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# Institutional Barriers and Strategic Enablers: A Knowledge Management Scale Development Study in Indonesian Higher Education

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**Abstract**

Knowledge management (KM) is increasingly important for Indonesian universities, which face rapid technological change and heightened demands for transparency, quality, and competitiveness. This study developed and validated a measurement instrument to identify key barriers and enablers of KM implementation in Indonesian higher education. A 22-item scale was developed for the local context and organized into six aspects: trust in individuals, trust in management, reward system, organizational process, IT, and technical support. The scale was produced in two versions: one for lecturers/education staff and one for students. Content validity was evaluated using the Content Validity Ratio (CVR) and the Content Validity Index (CVI) with expert panels (eight raters), followed by a pilot administration to 60 respondents (30 lecturers/staff and 30 students). The scale demonstrated strong content validity (mean I-CVI 0.87–0.91), acceptable item discrimination (lecturer/staff: 0.471–0.834; student: 0.250–0.785), and high internal consistency (Cronbach's alpha: 0.952 for lecturer/staff; 0.923 for students). These results indicate that the instrument is robust for diagnosing KM enablers and barriers in Indonesian universities and can support targeted policies and interventions. Future studies should expand validation across diverse institutions nationwide.



## 1. Introduction

Knowledge is a strategic asset for universities, which simultaneously create, curate, and disseminate knowledge through teaching, research, and community service [1]. Yet much of the know-how that sustains academic and administrative work, such as effective teaching practices, research administration routines, and student-service solutions, often remains tacit and fragmented across individuals and units, limiting institutional learning and innovation [2]. Indonesian higher-education institutions (HEIs) face additional pressure to transform their operating models amid digital disruption and intensifying competition, including the expansion of online education platforms and increasing expectations from digitally native students [3].

Policy reforms such as the Merdeka Belajar-Kampus Merdeka (MBKM) program have also increased cross-unit collaboration and external partnerships, thereby heightening the need for the systematic capture, transfer, and reuse of institutional knowledge.

Knowledge management (KM) refers to the systematic creation, validation, organization, sharing, and application of knowledge to support organizational goals and performance [4, 5]. For HEIs, the practical challenge is not whether knowledge exists, but whether it can be reliably captured, accessed, reused, and translated into better decisions and services across diverse functions. In this study, "KM enablers" are defined as internal socio-technical conditions that facilitate the KM cycle (creation, sharing, storage, and application), whereas "KM barriers" are the absence, weakness, or dysfunction of the same conditions that increase friction, perceived risk, and the likelihood of knowledge loss or non-use. Because enablers and barriers are largely latent, valid measurement is necessary to diagnose readiness, identify bottlenecks, and prioritize targeted interventions, rather than treating KM as a purely technological project.

Although KM has been widely studied in corporate settings, research on KM in higher education remains comparatively limited and fragmented [6, 7]. Reviews highlight persistent ambiguity about what "knowledge" is being managed in universities and how KM should be operationalized across university functions, resulting in uneven constructs, inconsistent measures, and limited cumulative evidence [7, 8]. Moreover, much of the empirical work treats universities as relatively homogeneous communities of academics, overlooking the heterogeneous actors who co-produce and use knowledge in day-to-day university life, namely teaching staff, educational staff, and students, who operate under different norms, incentives, and capabilities [9]. Recent evidence on academic knowledge sharing similarly describes a loosely focused and fragmented literature, reinforcing the need for instruments that are conceptually clear and comparable across studies [10].

These gaps matter for measurement and explain why a context-adapted instrument is needed. Existing KM assessments are often framed as maturity or capability diagnostics and were largely developed for corporate settings; they tend to emphasize organization-level KM processes without adequately capturing university-specific governance, incentive systems, and multi-actor knowledge flows that shape day-to-day knowledge work. In Indonesia's public HEIs, centralized management structures and inflexible funding mechanisms can constrain the design of performance-related incentives and recognition, potentially weakening knowledge-sharing and documentation behaviors [7]. More broadly, studies of remuneration and performance in Indonesian state universities report mixed results, suggesting that perceived incentive alignment cannot be assumed and should be measured rather than treated as a contextual constant [11, 12]. Consequently, applying generic instruments without context adaptation and psychometric testing risks misdiagnosing KM readiness and obscuring the specific barriers and enablers that matter in Indonesian HEIs.

The instrument in this study is grounded in a socio-technical view of KM systems, which conceptualizes KM effectiveness as a function of alignment among people, processes, and technology. This perspective is consistent with knowledge management system requirements that emphasize leadership and culture (people), operational integration (process), and enabling infrastructure (technology) as mutually reinforcing components (International Organization for Standardization. Accordingly, we operationalize KM enablers and barriers across six dimensions mapped to three components: people (trust in individuals; trust in management, as a proxy for leadership support and institutional trust), process (reward system; organizational processes), and technology (IT infrastructure; technical support). Each dimension can function as an enabler when it reduces friction and risk in the KM cycle, or as a barrier when it is weak, inconsistent, or perceived as unfair.

Trust constitutes a central people-related antecedent of knowledge sharing because it reduces perceived interpersonal risk and increases individuals' willingness to exchange both tacit and practice-based knowledge. In HEIs, trust is multi-layered: horizontal trust among colleagues supports open exchange, while vertical trust toward leaders/management shapes perceived fairness, psychological safety, and the expected consequences of speaking up or sharing knowledge [13]. Recent evidence indicates that knowledge sharing among academics remains fragmented and inconsistently measured, underscoring the need for instruments that clearly specify people-related antecedents such as trust [10]. The documented dark side of knowledge behavior also justifies a focus on trust. In low-trust climates, individuals may actively hide or delay sharing useful knowledge, which undermines collective learning [14]. Meta-analytic evidence further shows that leadership and HR-related conditions systematically relate to knowledge hiding and its consequences, supporting the separation of trust in individuals and trust in management as distinct targets of trust that may affect KM behaviors differently in universities [15].

Effective KM in universities depends on process-level alignment mechanisms that shape how daily tasks are routinized and how institutions signal priorities through evaluation and incentives. Many HE-KM studies discuss culture or structure in broad terms. Still, such generalization can obscure the concrete process mechanisms that make KM repeatable, such as SOPs, documentation and archiving routines, clear decision rights, and regular coordination forums; without these, KM remains tacit, fragmented, and dependent on individual champions rather than institutional routines [8]. Recent HE studies and reviews emphasize that KM becomes scalable when knowledge activities are embedded into workflows and governance rather than treated as ad hoc projects [16]. Reward systems are a complementary mis/alignment lever because academics and administrative staff tend to prioritize what is formally evaluated and recognized. Empirical evidence links performance-system practices to knowledge sharing in HEIs, while broader reward-system research shows that incentives shape behavior but with context-dependent effects [17]. In Indonesian public universities, the flexibility of incentives can be constrained by governance and budgeting arrangements, and evidence on remuneration effects is mixed [11, 12]. These inconsistencies strengthen the case for measuring organizational process and reward system as separate but complementary process-level dimensions when diagnosing KM barriers and enablers.

Technology plays a necessary but insufficient role in enabling KM, as infrastructure and support must jointly facilitate meaningful use. IT infrastructure enables the storage, search, retrieval, and distribution of knowledge repositories, but technical support determines whether users can adopt tools, troubleshoot issues, and integrate systems into their daily routines. HEIs frequently equate KM with platform adoption, yet evidence shows that infrastructure alone does not ensure sustained knowledge capture, retention, or reuse; success depends on embedding technology into routines and building user capability [16]. Recent evidence in HE indicates that KM technologies may support KM processes without guaranteeing performance gains when complementary conditions are weak [18]. Systematic reviews of educational technology and ICT-supported KM likewise identify facilitating conditions, such as training, user support, and institutional readiness, as decisive for effective use, while barriers such as resistance and inadequate support lead to uneven adoption and underutilization [19, 20]. Studies of LMS/KMS use also show that widespread availability does not imply meaningful use, reinforcing the importance of technical support and guidance for routinized practice across staff and students [13].

Taken together, the literature supports a socio-technical people-process-technology framework but also reveals persistent measurement gaps in higher education: fragmented evidence, limited multi-actor coverage, and insufficiently operationalized diagnostics that distinguish barriers from enablers. The theoretical contribution of this study is therefore not the invention of new constructs. Still, a measurement refinement that (a) defines enablers and barriers as diagnosable socio-technical conditions, (b) maps these conditions to a coherent people-process-technology framework, and (c) adapts measurement to the Indonesian HE context and its heterogeneous actors. This approach extends prior KM measurement efforts by providing actionable to guide implementation decisions rather than only describing KM activities or outcomes.

Accordingly, this study aims to develop and psychometrically validate a Knowledge Management Enablers and Barriers Scale for Indonesian higher education. Drawing on KM enabler/barrier research and the socio-technical KM system perspective, an initial item pool was adapted to the context and refined through expert review to produce a 22-item instrument across six dimensions: trust in individuals, trust in management, reward system, organizational process, IT infrastructure, and technical support. The scale is implemented in two versions to reflect different actor roles (teaching/educational staff and students). Establishing the validity and reliability of this scale provides a practical tool for diagnosing KM readiness, identifying intervention priorities, and supporting evidence-based KM implementation in Indonesian HEIs.

## 2. Materials and Methods

### *2.1. Study Design and Setting*

This study used an instrument-development and early-stage psychometric-evaluation design to develop and preliminarily assess a KM enablers-and-barriers instrument for Indonesian higher education. Data collection was conducted in two sequential phases: (i) judging to establish content relevance and clarity, and (ii) a pilot administration to assess feasibility, item discrimination, and internal consistency reliability. All procedures were implemented via online questionnaires in Google Forms, accessible on smartphones or computers with internet access. The study was conducted at Universitas Syiah Kuala (USK) Aceh, Indonesia.

*2.2. Research Stages*

This study followed widely accepted best-practice guidelines for scale development, progressing systematically from construct and domain specification to item generation, content validation, and pilot testing, before more extensive construct validation in larger samples. This staged approach is consistent with recommendations in the scale-development literature [21–23]. Accordingly, the present manuscript reports early-stage evidence focusing on content validity and internal consistency reliability and explicitly documents the decision rules applied at each stage of development.

The first stage involved defining the constructs and mapping the content domain. KM enablers and barriers were conceptualized as internal conditions within higher-education institutions that facilitate (enablers) or hinder (barriers) the creation, sharing, retention, and reuse of knowledge. Drawing on the widely used people–process–technology framework in KM implementation research, the domain was organized into six dimensions across three levels: People (trust in individuals; trust in management), Process/Organization (reward system; organizational process), and Technology (information technology; technical support). Clear working definitions were developed for each dimension to guide item writing and to support expert judgment during content validation.

In the second stage, an initial pool of items was generated and refined. Item development followed established scale-construction principles, beginning with a careful definition of each dimension to ensure adequate content coverage. Candidate items were written as concise, single-idea statements, avoiding double-barreled phrasing, vague wording, and unnecessary complexity. Overlapping or redundant items were removed, and wording was refined for clarity and relevance. This process resulted in a preliminary pool of 22 items distributed across the six dimensions: trust in individuals (3 items), trust in management (4 items), reward system (4 items), organizational process (4 items), information technology (3 items), and technical support (4 items). For the content-validity assessment, items were formatted using a 5-point suitability Likert scale (1 = very not suitable, 2 = not suitable, 3 = moderately suitable, 4 = suitable, 5 = very suitable), in line with recommendations for early instrument evaluation [21, 22].

The third stage addressed contextual adaptation through questionnaire versioning. Recognizing that KM practices and experiences vary across university actors, two versions of the questionnaire were developed while maintaining identical construct definitions and item intent. Version 1 was designed for lecturers and educational staff, whereas version 2 targeted students. Versioning was implemented by adjusting item referents to ensure contextual relevance for each respondent group without altering the underlying dimensions or the items' conceptual meaning. This approach is consistent with prior methodological guidance and empirical studies on contextual adaptation in educational and psychological measurement [24–27].

*2.3. Content Validity Assessment*

Content validity was assessed to ensure that items were relevant to their intended dimension and clearly worded for the Indonesian higher-education context. Judging panels were used, consistent with guidance that combines expert appraisal with target-population feedback to strengthen evidence of relevance and comprehensibility [21].

The panel (subject matter experts) comprised eight judges with expertise in knowledge management and higher-education governance. This panel included six academics (lecturers and KM-related researchers) and two higher-education practitioners or policymakers. Experts were purposively selected based on three criteria: (i) at least 10 years of university teaching experience, (ii) demonstrated involvement in KM-related research and/or initiatives, and (iii) governance experience, such as serving as policymakers or decision-makers in government agencies. These individuals also remained actively engaged with the university sector. Judges received written definitions of the six dimensions, the relevant item set, and a standardized rating form. They rated each item's relevance using a 4-point scale (1 = irrelevant, 2 = slightly relevant, 3 = relevant, 4 = very relevant) and provided comments. The research team compiled all ratings and suggestions and revised items until the set reached acceptable relevance and clarity.

Judging protocol. Each judge received: (a) written definitions for the six dimensions, (b) the full item set of the relevant version, and (c) a standardized rating form. Judges rated each item for relevance using a 4-point scale (1 = irrelevant, 2 = slightly relevant, 3 = relevant, 4 = very relevant) and provided qualitative comments (e.g., unclear terms, ambiguity, missing content, or contextual mismatch). The research team compiled all quantitative ratings and qualitative suggestions and revised items iteratively until the set achieved acceptable relevance and clarity.

*2.4. Content Validity Ratio (CVR)*

To compute CVR, the team treated relevance ratings of 3–4 as “essential” and ratings of 1–2 as “not essential.” They

calculated item-level CVR using Lawshe's formula, as shown in Equation 1:

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

where $n_e$ is the number of judges indicating the item is essential, and $N$ is the number of judges [28]. For $N$ = 8, the team retained items when CVR met or exceeded the Lawshe critical value for eight judges; they revised or removed items below the threshold based on judge comments and the need to preserve adequate content coverage for the dimension.

Judges rated each item as 3 (relevant) or 4 (highly relevant), and we computed the item-level content validity index (I-CVI) as the proportion of judges assigning these ratings. We summarized the scale-level content validity index (S-CVI/Ave) as the mean of I-CVI values across all items, following a commonly reported approach for assessing overall content relevance. Items with borderline I-CVI values were revised to better align with their intended definitions and enhance clarity, guided by qualitative feedback from judges.

*2.5. Pilot Administration*

After the content validity stage, the revised instrument was pilot-tested to evaluate feasibility and get initial response-process evidence. This tested whether respondents interpreted the items as intended and responded without difficulty. The pilot was conducted using Google Forms and included 60 respondents from USK. Thirty lecturers/educational staff completed version 1; thirty students completed version 2. Participants were recruited purposively from multiple organizational units or faculties to ensure item clarity across diverse roles and academic backgrounds.

Pilot protocol. Participants received an invitation with a brief study explanation, electronic consent, and the survey link. Participation was voluntary and anonymous, and respondents could discontinue at any time. The online form required answers to all items to minimize missing data. At the end, respondents could optionally provide open-ended feedback on unclear, ambiguous, or inapplicable items.

*2.6. Item Analysis and Internal Consistency Reliability*

We analysed the pilot data separately for versions 1 and 2. We assessed item discrimination using corrected item–total correlations, which are the correlations between an item and the total score excluding that item. We used a corrected item–total correlation of 0.30 or higher as a practical benchmark for early-stage scale development. We flagged items below this benchmark for revision and prioritized them for rewording or retesting in later studies [27]. We estimated internal consistency reliability using Cronbach's alpha for each dimension and for the overall scale in each version. For early-stage research, we considered alpha values of 0.70 or higher acceptable for preliminary reliability. Data exported from Google Forms were cleaned and analyzed using spreadsheet or statistical procedures. Analyses computed CVR, CVI, corrected item–total correlations, and Cronbach's alpha.

*2.7. Scoring and Interpretation*

Items are scored on a scale of 1 to 5. Dimension scores are computed as the mean of items within each dimension, and a total score can be computed as the mean of all items in the corresponding version. Higher scores indicate a stronger perceived presence of KM-enabling conditions; lower scores indicate weaker enabling conditions that may act as barriers. Because this study reports early-stage evidence (content validity and internal consistency), additional psychometric evaluation, such as factor analysis to confirm the dimensional structure and tests of convergent/divergent and criterion validity, is considered a subsequent validation phase.

## 3. Results and Discussion

This study developed a KM Enablers and Barriers Scale to diagnose internal conditions that help or block KM in Indonesian higher education. The instrument has 22 items in six dimensions: trust in individuals, trust in management, reward system, organizational process, IT, and technical support. These follow a people–process–technology logic. This structure aligns with KM evidence in higher education, which shows that KM success depends on human factors, organizational processes, and technology [8, 29]. Recent reviews also show that knowledge-sharing research in higher education is fragmented and needs clearer measurement [10].

*3.1. Validity Test*

Content validity was examined to provide initial evidence that the scale items adequately represent the intended Knowledge Management (KM) enabler–barrier domains. Content validity is particularly important in the early stages of scale development because it assesses item relevance before more advanced psychometric testing. However, consistent with best practices, content validity is treated in this study as preliminary evidence of validity, not as proof of construct or external validity [21, 22].

The assessment was conducted using the Content Validity Ratio (CVR) and the Content Validity Index (CVI).

**Table 1.** CVR value of research scale items.

| Research Instruments | Raters | Mean I-CVI | Conclusion |
|---|---|---|---|
| Supporting and inhibiting factors for the implementation of knowledge management version 1—teaching staff and education personnel | 8 | 0.87 | Accepted |
| Supporting and inhibiting factors for the implementation of knowledge management version 2—student | 8 | 0.91 | Accepted |

**Table 2.** Reliability value of the knowledge management enablers and barriers scale.

| Research Instruments | Reliability | Conclusion |
|---|---|---|
| Knowledge management enablers and barriers scale version 1—teaching staff and education personnel | 0.952 | Reliable |
| Knowledge management enablers and barriers scale version 2— student | 0.923 | Reliable |

Eight subject-matter experts evaluated item relevance, and Lawshe's minimum CVR criterion for eight raters (CVR ≥ 0.75) was applied [28]. As shown in Table 1, both versions of the instrument met this criterion. The mean item-level CVI (I-CVI) was 0.87 for Version 1 (Teaching Staff and Educational Personnel) and 0.91 for Version 2 (Students). These values indicate strong expert agreement that the items are relevant representations of the proposed KM dimensions.

Overall, the results in Table 1 support aligning item content with the conceptual domains of trust, organizational processes, rewards, and technological support. At the same time, these findings are interpreted conservatively, recognizing that content validity alone does not confirm dimensional structure or predictive utility.

*3.2. Reliability Test*

Internal consistency reliability was assessed using Cronbach's alpha to evaluate the degree to which items within each version of the scale function coherently. As reported in Table 2, both versions demonstrated high reliability, with alpha coefficients of 0.952 for Version 1 and 0.923 for Version 2. These values exceed commonly accepted thresholds for research instruments, indicating strong internal consistency within each respondent group.

The results in Table 2 suggest that the items within each version consistently measure related aspects of KM enablers and barriers. Nevertheless, reliable evidence does not substitute for construct validity. High internal consistency may coexist with multidimensionality or measurement bias and therefore must be interpreted in conjunction with other forms of validity evidence [21, 22].

*3.3. Item Analysis*

Item discrimination analysis was conducted to examine how effectively individual items differentiate respondents based on their perceptions of KM conditions. The results, summarized in Table 3, reveal notable differences between the two versions of the instrument.

For Version 1 (Teaching Staff and Educational Personnel), all dimensions demonstrated acceptable to strong discrimination values, ranging from 0.471 to 0.834. As shown in Table 3, the strongest discrimination appeared in the organizational process, trust in management, and technical support dimensions. These results indicate that staff respondents clearly distinguished among varying levels of KM-enabling and inhibiting conditions across organizational and technological domains.

In contrast, Version 2 (Students) showed more variable discrimination values (0.250–0.785), as reported in Table 3. IT and technical support items consistently showed strong discrimination. In contrast, several items within the trust in individuals and reward system dimensions showed weaker performance, with at least one item falling below commonly recommended cutoffs.

This contrast between versions suggests that identical conceptual domains do not function in the same way across stakeholder groups. While experts judged the student items to be conceptually relevant (as reflected in the high CVI values in Table 1), student responses showed less variability for abstract organizational constructs. This discrepancy illustrates why content validity and item discrimination address different aspects of measurement quality and why both are necessary in staged scale development. Items that show low discrimination in Table 3 should therefore be prioritized for revision and retesting rather than treated as finalized indicators.

*3.4. Discussion*

The Knowledge Management Enablers and Barriers Scale developed in this study contributes to higher education KM research by providing a context-sensitive diagnostic instrument tailored to Indonesian universities. Rather

**Table 3.** Results of item analysis.

| Research Instruments | Aspect | Number of Items | Item Discrimination Value |
|---|---|---|---|
| Supporting and inhibiting factors for the implementation of knowledge management version 1—teaching staff and education personnel | Trust in Individual | 3 | 0.478-0.625 |
| | Trust in Management | 4 | 0.471-0.796 |
| | Reward System | 4 | 0.597-0.677 |
| | Organizational Process | 4 | 0.497-0.834 |
| | IT | 3 | 0.609-0.712 |
| | Technical Support | 4 | 0.742-0.807 |
| Supporting and inhibiting factors for the implementation of knowledge management version 2—student | Trust in Individual | 3 | 0.250-0.628 |
| | Trust in Management | 4 | 0.483-0.617 |
| | Reward System | 4 | 0.374-0.614 |
| | Organizational Process | 4 | 0.434-0.669 |
| | IT | 3 | 0.693-0.785 |
| | Technical Support | 4 | 0.560-0.742 |

than introducing new KM constructs, the scale operationalizes well-established KM enablers and barriers within a people–process–technology framework. It distinguishes between key stakeholder groups through two respondent versions. This approach responds to ongoing calls in the higher education KM literature to clarify and standardize the measurement of conditions that support knowledge creation, sharing, and transfer [29, 30], while addressing concerns about fragmented measurement practices and the underrepresentation of technological dimensions [10].

The findings highlight meaningful differences in how KM conditions are perceived by teaching staff, educational personnel, and students. Items in Version 1 demonstrated consistently strong discrimination, particularly for organizational processes and trust in management, suggesting that staff respondents can clearly distinguish between enabling and inhibiting KM conditions. In contrast, Version 2 showed more variable item performance, with stronger discrimination for IT and technical support items and weaker discrimination for several trust-related items. This pattern suggests that students' perceptions of KM are shaped primarily by direct, experiential factors, such as access to and support for digital platforms. In contrast, more abstract organizational or governance-related constructs may be less salient or more uniformly perceived.

The coexistence of high content-validity ratings and weaker item discrimination, especially in the student version, underscores the importance of staged instrument development. Items may be judged conceptually relevant by experts yet still fail to elicit sufficient variability in responses during pilot testing. This finding reinforces methodological guidance that content validity and reliability should be interpreted as preliminary evidence rather than as confirmation of full construct validity [21, 22]. From a substantive perspective, the results suggest that KM initiatives in higher education may be more visible to students through technological infrastructure and support services than through institutional trust or governance mechanisms.

## 4. Conclusions

This study set out to address a practical and scholarly gap identified in the Introduction. KM enablers and barriers are widely discussed in the literature. However, few context-adapted measurement tools can diagnose KM conditions in Indonesian higher education while accommodating the diverse university actors. We adapted a 22-item instrument to the Indonesian university context. We defined KM enablers and barriers as internal conditions that can help or hinder KM behaviors, especially knowledge sharing, capture, retention, and reuse across the people, process, and technology domains. Two versions of the scale were produced (for teaching staff/educational personnel and for students) to reflect differences in roles, experience, and exposure to KM practices within universities.

The results provide initial psychometric evidence for the adapted instrument. The content validity assessment (CVR/CVI) shows that the items generally represent the intended enabler/barrier domains. Internal consistency estimates indicate acceptable reliability for a preliminary screening tool. However, these findings offer only preliminary evidence of content validity and reliability, not comprehensive validation. Several items, especially in the student version, showed weaker discrimination indices. This suggests that some indicators may need refinement before use in comparative research or high-stakes evaluation.

Several methodological limitations constrain the strength of the validity claims and inform next steps in research. First, the pilot involved a relatively small sample (n = 60) from a single institution, which limits generalizability and the stability of item statistics. Second, we did not test construct validity (e.g., EFA/CFA) or establish criterion or

convergent/divergent validity. Thus, the scale's dimensional structure and external validity remain unconfirmed.

Future research should strengthen the instrument's psychometric foundation before scaling data collection nationally. Key priorities include: (1) revising and cognitively pretesting the low-performing items, and retesting with a larger sample; (2) conducting factor analyses to verify the people, process, and technology dimensional structure and to evaluate model fit; (3) establishing convergent, divergent, and criterion validity by examining relationships with existing KM measures and relevant outcomes (such as knowledge sharing behaviors, repository usage, or performance indicators); (4) testing measurement invariance across both versions and key subgroups to ensure comparability; and (5) adding reliability evidence beyond internal consistency, such as test–retest reliability. These steps will help the instrument progress from an initial diagnostic tool to a robust measure capable of evaluating KM enablers and barriers. They will also inform targeted interventions across Indonesian higher education institutions.

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