaptive, knowledge-driven governance models in universities facing digital transformation pressures.

II. Literature Review

A. Knowledge Management

1) Definition and concepts

Nonaka and Takeuchi (1995) categorize knowledge into two fundamental types: tacit knowledge, characterized by its personal and experiential nature and difficulty in formalization, and explicit knowledge, which is codified and readily communicable. Effective KM entails managing both types of knowledge and facilitating the dynamic interaction between them. The authors presented the SECI (Socialization, Externalization, Combination, Internalization) model, a fundamental concept in KM, delineating the iterative process of knowledge creation through four modalities: socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit). This paradigm highlights that organizational knowledge is perpetually generated and augmented through social and organizational interactions [13].

KM systematically coordinates people, technology, and processes to generate value through innovation and knowledge reuse [14]. This perspective emphasizes the multidimensional nature of KM, which necessitates alignment among human capital, digital infrastructure, and organizational culture. KM extends beyond the mere storage of information in databases or the construction of repositories; it represents a holistic approach that fosters a culture of sharing, designs processes to facilitate knowledge flow, and employs technological tools that enhance knowledge accessibility and reuse. As such, KM is a critical enabler of organizational agility, strategic learning, and performance improvement [14].

2) Knowledge management strategy

A KM strategy integrates multiple dimensions, including knowledge resources, processes, and infrastructure, and aligns them with the overall business or institutional strategy [15]. The Extended Knowledge Chain Model demonstrates how organizations create value by effectively transforming knowledge into action through integrated KM activities such as acquisition, storage, transformation, and application [15]. A KM strategy must be context-sensitive, considering organizational size, maturity, and readiness [16]. An effective strategy should incorporate elements such as a compelling KM vision, strong leadership commitment, clear justification for action, and a roadmap that integrates people, processes, and technology. Additionally, it should address the knowledge lifecycle and include metrics for evaluating impact and progress [16].

In terms of formulation, a KM strategy typically begins with a knowledge audit, which involves assessing existing knowledge assets, flows, gaps, and barriers. Organizations often follow this audit with a gap analysis that compares the current state of KM practices to desired outcomes. From this, institutions can develop targeted actions that address gaps, including cultural change initiatives, digital knowledge repositories, communities of practice (CoPs), and incentives for knowledge sharing [16].

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One critical component of the KM strategy is the value proposition. Organizations must clearly articulate the purpose and expected benefits of KM, such as improving decision-making, reducing redundancy, enhancing innovation, or increasing responsiveness. Typical value propositions identified in KM literature include [16]:

- Customer Intimacy: Leveraging knowledge to understand better and serve stakeholders.
- Operational Excellence: Using knowledge to optimize internal processes and reduce inefficiencies.
- Innovation Leadership: Capturing and disseminating new ideas to accelerate learning and development.

Formulating and implementing a KM strategy requires not only technical tools, but also organizational commitment and governance. A successful strategy bridges the gap between knowledge potential and practical application, ensuring that knowledge contributes to institutional resilience and strategic transformation [16].

3) KM strategy in higher education

HEIs are inherently knowledge-intensive organizations where teaching, research, and administrative activities revolve around producing, disseminating, and utilizing knowledge. Implementing a KM strategy is vital for academic excellence, operational efficiency, institutional learning, and strategic adaptability [13], [14]. Developing a KM strategy in higher education involves aligning knowledge processes with academic and organizational goals. As universities face increased pressure to enhance competitiveness, digitalize services, and respond to societal needs, KM provides a framework to leverage internal expertise, improve decision-making, and ensure the sustainability of institutional memory [16]. A well-formulated KM strategy enables universities to manage fragmented knowledge systems, support interdisciplinary collaboration, and promote innovation in curriculum design, research management, and student services [15].

A strategic KM framework supports the integration of ITG and academic planning by formalizing knowledge processes across faculties and departments [11]. Such a framework highlights the importance of adapting KM tools and governance mechanisms to institutional contexts, including leadership commitment and infrastructural readiness. Furthermore, universities are encouraged to move beyond passive knowledge repositories and foster dynamic knowledge ecosystems where knowledge is continuously generated, assessed, and embedded within institutional routines [17].

Implementing KM in HEIs, particularly in developing countries, presents several unique challenges. These include resistance to change, limited technological infrastructure, absence of standardized procedures, and underdeveloped governance mechanisms [18], [19]. Universities should tailor their KM strategies to align with specific organizational structures, regulatory frameworks, and cultural contexts, ensuring sustainability and effectiveness. KM strategies in higher education represent a critical pathway for improving institutional performance, ensuring academic continuity, and fostering innovation. As HEIs increasingly adopt digital transformation agendas, KM will enable the creation of informed, agile, and collaborative environments [20], [21].

B. Information Technology Governance in Higher Education

ITG refers to the framework of structures, processes, and relational mechanisms that ensure the effective and efficient utilization of IT resources, enabling an organization to achieve its objectives. ITG is crucial in aligning IT initiatives with the academic, research, and administrative priorities of HEIs, while ensuring accountability, risk management, and the delivery of strategic value [22].

Unlike corporate environments, HEIs are complex, decentralized, and often operate under collegial decision-making models. This situation creates unique governance challenges, including fragmented IT ownership, diverse stakeholder expectations, and overlapping academic and administrative functions [23]. As a result, effective ITG in universities requires not only formal policies and procedures, but also inclusive communication, participatory leadership, and knowledge-sharing practices.

Essential elements of ITG in higher education often encompass IT strategy, business-IT alignment, value delivery, resource management, performance measurement, and risk mitigation [24]. These elements should be tailored to the specific institutional context, taking into account organizational size, structure, digital maturity, and national regulatory frameworks. Governance maturity in universities is significantly influenced by leadership culture, resource allocation, and the level of stakeholder engagement, as demonstrated in a multi-country study [20].

Digital transformation agendas are increasingly intertwined with ITG in HEIs. As universities adopt enterprise systems, online learning platforms, data analytics, and cloud infrastructure, the need for robust governance mechanisms becomes more pronounced [12]. Effective ITG frameworks provide a strategic foundation for managing digital innovation, ensuring cybersecurity, and optimizing IT investments.

In developing countries, additional challenges persist, including limited infrastructure, funding constraints, and inadequate IT capacity. These factors hinder the implementation of formal governance models, often resulting in reactive or ad hoc decision-making processes [20]. Therefore, there is a growing call for context-sensitive ITG models that consider institutional diversity, socio-economic conditions, and cultural dynamics.

Ultimately, ITG is not merely a technical function but a strategic enabler that supports institutional resilience, operational excellence, and academic innovation. Its

effectiveness depends on the integration of the university's leadership, policy, and knowledge systems.

C. Integrating Knowledge Management with IT Governance

Integrating KM and ITG represents an emerging paradigm in strategic organizational development, particularly in complex environments such as HEIs. While KM focuses on creating, disseminating, and utilizing knowledge to enhance organizational learning and innovation, ITG ensures that IT resources are aligned with institutional objectives and managed efficiently. The intersection of these two domains is increasingly recognized as a means to enhance decision-making, improve agility, and foster value creation through informed IT investments [25].

Several scholars have proposed that embedding KM principles into ITG frameworks can significantly strengthen the governance process by transforming fragmented information flows into coherent, actionable knowledge assets [26]. In the context of HEIs, this integration becomes particularly relevant. Universities manage decentralized, multi-unit structures that distribute knowledge across faculties, administrative departments, and stakeholders. Integrating KM with ITG allows institutions to consolidate expertise, facilitate participatory governance, and support data-informed policy-making [8]. This integration is especially critical in developing countries, where limited resources demand that IT initiatives are both strategically sound and knowledge-driven.

A design science study demonstrated that KM practices, such as internal CoPs, digital knowledge hubs, and governance knowledge audits, can enhance the maturity of ITG in universities [20]. The findings indicate that HEIs with integrated KM-ITG models exhibit greater adaptability, more substantial strategic alignment, and more effective IT utilization in academic and administrative functions [20].

Despite these advantages, the literature also notes several barriers to successful integration. These include cultural resistance to knowledge sharing, lack of leadership support, and insufficient technological infrastructure [7]. Therefore, the success of KM-ITG integration depends on both strategic planning and organizational readiness, including the development of a governance culture that values learning, transparency, and innovation.

III. Research Methods

This research employed an SLR following the principles established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [27]. The study employed the PRISMA framework to ensure the reliability, transparency, and integrity of the data collection and reporting process. This methodological approach provided a structured protocol for identifying, screening, and including relevant studies, thereby enhancing the overall rigor and reproducibility of the research findings [12].

To ensure a structured and focused formulation of the research questions (RQs), this study employed the PICO framework, which is commonly used in SLR to define the scope of the investigation. PICO stands for Population, Intervention, Comparison, and Outcome. It helps clarify the review's context and guide the literature selection process accordingly [28]. Table 1 outlines the elements of the PICO framework as applied in this study.

Table 1.
Application of the PICO Framework in Formulating RQs

PICO Element	Definition
Population (P)	HEIs in developing countries that apply or consider applying KM practices to support ITG.
Intervention (I)	Implementing KM strategies to enhance the effectiveness, maturity, or integration of ITG frameworks in higher education.
Comparison (C)	Not applicable. This study focuses on qualitative synthesis and does not involve comparative experimental groups.
Outcome (O)	• Conceptual understanding of how KM contributes to ITG in HEIs. • Identification of KM strategies effectively used to support or integrate ITG. • Practical recommendations and frameworks derived from best practices in the reviewed literature.

By applying the PICO framework, this review established a clear analytical scope. It ensured methodological consistency, particularly in identifying relevant studies, formulating focused RQs, and synthesizing findings in alignment with the study objectives. Accordingly, the study addresses the following RQs:

- RQ1: How has KM been utilized to enhance ITG in HEIs?
- RQ2: What strategies have been employed to integrate KM with ITG?

A. Search Strategy

The researchers developed a structured search strategy to compile a set of publications relevant to the RQs regarding the integration of KM and ITG in HEIs. Initially, the keywords "Knowledge Management," "KM," and "strategic" were used to capture the general discourse surrounding knowledge-centric approaches and strategic perspectives. Subsequently, additional keywords and their variations were incorporated, including "IT Governance," "IT Management," "Information Technology Governance," "IT Strategy," "ITG," and "Digital Transformation," to capture a broad spectrum of literature related to the governance of information technology.

To refine the focus on implementation perspectives, terms such as "implementation," "adoption," "application," "usage," "support," "strategy," "framework," "integration," "best practice," and "approach" were added. Furthermore, to ensure relevance to the education sector, the search included terms such as "higher education," "university," "higher education institution," and "HEIs."

An advanced search function was used in databases, targeting these terms in the documents' titles, abstracts, and keywords. The Boolean operator "AND" was applied to connect the major themes, while the Boolean operator "OR" was used to link synonymous terms. This study utilized the wildcard symbol (*) to capture variations in word endings for proximity searches.

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B. *Eligibility Criteria*

This study established a series of eligibility criteria to refine the selection of relevant articles, encompassing aspects such as language, subject domain, and publication type. Table 2 summarizes the inclusion and exclusion parameters. Furthermore, the presence of the term "knowledge management" in the document was required, as it represents the core focus of this review.

Table 2.
Eligibility Criteria

Stage	Inclusion Criteria	Exclusion Criteria
Initiation	Articles (2020–2025) discussing KM and ITG in higher education, written in English or Indonesian, peer-reviewed, and accessible.	Irrelevant topics, non-academic sources (books, theses), or inaccessible articles.
Stage 1 (Title and Abstract)	Titles and abstracts must mention KM, ITG, and higher education and include strategies, frameworks, or best practices.	There is no direct linkage between KM and ITG; it focuses primarily on business and technology without an educational context.
Stage 2 (Full-Text)	In-depth discussion of KM implementation in ITG with transparent methodology and insights.	Unclear methods, irrelevant content, and generic KM without governance focus.
Stage 3 (Quality Assessment)	Empirical or systematic studies with practical relevance published in indexed journals.	High bias, weak conclusions, or purely theoretical without data support.

C. *Review Process*

Researchers retrieved 3,361 records from multiple scholarly databases during the identification phase, as shown in Fig. 1, including IEEE, Scopus, ACM Digital Library, Springer Nature Link, Google Scholar, and ResearchGate. The search employed a combination of keywords related to KM, ITG, and higher education in developing countries. In the screening phase, this study filtered articles based on their titles, abstracts, and keywords. During this stage, the researchers excluded 12 articles due to limited accessibility, deemed 3,278 irrelevant, and retained 71 for further review. In the eligibility phase, researchers conducted a full-text review of the 71 articles to assess their relevance to the research objectives. From this step, they retained 33 articles for further review while excluding 38 after additional examination.

During the inclusion phase, this study analyzed the reference lists of the 33 shortlisted articles to identify additional relevant studies. From this process, the researchers selected 22 articles for final synthesis. Twenty articles were deemed highly relevant and included in the qualitative synthesis and discussion of this review. The stringent selection process guaranteed that the studies incorporated in the final evaluation were methodologically robust and specifically focused on the convergence of KM strategies and ITG within the framework of HEIs in developing nations.

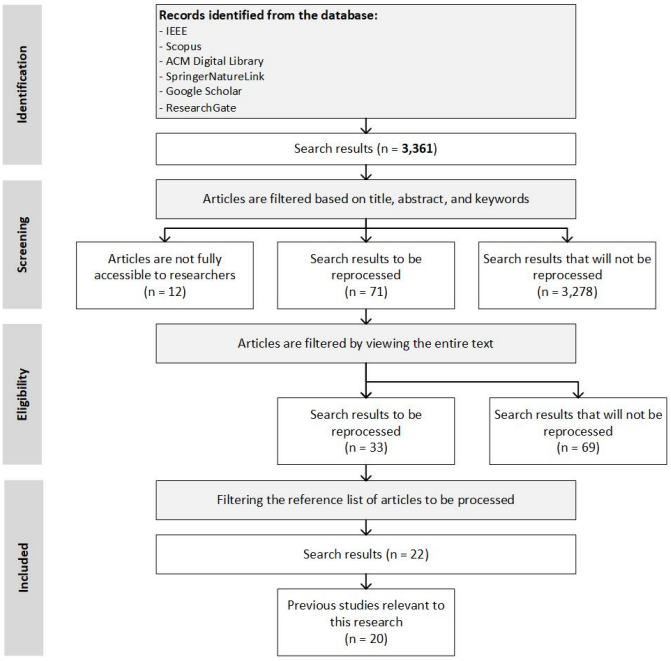

Fig. 1. Document selection process.

The documents included in this review were collected and organized using Mendeley Reference Manager. Figure 1 illustrates the procedure undertaken to identify and select 20 relevant documents. The Appendix provides a comprehensive listing of these documents.

D. *Data Extraction and Analysis*

After retrieving the full-text documents, researchers extracted data using a structured extraction sheet they designed in advance to ensure consistency across the review process. Key information was recorded, including the author(s), year of publication, research objectives, methodology, context (developed or developing countries), and key findings related to the integration of KM and ITG.

The researchers regularly discussed the review procedure to maintain the validity and transparency of the process and to resolve any ambiguity or disagreements regarding study inclusion or interpretation. They organized and compiled the bibliographic and content-related information for each selected article using an Excel workbook for synthesis and thematic coding.

This review also incorporated a qualitative content analysis approach, whereby the selected studies were coded and categorized based on emerging themes relevant to the RQs. These themes included the types of KM strategies used, the role of KM in supporting ITG, contextual challenges in developing countries, and best practices in higher education settings. The researchers structured the synthesis to address the two RQs guiding this study and to identify research gaps and strategic

patterns within the literature.

E. Thematic Analysis Procedure

Researchers conducted the thematic analysis using a manual open coding approach, following the six-phase framework developed by Braun and Clarke [29]. The researchers independently examined the full-text articles to extract key elements related to KM-ITG integration. Initial codes were generated inductively from the data, followed by axial coding to identify recurring themes aligned with the RQs. The process included familiarizing with the data, code generation, theme searching, reviewing, defining, and final reporting. The researchers resolved discrepancies in coding and reached a consensus to ensure the reliability of the results. They systematically documented all coding procedures using spreadsheets for transparency and reproducibility.

IV. RESULTS

This section presents the results and findings of the SLR, organized according to the two RQs formulated in this study. The review synthesizes empirical and conceptual insights concerning the role of KM strategies in supporting ITG within HEIs, with a particular emphasis on developing countries. Through a PRISMA-guided screening, this study selected 20 peer-reviewed articles published between 2020 and 2025.

The researchers retrieved these articles from reputable academic databases, including IEEE, Scopus, ACM Digital Library, Springer Nature Link, Google Scholar, and ResearchGate, based on strict inclusion criteria that prioritized methodological rigor, topical relevance, and alignment with the study objectives.

The selected studies span a range of geographical and institutional contexts, including public and private universities, research centers, and applied science institutions across Southeast Asia, Latin America, Africa, and the Middle East. To strengthen contextual relevance, the review includes six studies focused on Indonesian HEIs (P4, P5, P12, P13, P14, and P16).

These studies offer insights into the application of KM strategies across various institutional settings, including public universities, Islamic higher education institutions, and government-affiliated institutions. Other developing countries represented in the review include India, Malaysia, Morocco, Ecuador, Colombia, and Saudi Arabia. This geographic diversity reinforces the applicability of the synthesized findings across a range of developing country contexts while allowing for deeper reflection on localized challenges and opportunities in Indonesia.

Methodologically, the studies employ a range of approaches, including case studies, surveys, empirical modeling, conceptual frameworks, and design science research, thereby demonstrating both theoretical robustness and practical applicability. Table 3 summarizes the key attributes of these 20 articles, including the KM strategies/tools used, ITG focus areas, institutional types, and country of origin. This synthesis forms the basis for the thematic analysis presented in the subsequent sections. The Appendix provides further details.

Table 3.
Overview of The 20 Reviewed Articles

ID	KM Strategy/Tool	ITG Focus	Institutional Context	Country/ Region
P1	Education 4.0 KM Ecosystem	Strategic Alignment	Public HEIs	Ukraine
P2	Communities of Practice (CoPs)	Process Digitization	Private HEIs	Ecuador
P3	Knowledge Transfer Process	Digital Transformation	Research University	Germany
P4	Capability Maturity Evaluation	KM Evaluation	Private HEIs	Indonesia
P5	Strategic ICT Framework	IT Planning	Public HEIs	Indonesia
P6	Pedagogical KM System	Smart Learning	Public HEIs	Morocco
P7	Digital KM Culture	Employee Performance	Public HEIs	India
P8	Knowledge Creation Spaces	Crisis Response	Public HEIs	Brazil
P9	Transparency Analysis	IT Transparency	Public HEIs	Spain
P10	Digital Strategy Impact	Academic and Career Outcomes	Public HEIs	Saudi Arabia
P11	Governance Model	Multi-level ITG	Cross-National	Multi-Country
P12	IT Resources and KM	KM Capabilities	Public HEIs	Indonesia
P13	KM Foundation	KM Solution Implementation	Government HEIs	Indonesia
P14	University Collaboration	Innovation Frameworks	Public HEIs	Indonesia
P15	ERM Integration	Performance Management	Private HEIs	Malaysia
P16	Islamic HEIs Analysis	ITG Readiness	Islamic Public HEIs	Indonesia
P17	ICT Knowledge Flow	Knowledge Use	Public HEIs	Colombia
P18	Specialized ITG Strategy	IT Governance Structure	Public HEIs	Morocco
P19	Knowledge Creation in Innovation	Tech Diffusion	Research HEIs	China
P20	CIO Strategy Execution	Capability Models	Applied Sciences University	Finland

A. Findings Related to RQ1: How Has KM Been Utilized to Enhance ITG in HEIs?

A systematic review of 20 studies reveals how KM has been employed to enhance ITG within HEIs. The findings are categorized into four thematic areas: (1) KM as a basis for IT decision-making, (2) KM for operational efficiency and transparency, (3) KM in supporting digital transformation, and (4) KM for capacity building and staff performance.

1) KM as a basis for IT decision-making

Supporting reference: P4, P11, P13, P20. KM supports strategic IT decision-making by facilitating evidence-based alignment between IT investments and institutional goals. Structured mechanisms, such as knowledge audits, maturity

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assessments, and strategic documentation, actively support decision-makers by providing actionable insights that inform their decisions.

2) KM for operational efficiency and transparency

Supporting reference: P9, P12, P15. KM contributes to governance efficiency by enabling process documentation, real-time dashboards, and risk monitoring tools. KM systems help ensure institutional accountability, improve communication, and reduce information asymmetry.

3) KM in supporting digital transformation

Supporting reference: P3, P6, P8, P19. KM plays a crucial role in enabling digital transformation within HEIs. Through digital learning ecosystems, AI-supported platforms, and agile decision-making frameworks, KM empowers institutions to innovate while maintaining institutional resilience and adaptability in disruptive contexts.

4) KM for Capacity Building and Staff Performance

Supporting reference: P7, P16, P17. KM supports capacity building and performance enhancement among IT personnel and academic staff. By fostering a knowledge-sharing culture, facilitating digital training, and providing collaborative tools, KM contributes to the development of human capital essential for effective ITG implementation.

KM should not be viewed merely as a documentation tool but as a strategic foundation that enhances the competitiveness, transparency, and adaptability of IT systems within HEIs. By facilitating informed decision-making, promoting organizational learning, and supporting responsive governance, KM plays a pivotal role in aligning IT initiatives with institutional goals and sustaining digital innovation in complex academic environments. Table 4 shows that KM provides HEIs with the structure, resources, and cultural foundation to govern their IT functions more effectively. Its integration strengthens the coherence between institutional knowledge and technology governance, ultimately enhancing organizational agility, resilience, and accountability.

Table 4.
Thematic Summary For RQ1

No	Thematic Category	Key Insights	Supporting References
1	KM as a Basis for IT Decision-Making	KM supports evidence-based decisions in IT planning and monitoring through internal audits, digital repositories, and strategic reporting.	P4, P11, P13, P20
2	KM for Operational Efficiency and Transparency	KM for Operational Efficiency and Transparency	P9, P12, P15
3	KM in Supporting Digital Transformation	KM structures knowledge flows and enables digital transformation through innovative platforms, AI-based tools, and agile responses to institutional disruptions.	P3, P6, P8, P19
4	KM for Capacity Building and Staff Performance	KM promotes digital skills, collaboration, and continuous learning, improving staff performance and knowledge engagement.	P7, P16, P17

B. Findings Related to RQ2: What Strategies Have Been Employed to Integrate KM with ITG?

The second RQ examines the strategic approaches and frameworks that prior studies have used to integrate KM with ITG in HEIs. The reviewed articles explicitly addressed KM-ITG integration, with strategies ranging from conceptual models and design frameworks to organizational transformation initiatives. This study identified four thematic patterns: (1) integration through tailored governance frameworks; (2) collaborative strategies via digital platforms and CoPs; (3) maturity evaluation and strategic alignment frameworks; and (4) adaptive strategies: SECI model, leadership, and organizational culture.

1) Integration through tailored governance frameworks

Supporting reference: P8, P13, P18, P20. Several studies emphasized the development of customized ITG models that embed KM processes within their structure. These include contingency-based frameworks, design science research outputs, and strategic models that position KM as an integral enabler of transparency, communication, and decision-making. These approaches align with the institution's operational complexity and digital maturity.

2) Collaborative strategies via digital platforms and CoPs

Supporting reference: P14, P17. Organizations also integrate KM by leveraging collaborative platforms and initiating inter-organizational knowledge-sharing efforts. Digital tools such as repositories, CoPs, and open innovation networks are widely adopted to facilitate continuous knowledge flow among academic, administrative, and external stakeholders. These efforts enhance knowledge transparency and promote shared governance practices across institutional boundaries.

3) Maturity evaluation and strategic alignment frameworks

Supporting reference: P4, P15. Numerous studies have employed strategic performance and capability maturity models, such as the Control Objectives for Information and Related Technology (COBIT) and the Digital Capability Maturity Model (DCMM), to link KM and ITG. These tools support the evaluation of knowledge integration effectiveness and help align KM initiatives with governance objectives, ensuring readiness for digital transformation.

4) Adaptive strategies: SECI model, leadership, and organizational

Supporting reference: P7, P16, P19. Lastly, many institutions adopt adaptive approaches emphasizing cultural transformation and leadership styles. Researchers recognize Nonaka's SECI model (socialization, externalization, combination, internalization), middle-up-down leadership, and trust-based knowledge sharing as critical enablers of successful KM-ITG integration in complex university ecosystems.

Table 5.
Thematic Summary for RQ2

No	Thematic Category	Key Insights	Supporting References
1	Integration through Tailored Governance Frameworks	Institutions embed KM into ITG by developing models tailored to their context, such as contingency-based or design science frameworks.	P8, P13, P18, P20
2	Collaborative Strategies via Digital Platforms and CoPs	Organizations integrate KM by utilizing digital knowledge-sharing platforms, fostering inter-university collaboration, and supporting CoPs that facilitate innovation and cross-functional governance.	P14, P17
3	Maturity Evaluation and Strategic Alignment Frameworks	KM and ITG are connected through performance maturity models and assessment tools (e.g., COBIT, DCMM) to ensure alignment and readiness.	P4, P15
4	Adaptive Strategies: SECI Model, Leadership, and Organizational Culture	Organizations enable KM integration by adopting dynamic approaches emphasizing knowledge creation processes (SECI), middle-up-down leadership, and culture-driven adoption.	P7, P16, P19

Table 5 illustrates that integrating KM and ITG requires a flexible approach that goes beyond technological implementation. The successful integration depends on fostering an organizational culture that prioritizes knowledge sharing and ongoing learning, with leadership that actively endorses and exemplifies these principles. This socio-technical perspective emphasizes that sustainable KM-ITG alignment depends not only on digital infrastructures but also on human-centered factors, such as trust, engagement, and adaptive governance practices.

C. Cross-Cutting Themes and Emerging Trends

Beyond the thematic classifications derived from RQ1 and RQ2, the reviewed studies reveal several cross-cutting themes and emerging trends that highlight the evolving interplay between KM and ITG in HEIs. These themes reflect broader institutional dynamics and offer insights into the future direction of KM-ITG integration in the academic sector.

1) Hybrid governance models combining technology and organizational culture

Supporting reference: P16, P20. A consistent finding across the literature is the emergence of hybrid governance models that integrate digital infrastructures with organizational culture and human-centered approaches. Rather than relying solely on technical solutions, many institutions incorporate KM through trust-building mechanisms, leadership engagement, and cultural adaptation strategies. This convergence enhances knowledge absorption, stakeholder involvement, and long-term governance maturity.

2) KM as a strategic enabler of institutional innovation

Supporting reference: P14, P19. Organizations increasingly position KM as not only a support mechanism but also a strategic enabler for innovation in teaching, research, and management. Studies demonstrate that institutions leveraging KM through open innovation frameworks, knowledge-sharing networks, and adaptive learning systems experience increased agility and innovation performance. This finding reinforces the role of KM in facilitating proactive, knowledge-driven institutional change.

3) Growing emphasis on digital ecosystems and knowledge platforms

Supporting reference: P6, P17. A significant trend is the emergence of digital learning ecosystems and KM platforms that facilitate real-time collaboration, content customization, and the integration of information assets across various departments and organizations. These ecosystems are often supported by artificial intelligence, cloud computing, and learning analytics, reflecting a shift toward intelligent governance environments.

4) Integration with broader governance agendas: risk, performance, and quality

Supporting reference: P15, P16. Several studies demonstrate how KM practices are increasingly integrated with enterprise risk management, performance measurement, and quality assurance systems, creating a unified approach to institutional governance. This alignment supports strategic coherence and enhances the institution's ability to navigate uncertainty and regulatory demands.

D. Towards a Contextualized KM-ITG Integration Framework

Drawing on the thematic analysis and cross-cutting insights, this review proposes a conceptual foundation for integrating KM into ITG, aligned with the structural conditions of higher education in developing countries. While existing models offer valuable guidance, many are extrapolated from corporate settings or high-income regions, lacking adaptability to the cultural, infrastructural, and strategic constraints of institutions in the Global South.

To address this gap, we identify four interdependent pillars as a scaffold for future model development:

1) Alignment with institutional mission and digital maturity

Institutions must integrate KM within ITG structures to reflect their academic priorities, governance philosophies,

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and digital readiness levels. Strategic alignment ensures that IT investments align with and support long-term institutional goals.

2) *Participatory governance and leadership engagement*

Embedding KM practices requires inclusive decision-making and strong leadership commitment. Approaches such as middle-up-down leadership and SECI-based knowledge creation foster stakeholder trust and collaboration, enhancing organizational effectiveness.

3) *Socio-technical adaptability*

Integration success depends on the ability of institutions to synchronize technological tools with human and organizational dynamics. This requirement includes fostering a culture that embraces knowledge sharing, innovation, and learning agility.

4) *Continuous evaluation through localized maturity models*

Sustainable integration necessitates iterative assessment using tailored evaluation tools. Maturity models such as COBIT (Control Objectives for Information and Related Technology) and DCMM (Digital Capability Maturity Model), when adapted to local contexts, can help HEIs diagnose gaps and track KM-ITG alignment over time.

Figure 2 illustrates a contextualized framework for integrating KM into ITG in HEIs. These pillars, distilled from multi-contextual studies, provide both a theoretical lens and a strategic roadmap for action. They mark a shift toward hybrid governance models that prioritize resilience, institutional learning, and context-driven innovation. Future empirical studies may validate and refine this framework to support its applicability.

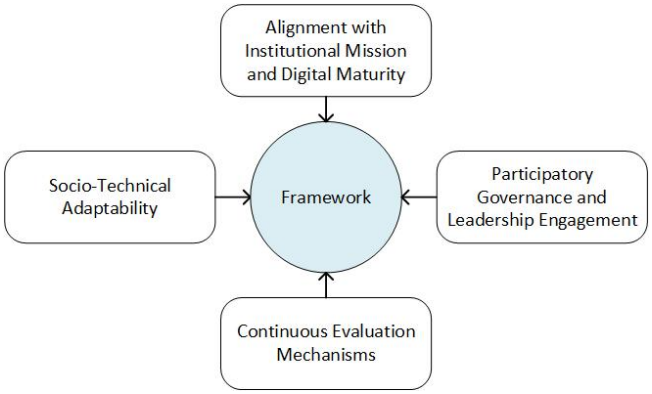

Fig. 2. A contextualized framework for integrating KM into ITG in HEIs.

V. Discussion

The findings of this review reinforce the growing recognition that knowledge is a central asset in managing complex IT environments, especially in higher education systems characterized by decentralized governance and limited technological capacity. Consistent with recent literature [20], [8], this study affirms that integrating KM into ITG frameworks enhances institutional agility, transparency, and the long-term alignment of IT initiatives with academic and administrative objectives.

A significant insight is the prevalence of informal and emergent KM practices in HEIs, often driven more by necessity than strategic design. While these practices have been effective in bridging communication gaps and capturing tacit knowledge, they frequently lack sustainability, consistency, and formal linkage to ITG structures. This situation underscores the need to institutionalize KM through policy mandates, governance bodies, and long-term capacity-building initiatives.

In the Indonesian context, several studies included in this review (e.g., P4, P5, P12, P13, and P14) highlight the practical implementation of KM strategies in public universities and Islamic higher education institutions. These cases demonstrate how localized KM approaches, such as structured documentation systems, collaborative decision-making tools, and knowledge-sharing platforms, have supported ITG objectives such as budgeting transparency and project monitoring. However, challenges persist in terms of regulatory standardization and limited cross-institutional collaboration.

Recent national statistics from Indonesia's Central Bureau of Statistics indicate that while digital transformation has accelerated nationwide, regional disparities remain a significant barrier, particularly in underdeveloped and remote regions where infrastructure and digital literacy are lagging. These structural challenges suggest that, although many HEIs may have formal ITG frameworks, the implementation of integrated KM systems remains underutilized. Such circumstances underscore the urgency of developing context-specific KM- ITG integration frameworks to enhance institutional resilience and effectiveness in Indonesia [30].

Theoretically, this review contributes by bridging KM and ITG discourses in the higher education domain, particularly within developing country contexts. The lack of context-specific KM-ITG frameworks, especially in the Global South, highlights a research gap. Many existing models originate from corporate or high-income country settings, which do not reflect the socio-cultural and regulatory realities of HEIs in countries like Indonesia. Future research should focus on empirically developing adaptive models that align with national education strategies and local governance norms.

Overall, this review affirms the transformative potential of knowledge-based governance in higher education. Strategic alignment between KM and ITG supports not only operational performance but also strengthens institutional resilience and innovation capacity amid rapid digital transitions.

VI. Conclusion

This SLR offers a novel contribution by mapping how KM

strategies are integrated into ITG within HEIs, particularly in developing countries. The review reveals that KM can act as a strategic enabler of ITG by enhancing informed decision-making, promoting cross-functional collaboration, and aligning digital initiatives with institutional objectives.

The findings highlight that while some universities have begun implementing KM elements, these initiatives are often informal, uncoordinated, and poorly institutionalized. Successful cases demonstrate the importance of enabling factors such as strong leadership commitment, supportive digital transformation policies, and a culture of knowledge sharing. On the other hand, persistent barriers include siloed data systems, a lack of standardized KM tools, inadequate infrastructure, and organizational resistance to change.

This study faced several limitations, primarily the limited availability of empirical research focused on KM--ITG integration in developing countries. In many cases, the available literature was either conceptual or lacked contextual depth. Language constraints and restricted access to local institutional data further complicated comparative analysis.

Theoretically, this review advances the digital governance literature by positioning KM as a central mechanism for sustaining ITG in educational institutions. Practically, it emphasizes the urgency of developing integrated governance models that bridge knowledge processes with IT structures, rather than treating them as separate functions. These findings provide a valuable basis for designing governance frameworks sensitive to the institutional, cultural, and infrastructural realities of the Global South.

In practical terms, Indonesian universities and policymakers should consider formalizing KM practices through institutional policies, creating cross-functional governance units, and investing in digital platforms that support structured documentation, tacit knowledge capture, and collaborative decision-making. These strategies can improve institutional agility, resilience, and long-term sustainability in managing digital transformation.

Future research should explore field-based validation of the proposed KM-ITG integration framework through qualitative case studies or mixed-methods research. Comparative and longitudinal studies involving HEIs with different levels of digital maturity can also uncover how governance culture shapes KM effectiveness. Such empirical efforts are crucial to translating conceptual insights into scalable, evidence-based models of governance innovation across developing country contexts.

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APPENDIX

The Research Selected All Reviewed Documents by Searching Databases and Exploring Citations

ID	Title	Author	Country/Region	Study Type	Year	Contribute to		Ref
						RQ1	RQ2	
P1	The Concept of an Innovative Educational Ecosystem of Ukraine in the Context of the Approach "Education 4.0 for Industry 4.0"	Tetiana Kovaliuk; Nataliya Kobets	Ukraine	Conceptual	2021	√	√	[31]
P2	Communities of practice applied for process digitization: a case study of the Universidad Técnica Particular de Loja	Ingrid Weingärtner Reis; Suelen Jorge Felizatto Marostica; Gregório Varvakis	Ecuador	Case Study	2022	√	√	[32]
P3	Process Model for Digital Transformation of University Knowledge Transfer	Claudia Doering; Finn Reiche; Holger Timinger	Germany	Model Proposal	2021	√	√	[17]
P4	Knowledge Management Evaluation Using Digital Capability Maturity Model in Higher Education Institution	Nuril Kusumawardani Soepra Putri; Dinda Permatasari; Reynilda Susanto; Chen Kang Lee; Yohannes Kurniawan	Indonesia	Empirical	2023	√	√	[33]
P5	Developing an Effective ICT Strategic Framework for Higher Education Institutions: A Case of Mataram University	Surya Sumarni Hussein; Muhamad Wisnu Alfiansyah; Rohaizan Daud; Suraya Ya'acob; Anitawati Mohd Lokman	Indonesia	Case Study	2023	√	√	[11]
P6	Toward an adaptive learning system by managing pedagogical knowledge in a smart way	Meriyem Chergui; Aki Nagano; Abdelkrim Ammoumou	Morocco	Framework Design	2024	√	√	[34]
P7	Cultivating digital culture: exploring the impact of digital knowledge management on employee performance in higher educational institutions	Anchal Luthra; Namrata Pancholi; Shivani Dixit; Anamica Singh; Seema Garg	India	Survey-Based	2024	√	-	[35]
P8	Universities as Spaces of Knowledge Creation—Going Through the Test of the Pandemic	Artieres Romeiro; Ingrid Weingärtner Reis	Brazil	Conceptual	2023	√	-	[36]
P9	Data Mining to Assess Organizational Transparency across Technology Processes: An Approach from IT Governance and Knowledge Management	Pedro Solana-González1; Adolfo Alberto Vanti; María Matilde García Lorenzo; Rafael E. Bello Pérez	Spain	Data Mining	2021	√	-	[37]
P10	Cultivating Success: Unveiling the Influence of Higher Education Strategies on Information Technology Governance, Academic Excellence, and Career Prospects in Saudi Arabia	Khaled Alshammari; Murad Thomran; Rayed Alobaid; Mohieddin Grada; Abdulsalam Alquhaif; Ali Saleh Alshebami; Syed Ali Fazal; Hamed M. S. Ahmed; Fahad Al-Anazi	Saudi Arabia	Empirical	2024	√	-	[18]

ID	Title	Author	Country/Region	Study Type	Year	Contribute to		Ref
						RQ1	**RQ2**	
P11	Information Technology Governance for Higher Education Institutions: A Multi-Country Study	Isaías Scalabrin Bianchi; Rui Dinis Sousa; Ruben Pereira	Multi-Country	Survey Study	2021	√	-	[8]
P12	The Influences of Information Technology Resources on Knowledge Management Capabilities: Organizational Culture as Mediator Variable	Mohammad Iqbala; Endang Siti Astutia; Rahmat Trialihb; Wilopoa; Zainul Arifina; Yudha Alief Apriliana	Indonesia	Empirical	2020	√	-	[38]
P13	Knowledge Management Foundation and Solutions Implementation in Indonesian Government Higher Educational Institution	Boy Sandi Kristian Sihombing; Fatoumatta Binta Jallow; Ghina Fitriya; Dana Indra Sensuse; Sofian Lusa; Damayanti Elisabeth; Nadya Safitri	Indonesia	Case Study	2024	√	-	[19]
P14	A Systematic Literature Review on University Collaboration in Open Innovation: Trends, Technologies, and Frameworks	Novi Sofia Fitriasari; Dana Indra Sensuse; Deden Sumirat Hidayat; Erisva Hakiki Purwaningsih	Indonesia	SLR	2024	√	√	[39]
P15	Enterprise risk management : impact on performance of private higher educational institutions in Malaysia	Setapa M.; Mamat M.; Bakar H.A.; Yusuf S.N.S.; Kazemian S.	Malaysia	Empirical	2020	√	-	[40]
P16	Scrutinizing Islamic Higher Education Institutions in Indonesia	Nizar Alam Hamdani	Indonesia	Qualitative	2023	√	-	[41]
P17	Information and Communication Technologies (ICT) in the processes of distribution and use of knowledge in Higher Education Institutions (HEIs)	Jey Howard Escorcia Guzmana; Rohemi Alfredo Zuluaga-Ortiz; David Andres Barrios-Mirandaa; Enrique José Delahoz-Dominguez	Colombia	Survey-Based	2021	√	-	[42]
P18	Building a Specialized IT Governance Strategy for Higher Education: A Strategic Model	Chahid Abdelilah1; Souad Ahriz1; Kamal El Guemmat1 and Khalifa Mansouri	Morocco	Strategic Model	2024	√	√	[12]
P19	How can technology leverage university teaching & learning innovation? A longitudinal case study of diffusion of technology innovation from the knowledge creation perspective	Xiaolei Zhang; Shuangye Chen; Xiaoxiao Wang	China	Longitudinal Case	2023	√	√	[43]
P20	The Capability Models for Steering Execution of the Strategies in the Finnish Universities of Applied Sciences CIO Forum	Ari Rouvari	Finland	Model-Based	2025	√	√	[44]