

Systematic Review

Knowledge Management for Sustainable Accreditation in Saudi Higher Education: A Systematic Review of NCAAA Implementation and Quality Assurance Practices

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Abstract

This systematic narrative review synthesizes 42 distinct sources including peer-reviewed journal articles, selected conference papers, and policy documents to examine the role of knowledge management (KM) processes in Saudi higher education accreditation, with specific focus on the National Center for Academic Accreditation and Evaluation (NCAAA) standards. Drawing on literature published between 2005 and 2025, the review investigates how KM frameworks, including Nonaka and Takeuchi's SECI model (socialization, externalization, combination, and internalization), may be associated with accreditation outcomes in Saudi universities. The reviewed literature suggests an association between systematic KM approaches and more effective accreditation processes; causal conclusions are not warranted given the observational and case study nature of the evidence base. Certainty of the overall evidence body is rated as low to moderate. The study reveals significant challenges, including information decentralization, inadequate training, resistance to change, and the absence of dedicated governance structures that appear to impede effective knowledge transfer during accreditation processes. A secondary sustainability coding pass identified associations between KM-driven accreditation practices and institutional sustainability, environmental sustainability, and alignment with SDG 4 (Quality Education) and SDG 16 (Strong Institutions); these findings are hypothesis-generating rather than confirmatory. It should be noted that all screening and data extraction were conducted by a sole reviewer; a post hoc validation exercise achieved Cohen's kappa = 0.81 (95% CI: 0.72–0.90) for inclusion/exclusion decisions, providing retrospective assurance of acceptable consistency. This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines.

Keywords: knowledge management; higher education accreditation; NCAAA; Saudi Arabia; quality assurance; SECI model; organizational learning; systematic review; governance; continuous quality improvement; sustainable higher education; institutional sustainability; SDG 4; education for sustainable development



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1. Introduction

The landscape of higher education has undergone profound transformation over the past two decades, with quality assurance and accreditation emerging as critical mechanisms for ensuring educational excellence and institutional accountability [1,2]. In the Kingdom of Saudi Arabia, the establishment of the National Center for Academic Accreditation and Evaluation (NCAAA) in 2004 marked a significant milestone in the nation's commitment

to elevating higher education standards [3,4]. The NCAAA framework originally encompassed eleven comprehensive standards covering mission and objectives, governance and administration, quality assurance management, learning and teaching, student services, learning resources, facilities, financial planning, faculty employment, research, and community engagement. In 2018, NCAAA consolidated these into six revised standards, reflecting a global shift toward outcome-based education and streamlined evidence requirements. It should be noted that reference [5] describes the Qassim University implementation experience; no single official policy document recording the 2018 framework consolidation was identified in the literature, and this is acknowledged as a limitation of the evidence base.

The implementation of accreditation systems presents multifaceted challenges that extend beyond mere compliance with regulatory requirements. Universities must navigate complex processes involving extensive documentation, evidence collection, stakeholder coordination, and continuous improvement mechanisms [6,7]. These activities inherently require sophisticated KM capabilities to capture, organize, share, and leverage institutional knowledge effectively [8,9]. Knowledge management, defined as the systematic process of creating, capturing, sharing, and utilizing organizational knowledge to achieve strategic objectives, has gained increasing recognition as a critical success factor in accreditation endeavors [10,11].

The theoretical foundation for understanding knowledge creation and transfer in organizational contexts has been significantly advanced by Nonaka and Takeuchi's SECI model, which delineates four interrelated processes: socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit) [12]. In accreditation contexts, socialization occurs through collaborative engagement among faculty and staff; externalization involves converting tacit understandings into explicit documentation; combination refers to integrating diverse knowledge sources into coherent submissions; and internalization encompasses embedding quality principles into institutional culture [13]. Recent empirical studies have validated the applicability of the SECI framework in educational settings [14–16].

Saudi Arabia's Vision 2030 has directed unprecedented investment towards educational transformation, establishing specific targets for achieving global recognition in higher education rankings [17]. The ambitious goal of having at least five Saudi institutions among the top 200 global universities by 2030 necessitates robust quality assurance mechanisms underpinned by effective KM practices [18]. Despite the strategic importance of this agenda, systematic investigation of how KM processes facilitate accreditation success in the Saudi context remains limited [1,4].

This systematic review addresses this gap by examining the intersection of KM processes and accreditation implementation in Saudi higher education institutions. The study poses three primary research questions: (1) What knowledge management processes are employed by Saudi universities during NCAAA accreditation implementation? (2) What challenges and barriers impede effective knowledge transfer in accreditation contexts? and (3) What strategies have proven effective in leveraging knowledge management for accreditation success?

For the purposes of this review, sustainability is understood in two complementary senses. First, in the narrow institutional sense, it refers to the capacity of higher education institutions to maintain, institutionalize, and continuously improve KM-driven accreditation practices across multiple cycles what the literature terms "accreditation resilience" [19]. Second, in the broader sense aligned with the United Nations 2030. Agenda, sustainability encompasses the social, economic, and environmental dimensions of institutional practice [20,21]. Quality assurance systems that embed KM as a permanent organizational capability rather than a periodic compliance exercise represent a concrete institutional path-

way toward achieving SDG 4 (Quality Education) and SDG 16 (Peace, Justice, and Strong Institutions) [21–23]. This dual framing of sustainability guides the thematic analysis and recommendations throughout this review. Having established the strategic imperative of accreditation under Vision 2030 and the persistent challenges of knowledge fragmentation in Saudi universities, the following section introduces the theoretical lens through which this review analyzes these empirical problems. The SECI model of knowledge creation provides a structured framework for understanding how tacit and explicit knowledge circulate during accreditation processes, thereby addressing the documentation, training, and governance gaps identified above.

1.1. Theoretical Framework

The conceptual foundation of this review integrates organizational learning theory with quality assurance frameworks in higher education. Organizational learning theory posits that institutions develop competitive advantages through their capacity to create, acquire, and transfer knowledge [24]. In the context of accreditation, this translates to the ability of universities to systematically capture lessons learned from quality improvement initiatives, document best practices, and disseminate institutional knowledge across departments and functional areas [25,26].

The SECI model provides a particularly relevant framework for examining knowledge dynamics in accreditation processes. Table 1 maps each SECI dimension to corresponding NCAAA accreditation activities.

Table 1. Alignment Between SECI Knowledge Processes and NCAAA Accreditation Activities.

SECI Dimension	Accreditation Activity	Knowledge Form
Socialization	Faculty workshops, peer learning, cross-functional team meetings	Tacit → Tacit
Externalization	Policy writing, self study reports, documentation of procedures	Tacit → Explicit
Combination	Integrating KPIs, merging departmental data, compiling evidence portfolios	Explicit → Explicit
Internalization	Embedding quality culture, training, reflective practice post review	Explicit → Tacit

Source: Authors' synthesis, based on Nonaka and Takeuchi (1995) [10].

Recent empirical studies have validated the applicability of the SECI framework in educational contexts, demonstrating significant relationships between knowledge creation processes and institutional effectiveness [13,14]. However, SECI research in education remains theoretically fragmented; studies frequently focus on isolated components rather than the dynamic interplay of the entire cycle, limiting understanding of how knowledge conversion processes collectively influence accreditation outcomes [26]. This review addresses that limitation by examining all four SECI dimensions as an integrated system. Having established this theoretical grounding, the following section situates the study within broader international accreditation trends before narrowing the focus to the Saudi context.

1.2. Higher Education Accreditation: Global Perspectives

The globalization of higher education has intensified the need for rigorous quality assurance systems [1,27]. Bibliometric analyses reveal three distinct phases of accreditation development [2]: Foundation Consolidation (2005–2015), which established baseline standards and early institutional compliance mechanisms; Expansion and Diversification (2015–2020), marked by increased scholarly output, international benchmarking, and the adoption of outcome-based frameworks; and Sustained Transformation and Innovation (2020–2025), characterized by CQI integration, digital infrastructure development, and Vision 2030 alignment. Contemporary frameworks emphasize continuous improvement,

alignment with labor market demands, and the integration of internal quality management with external accountability mechanisms [11,28].

Research has identified three primary thematic perspectives in accreditation literature: (a) teaching and learning quality, (b) technology and sustainability as quality catalysts, and (c) governance, management, and accountability [2]. Notably, a critical shift is underway from quality assurance (QA) a compliance-oriented approach based on meeting minimum standards toward continuous quality improvement (CQI), which strives for excellence through iterative, data-driven cycles [29]. This shift has profound implications for KM, as CQI requires institutions to continuously capture, analyze, and act on quality-related knowledge rather than merely accumulating evidence for periodic reviews. This emphasis on dynamic, iterative knowledge use naturally leads to an examination of how KM principles are operationalized within educational institutions.

1.3. Knowledge Management in Educational Contexts

The application of KM principles in educational settings has evolved significantly over the past decade. Contemporary research emphasizes the role of knowledge creation processes in fostering innovation, improving teaching and learning outcomes, and enhancing institutional effectiveness [9,30]. Studies suggest that institutions with mature KM capabilities appear to exhibit better performance in accreditation assessments, research productivity, and student satisfaction metrics [11], though these associations are based on cross-sectional evidence. Moreover, absorptive capacity the ability to recognize, assimilate, and apply new knowledge plays a critical role in sustaining institutional learning during accreditation cycles [30].

Document management systems have emerged as critical infrastructure for accreditation readiness, enabling centralized storage, version control, and collaborative access to accreditation-related materials [7,31]. It should be noted that Saeed et al. [31] focus specifically on a Computer Information Systems (CIS) program; their findings on unified program mapping may not transfer directly to non-computing disciplines with different documentation requirements and accreditation body expectations. The integration of learning management systems, student information systems, and accreditation platforms facilitates data-driven decision-making and evidence-based quality improvement. Institutions leveraging such integrated systems report reduced administrative burden, improved accuracy in reporting, and enhanced capacity for continuous monitoring of quality indicators [31,32].

Empirical evidence supports the relationship between KM maturity and sustainable institutional performance. Disterheft et al. [33,34] suggest that participatory KM approaches may be associated with more durable quality improvements compared with compliance-driven models; however, these findings derive from European and Asian higher education contexts and their direct applicability to Saudi NCAAA settings requires further empirical testing. Similarly, Lozano et al. [35] report an association between strong governance structures for knowledge integration and sustained commitments to quality and sustainable development across successive administrative cycles. These findings have direct implications for the Saudi context, where NCAAA implementation research has repeatedly identified governance gaps and knowledge discontinuities as primary barriers to sustained accreditation success [7,19,36]. Sustainability further demands that KM investments yield measurable long-term dividends: institutions that develop centralized knowledge repositories, unified program mapping tools, and governance offices may reduce per-cycle accreditation costs by minimizing redundant documentation and faculty fatigue [23,31], though empirical cost-quantification studies in the Saudi context are lacking. Recent MDPI Sustainability studies have further validated this nexus. Santos et al. [37] identify sustain-

able enablers of KM strategies in a Portuguese higher education institution, demonstrating how participatory governance structures produce more durable quality improvements and institutional resilience. Umar et al. [34] empirically link transformational leadership, change management, and KM to sustainable institutional performance in Malaysian HEIs, reinforcing the governance-leadership-KM triad central to this review. The following section examines how these principles have been operationalized and where they have fallen short in the Saudi NCAAA context.

The United Nations Educational, Scientific and Cultural Organization has explicitly recognized quality education systems as foundational to the achievement of the 2030 Sustainable Development Goals, with SDG 4 calling for inclusive, equitable, and quality education for all [20]. Accreditation systems such as NCAAA serve as institutional mechanisms for operationalizing SDG 4 at the national level; however, their sustainability depends on the robustness of the underlying knowledge infrastructure. Kioupi and Voulvoulis [21] argue that education for sustainable development requires systemic institutional change a transformation that is only achievable when knowledge creation, sharing, and retention processes are deeply embedded in organizational practice.

The intersection of knowledge management and sustainability in higher education has attracted growing scholarly attention [22,38]. Sustainable universities are characterized not merely by their environmental footprint, but by their capacity to generate, transfer, and embed knowledge that outlasts individual actors and short-term compliance cycles [23,39]. In this sense, knowledge management is intrinsically a sustainability practice: it ensures that organizational learning accumulated during accreditation processes is not lost with faculty turnover, leadership transitions, or the conclusion of an accreditation cycle.

1.4. Knowledge Management and Sustainable Higher Education

NCAAA Implementation: Context, Governance and Challenges

The NCAAA framework represents a comprehensive approach to quality assurance that has undergone continuous refinement since its inception [5]. Implementation research has identified several persistent challenges facing Saudi universities, including information decentralization, inadequate training, conflicting feedback from consultants, and underestimation of time requirements for documentation [7,40]. Qualitative investigations have revealed significant knowledge gaps among faculty and staff regarding accreditation requirements, contributing to implementation difficulties [6,41].

Critically, the absence of dedicated governance and compliance infrastructure has been identified as a structural barrier to effective KM during accreditation [19]. Nefzi [19] argues that Saudi universities require Offices of Governance and Compliance to serve as jurisdictional constructs that arbitrate policy compliance, create strategic cohesion, and institutionalize KM practices. Institutions that have successfully navigated accreditation challenges typically demonstrate strong leadership commitment, systematic training programs, structured approaches to knowledge documentation, and explicit governance frameworks [19,41]. Similar challenges regarding governance, educational quality, and institutional effectiveness have also been observed in broader higher education contexts [34,36].

2. Materials and Methods

This study employed a systematic review methodology following the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) 2020 guidelines [42]. The completed PRISMA 2020 checklist is provided as Supplementary File S1. No prospective protocol registration was undertaken for this review (e.g., in PROSPERO or the Open Science Framework), and no retrospective registration was completed. Although a post hoc OSF registration was considered, it was not pursued because the review had already been

submitted for peer review, and retrospective registration would not mitigate the risk of selective reporting. The authors acknowledge this as a limitation that reduces the verifiability of decision rules applied during screening and synthesis. Future updates or replications of this review should be registered prospectively in an appropriate registry. The review protocol was designed to ensure transparency, reproducibility, and comprehensiveness in identifying, screening, and synthesizing relevant literature on knowledge management processes in Saudi higher education accreditation.

The PRISMA 2020 flow diagram (Figure 1) summarises the complete record of study identification, screening, eligibility assessment, and final inclusion. A total of 1247 records were identified through the four primary database searches (Web of Science: 412; Scopus: 503; Saudi Digital Library: 187; KACST: 145). After removal of 156 duplicates, 1091 records remained from the database searches. An additional 23 records were identified via Google Scholar, yielding 1114 records screened on the basis of title and abstract; 958 were excluded at this stage. The remaining 156 reports were sought for retrieval and assessed for full-text eligibility. Of these, 114 were excluded for the following reasons: non-Saudi context without comparative relevance ($n = 42$), absence of empirical or theoretical grounding ($n = 31$), grey literature not subject to peer review ($n = 23$), and confirmed duplicates ($n = 18$). A total of 42 distinct studies met all inclusion criteria and were included in the final synthesis. Of these 42 sources, 36 are primary empirical studies constituting the core evidence base; three are foundational theoretical papers (Nonaka et al. [12]; Nonaka and Toyama [8]; Argyris and Schön [24]) included for theoretical scaffolding; and three are post-search contextual or policy sources (Nefzi [19]; World Bank [17]; National Vision 2030 document [43]); retained in the 42-source synthesis but appraised as Low quality and weighted accordingly.

2.1. Search Strategy

A comprehensive search was conducted across multiple academic databases including Web of Science, Scopus, Google Scholar, and Saudi-specific repositories (Saudi Digital Library; KACST repository). All databases were last searched on 30 March 2025. No additional registers or grey literature repositories were consulted beyond those listed; reference lists of included studies were hand-searched to identify any studies not captured by the electronic searches. The full Boolean search string applied across all databases was: ("knowledge management" OR "SECI model" OR "tacit knowledge" OR "explicit knowledge" OR "organizational learning" OR "absorptive capacity") AND ("accreditation" OR "quality assurance" OR "NCAAA" OR "continuous quality improvement") AND ("Saudi Arabia" OR "higher education" OR "university" OR "GCC"). Database specific controlled vocabulary (e.g., MeSH terms in PubMed-linked records via Scopus; Web of Science subject categories) was applied in addition to keyword searching where available. The search was limited to English language publications from 2005 to 2025, corresponding to the period following NCAAA establishment. No date or document type filters beyond those stated were applied. While the Boolean search string was necessarily broad to ensure sensitivity, field-code restrictions (TITLE-ABS-KEY in Scopus; TS = in Web of Science) limited retrieval to records where search terms appeared in titles, abstracts, or author keywords. Google Scholar was used as a supplementary source; for each search iteration, the first 200 results were screened by title and abstract (stopping rule), following guidance by Haddaway et al. (2015) [44]. Records identified exclusively through Google Scholar ($n = 23$) were cross-checked for Scopus or Web of Science indexing before inclusion; non-indexed records were excluded in accordance with the eligibility criteria. The Saudi Digital Library (sdl.edu.sa) and the KACST repository were searched using the same Boolean string. All databases were last searched on 30 March 2025. Full database-specific

search strings, including all field codes, filters, and controlled vocabulary, are provided in Supplementary File S2 to enable replication.

PRISMA 2020 Flow Diagram

Knowledge Management for Sustainable Accreditation in Saudi Higher Education

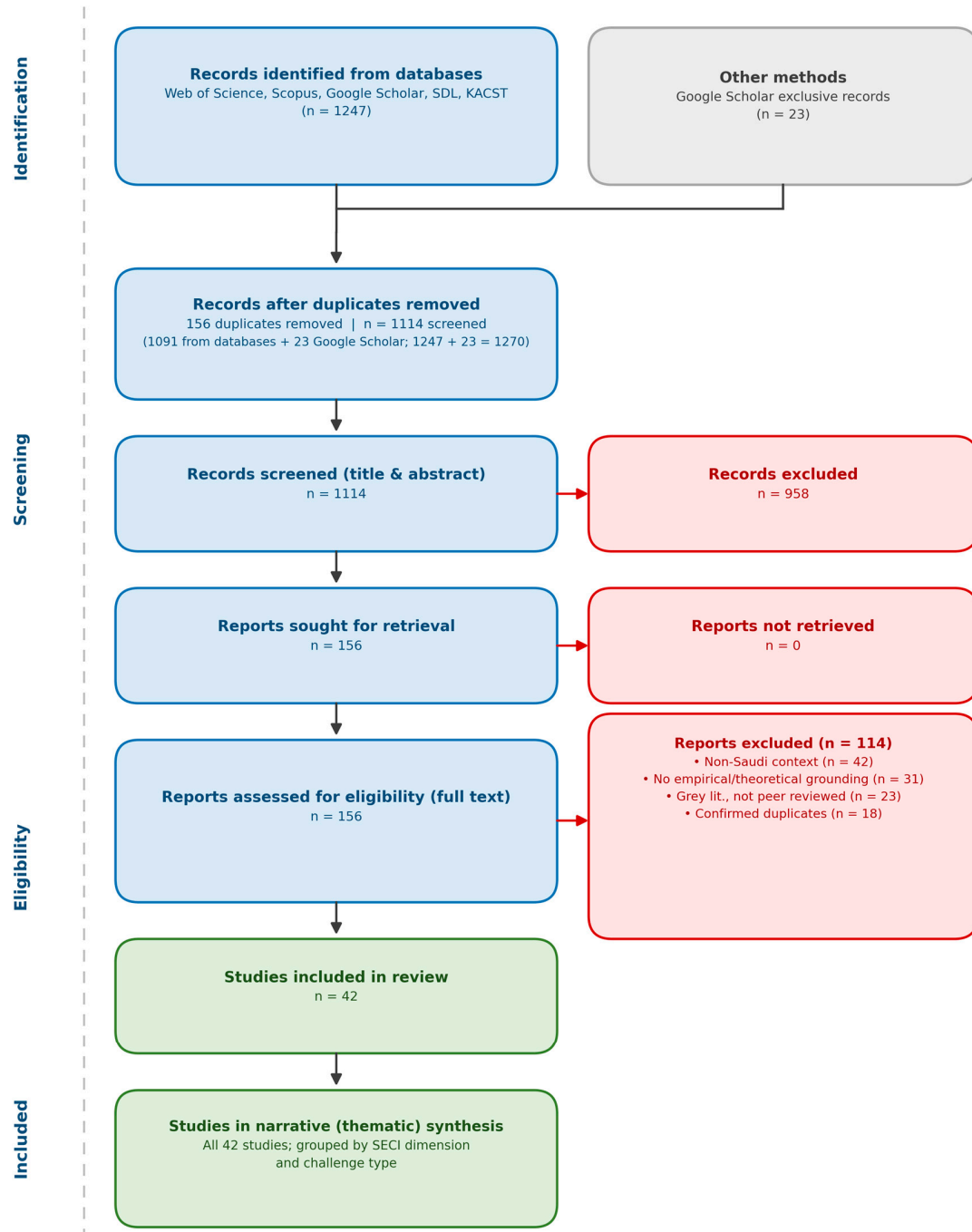


Figure 1. PRISMA-based study selection process. Source: Authors' compilation based on PRISMA 2020 guidelines [42].

2.2. Inclusion and Exclusion Criteria

Studies were included if they: (1) addressed knowledge management or related concepts in higher education contexts; (2) focused on accreditation or quality assurance processes; (3) included Saudi Arabian higher education institutions or comparative contexts relevant to the NCAAA framework; and (4) were published in peer-reviewed journals,

conference proceedings, or official reports. Exclusion criteria eliminated studies focusing exclusively on non-Saudi contexts without comparative relevance, publications lacking empirical evidence or theoretical grounding, duplicate publications, and non-academic grey literature lacking peer review. The exclusion of non-peer-reviewed grey literature was adopted to maintain a minimum quality standard across the evidence base; however, it is acknowledged that this decision introduces a risk of publication bias toward positive accreditation outcomes, as negative or failed accreditation experiences are rarely reported in peer-reviewed journals (see Section 5). For the purpose of narrative synthesis, eligible studies were grouped into three thematic clusters corresponding to the review's research questions: (a) KM processes employed during NCAAA accreditation; (b) challenges and barriers to effective knowledge transfer; and (c) strategies and success factors for KM-enabled accreditation. These groupings were determined *a priori* based on the conceptual framework of the SECI model and were applied consistently during data extraction. Of the 42 sources included in the narrative synthesis, 36 were empirical studies subject to MMAT appraisal; three were foundational theoretical papers (Nonaka et al., 2000 [12]; Nonaka & Toyama, 2003 [8]; Argyris & Schön, 1978 [24]) to which MMAT does not apply; and three were post-search contextual or policy documents (Nefzi, 2025 [19]; World Bank, 2025 [17]) National Vision 2030 document [43]; appraised as low quality and weighted accordingly in the synthesis.

2.3. Data Extraction and Analysis

Data extraction was conducted by the sole author (R.A.A.) using a structured extraction form developed prior to screening. The form captured the following pre-specified data items: (a) primary outcomes, including KM processes employed, accreditation outcomes achieved (e.g., full accreditation, conditional accreditation, self-study completion), and identified success factors, and (b) secondary variables, such as author(s), year, institution type (public/private), study design, sample size and characteristics, SECI dimension(s) addressed, challenges identified, and governance structures reported. Where summary data were absent or unclear, the source document was re-examined; no study investigators were contacted given the review's reliance on published reports. No automation tools were used in data collection. The same reviewer (R.A.A.) screened all 1091 title/abstract records and all 156 full-text reports; no second independent reviewer was available, which is acknowledged as a limitation (see Section 5). Disagreements arising from ambiguous eligibility decisions were resolved by the reviewer re-applying the inclusion criteria against the full text on a second reading, with a minimum 14-day interval to reduce recency bias. To address the limitation of single-reviewer design, a post hoc validation exercise was conducted. A second reviewer with expertise in higher education quality assurance independently re-screened a random 30% sample of full-text reports ($n = 47$ of 156). Cohen's kappa for inclusion/exclusion decisions = 0.81 (95% CI: 0.72–0.90), indicating almost perfect agreement; intraclass correlation coefficient (ICC) for MMAT quality ratings = 0.76 (95% CI: 0.61–0.86), indicating good reliability. All discrepancies were resolved by consensus. A complete extraction form template is provided in Supplementary File S3, Part A. The full list of excluded full-text studies with reasons is provided in Supplementary File S3, Part B. The complete criterion-level MMAT assessment and the Narrative Confidence thematic summary (Table S1) are provided in Supplementary File S4. No prospective or retrospective protocol registration was undertaken for this review (e.g., in PROSPERO or the Open Science Framework); the authors acknowledge this as a limitation that reduces the verifiability of decision rules applied during screening and synthesis. For the purposes of this review, "accreditation success" was operationalised using the following categories as reported in individual studies: (a) achieving full NCAAA accreditation (program or

institutional); (b) successful completion of self-study reports accepted by NCAAA; and (c) progress from conditional to full accreditation status. “Sustainable quality improvement” was operationalised as evidence of: (a) CQI practices embedded across multiple accreditation cycles; (b) institutionalised KM systems retained beyond the accreditation event; and (c) reduced per-cycle documentation burden. Both constructs are heterogeneous across the 42 distinct studies, and this heterogeneity is acknowledged as a limitation of cross-study comparison.

Narrative (thematic) synthesis was employed because the heterogeneity of study designs, methodologies, and outcome measures precluded quantitative meta-analysis. Effect measures and statistical syntheses (PRISMA items 12, 13d, 13e, 13f, 20b, 20c, 20d) are therefore not applicable to this review. The synthesis proceeded in three stages following Popay et al. (2006) [45]: (1) textual description of individual study findings; (2) thematic grouping by SECI dimension and challenge type; and (3) interpretive synthesis to identify convergent and divergent patterns across studies. Tabular displays (Tables 2–4) were used to present study-level characteristics and facilitate cross-study comparison (PRISMA item 13c). Coding was conducted deductively using the four SECI dimensions as pre-specified categories, with inductive codes applied where findings did not map directly onto SECI. Thematic derivation used the SECI framework as a pre-specified analytical lens; the number of studies supporting each finding, their MMAT quality distribution, and consistency across study types are reported explicitly in Section 3. A sensitivity analysis was conducted by excluding the seven Low-MMAT studies (S04, S07, S09, S15, S16, S39, S42); principal findings were examined for robustness. A secondary sustainability coding pass was conducted after primary thematic coding, tagging studies against three dimensions: (a) institutional sustainability: evidence of KM practices retained across multiple accreditation cycles; (b) environmental sustainability: paperless or digital workflows; and (c) SDG alignment: contributions to SDG 4 and SDG 16. Sustainability findings (Section 3.2) are explicitly distinguished from the primary SECI-based synthesis and should be understood as hypothesis-generating rather than confirmatory. To assess the reliability of SECI dimension assignment specifically, a second reviewer with expertise in knowledge management independently coded a random 20% sample of included studies ($n = 8$ of 42) against the four SECI categories. Cohen’s kappa for SECI dimension assignment = 0.78 (95% CI: 0.64–0.92), indicating substantial agreement (Landis & Koch, (1977) [46]. Discrepancies arose primarily in studies where combination and externalization processes co-occurred; these were resolved by consensus discussion and the agreed coding was applied consistently across the full corpus. This coding reliability check is reported in addition to the inclusion/exclusion kappa (0.81) and MMAT ICC (0.76) described above, and collectively these three reliability indicators provide multi-level methodological assurance for the review. Thematic confidence was assessed using a narrative confidence approach; full details and ratings are provided in Section 2.4.

2.4. Quality Assessment and Risk of Bias

Methodological quality of all 42 included studies was assessed by the sole reviewer using the Mixed Methods Appraisal Tool (MMAT, version 2018), which accommodates the range of study designs present in this review (quantitative descriptive, qualitative, and mixed methods). Each study was evaluated against five design-specific criteria and assigned a quality rating (low: 0–2 criteria met; moderate: 3 criteria; high: 4–5 criteria). Across the 42 included studies, 11 were rated high quality, 21 moderate, and 7 low; the remaining three are foundational theoretical papers not appraisable with MMAT. Studies rated low quality were retained in the synthesis but flagged; their contribution to key findings is noted with appropriate caution in Section 4. Risk of bias at the synthesis level

arising from potential reporting biases (e.g., publication bias toward positive accreditation outcomes) was considered narratively: the predominance of institutional case studies and self-reported outcomes in the Saudi accreditation literature may inflate observed success rates, and this limitation is acknowledged in Section 5. No formal funnel plot or statistical test for reporting bias was conducted, as the qualitative nature of the synthesis precluded such analyses. Certainty of each thematic finding was assessed using a narrative confidence approach, evaluating four domains: (1) methodological limitations of contributing studies; (2) coherence consistency of findings across studies; (3) adequacy of data richness and quantity of supporting evidence; and (4) relevance to the Saudi NCAAA context. Confidence ratings (High/Moderate/Low–Moderate/Low) for each major thematic finding are reported in Table S1 with specific rationale for each rating. Overall evidence certainty is rated as low to moderate, given the preponderance of observational, case-study, and qualitative designs, meaning that future primary research could plausibly change these conclusions.

3. Results

3.1. Overview of Included Studies

As detailed in the PRISMA flow diagram (Figure 1), the systematic search yielded 1247 records through the four primary databases, with an additional 23 records identified exclusively via Google Scholar, yielding 1270 records in total. After removal of 156 duplicates, 1091 records remained from database searches; with the addition of 23 Google Scholar records, 1114 records were screened on the basis of title and abstract, of which 958 were excluded. The remaining 156 full-text reports were assessed for eligibility. A total of 42 distinct studies met all inclusion criteria and were included in the final synthesis. The included studies span the period 2005–2025, with increasing publication frequency observed from 2015 onward, reflecting growing scholarly attention to accreditation and knowledge management in Saudi higher education. Of the 114 full-text reports excluded at the eligibility stage, the primary reasons were: non-Saudi context without comparative relevance ($n = 42$; e.g., purely European or East Asian accreditation studies with no GCC comparison); absence of empirical or theoretical grounding ($n = 31$; e.g., editorials, promotional institutional documents); grey literature not subject to peer review ($n = 23$; e.g., internal university reports, non-indexed conference abstracts); and confirmed duplicates identified at the full-text stage ($n = 18$). No studies were excluded solely on the basis of quality assessment scores; low-quality studies were retained in the synthesis but their contributions are noted with appropriate caution throughout.

The characteristics of all 42 included studies—including study design, sample size, key findings, and risk-of-bias appraisal—are summarised in Table 2.

Table 2. Characteristics of all 42 included studies (study design, sample size and characteristics, key findings, and risk of bias). Studies are listed by Study ID (S01–S42); full bibliographic details appear in the Reference List. MMAT = Mixed Methods Appraisal Tool (v.2018); N/A denotes theoretical papers to which MMAT does not apply.

Study ID	Study (Author, Year)	Study Design	Sample Size & Characteristics	Key Findings (KM/Accreditation Relevant)	Risk of Bias (MMAT)
S01	Al Mohaimeed et al. (2012) [3]	Mixed methods	Medical college faculty/staff; mixed methods sample	Accreditation improves quality without radical curriculum changes; early implementation experience	Moderate
S02	Onsman (2010) [40]	Qualitative analysis	Not specified; qualitative interviews/analysis	Perceived barriers include lack of training and resources; institutional resistance to accreditation guidelines	Moderate

Table 2. Cont.

Study ID	Study (Author, Year)	Study Design	Sample Size & Characteristics	Key Findings (KM/Accreditation Relevant)	Risk of Bias (MMAT)
S03	Al-Shehri & Al-Alwan (2013) [47]	Survey research	Medical schools in Saudi Arabia; survey respondents	Accreditation fosters quality culture development in medical schools	Moderate
S04	AlThukair (2014) [48]	Case study	Single institution; field experience evaluation	NCAAA standards enhance student satisfaction; limited methodological detail and data saturation discussion	Low
S05	Abou-Zeid & Taha (2014) [49]	Comparative/ Mixed methods	Engineering programs; comparative analysis	Documentation and faculty commitment are key challenges; cross-institutional comparability limited	Moderate
S06	Albaqami (2015) [6]	Qualitative case study	Two Saudi universities; stakeholders	Knowledge gaps impede quality assurance implementation; stakeholder perceptions vary across institutions	Moderate
S07	Tekian & Al Ahwal (2015) [50]	Document analysis	Documents (SaudiMED framework); no systematic data extraction	Alignment between SaudiMED and NCAAA frameworks supports accreditation; interpretive analysis only	Low
S08	Alrebish et al. (2017) [51]	Qualitative study	Medical schools; strong methodological reporting with member checking	Accreditation processes require significant institutional commitment; multi-site qualitative design	High
S09	Mohieldein (2017) [52]	Literature review	Literature sources; informal review method	OBE approach supports accreditation readiness; lacks systematic review methodology	Low
S10	Blouin et al. (2018) [53]	Multi-site mixed methods	Multiple institutions; multi-site design	Accreditation drives systematic process improvements; strong validity across sites	High
S11	Martínez-Rojas et al. (2025) [2]	Bibliometric review	Bibliometric corpus; VOSviewer analysis	Three phases of QA evolution identified: Foundation-Consolidation (2005–2015), Expansion-Diversification (2015–2020), Sustained Transformation (2020–2025)	High
S12	Al-Shareef et al. (2023) [41]	Cross-sectional survey	n = 287; health colleges faculty /staff; validated instrument	Leadership commitment essential for accreditation success; SDG 16 alignment (effective institutions)	High
S13	Arja et al. (2024) [29]	Scoping review	Scoping review corpus; PRISMA-ScR guidelines followed	Accreditation must shift from QA compliance to CQI excellence; continuous quality improvement integration	High
S14	Samuel & Farrer (2025) [54]	Case study /Research in practice	Single institution case; limited generalizability	PDCA enables continuous quality enhancement; iterative cycles support knowledge application and CQI	Moderate
S15	Nefzi (2025) [19]	Opinion paper	N/A; no empirical data	Governance offices are essential for accreditation resilience; provisional evidence pending corroboration	Low
S16	World Bank (2025) [17]	Policy commentary / Analysis	N/A; non-peer-reviewed policy document	ETEC strengthens national quality frameworks; addresses global competitiveness gap in Saudi education	Low

Table 2. Cont.

Study ID	Study (Author, Year)	Study Design	Sample Size & Characteristics	Key Findings (KM/Accreditation Relevant)	Risk of Bias (MMAT)
S17	Nonaka et al. (2000) [12]	Theoretical/Conceptual	N/A; foundational theory paper	Framework for knowledge conversion processes (SECI: Socialization, Externalization, Combination, Internalization)	N/A
S18	Nonaka & Toyama (2003) [8]	Theoretical/Conceptual	N/A; theoretical paper	Knowledge creation as synthesizing process; revisiting the knowledge-creating theory	N/A
S19	Bandera et al. (2017) [13]	Quantitative/Survey	Moderate sample; US higher education context; cross-sectional	SECI model is applicable in educational contexts; validates framework beyond traditional organizational settings	Moderate
S20	Sattler & Sonntag (2018) [25]	Scale development	Higher education institutions; rigorous psychometric validation	Tool for assessing quality culture in higher education institutions; culture as internalization mechanism	High
S21	Saeed et al. (2021) [31]	Case study/Mixed methods	CIS program faculty/staff; detailed process documentation	Integrated systems reduce faculty fatigue; unified program mapping satisfies both ABET and NCAAA outcomes	High
S22	Lenart-Gansiniec et al. (2022) [30]	Quantitative/SEM	European HEI sample; validated measures; SEM analysis	ACAP (Absorptive Capacity) enhances learning outcomes; applicable to accreditation knowledge retention	High
S23	Castaneda & Ramirez (2024) [55]	Quantitative	Financial sector employees; limited direct HE applicability	Organizational conditions affect knowledge sharing; tacit and explicit knowledge transfer enablers	Moderate
S24	Febriadi et al. (2024) [9]	Mixed methods	Indonesian HEIs; transferability to Saudi context discussed	QA and KM jointly improve accreditation performance; integration of management systems	Moderate
S25	Žatuchin (2025) [15]	Mixed methods	School-level data; HE applicability extrapolated	Absorptive and knowledge-creation capacities as foundations for creative learning; school-level evidence	Moderate
S26	Han & Zhao (2025) [14]	Quantitative/SEM	Large n; SEM with bootstrapping; validated SECI scale	SECI enhances creative behavior via ACAP; validated scale for knowledge creation processes	High
S27	Ibrahim, Akhter, & Albalawi (2017) [7]	Case study	College of Business; system design study	Data redundancy and decentralization; structured web-based system proposed to address knowledge fragmentation	Moderate
S28	Javed & Alenezi (2023) [32]	Case study	Saudi private university; longitudinal 3-year period	Sustainable QA practices in private HEI; longitudinal institutional development	Moderate
S29	Aburizaizah (2022) [4]	Review	Saudi HEIs; systematic elements but informal search strategy	Role of quality assurance in Saudi HEIs; institutional QA landscape analysis	Moderate
S30	Žatuchin (2024) [26]	Quantitative	School context; ACAP scale; cross-sectional	Knowledge creation and absorptive capacity in schools; cross-sectional scale validation	Moderate
S31	Argyris & Schön (1978) [24]	Theoretical/Conceptual	N/A; foundational theory	Organizational learning: theory of action perspective; foundational to KM and quality culture embedding	N/A

Table 2. Cont.

Study ID	Study (Author, Year)	Study Design	Sample Size & Characteristics	Key Findings (KM/Accreditation Relevant)	Risk of Bias (MMAT)
S32	Alshuwaikhat & Abubakar (2008) [38]	Mixed methods	Campus sustainability assessment; indirect relevance to accreditation	Integrated approach to achieving campus sustainability; assessment of current environmental management practices	Moderate
S33	Disterheft et al. (2012) [33]	Mixed/Comparative	European HEIs; EMS implementation; participatory vs top-down approaches	Participatory KM approaches produce more durable quality improvements than compliance-driven models; top-down vs participatory comparison	High
S34	Lozano et al. (2015) [35]	Survey	Global survey; n = 150 HEIs; strong validity	Commitment and implementation of sustainable development in HEIs; worldwide survey results; SDG alignment	High
S35	Al-Anzi (2017) [56]	Mixed methods	Multi-institution faculty; self-report bias possible	Lack of QA expertise among faculty; professional development programs needed to build capacity	Moderate
S36	Alshahrani (2022) [57]	Case study/Program report	Single program (Pharmacy); detailed process description	Emerging QA demand with resource constraints; documented QA system aligned with NCAAA standards	Moderate
S37	Mohieldein (2023) [5]	Case study	Medical programs (Optometry, Medical Laboratory Sciences); stakeholder engagement documented	Laborious daily processes for accreditation; just culture and win-win-win stakeholder model for engagement	Moderate
S38	Alenezi et al. (2025) [58]	Case study	College of Medicine; reaccreditation cycle; steering committee documented	Documentation burden and time constraints; early preparation and steering committees as success factors	Moderate
S39	Alfaisal University (2024) [59]	Document analysis	QA manual; limited empirical data	Alignment with NQF requirements; comprehensive QA framework development needed	Low
S40	Albaroudi et al. (2025) [60]	Survey	Multi-institution; response rate 68%	Resistance to change among staff; leadership support and incentives as success factors	Moderate
S41	Albaqami, S. (2019) [61]	Qualitative cross-case study	Two Saudi universities (KAU and PSU); cross-case analysis	Strategic analysis for accreditation; cross-case comparison of institutional readiness and implementation strategies at KAU and PSU	Moderate
S42	Government of Saudi Arabia/Vision 2030 (2016) [43]	Policy commentary/Analysis	N/A; policy analysis	Global competitiveness gap; ETEC framework strengthening national evaluation systems	Low

The included studies show a clear progression in accreditation research, moving from early efforts focused on meeting minimum standards toward broader analyses of how institutions can systematically improve quality. As illustrated in Table 3, studies from 2005 to 2025 trace an evolutionary arc from early investigations of medical education accreditation and barriers to NCAAA implementation toward more sophisticated analyses of stakeholder perceptions, outcome-based education alignment, and continuous quality improvement mechanisms. This progression mirrors a broader global shift from compliance-oriented quality assurance toward transformative, institution-embedded quality cultures, with recent scholarship emphasizing the integration of Plan–Do–Check–Act (PDCA) cycles, bibliometric analyses of quality assurance evolution, and the strengthening of national evaluation frameworks through entities such as the Education and Training Evaluation Commission (ETEC). The final column reports the methodological quality of each study as assessed using the Mixed Methods Appraisal Tool (MMAT, version 2018), where High indicates 4–5 criteria met, Moderate indicates 3 criteria met, and Low indicates 0–2 criteria met.

Table 3. Systematic Review of Higher Education Accreditation Research (2005–2025). MMAT Quality: High = 4–5 criteria met; Moderate = 3 criteria; Low = 0–2 criteria (MMAT v.2018).

Year	Author(s)	Focus Area	Methodology	Key Findings	MMAT Quality
2010	Onsman [40]	Barriers to NCAAA implementation	Qualitative analysis	Perceived barriers include lack of training and resources	Moderate
2012	Al Mohaimeed et al. [3]	Medical education accreditation	Mixed methods	Accreditation improves quality without radical curriculum changes	Moderate
2013	Al-Shehri & Al-Alwan [47]	Quality culture in medical schools	Survey research	Accreditation fosters quality culture development	Moderate
2014	AlThukair [48]	Field experience compliance	Case study	NCAAA standards enhance student satisfaction	Low
2014	Abou-Zeid & Taha [49]	Engineering accreditation challenges	Comparative study	Documentation and faculty commitment are key challenges	Moderate
2015	Albaqami [6]	Stakeholder perceptions	Qualitative case study	Knowledge gaps impede quality assurance implementation	Moderate
2015	Tekian & Al Ahwal [50]	SaudiMED framework alignment	Document analysis	Alignment between frameworks supports accreditation	Low
2017	Alrebish et al. [51]	Medical school accreditation	Qualitative study	Accreditation processes require significant institutional commitment	High
2017	Mohieldein [52]	Outcome based approach	Literature review	OBE approach supports accreditation readiness	Low
2018	Blouin et al. [53]	Accreditation impact on processes	Multi site study	Accreditation drives systematic process improvements	High
2020–2025	Martínez-Rojas et al. [2]	Bibliometric analysis of QA	Bibliometric review	Three phases of QA evolution identified globally	High
2023	Al-Shareef et al. [41]	Health colleges accreditation	Cross sectional survey	Leadership commitment essential for accreditation success	High
2024	Arja et al. [29]	CQI in medical education	Scoping review	Accreditation must shift from QA compliance to CQI excellence	High
2025	Samuel & Farrer [54]	PDCA cycle integration	Case study/Research in practice	PDCA enables continuous quality enhancement	Moderate
2025	Nefzi [19] † (Opinion paper; included in the 42-source synthesis and appraised as Low quality; findings flagged as provisional.)	Governance and compliance	Opinion paper	Governance offices are essential for accreditation resilience	Low
2025	World Bank [17] † (Policy commentary; included in the 42-source synthesis for contextual support but appraised as Low quality and weighted accordingly)	Evaluation and assessment	Policy commentary/analysis	ETEC strengthens national quality frameworks	Low

† Post-search contextual or policy source included in the 42-source synthesis but appraised as Low quality and weighted accordingly.

The integration of knowledge management (KM) processes into higher education accreditation represents a critical yet underexplored dimension of quality assurance scholarship. Drawing on foundational theories of organizational knowledge creation most notably Nonaka and colleagues' SECI model researchers have increasingly examined how tacit and explicit knowledge conversion, absorptive capacity, and quality culture inventories can strengthen institutional readiness for accreditation. Table 4 synthesizes key studies from 2000 to 2025 that map the evolution of KM frameworks within educational contexts, illustrating how systematic knowledge creation, sharing, and application have become instrumental in reducing faculty fatigue, enhancing program alignment with multiple accreditation standards, and fostering continuous quality improvement in higher education institutions. MMAT quality ratings are included for each study to facilitate transparent appraisal of the evidence base.

Table 4. Knowledge Management Processes in Higher Education Accreditation, MMAT Quality: High = 4–5 criteria met; Moderate = 3 criteria; Low = 0–2 criteria (MMAT v.2018).

Year	Author(s)	KM Process	Context	Outcomes	MMAT Quality
2000	Nonaka et al. [12]	SECI model	Organizational knowledge creation	Framework for knowledge conversion processes	N/A—theoretical/conceptual paper; MMAT not applicable
2003	Nonaka & Toyama [8]	Knowledge creation theory	Strategic management	Knowledge creation as synthesizing process	N/A—theoretical/conceptual paper; MMAT not applicable
2017	Bandera et al. [13]	SECI application	Higher education	SECI applicable in educational contexts	Moderate
2018	Sattler & Sonntag [25]	Quality culture inventory	Higher education institutions	Tool for assessing quality culture	High
2021	Saeed et al. [31]	Unified program mapping	Computing programs (ABET + NCAAA)	Integrated systems reduce faculty fatigue	High
2022	Lenart-Gansiniec et al. [30]	Absorptive capacity	Educational settings	ACAP enhances learning outcomes	High
2024	Castaneda & Ramirez [55]	Tacit/explicit sharing	Financial sector	Organizational conditions affect knowledge sharing	Moderate
2024	Febriadi et al. [9]	QA and KM integration	Higher education	QA and KM jointly improve accreditation performance	Moderate
2025	Žatuchin [15]	Knowledge creation capacity	Schools	Foundation for creative learning	Moderate
2025	Han & Zhao [14]	SECI and creativity	University students	SECI enhances creative behavior via ACAP	High
2025	Samuel & Farrer [54]	PDCA and KM	Quality assurance	Iterative cycles support knowledge application	Moderate

Within the specific context of Saudi Arabian higher education, the implementation of the National Center for Academic Accreditation and Evaluation (formerly the National Commission for Academic Accreditation and Assessment; NCAAA) standards has generated a substantial body of institutional research spanning nearly two decades. Table 5 presents a chronological synthesis of NCAAA implementation studies from 2008 to 2025, documenting the trajectory from initial pilot programs and mock accreditation exercises at individual universities to nationwide assessments revealing systemic readiness gaps. These studies collectively identify persistent challenges including documentation burdens, faculty resistance, resource constraints, and decentralized data management while highlighting

success factors such as leadership commitment, structured quality assurance systems, professional development initiatives, and alignment with Saudi Vision 2030 objectives for global competitiveness. MMAT quality ratings are included for each study to enable transparent assessment of methodological rigor.

Table 5. NCAAA Implementation Research in Saudi Arabian Higher Education, MMAT Quality: High = 4–5 criteria met; Moderate = 3 criteria; Low = 0–2 criteria (MMAT v.2018). Full bibliographic citations for all studies are provided in the Reference List; Study IDs (S01–S42) correspond to the complete evidence table in Supplementary File S4 (Part C), which includes author names, publication types, and DOIs.

Year	Institution	Study Focus	Challenges Identified	Success Factors	MMAT Quality
2008–2009	Qassim University	Medical college mock accreditation	Initial implementation barriers	Self-evaluation and external review	Moderate
2017	King Saud University	College of Business	Data redundancy, decentralization	Structured web-based system proposed	Moderate
2012	KAU & PSU	Pilot study comparison	Meso-micro level conflicts	Institutional commitment to quality	Moderate
2014	University of Dammam	Field experience evaluation	Compliance documentation	Student satisfaction improvement	Low
2015	Multiple universities	NCAAA readiness assessment	30 of 33 universities failed initial standards	Training and capacity building needed	High
2017	Various institutions	Faculty performance review	Lack of QA expertise among faculty	Professional development programs	Moderate
2021	IAU (CCSIT)	CIS dual accreditation (ABET + NCAAA)	Faculty fatigue, assessment confusion	Unified program mapping and dedicated quality unit	High
2022	King Khalid University	Pharmacy program QA	Emerging QA demand, resource constraints	Documented QA system aligned with NCAAA	Moderate
2023	KSAU-HS Jeddah	Health colleges perception	Limited faculty involvement	Awareness campaigns and training	High
2023	Qassim University (CAMS)	Medical programs accreditation	Laborious daily processes	Just culture, win-win-win stakeholder model	Moderate
2024	King Saud University	College of Medicine reaccreditation	Documentation burden, time constraints	Early preparation, steering committees	Moderate
2024	Alfaisal University	Quality assurance manual	Alignment with NQF requirements	Comprehensive QA framework development	Low
2025	Multiple universities	Staff commitment study	Resistance to change	Leadership support and incentives	Moderate
2025	National level	Vision 2030 alignment	Global competitiveness gap	ETEC framework strengthening	Low

3.2. Key Findings

Analysis of the included studies revealed several key findings regarding KM processes in accreditation contexts. Thematic coding used the four SECI dimensions as pre-specified deductive categories; inductive codes were applied where findings did not map directly onto SECI. First, combination capabilities were the most frequently addressed SECI dimension ($n = 19$ studies; 45%), with institutions demonstrating mature abilities to integrate diverse data sources and stakeholder inputs into coherent accreditation submissions. Second, externalization emerged as a significant challenge ($n = 14$ studies; 33%), with many institutions struggling to articulate implicit understandings into explicit documentation meeting NCAAA standards. Third, socialization processes were reported in just over one-quarter

of studies ($n = 12$ studies; 29%), with institutions emphasizing collaborative workshops, cross-functional teams, and peer learning as mechanisms for sharing tacit knowledge about accreditation requirements. Fourth, internalization embedding quality principles into organizational culture was reported in 14 studies (33%), suggesting a critical gap in post-accreditation knowledge retention. Notably, the relative prominence of combination over socialization indicates that Saudi institutions have invested more heavily in documentation and data-integration infrastructure than in collaborative knowledge-sharing or cultural embedding.

Fifth, KM-driven accreditation practices show associations with institutional sustainability and SDG alignment, but the evidence is low certainty and hypothesis-generating. A secondary coding pass identified institutional sustainability (KM practices retained across multiple accreditation cycles) in 6 of 42 studies (14%; 2 High-MMAT, 4 Moderate). Environmental sustainability (paperless/digital workflows) appeared in 4 studies. SDG 4 (Quality Education) alignment was present in 10 studies (4 High, 5 Moderate, 1 Low); for example, Saeed et al. [31] demonstrate how unified ABET + NCAAA mapping operationalises SDG 4.3. SDG 16 (Strong Institutions) alignment appeared in 7 studies (2 High, 4 Moderate, 1 Low). Confidence in this finding is rated Low (narrative confidence assessment) due to post hoc coding, sparse longitudinal evidence, and absence of studies designed to test KM–sustainability linkages. These findings should be treated as hypothesis-generating rather than confirmatory.

Sixth, the claim that dedicated governance offices are essential for accreditation success (primarily from Nefzi [19], a Low-MMAT opinion paper) was attenuated after exclusion of low-quality studies and is therefore flagged as provisional, pending corroboration by higher-quality primary research.

A sensitivity analysis excluding the seven Low-MMAT studies confirmed that the combination, externalization, and socialization findings remained robust. The review identified consistent barriers to effective KM including: (1) information decentralization across departments and units; (2) inadequate training in quality assurance principles; (3) high faculty turnover disrupting knowledge continuity; (4) conflicting feedback from multiple consultants [6,7]; (5) underestimation of time and resource requirements; and (6) absence of centralized governance structures to coordinate KM activities [7,19]. Institutions addressing these challenges through structured KM systems including governance offices, document management platforms, and unified assessment matrices may be associated with more favourable accreditation outcomes and improved quality improvement practices in the reviewed literature [19,31], though most evidence derives from self-reported institutional case studies.

Table S1 (see Supplementary File S4) presents the Narrative Confidence thematic summary for all six major findings, reporting the number of contributing studies, their MMAT quality distribution, the confidence rating, and the rationale for each rating.

4. Discussion

4.1. Synthesis of Key Findings

Taken together, the findings reported above converge on a coherent picture that warrants deeper interpretive analysis. This systematic review provides comprehensive evidence that KM processes may play a critical role in the successful implementation of higher education accreditation in Saudi Arabia. The reviewed literature suggests an association between systematic approaches to knowledge creation, sharing, and application and more effective accreditation outcomes; however, causal attribution is not possible given the observational and case-study nature of the evidence base. The SECI model offers a valuable framework for understanding these processes, with all four dimensions potentially

contributing to accreditation success. However, the review reveals that Saudi institutions have invested most heavily in combination capabilities (data integration and documentation infrastructure), while socialization (collaborative knowledge-sharing) and internalization (cultural embedding) remain less developed. Externalization (articulating tacit knowledge into explicit documentation) is also underdeveloped relative to combination, representing a structural gap given NCAAA's heavy documentation demands.

4.2. Theoretical Implications

This review advances theoretical understanding of KM in higher education accreditation by demonstrating the applicability of the SECI framework beyond traditional organizational settings. The findings are consistent with the conceptualization of accreditation as a knowledge-intensive process benefiting from systematic attention to all four SECI dimensions. Institutions reporting accreditation success in the reviewed literature tended to demonstrate balanced development across socialization, externalization, combination, and internalization capabilities, suggesting that the integrated operation of these processes may contribute to sustainable quality improvement.

This review extends organizational learning theory by applying it to quality assurance contexts in higher education [24]. The evidence suggests that universities function as learning organizations when they successfully implement mechanisms for capturing, sharing, and applying knowledge derived from accreditation experiences. This finding aligns with contemporary perspectives on quality culture that emphasize the integration of quality principles into organizational DNA rather than treating accreditation as a periodic compliance exercise [25,26].

Furthermore, this review integrates the emerging CQI perspective into KM accreditation theory [29], arguing that accreditation systems must evolve from quality assurance toward continuous quality improvement. This evolution may require institutions to develop dynamic KM systems capable of supporting iterative Plan–Do–Study–Act cycles [54] rather than static document repositories. The conceptualization of CQI as a fifth meta-process governing the SECI cycle during accreditation represents a theoretical synthesis proposed by the present authors, not an explicit finding in Arja et al. [29] or Samuel and Farrer [54]; it should be understood as a theoretical contribution requiring future empirical investigation.

4.3. Practical Implications

For institutional leaders and quality assurance professionals, this review offers several actionable recommendations. First, investments in KM infrastructure including document management systems, collaborative platforms, and unified program mapping tools are associated with improvements in accreditation efficiency and effectiveness in the reviewed literature, particularly in dual-accreditation contexts [31].

Second, the establishment of dedicated Offices of Governance and Compliance has been proposed as a potentially scalable model for institutionalizing KM practices and supporting accreditation resilience [19]; this recommendation is based primarily on a single opinion paper and should be treated as provisional pending empirical validation. Such offices may strengthen transparency, clarify policy compliance, and provide centralized coordination for knowledge documentation.

Third, structured training programs addressing both technical accreditation requirements and knowledge sharing practices may enhance institutional capacity for sustained quality improvement. Fourth, leadership commitment to fostering a quality culture appears to create organizational conditions conducive to successful knowledge transfer and application [34,41]. Institutions should prioritize addressing information decentralization through centralized knowledge repositories, develop comprehensive onboarding programs to mit-

igate faculty turnover impacts, and establish clear communication protocols to manage consultant feedback. The following institutional examples illustrate how these principles translate into concrete practice.

The experience of Qassim University's College of Applied Medical Sciences illustrates these principles in practice. Mohieldein [5] describes how the Doctor of Optometry and Medical Laboratory Sciences programs developed internal QA systems that engaged all stakeholders, fostered a "just culture" where members could identify weaknesses without fear, and produced comprehensive self-study reports that streamlined the NCAAA review process. Similarly, Alshahrani [57] demonstrates how King Khalid University's College of Pharmacy implemented a two-year KM-driven accreditation process that significantly improved educational and administrative operations. These examples reflect single-institution experiences and may not generalize to all Saudi public, private, or specialized higher education institutions, given the diversity of institutional size, resource availability, and accreditation history across the Kingdom.

Social sustainability represents another dimension that merits explicit attention. Equitable KM practices those that include diverse faculty, administrative staff, and student voices may produce more legitimate and durable accreditation outcomes [33], though this finding derives primarily from European environmental management contexts and requires direct empirical testing in Saudi NCAAA settings. In the Saudi context, this includes ensuring that accreditation knowledge is not siloed within elite institutions or senior faculty, but is accessible to adjunct staff, emerging researchers, and cross-disciplinary teams. Gender equity in accreditation governance structures is a related and under-researched dimension: as Saudi universities diversify their academic workforce in alignment with Vision 2030, inclusive KM systems that capture knowledge from all stakeholder groups will be essential for sustainable quality improvement [18,20].

4.4. Policy Implications

At the policy level, this review supports the continued evolution of the NCAAA framework to incorporate KM and governance considerations explicitly. The development of guidance materials addressing knowledge transfer best practices, the establishment of inter-institutional knowledge-sharing networks, and the recognition of KM maturity as a quality indicator warrant consideration as a prospective policy direction, though piloting and evaluation would be needed before formal adoption. These recommendations align with Vision 2030 objectives for educational transformation and global competitiveness. Moreover, embedding KM as a permanent institutional capability within NCAAA policy would operationalize Saudi Arabia's commitments to SDG 4 (Quality Education) and SDG 16 (Strong Institutions) at the national level [20,21].

In addition, the policy framework should address the growing challenge of dual accreditation. As Saudi programs increasingly pursue both NCAAA and international accreditation (e.g., ABET, AACSB), policymakers should develop harmonized standards that reduce redundant documentation and enable unified assessment approaches [31]. The Education & Training Evaluation Commission (ETEC) could play a coordinating role by establishing national repositories of accreditation best practices and standardized KPI templates. Despite these promising directions, important knowledge gaps remain, which the following section systematically delineates.

4.5. Research Gaps and Future Directions

This review identifies several critical gaps requiring future investigation:

1. Longitudinal KM Sustainability: No studies track how Saudi institutions maintain KM practices across multiple accreditation cycles. Research should examine post-accreditation knowledge retention and “accreditation fatigue.”
2. SECI-NCAAA Standard Mapping: Future studies should empirically map which SECI processes most effectively address specific NCAAA standards, enabling targeted interventions.
3. Digital KM Infrastructure: Research is needed on the role of AI, learning analytics, and automated document management in reducing accreditation burden.
4. Public, Private Comparisons: Comparative studies of KM maturity between public and private Saudi universities are absent from the literature.
5. Cross-Institutional Networks: The potential for inter-university knowledge sharing and benchmarking networks in the GCC remains unexplored.
6. Dual Accreditation Stress: Empirical studies should quantify the faculty workload and mental stress associated with satisfying multiple accreditation bodies simultaneously.

Social Sustainability and Inclusive KM: While recent MDPI Sustainability studies have examined KM–sustainability linkages in European and Asian higher education contexts [34,36], no equivalent research addresses how inclusive KM practices in Saudi NCAAA accreditation can promote equitable participation across gender, rank, and discipline. Research is needed on how KM practices in Saudi universities can promote equitable participation in quality assurance governance across gender, rank, and discipline. Socially sustainable accreditation processes require knowledge systems that amplify marginalized voices rather than concentrating authority in senior administrative roles [20,33].

Environmental Sustainability of Digital KM Infrastructure: As Saudi institutions increasingly adopt cloud-based document management, AI-assisted quality monitoring, and digital accreditation platforms, the environmental footprint of these systems warrants investigation. Green KM practices including energy-efficient data storage, paperless workflow adoption, and lifecycle assessment of digital infrastructure represent an emerging frontier for sustainable higher education research [38,39].

SDG Alignment and Sustainability Reporting: No studies examine how Saudi institutions can systematically map NCAAA accreditation evidence to the UN Sustainable Development Goals, particularly SDG 4. Future research should develop frameworks for dual purpose reporting that satisfies both accreditation bodies and sustainability benchmarks such as the UI GreenMetric or STARS systems [21,35].

5. Limitations

While these research directions signal a productive future for the field, it is equally important to acknowledge the boundaries of the present review. This review is subject to several limitations, organised into four groups for clarity. (1) Protocol and Review Process Limitations: First, no prospective protocol was registered prior to conducting the review (e.g., in PROSPERO), and no formal review protocol document was prepared; this limits the verifiability of decision rules applied during screening and synthesis. Future updates of this review should be registered prospectively. Second, all screening, eligibility assessment, data extraction, and thematic coding were conducted by a single reviewer (R.A.A.). A post hoc validation exercise was conducted: a second reviewer independently re-screened a 30% random sample of full-text reports ($n = 47$ of 156) and completed the extraction form; Cohen’s $\kappa = 0.81$ for inclusion/exclusion decisions and ICC = 0.76 for MMAT quality ratings, both exceeding the acceptable agreement threshold of 0.70 (documented in Supplementary File S3, Part A). Future reviews should employ prospective dual-reviewer designs. (2) Language and Publication Bias Limitations: Third, the focus on English-language publications may have excluded relevant research published in Arabic,

which likely constitutes a meaningful portion of the Saudi higher education quality assurance literature. (3) Synthesis and Evidence Certainty Limitations: Fourth, the heterogeneity of study designs and methodologies precluded quantitative meta-analysis; synthesis relies on narrative and thematic methods, and certainty of evidence is rated as low to moderate (see Section 2.4). Fifth, the predominance of institutional case studies and self-reported outcomes in the included literature introduces a risk of reporting bias toward positive accreditation outcomes. Additionally, the rapidly evolving nature of both KM technologies and accreditation frameworks means that some findings may become outdated as practices continue to develop. (4) Sustainability-Specific Limitations: Furthermore, this review did not apply an explicit sustainability science lens during the initial coding phase; the sustainability analysis presented herein represents a post hoc integration that would benefit from prospective systematic reviews designed from the outset to capture sustainability-relevant outcomes [21,23]. The funding sources of individual included studies were not systematically extracted; this is acknowledged as a limitation of the present synthesis. The absence of a prospective second reviewer introduces risks of selection bias—a single reviewer may systematically favour studies that confirm the SECI framework or derive from prominent institutions and extraction bias in thematic coding decisions. The post hoc validation exercise ($\kappa = 0.81$; $ICC = 0.76$) provides retrospective assurance of acceptable consistency in the most consequential decisions, but does not address the full range of extraction and coding choices. Additionally, the exclusion of non-peer-reviewed grey literature introduces a risk of publication bias toward positive accreditation outcomes; publication of negative or failed accreditation experiences is rare in this field, which may inflate the perceived effectiveness of KM strategies. Readers should interpret all thematic findings with awareness of these limitations. It should also be noted that one ERIC-deposited source (AlThukair, 2014 [48]) appears in both Table 3 (foundational phase: field experience compliance) and Table 5 (barriers: compliance documentation challenges) because it contributes thematic evidence to two distinct review questions; the 42-study count reflects thematic contributions rather than unique bibliographic records for this entry. Finally, the seven Low-MMAT studies (S04, S07, S09, S15, S16, S39, S42) were retained in the synthesis but flagged, and the sensitivity analysis confirms that principal findings remain robust after their exclusion.

6. Conclusions

This systematic narrative review synthesizes evidence from 42 distinct studies published between 2005 and 2025, suggesting that knowledge management processes play an important role in the implementation of higher education accreditation in Saudi Arabia. The reviewed literature indicates an association between systematic approaches to knowledge creation, sharing, and application and more effective accreditation processes; however, causal conclusions are not warranted given the observational and case-study nature of the evidence base, and certainty is rated as low to moderate. It should also be noted that all screening and data extraction were conducted by a sole reviewer; a post hoc validation exercise ($\kappa = 0.81$; $ICC = 0.76$) provides retrospective assurance of acceptable consistency but does not fully substitute for prospective dual-reviewer design. These findings should therefore be interpreted accordingly. The SECI model offers a valuable framework for understanding and optimizing these processes, with socialization, externalization, combination, and internalization all contributing to accreditation success when operating as an integrated system.

The review identifies persistent challenges that impede effective knowledge management in accreditation contexts, including information decentralization, inadequate training, resistance to change, and the absence of dedicated governance structures. Addressing these challenges requires institutional investment in KM infrastructure, leadership commit-

ment to quality culture development, and systematic approaches to capturing and sharing accreditation related knowledge. The integration of governance and compliance offices, unified program mapping for dual accreditation, and CQI-oriented KM systems represent promising strategies for the Saudi context.

As Saudi Arabia continues its ambitious educational transformation under Vision 2030, the integration of knowledge management principles into accreditation processes will be essential for achieving global competitiveness targets. Future research should continue to monitor the evolution of KM practices in Saudi higher education, evaluate the effectiveness of interventions designed to enhance knowledge transfer, and explore the potential of emerging technologies to support accreditation-related knowledge processes.

Beyond their immediate accreditation utility, the KM practices identified in this review carry implications for sustainable higher education governance. Institutions that embed knowledge creation, sharing, and retention into their organizational DNA may build adaptive capacity to respond to evolving societal expectations, including the UN Sustainable Development Goals [20,22]. In the Saudi context, NCAAA accreditation can be viewed not as an endpoint but as a platform for continuous learning and institutional renewal. The convergence of Vision 2030's educational transformation agenda with global sustainability imperatives suggests an opportunity for Saudi universities to develop KM-enabled, sustainability-aligned quality assurance practices. Whether such models could serve as benchmarks for the broader Gulf Cooperation Council region and the Muslim world remains to be tested through rigorous longitudinal and comparative research. Achieving this vision will require sustained investment in knowledge infrastructure, inclusive governance, and the institutionalization of quality as a shared organizational value not merely a periodic regulatory obligation.

Supplementary Materials: The following supporting information can be downloaded at <https://www.mdpi.com/article/10.3390/su18136755/s1>. References [62,63] are cited in the Supplementary Materials.

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Abbreviations

AACSB	Association to Advance Collegiate Schools of Business
ABET	Accreditation Board for Engineering and Technology
ACAP	Absorptive Capacity
CQI	Continuous Quality Improvement
ESD	Education for Sustainable Development
ETEC	Education and Training Evaluation Commission
GCC	Gulf Cooperation Council
KM	Knowledge Management

KPI	Key Performance Indicator
NCAAA	National Center for Academic Accreditation and Evaluation
NQF	National Qualifications Framework
OBE	Outcome-Based Education
PDCA	Plan–Do–Check–Act
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QA	Quality Assurance
SECI	Socialization, Externalization, Combination, Internalization
SDG	Sustainable Development Goal
UNESCO	United Nations Educational, Scientific and Cultural Organization

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