

Designing an Evidence-Traceable Accreditation Readiness System using the Innovation Canvas: A Conceptual Study for LAMTEK Accreditation

¹Perdana Suteja Putra*, ²Mohammad Adam Jerusalem, ³Grahita Prisca Brilianti, ⁴Dyantika Putri Mahmud

^{1,2,3,4}Industrial Engineering, Faculty of Engineering, Universitas Negeri Yogyakarta
^{1,2,3,4}Colombo 1st St., Karang Malang, Caturtunggal, Depok District, Sleman Regency, Special Region of Yogyakarta 55281, Indonesia

*e-mail: perdanasutejaputra@uny.ac.id

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Abstract

Accreditation readiness in higher education is often hindered by fragmented evidence, unclear ownership, inconsistent validity, and weak links between identified gaps and corrective actions. Existing accreditation applications predominantly support document storage, workflow administration, or performance visualisation, but rarely preserve an auditable relationship from accreditation requirements to institutional improvement. This study aims to formulate a conceptual design for an evidence-traceable accreditation-readiness system for engineering programmes under the Lembaga Akreditasi Mandiri Program Studi Keteknikan framework. A scenario-based conceptual design approach was employed by synthesising the official accreditation instrument, recent literature, and an illustrative stakeholder-scenario dataset. The resulting requirements were systematically translated across the Explore, Ideate, Market, Design, and Value domains of the Innovation Canvas and evaluated through cross-domain traceability and proposition-based analysis. The study produces an integrated architecture consisting of four interrelated categories: instrument and evidence governance, verification and readiness management, gap-to-action improvement, and institutional adoption and sustainability. Together, these categories connect accreditation requirements with governed evidence, accountable ownership, explainable readiness decisions, and monitored corrective actions. The principal contribution is the integration of semantic, governance, and improvement traceability, supported by mandatory evidence gates and explainable readiness states. The Market domain is further adapted from a commercial orientation into an institutional model of adoption, stewardship, integration, training, maintenance, and sustainability. The proposed design advances accreditation management beyond file-based compliance toward continuous, accountable, and evidence-based quality improvement while providing a structured blueprint for subsequent prototyping and empirical evaluation.

Keywords: accreditation readiness, engineering programme accreditation, evidence traceability, Innovation Canvas, quality assurance information system.

1 Introduction

Accreditation is a central mechanism for assuring the accountability and continuous improvement of higher education programmes. Its value, however, depends on whether institutions use accreditation evidence to understand performance and guide improvement rather than merely to demonstrate compliance [1], [2]. Evidence from a complete accreditation cycle indicates that accreditation-related interventions can support academic improvement, although their effects depend on institutional implementation [3]. Conversely, accreditation may become administratively burdensome when documentary production is disconnected from routine quality practices and educational decision-making [4], [5]. Sustainable accreditation readiness therefore requires a quality culture in which evidence collection, review, and improvement are embedded in everyday institutional work [6]–[8].

In Indonesia, engineering-programme accreditation is administered by *Lembaga Akreditasi Mandiri Program Studi Keteknikan* (LAM Teknik), hereafter referred to as LAMTEK. Its

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accreditation instruments require study programmes and their managing units to demonstrate performance through indicators, self-evaluation, quantitative data, and supporting evidence [9]. Preparing this evidence requires coordination among programme leaders, accreditation teams, quality-assurance units, lecturers, administrative staff, and information-system administrators. Evidence is often distributed across organisational units and storage locations, while its ownership, validity, and relationship to particular indicators may remain implicit. This condition makes accreditation readiness not only a document-management problem but also an information-governance and organisational-coordination problem.

Digital systems have addressed parts of this challenge. Accreditation applications have supported multi-user administration, data synchronisation, assessment workflows, and dashboards [10], while repository systems have improved document classification and retrieval [11]. Digital quality-assurance applications and business-intelligence dashboards have also helped stakeholders visualise outcomes, indicators, and quality gaps [12], [13]. Integration with learning-management systems can further reduce repeated reporting by reusing educational data for accreditation purposes [14]. Nevertheless, higher-education digital transformation often remains fragmented when isolated initiatives are not connected to institutional strategy, governance, and process redesign [15]. Existing accreditation systems similarly tend to emphasise administration, storage, or visualisation rather than maintaining a complete relationship among an indicator, its required evidence, evidence owner, validity, verification decision, readiness gap, and corrective action.

This limitation has cognitive consequences. Accreditation personnel must locate information, interpret formal criteria, compare documents, detect inconsistencies, and coordinate decisions across heterogeneous sources. Information overload can impair attention, judgement, and task performance when information volume, complexity, or irrelevance exceeds available processing capacity [16], [17]. Cognitive-workload research therefore recommends that systems organise information around user tasks, reveal only decision-relevant detail, and preserve clear pathways from summaries to source information [18], [19]. Human-centred design studies likewise show that successful systems must align technology with users, workflows, organisational settings, and implementation conditions [20]–[24]. For accreditation, a readiness score alone is insufficient if users cannot explain the evidence and decisions that produced it.

The Innovation Canvas offers an appropriate framework because accreditation readiness requires simultaneous attention to stakeholder needs, system functions, institutional implementation, technical design, and expected value [25], [26]. Rather than treating these considerations as separate decisions, the framework supports their integration within a coherent design logic. For an internal university service, however, its Market domain requires adaptation from a commercial orientation to an institutional perspective that emphasises adoption, governance, stewardship, integration, and sustainability. This adaptation is consistent with evidence that digital quality assurance depends not only on technical functionality but also on organisational ownership and human oversight [27].

The literature therefore presents a specific gap. Previous studies demonstrate the benefits of accreditation workflow systems, repositories, LMS integration, and quality dashboards, but do not provide an integrated design logic for evidence-traceable accreditation readiness. In this study, evidence traceability is defined through three interrelated dimensions. Semantic traceability connects accreditation requirements with relevant and interpretable evidence. Governance traceability connects evidence with accountable ownership, validity, verification, and history. Improvement traceability connects identified readiness deficiencies with responsible and monitorable corrective actions. This definition extends conventional requirements traceability by incorporating institutional responsibility and improvement while retaining only relationships that support meaningful verification or change decisions [28]. It also responds to the need for evidence to be accessible, interpretable, and actionable in higher-education decision-making [29].

Accordingly, this study aims to formulate a conceptual design for an evidence-traceable LAMTEK accreditation-readiness system using the Innovation Canvas. It addresses three research questions: RQ1: What stakeholder problems and requirements define evidence-traceable accreditation readiness? RQ2: How can these requirements be translated across the Explore, Ideate, Market, Design, and Value domains of the Innovation Canvas? RQ3: What distinguishes the proposed concept from existing accreditation repositories, workflow systems, and quality dashboards? The study contributes an adapted Innovation Canvas for an institutionally governed service, a traceable-

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evidence-object model, and an explainable readiness architecture linking every material gap to accountable corrective action. The intended outcome is not a tested software product or a prediction of the official accreditation result, but a coherent design blueprint for subsequent prototyping and empirical evaluation.

2 Literature Review

Recent accreditation scholarship increasingly distinguishes between accreditation as periodic compliance and accreditation as an infrastructure for continuous improvement. Reviews published during the last five years show that accreditation research has concentrated on the operation of accreditation systems, the quality-assurance role of accreditation, implementation barriers, and institutional effects, but has devoted less attention to how evidence is transformed into routine organisational action [1], [2]. Empirical studies indicate that accreditation can improve programme performance when standards are translated into sustained institutional practices [3], yet the same process can generate documentation-heavy behaviour when evidence is produced primarily for an external visit [4]. This tension explains why a quality culture cannot be created by periodic document compilation alone. Continuous enhancement requires evidence to be collected, interpreted, discussed, and used within ordinary decision cycles rather than activated only near an accreditation deadline [7], [8]. The relevant design problem is therefore not simply how to digitise accreditation documents, but how to preserve an intelligible path from a formal requirement to evidence, judgement, responsibility, and improvement.

Existing digital initiatives solve important but partial elements of that problem. Accreditation information systems have supported multi-user administration, data entry, synchronisation, scoring, and workflow coordination [10], [11]. Repository-oriented systems improve retrieval by classifying documents according to accreditation standards, subcategories, dates, and organisational scopes [11], while LMS integration reduces duplicate reporting by reusing learning-outcome data already produced in educational processes [14]. Stakeholder-informed quality-assurance applications and business-intelligence dashboards add another layer by visualising programme outcomes, assessment methods, indicators, and performance gaps [12], [13]. These contributions demonstrate that digitisation can make accreditation information more accessible. However, their dominant unit of management remains a document, data field, workflow transaction, or indicator score. None of these units alone establishes whether a particular item of evidence is semantically appropriate for an indicator, remains valid for the relevant period, has been verified by an authorised actor, or has generated an accountable corrective action.

This fragmentation reflects a broader problem in higher-education digital transformation. Technology initiatives often underperform when new applications are added without redesigning institutional processes, clarifying data ownership, or connecting the application to organisational strategy [15]. A dashboard may make a gap visible but cannot ensure that the gap has an owner, due date, resolution pathway, and closure evidence. Likewise, a repository may contain all requested files while still providing weak readiness information if the relationship between each file and the accreditation requirement is implicit. Evidence-use research in higher education shows that evidence becomes decision-relevant only when it is accessible, credible, interpretable, and connected to an organisational context in which actors can act upon it [29]. Accreditation readiness should consequently be treated as a network of decision-relevant relationships rather than a count of uploaded documents.

Requirements-traceability research provides a useful starting point because it links requirements to artefacts, verification, and change decisions. Recent work argues for focused traceability: relationships should be maintained when they support a meaningful verification or change task rather than recorded indiscriminately [28]. Applied to accreditation, this logic requires more than a link between an indicator and a file. The relationship must also preserve the evidence definition, source, owner, period, version, validity, verification result, and rationale. These elements form semantic traceability, which explains why evidence supports a requirement, and governance traceability, which explains who is accountable for its quality and continued validity. The reviewed accreditation systems provide parts of this structure, but do not extend it consistently from the criterion to the final improvement response. This synthesis supports the first proposition: P1: An accreditation-readiness

design that links each requirement to verified and interpretable evidence will provide more explainable readiness judgements than a design based primarily on document completeness.

Evidence ownership and temporal validity are equally important because accreditation records are produced across academic, administrative, research, human-resource, and quality-assurance units. When ownership remains implicit, missing evidence is discovered late, updates depend on personal memory, and organisational knowledge can disappear when personnel change. Studies of quality culture emphasise that sustained improvement depends on distributed participation, defined responsibility, and routines that connect evidence with institutional dialogue [5], [7]. Digital quality assurance also requires explicit human oversight even when advanced analytics or artificial intelligence is introduced [27]. Accordingly, accountability metadata should be designed as part of the evidence object rather than added later as an administrative assignment. This leads to the second proposition: P2: Incorporating evidence ownership, validity, verification authority, and history into the evidence structure will strengthen accountability and organisational continuity compared with document records without governance metadata.

The way information is presented also determines whether traceability improves or burdens accreditation work. Accreditation personnel must interpret criteria, search across sources, compare versions, detect inconsistencies, and coordinate follow-up. Reviews of information overload show that excessive volume, complexity, redundancy, and irrelevant detail can reduce attention and decision quality [16], [17]. Cognitive-workload research in human-computer interaction similarly cautions that providing more information is not equivalent to supporting better judgement; information should be organised around the user's task and progressive decision needs [18], [19]. Human-centred design studies reinforce the need to connect technology with users, tasks, environments, and organisational constraints [20], [21]. For accreditation, this means that summaries must be reversible to their source evidence, while operational views should prioritise exceptions rather than present all records with equal salience.

Yet explainability and exception visibility are insufficient if a detected gap does not trigger improvement. A readiness dashboard can represent the current condition while leaving the institution uncertain about what to do next. The missing relationship is improvement traceability: the connection from a verified deficiency to its priority, corrective action, accountable owner, due date, progress, and closure evidence. This mechanism aligns accreditation preparation with continuous quality improvement and distinguishes a readiness system from a reporting system. It also limits a common risk in digital assurance: producing increasingly sophisticated indicators without strengthening the institution's capacity to respond. The third proposition therefore states: P3: Linking each verified readiness gap to a prioritised and monitored corrective action will make accreditation information more actionable than dashboard visualisation without an explicit gap-to-closure pathway.

The Innovation Canvas is particularly relevant because these semantic, governance, cognitive, and improvement requirements cannot be resolved within technical architecture alone. The canvas was developed to connect stakeholder exploration, concept generation, market and implementation considerations, technical design, and value rather than treating them as independent decisions [25], [26]. In a public or university service, however, its Market domain cannot be interpreted only in commercial terms. The relevant "market" consists of institutional users, decision owners, quality units, evidence-producing units, technical stewards, policy channels, resources, partnerships, adoption mechanisms, and sustainability costs. Reinterpreting Market in this way addresses a recurring limitation of higher-education digital transformation: a technically viable system may remain institutionally orphaned when governance, training, maintenance, and integration are not designed concurrently [15]. The Value domain must likewise extend beyond efficiency to include explainability, accountability, continuity, auditability, and earlier corrective action.

Taken together, the literature suggests that evidence-traceable readiness depends on alignment across all five Innovation Canvas domains. Explore must identify the actual breakdowns in accreditation work; Ideate must translate them into bounded functions; Market must establish adoption and stewardship; Design must encode the evidence lifecycle and controls; and Value must state how the arrangement improves decisions and action. Weakness in any one domain can break the chain: a technically detailed architecture without stakeholder grounding may solve the wrong problem, whereas a strong value proposition without governance may not persist. This produces the fourth proposition: P4: Alignment among stakeholder problems, proposed functions, institutional-

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adoption arrangements, technical architecture, and expected value will produce a more complete and implementable accreditation-readiness concept than feature-centred system design. The four propositions define what remains underdeveloped in current research and direct this article toward that gap. Rather than proposing another repository or readiness dashboard, the study develops an integrated evidence-to-action design in which every readiness judgement can be traced to an applicable requirement, governed evidence, verification decision, accountable gap, and monitored response.

3 Research Methods

This study employed a scenario-based conceptual design approach to formulate an evidence-traceable accreditation-readiness system for Indonesian engineering programmes. The approach was selected because the intended output was a design blueprint rather than a working application or an estimate of official LAMTEK accreditation results. Scenario-based design allows prospective users, tasks, information breakdowns, and desired future practices to be represented before implementation, while human-centred design requires an explicit understanding of users, tasks, and organisational environments [20], [24], [30]. The Innovation Canvas served as the principal synthesis instrument because it connects Explore, Ideate, Market, Design, and Value within one design logic [25]. The unit of analysis was the relationship among an accreditation requirement, its supporting evidence, the actors responsible for producing and verifying it, its readiness status, and the action generated when a gap was identified.

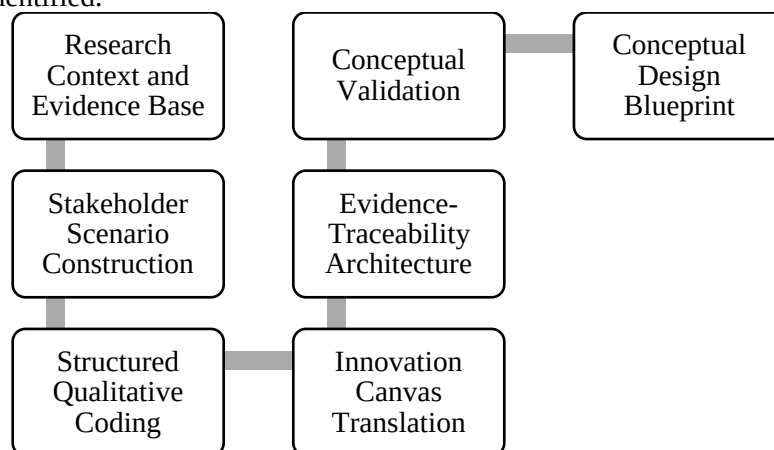


Figure 1 Methodological sequence

The study was conducted as desk-based conceptual research in Indonesia in the context of LAMTEK accreditation for engineering study programmes; no university was treated as an empirical case site. The primary materials were the official LAMTEK accreditation instruments, recent peer-reviewed literature on accreditation and quality assurance, documented functions of existing accreditation or quality-assurance systems, and an illustrative stakeholder-scenario dataset. The targeted literature search was updated through August 2026 and prioritised peer-reviewed publications from 2021–2026 indexed by major academic databases; older sources were retained only when provided the original Innovation Canvas or an established methodological standard. Search combinations included *higher education accreditation*, *quality assurance information system*, *accreditation repository*, *quality dashboard*, *evidence use*, *requirements traceability*, *information overload*, *cognitive workload*, and *human-centred design*. Sources were retained when they reported a relevant accreditation problem, system capability, implementation condition, or design limitation. The scenario dataset comprised 18 analytical stakeholder profiles: four programme leaders, six accreditation-team members, three quality-assurance personnel, three evidence owners, and two information-system administrators. Each profile was assigned three statements describing a recurrent problem, an expected system response, and the value sought, producing 54 statements. These profiles were not survey respondents and the frequencies derived from them were used only to prioritise conceptual design requirements, not to infer prevalence in a population.

Data construction followed a structured role–task–information procedure. The research instruments comprised a document-extraction sheet, literature matrix, stakeholder-scenario template, coding framework, Innovation Canvas worksheet, cross-domain traceability matrix, and risk-and-control checklist. The materials and coding records were managed in a spreadsheet; a reference manager was used to control citation metadata, and a diagramming application was used only to visualise the final research flow and conceptual architecture. First, the LAMTEK instruments were examined to identify the types of criteria, indicators, quantitative data, narratives, supporting evidence, and institutional actors implied by accreditation preparation. Second, findings from recent accreditation-system, digital quality-assurance, evidence-use, traceability, and cognitive-workload studies were extracted into a literature matrix containing the problem addressed, system capability, organisational condition, reported limitation, and implication for the proposed design. Third, five recurrent accreditation tasks were used to generate stakeholder scenarios: interpreting an indicator, locating or registering evidence, assessing validity and relevance, identifying a readiness gap, and assigning and monitoring corrective action. The 54 statements were then checked for internal consistency by requiring every problem statement to identify an affected role, task, information object, failure mechanism, and desired outcome. This procedure created a transparent design dataset while avoiding the false presentation of constructed scenarios as interview or questionnaire data.

The statements were analysed through structured qualitative coding. Initial coding remained close to the task represented in each statement; related codes were subsequently grouped into six design needs: rapid evidence retrieval, clear indicator–evidence mapping, explicit responsibility, controlled validity and versioning, early gap visibility, and reduced manual compilation. Coding and category development followed the principles of transparent code definition, iterative comparison, and maintenance of an analytic record [31], [32]. Frequencies were calculated as the number and percentage of the 18 profiles represented in each category. Since a profile could express more than one need, the categories were non-exclusive and the percentages were not expected to total 100%. The analysis did not use inferential statistics, reliability coefficients, or hypothesis tests because the data were purposively constructed for concept development.

The coded needs were translated through the five Innovation Canvas domains. Explore synthesised stakeholder roles, tasks, breakdowns, and desired outcomes. Ideate converted those needs into functions, external-system relationships, and design principles. Market was adapted from commercial exchange to institutional adoption and sustainability by identifying user segments, decision owners, governance arrangements, channels, partners, resources, activities, costs, and non-financial returns. Design specified the traceable evidence object, system modules, readiness states, mandatory gates, integrations, and risk controls. Value integrated the benefits expected by each stakeholder and the mechanisms through which those benefits would be produced. Translation was iterative: an element was retained only when it could be traced backward to an Explore need and forward to an identifiable institutional value.

The principal analytical tool was a cross-domain traceability matrix with the structure Explore finding, Ideate response, Market requirement, Design realisation, Value. It was used to assess conceptual completeness, detect unsupported features, and identify needs that had not received a governance or technical response. A second evidence-traceability model specified the chain instrument version, indicator, evidence requirement, evidence object, owner and validity, verification decision, readiness state, gap, corrective action, monitoring record. The four propositions developed in the literature review were examined analytically through these two structures. P1 was represented by the requirement–evidence–verification relationship; P2 by ownership, validity, authority, and history; P3 by the gap-to-corrective-action pathway; and P4 by complete alignment across the five canvas domains. The propositions were not statistically tested; they provide testable expectations for later prototype evaluation.

The operational constructs used in the analysis are presented in Table 1. In this conceptual study, they functioned as design constructs rather than measured variables.

Table 1 Operationalisation of the conceptual design constructs

Construct	Operational	Observable design	Analytical criterion
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	definition	evidence	
Stakeholder need	A task-related problem or expected outcome assigned to an accreditation role	Coded statement containing role, task, breakdown, and desired result	The need is supported by at least one scenario and translated into a function
Semantic traceability	The explicit relationship explaining why evidence supports an indicator	Indicator, evidence definition, source, mapping, verifier decision, and rationale	A readiness judgement can be traced to relevant evidence and its interpretation
Governance traceability	The relationship connecting evidence with accountability and temporal control	Owner, verifier, period, version, validity, history, and reassignment	Responsibility and current validity remain visible throughout the evidence lifecycle
Improvement traceability	The relationship connecting a verified deficiency with resolution	Gap, priority, action, owner, deadline, progress, and closure evidence	Every material gap has an accountable and monitorable response
Institutional adoption	The arrangements required to embed the system in routine quality work	Governance roles, policy channel, training, partners, resources, integration, and maintenance	The concept identifies who authorises, operates, sustains, and updates the service
Value	A decision or work outcome enabled by the integrated concept	Reduced search and rework, explainable status, continuity, auditability, and earlier intervention	Each claimed value is linked to a need, function, governance arrangement, and design element

Conceptual validation was conducted through three checks. The completeness check confirmed that each prioritised need appeared in all required downstream domains. The parsimony check removed functions that had no traceable need or value and avoided duplicating information already held by authoritative institutional systems. The risk-and-control check examined foreseeable failures, including obsolete instrument versions, incorrect evidence mapping, opaque aggregation, duplicate data entry, notification overload, privacy breaches, loss of ownership after personnel rotation, and excessive reliance on automated recommendations. The resulting design was then compared analytically with recent workflow, repository, LMS-integration, and dashboard studies to establish whether the contribution was an incremental feature or a distinct evidence-to-action architecture. As the study used publicly available documents, published literature, and constructed scenarios rather than human participants or personal records, it did not collect identifiable or sensitive participant data. Empirical stakeholder validation, prototyping, usability testing, and cognitive-workload evaluation are reserved for subsequent research.

The methodological sequence shown in Figure 1 begins with the accreditation context and evidence base, passes through scenario construction and coding, and then iterates across the five Innovation Canvas domains before producing the evidence-traceability architecture and conceptual checks. This sequence matches the Results and Analysis section: Explore reports the prioritised needs; Ideate reports the functional response; Market reports adoption and sustainability; Design reports the architecture and controls; and Value reports cross-domain alignment, novelty, and expected institutional benefit.

4 Results and Analysis

4.1 Explore: Defining the Accreditation-Readiness Problem

The Explore domain was developed from an illustrative scenario-based dataset representing 18 stakeholder roles: four programme leaders, six accreditation-team members, three quality-assurance personnel, three evidence owners, and two system administrators. Fifty-four problem and expectation statements were coded into six dominant needs (Table 2). Because the dataset supports conceptual design rather than population inference, the frequencies indicate design priority only.

Table 2 Synthesis of stakeholder needs and design implications

Dominant need	Profiles, n (%)	Design implication
Rapid evidence retrieval	15 (83.3)	Searchable registry linked to criteria and indicators
Clear indicator–evidence mapping	14 (77.8)	Evidence definitions, examples, and verifier rationale
Explicit responsibility	13 (72.2)	Owner, verifier, deadline, escalation, and history
Controlled validity and version	12 (66.7)	Period, approval, expiry, and replacement metadata
Early gap visibility	12 (66.7)	Continuous status and gap-to-action workflow
Reduced manual compilation	11 (61.1)	Reusable evidence objects and automated summaries

The findings reframe the problem from document scarcity to broken relationships among requirements, evidence, decisions, time, and responsibility. A conventional repository can show where a file is stored, but it cannot necessarily establish why the file is relevant, whether it remains valid, who is accountable for it, or what should happen when it is inadequate. This distinction explains why document digitisation may improve retrieval without producing continuous readiness. Prior systems have demonstrated the value of administrative automation and document classification [10], [11], whereas the proposed concept treats evidence as a governed organisational object rather than an uploaded file.

The principal user scenarios were consequently defined as: registering evidence against a requirement; locating evidence through an indicator; verifying relevance and validity; identifying a readiness gap; assigning corrective action; and monitoring resolution. These scenarios share one information path. Breaking the path at any point weakens readiness: evidence without mapping lacks meaning, mapping without ownership lacks accountability, verification without validity control becomes outdated, and gaps without action reproduce compliance reporting rather than improvement. The Explore result therefore establishes continuous auditable readiness as the organising concept.

4.2 Ideate: Translating Needs into System Functions

The Ideate domain converted the six needs into four functional groups. First, instrument governance maintains versioned criteria, indicators, required evidence, mandatory status, and effective dates. Second, evidence governance registers evidence with ownership, source, period, approval, version, and expiry metadata. Third, assurance and readiness management supports verification, status determination, gap prioritisation, and corrective action. Fourth, oversight provides role-based dashboards, alerts, and auditable reports. The explicit mapping between the six stakeholder needs and the four functional groups is presented in Table 3. Some needs are addressed by more than one functional group because accreditation readiness requires both operational and oversight mechanisms.

Table 3 Mapping of stakeholder needs to functional groups

Stakeholder need	Primary functional group	Supporting functional group	Design response
Rapid evidence retrieval	Evidence governance	Oversight	Indicator-linked evidence registry, structured metadata, search, and role-based access
Clear indicator–evidence mapping	Instrument governance	Evidence governance	Versioned evidence requirements, mapping guidance, examples, and verifier rationale
Explicit responsibility	Evidence governance	Assurance and readiness management	Named owner, verifier, due date, escalation, reassignment, and accountability history
Controlled validity and versioning	Evidence governance	Instrument governance	Reporting period, approval status, expiry, replacement, and version metadata
Early gap visibility	Assurance and readiness management	Oversight	Continuous readiness states, mandatory gates, exception alerts, gap prioritisation, and corrective-action monitoring
Reduced manual compilation	Oversight	Evidence governance	Reusable evidence objects, selective source-system integration, and automated summaries

Table 3 shows that the functional structure was derived directly from the Explore findings. Instrument governance provides a stable and version-controlled basis for evidence interpretation; evidence governance addresses retrieval, responsibility, and validity; assurance and readiness management converts verification exceptions into accountable action; and oversight consolidates these functions into role-based monitoring and reporting. This mapping ensures that none of the six needs remains without an operational response.

The resulting concept is not a single repository with additional menus. It is a workbench in which the active accreditation instrument structures the evidence lifecycle. Three design principles emerged. Traceability before aggregation requires every summary to be reversible to evidence and verification. Exception before volume prioritises missing, invalid, expired, or rejected evidence instead of presenting all documents equally. Action before display requires every material gap to have an owner, due date, priority, and closure record. These principles reduce avoidable search and interpretation demands by presenting information according to decisions rather than storage structure, consistent with information-overload and cognitive-workload research [17], [18], [33].

Potential external systems include institutional identity management, document storage, academic information, human resources, research and community-service databases, and notification services. Integration is selective: authoritative data should be referenced or synchronised rather than copied. This avoids creating another isolated platform, a common weakness in higher-education digital transformation [15]. The Ideate result therefore converts stakeholder needs into a bounded function set while preserving interoperability and cognitive simplicity.

4.3 Market: Institutional Adoption and Sustainability

Since the proposed system is an internal institutional service, the Market domain was adapted into an adoption and sustainability model. Five user segments were identified: decision owners, operational accreditation teams, evidence providers, validators, and technical stewards. Their relationship is governed co-ownership rather than vendor–customer exchange. Programme leaders authorise priorities; quality units govern mappings and verification rules; evidence owners maintain source records; and IT units maintain access, integration, and security.

Adoption channels include formal quality-assurance policy, programme onboarding, accreditation workshops, user champions, and helpdesk support. Key resources are accreditation expertise, data stewardship, secure infrastructure, and policy authority. Key activities comprise instrument updating, evidence maintenance, verification, periodic readiness review, training, and corrective-action monitoring. Faculty leadership, quality units, study programmes, institutional IT, and data-owning units function as partners. The principal costs are development, integration, migration, training, maintenance, security, and regulatory updates; the returns are reduced search and rework, earlier gap resolution, preserved organisational memory, and improved auditability.

This analysis reveals that adoption is part of the artefact, not an activity that begins after design. Digital initiatives create limited value when they are detached from strategy and ownership [15], while quality assurance becomes episodic when it is activated only near external review [5], [7]. The Market domain therefore prevents the system from becoming a technically functional but institutionally orphaned repository. Its distinctive adaptation is to make governance, routine stewardship, and continuity explicit design variables.

4.4 Design: Evidence-Traceability Architecture

The Design domain produced a modular architecture centred on a traceable evidence object. Each object contains: the applicable criterion and indicator; required-evidence definition; file or authoritative-source reference; owner; reporting period; approval and version; validity status; verifier decision and rationale; readiness state; linked gap; corrective action; and audit history. This structure applies the logic of focused requirements traceability, in which links are maintained because they support verification or change decisions rather than because all possible relationships must be recorded [28].

Table 4 Conceptual system architecture

Module	Primary responsibility
Instrument master	Versioned criteria, indicators, requirements, weights, and mandatory gates
Evidence registry	Traceable objects, metadata, sources, versions, and validity
Mapping and guidance	Indicator–evidence relationships, examples, and interpretation notes
Verification workflow	Review decisions, rationale, revision requests, and history
Readiness and gap engine	Status aggregation, mandatory gates, gaps, and priorities
Corrective-action register	Owner, due date, progress, escalation, and closure evidence
Dashboard and reporting	Role-based summaries and drill-down reports

The operative chain is:
instrument version → indicator → evidence requirement → evidence object → owner and validity → verification decision → readiness state → gap → corrective action → monitoring record.

Readiness is represented through the actionable states defined in Table 5. These states distinguish between evidence that has not been prepared, evidence that is undergoing verification, and evidence that cannot currently support readiness. Aggregate percentages may be displayed, but mandatory evidence acts as a gate: an indicator cannot be declared ready when required evidence is missing, invalid, expired, or unverified. This mechanism prevents score gaming and distinguishes internal readiness from an imitation of the official LAMTEK score. Users can move from any aggregate status to the relevant indicator, evidence object, verifier rationale, accountable owner, and open corrective action. The architecture is therefore explainable by construction.

Table 5 Readiness states and operational implications

Readiness state	Trigger or condition	Operational implication
Not initiated	No evidence-preparation activity has started	Assign an owner and initiate evidence preparation
Missing	Required evidence is unavailable	Register a gap and define corrective action
Submitted	Evidence has been registered by its owner	Queue the evidence for verification
Under verification	An authorised verifier is reviewing the evidence	Await the verification decision and rationale
Revision required	Evidence is incomplete, irrelevant, inconsistent, or invalid	Return the evidence to its owner with revision notes
Verified	Evidence has been accepted for the relevant requirement and period	Include it in the internal readiness calculation
Expired	The evidence is no longer valid for the applicable reporting period	Request replacement or renewal
Not applicable	The requirement does not apply and an authorised justification is recorded	Exclude it only after approval of the justification

The architecture was also evaluated against the eight critical risks and corresponding controls presented in Table 6. These controls address instrument obsolescence, mapping errors, aggregation opacity, data duplication, notification overload, privacy breaches, ownership discontinuity, and excessive reliance on automation. Collectively, they preserve the reliability, accountability, and interpretability of readiness information. This is important because greater information volume and automation do not automatically improve judgement [19]. Although emerging AI applications may support quality assurance, governance and human accountability must remain explicit [27]. The proposed system therefore assists internal preparedness; it neither replaces authorised assessors nor predicts the final accreditation outcome.

Table 6 Critical system risks and proposed controls

Risk	Potential Consequence	Proposed Control
Outdated accreditation instruments	Evidence is prepared against obsolete requirements	Versioned instrument packs with effective dates and controlled activation
Incorrect indicator–evidence mappings	Irrelevant evidence is accepted as adequate	Expert-approved mappings, guidance notes, and recorded verifier rationale
Opaque readiness aggregation	Users cannot explain how a readiness status was produced	Mandatory evidence gates and drill-down from summaries to source evidence
Duplicate data entry	Additional workload and inconsistent records	References or synchronisation with authoritative institutional systems
Notification overload	Important exceptions are overlooked	Prioritised, role-based, and configurable alerts
Privacy and access breaches	Confidential institutional evidence is exposed	Least-privilege access, role-based permissions, and audit logs
Orphaned evidence after staff	Evidence loses ownership and	Role-based reassignment,

Risk	Potential Consequence	Proposed Control
rotation	is not maintained	stewardship records, and ownership history
Over-reliance on automated recommendations	Incorrect recommendations influence readiness decisions	Human verification, explainable recommendations, and documented approval authority

4.5 Value, Cross-Domain Alignment, and Novelty

The central value proposition is a continuous accreditation-readiness workbench in which every readiness judgement is traceable to the applicable requirement, verified evidence, accountable ownership, identified gap, and monitored corrective action. Program leaders gain defensible priorities; accreditation teams reduce searching and reconciliation; evidence owners receive explicit requirements and deadlines; quality units obtain comparable oversight; and institutions preserve knowledge that would otherwise remain with particular individuals.

Value is generated through three coupled mechanisms. Semantic traceability connects an indicator to the meaning and adequacy of its evidence. Governance traceability connects evidence to ownership, validity, verification, and time. Improvement traceability connects a deficiency to prioritised corrective action and closure. The mechanisms are interdependent. Semantic mapping without governance produces unreliable evidence; governance without improvement produces controlled documentation but no quality change; and action without semantic grounding may solve the wrong problem. This explains why the proposed value is stronger than “all documents in one place.” Evidence becomes useful when it is interpretable and connected to decision and action [29].

Table 7 Cross-domain alignment of the Innovation Canvas

Explore finding	Ideate response	Market requirement	Design realisation	Value
Evidence is difficult to locate	Indicator-linked retrieval	Evidence stewardship	Registry and traceability engine	Less search and reconciliation
Evidence relevance is ambiguous	Mapping and verification	QA governance	Guidance and verifier rationale	Defensible evidence fit
Responsibility is unclear	Owner, deadline, escalation	Governed co-ownership	Role-based work queues	Accountability and continuity
Evidence becomes outdated	Validity and replacement rules	Routine owner review	Health status and alerts	Fewer obsolete submissions
Gaps are detected late	Continuous exception monitoring	Periodic readiness review	Gap and action registers	Earlier intervention
Compilation is repetitive	Reusable evidence objects	Integration resources	Source links and reporting	Lower rework and retained knowledge

Compared with previous work, the novelty lies in integration rather than an isolated feature. Accreditation workflow systems primarily facilitate multi-user processing [10]; repositories improve classification and retrieval [11]; LMS-based approaches reuse educational data [14]; and dashboards improve visibility of quality indicators [12], [13]. The present concept combines these capabilities but

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changes the unit of management from a file to a governed evidence object and extends the information path through verification, accountability, gaps, and action.

Four contributions result. First, the Market domain of the Innovation Canvas is adapted into an institutional adoption and sustainability model. Second, the traceable evidence object connects accreditation semantics with documentary and organisational governance. Third, mandatory-gated readiness provides an explainable internal status without claiming equivalence to an official score. Fourth, the gap-to-action chain integrates accreditation preparation with continuous quality improvement. Together, these contributions answer RQ1 by identifying broken evidence relationships as the core problem, RQ2 by aligning requirements across all five canvas domains, and RQ3 by establishing an evidence-to-action architecture that extends beyond repositories, workflow automation, and dashboards.

The result is a sufficiently specific blueprint for prototyping while remaining appropriately bounded as a conceptual study. Subsequent research should validate stakeholder priorities, instantiate the architecture, and evaluate task performance, usability, cognitive workload, governance fit, and realised institutional value. Such evaluation is necessary before claims of efficiency or effectiveness can be made.

5 Conclusion

This study proposes a conceptual design for an evidence-traceable accreditation-readiness system for engineering programmes under the LAMTEK framework. Using the five domains of the Innovation Canvas, the study transforms fragmented accreditation activities into an integrated evidence-to-action chain linking requirements, governed evidence, accountable owners, verification decisions, readiness gaps, corrective actions, and monitoring records. The design combines semantic, governance, and improvement traceability, enabling accreditation readiness to be assessed transparently rather than merely through document completeness or aggregate scores. The study makes two main conceptual contributions. First, it shifts the unit of accreditation management from files to governed and traceable evidence objects. Second, it adapts the Market domain of the Innovation Canvas from commercial exchange into a model of institutional adoption and sustainability encompassing governance, stewardship, integration, training, maintenance, and organisational continuity. This adaptation demonstrates that the viability of a university information system depends not only on technical design but also on the institutional arrangements required to embed it in routine quality-assurance practices. As a scenario-based conceptual study, this research does not evaluate a functional prototype or claim improvements in usability, task performance, or accreditation outcomes. Future studies should validate the requirements with actual stakeholders, develop the proposed prototype, and evaluate its usability, cognitive workload, adoption readiness, governance fit, and effectiveness in supporting accreditation preparation. By connecting accreditation evidence with accountable and continuous improvement, the proposed design provides a foundation for higher-education digital transformation that strengthens institutional quality culture rather than merely digitising periodic compliance.

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